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AVATAR
ENVIRONMENTAL

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This Remedial Investigation/Feasibility Study (RI/FS) was prepared by Avatar Environmental, LLC (Avatar) and Nobis Engineering, Inc. (Nobis) in accordance with Avatar's contract with the U.S. Army Corps of Engineers (USACE), North Atlantic Division, New England District (CENAE) Hazardous Toxic Radioactive Waste (HTRW) (Contract No. W912WJ-11-D-0002, Delivery Order 0002).

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Table of Contents

EXECUTIVE SUMMARY

1. INTRODUCTION 1-1
  1.1 PURPOSE OF REPORT 1-1
  1.2 SITE BACKGROUND 1-2
    1.2.1 Site Description 1-2
    1.2.2 Site History 1-5
    1.2.3 Previous Investigations 1-6
      1.2.3.1 Summary of Pre-1996 Investigations 1-7
      1.2.3.2 Site Closure Activities 1-8
      1.2.3.3 1996 Groundwater Investigation 1-8
      1.2.3.4 1998 Maine Department of Environmental Protection Geophysical Investigation 1-8
      1.2.3.5 Expanded Water Supply Monitoring 1-9
      1.2.3.6 1998 Site Inspection 1-9
      1.2.3.7 1999 Preliminary Site Investigation 1-10
      1.2.3.8 2001 Supplemental Site Investigation 1-12
      1.2.3.9 Long-Term Monitoring Program (LTMP) 1-14
      1.2.3.10 2008 Geophysical/Hydrophysical Investigation 1-15
      1.2.3.11 2008 Through 2012 Groundwater Long-Term Monitoring Program 1-17
      1.2.3.12 Investigation Reports 1-17

2. SITE CHARACTERISTICS 2-1
  2.1 GENERAL SITE CHARACTERISTICS AND OWNERSHIP HISTORY 2-1
  2.2 SITE UTILITIES 2-1
  2.3 SURFACE FEATURES 2-2
  2.4 METEOROLOGY 2-3
  2.5 SURFACE WATER HYDROLOGY 2-3
    2.5.1 Regional Watershed 2-4
    2.5.2 Floodplain 2-4
  2.6 GEOLOGY 2-5
    2.6.1 Topography 2-5
    2.6.2 Soil and Overburden Geology 2-5
      2.6.2.1 Soil Description 2-5
      2.6.2.2 Overburden Geology 2-5
      2.6.2.3 Bedrock Geology 2-6
      2.6.2.4 Lithology 2-6
      2.6.2.5 Bedrock Fabric 2-7
  2.7 HYDROGEOLOGY 2-9
    2.7.1 Overburden Hydrogeology 2-9
    2.7.2 Bedrock Hydrogeology 2-10
      2.7.2.1 Bedrock Groundwater Elevation 2-10

Table of Contents, Continued

2.7.2.2 Bedrock Groundwater Flow Velocity and Transmissivity 2-11
2.7.2.3 Bedrock Groundwater Horizontal Gradients 2-12
2.7.2.4 Bedrock Groundwater Vertical Gradients 2-14
2.8 DEMOGRAPHY AND LAND USE 2-15
2.9 ECOLOGY 2-16

3. NATURE AND EXTENT OF CONTAMINATION 3-1
3.1 REMEDIAL INVESTIGATIONS 3-1
3.2 BACKGROUND INVESTIGATIONS 3-2
3.2.1 Soil 3-3
3.2.2 Ambient Air 3-3
3.3 SOILS 3-4
3.3.1 VOCs in Soils 3-4
3.3.2 SVOCs in Soils 3-7
3.3.3 Metals in Soils 3-8
3.3.4 PCBs in Soils 3-8
3.3.5 Petroleum Hydrocarbons in Soils 3-8
3.4 GROUNDWATER 3-9
3.4.1 VOCs in Groundwater 3-9
3.4.1.1 VOCs in Drinking Water Wells 3-11
3.4.2 SVOCs in Groundwater 3-12
3.4.3 Metals in Groundwater 3-13
3.4.4 PCBs in Groundwater 3-15
3.4.5 Other Inorganic Substances in Groundwater 3-15
3.5 DRINKING WATER 3-15
3.6 SURFACE WATER 3-15
3.7 DRAINAGEWAY SOILS 3-16
3.7.1 VOCs in Drainageway Soils 3-17
3.7.2 SVOCs in Drainageway Soils 3-17
3.7.3 Metals in Drainageway Soils 3-18
3.7.4 PCBs in Drainageway Soils 3-18
3.8 AIR 3-19
3.8.1 Sub-Slab Soil Gas 3-20
3.8.2 Indoor Air 3-21
3.9 CONTAMINANT SOURCES 3-22
3.9.1 Petroleum Source Areas 3-23
3.9.2 Chlorinated Solvent Source Areas 3-24
3.9.2.1 CVOCs in Soils 3-24
3.9.2.2 CVOCs in Soil Vapor and Indoor Air 3-25
3.9.2.3 CVOCs in Groundwater 3-28

4. CONTAMINANT FATE AND TRANSPORT 4-1
4.1 CONTAMINANT CHARACTERISTICS 4-2

Table of Contents, Continued

4.1.1 Chemical Properties and Partitioning 4-3
4.1.1.1 CVOC/Volatile Petroleum Hydrocarbon Partitioning 4-5
4.1.2 Metals Mobility and Partitioning 4-5
4.1.3 Degradation 4-7
4.2 POTENTIAL ROUTES OF MIGRATION 4-10
4.2.1 Soil Migration Routes 4-10
4.2.2 Groundwater Migration Routes 4-10
4.2.3 Surface Water/Sediment Migration Routes 4-11
4.2.4 Air Migration Routes and Transport Pathways 4-11
4.3 CONTAMINANT MIGRATION 4-11
4.3.1 Contaminant Migration in Soil 4-12
4.3.2 Contaminant Migration in Groundwater 4-12
4.3.3 Contaminant Migration in Sediment/Surface Water 4-14
4.3.4 Contaminant Migration in Soil Gas and Indoor Air 4-14

5. HUMAN HEALTH RISK ASSESSMENT 5-1
5.1 DATA EVALUATION 5-2
5.1.1 Media of Concern 5-2
5.1.1.1 Soil 5-3
5.1.1.2 Groundwater 5-3
5.1.1.3 Indoor Air 5-3
5.1.2 Guidelines for Data Reduction 5-3
5.1.3 Selection of Contaminants of Potential Concern 5-5
5.1.3.1 Approach 5-5
5.1.3.2 Soil 5-6
5.1.3.3 Groundwater 5-8
5.1.3.4 Indoor Air 5-9
5.2 EXPOSURE ASSESSMENT 5-10
5.2.1 Exposure Setting 5-11
5.2.2 Conceptual Site Model for Human Exposures 5-11
5.2.3 Exposure Scenarios 5-13
5.2.3.1 Potentially Exposed Populations 5-13
5.2.4 Exposure Point Concentrations 5-15
5.2.5 EUs 5-16
5.2.6 Exposure Equations and Parameters 5-18
5.2.6.1 AMAC Staff 5-19
5.2.6.2 AMAC Client 5-20
5.2.6.3 Launcher Area Trespasser 5-21
5.2.6.4 Site Worker 5-22
5.2.6.5 Future Construction Worker 5-22
5.2.6.6 Future Commercial/Industrial Worker 5-23
5.2.6.7 Hypothetical Future Residents 5-23
5.3 TOXICITY ASSESSMENT 5-25

Table of Contents, Continued

5.3.1 Cancer Effects 5-25
5.3.2 Noncancer Effects 5-26
5.3.3 Sources of Toxicity Values 5-27
5.3.4 Dermal Exposure 5-27
5.4 RISK CHARACTERIZATION 5-28
5.4.1 Risk Characterization Estimates 5-28
5.4.1.1 Cancer Risk 5-28
5.4.1.2 Noncancer Health Effects 5-31
5.4.2 Risk Characterization Results 5-32
5.4.2.1 AMAC Staff 5-32
5.4.2.2 AMAC Client 5-33
5.4.2.3 Launcher Area Trespasser 5-34
5.4.2.4 Site Worker 5-34
5.4.2.5 Future Construction Worker 5-35
5.4.2.6 Future Commercial/Industrial Worker 5-35
5.4.2.7 Hypothetical Future Resident 5-36
5.4.2.8 Soil Background Comparisons 5-37
5.4.2.9 Cumulative Risks 5-38
5.5 UNCERTAINTY ANALYSIS 5-38
5.5.1 Data Evaluation 5-38
5.5.2 Exposure Assessment 5-42
5.5.3 Toxicity Assessment 5-42
5.5.4 Risk Characterization 5-44
5.6 RISK SUMMARY 5-45
5.6.1 Summary of Risks 5-45
5.6.1.1 AMAC Staff 5-45
5.6.1.2 AMAC Client 5-45
5.6.1.3 Launcher Area Trespasser 5-46
5.6.1.4 Site Worker 5-46
5.6.1.5 Future Construction Worker 5-46
5.6.1.6 Future Commercial/Industrial Worker 5-47
5.6.1.7 Hypothetical Future Resident 5-47
5.6.2 Risk Drivers 5-48
5.6.2.1 AMAC Staff 5-48
5.6.2.2 AMAC Client 5-48
5.6.2.3 Launcher Area Trespasser 5-49
5.6.2.4 Site Worker 5-49
5.6.2.5 Future Construction Worker 5-49
5.6.2.6 Future Commercial/Industrial Worker 5-49
5.6.2.7 Hypothetical Future Resident 5-50
5.7 HUMAN HEALTH RISK ASSESSMENT CONCLUSIONS 5-50

6. SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT (SLERA) 6-1

Table of Contents, Continued

6.1 SCREENING-LEVEL PROBLEM FORMULATION AND ECOLOGICAL EFFECTS EVALUATION (STEP 1) 6-3
  6.1.1 Ecological Setting 6-3
    6.1.1.1 Terrestrial Setting 6-3
  6.1.2 Preliminary Conceptual Site Model 6-7
    6.1.2.1 Potentially Exposed Populations 6-8
    6.1.2.2 Exposure Areas 6-8
  6.1.3 Preliminary Assessment and Measurement Endpoints 6-9
  6.1.4 Available Data 6-10
  6.1.5 Data Evaluation and Reduction 6-11
  6.1.6 Development of Screening-Level Benchmarks 6-11
6.2 SCREENING-LEVEL PRELIMINARY EXPOSURE ESTIMATES AND RISK CALCULATION (STEP 2) 6-14
  6.2.1 Level 1 Screening Methodology 6-15
  6.2.2 Level 2 Screening Methodology 6-15
    6.2.2.1 Exposure Evaluation 6-16
    6.2.2.2 Ecological Effects Evaluation 6-25
  6.2.3 Conclusions 6-48

7. REMEDIAL INVESTIGATION SUMMARY AND CONCLUSIONS 7-1

8. REMEDIAL ACTION OBJECTIVES (RAOS) 8-1
8.1 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) AND TO-BE-CONSIDERED (TBCS) 8-1
  8.1.1 Chemical-Specific ARARs 8-2
  8.1.2 Location-Specific ARARs 8-3
  8.1.3 Action-Specific ARARs 8-4
8.2 DEVELOPMENT OF RAOS 8-4
  8.2.1 Basis for Action 8-4
  8.2.2 Principal Threat Evaluation 8-7
  8.2.3 Identification of Media of Concern 8-8
  8.2.4 Identification of Remedial Action Objectives 8-8
8.3 CONTAMINANTS OF CONCERN (COCS) 8-9
  8.3.1 Potential COCs 8-9
  8.3.2 Selection of COCs 8-9
8.4 PRELIMINARY REMEDIATION GOALS (PRGS) 8-10

9. IDENTIFICATION AND SCREENING OF TECHNOLOGIES 9-1
9.1 ESTIMATED VOLUMES AND MASS OF CONTAMINATED MEDIA 9-1
9.2 IDENTIFICATION AND SCREENING OF TECHNOLOGIES 9-3
  9.2.1 Groundwater Remedial Technology Evaluation 9-4
  9.2.2 Soil Vapor and Indoor Air Remedial Technology Evaluation 9-6

Table of Contents, Continued

10. DEVELOPMENT OF REMEDIAL ACTION ALTERNATIVES 10-1
  10.1 RATIONALE FOR DEVELOPMENT OF REMEDIAL ACTION ALTERNATIVES 10-1
    10.1.1 Statutory, Regulatory, and Policy Considerations 10-1
    10.1.2 Protection of Human Health Considerations 10-1
    10.1.3 Protection of Environment Considerations 10-2
  10.2 ASSEMBLY OF ALTERNATIVES 10-2
    10.2.1 Groundwater Alternatives 10-2
      10.2.1.1 Alternative GW1: No Action 10-3
      10.2.1.2 Alternative GW2: Limited Action – Continued POE Treatment of DW-01, Institutional Controls, Long-Term Monitoring, and Five-Year Reviews 10-3
      10.2.1.3 GW3: Installation of New Drinking Water Supply Line, Institutional Controls, Long-term Monitoring, and Five-year Reviews 10-4
      10.2.1.4 GW4: In-Situ Treatment of Bedrock Groundwater, Installation of New Drinking Water Supply Line, Institutional Controls, Long-term Monitoring, and Five-year Reviews 10-5
      10.2.1.5 GW5: Groundwater Extraction, Treatment, and Discharge, Institutional Controls, Long-term Monitoring, and Five-year Reviews 10-6
    10.2.2 Vapor Intrusion Alternatives 10-7
      10.2.2.1 Alternative VI1: No Action 10-7
      10.2.2.2 Alternative VI2: Limited Action – Institutional Controls, Long-term Monitoring, and Five-year Reviews 10-7
      10.2.2.3 Alternative VI3: Active Subslab Vapor Mitigation, Institutional Controls, Long-term Monitoring, and Five-year Reviews 10-8
      10.2.2.4 Alternative VI4: Vapor Barrier Installation, Institutional Controls, Long-term Monitoring, and Five-year Reviews 10-9
  10.3 SCREENING OF ALTERNATIVES 10-9

11. DETAILED ANALYSIS OF ALTERNATIVES 11-1
  11.1 EVALUATION CRITERIA 11-1
  11.2 DETAILED ANALYSIS OF ALTERNATIVES 11-2
  11.3 COST ESTIMATION 11-3
  11.4 IDENTIFICATION OF ARARS 11-4

12. COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES 12-1
  12.1 COMPARATIVE ANALYSIS APPROACH 12-1
  12.2 COMPARATIVE ANALYSIS 12-1
    12.2.1 Overall Protection of Human Health and the Environment 12-1
      12.2.1.1 Groundwater Alternatives 12-1
      12.2.1.2 Vapor Intrusion Alternatives 12-2
    12.2.2 Compliance with ARARs 12-2
      12.2.2.1 Groundwater Alternatives 12-3
      12.2.2.2 Vapor Intrusion Alternatives 12-3

Table of Contents, Continued

12.2.3 Long-term Effectiveness and Permanence 12-3
  12.2.3.1 Groundwater Alternatives 12-3
  12.2.3.2 Vapor Intrusion Alternatives 12-4
12.2.4 Reduction of Toxicity, Mobility, or Volume Through Treatment 12-4
  12.2.4.1 Groundwater Alternatives 12-4
  12.2.4.2 Vapor Intrusion Alternatives 12-4
12.2.5 Short-term Effectiveness 12-5
  12.2.5.1 Groundwater Alternatives 12-5
  12.2.5.2 Vapor Intrusion Alternatives 12-6
12.2.6 Implementability 12-7
  12.2.6.1 Groundwater Alternatives 12-7
  12.2.6.2 Vapor Intrusion Alternatives 12-7
12.2.7 Cost 12-8

13. REFERENCES 13-1

LIST OF FIGURES

Figure 1-1 Site Locus Map
Figure 1-2 Site Plan
Figure 1-3 Historic Site Plan
Figure 1-4 Site Plan with Historic Sample Locations
Figure 2-1 Isopach Map of Overburden Thickness
Figure 2-2 Bedrock Topographical Elevation Contours
Figure 2-3 Stereonet Plot of Bedding Planes and Measured Joints
Figure 2-4 Bedrock Groundwater Elevation Map
Figure 3-1 2012 Soil, Groundwater, and Sediment Sampling Locations
Figure 3-2 2012 Air Sampling Results
Figure 3-3 Soil Sampling Results – Organic COPCs
Figure 3-4 Groundwater Exceedances of Screening Criteria
Figure 3-5 DW-01 TCE Concentrations
Figure 4-1 Fate and Transport Conceptual Site Model
Figure 5-1 Conceptual Site Model Human Health Risk Assessment
Figure 6-1 Generic Eight-Step Ecological Risk Assessment Process for Superfund
Figure 6-2 Orientation of Site to the Caribou Overpass
Figure 6-3 Conceptual Site Model Ecological Risk Assessment
Figure 10-1 GW-2 Site Plan
Figure 10-2 GW-3 Site Plan
Figure 10-3 GW-4 Site Plan
Figure 10-4 GW-5 Site Plan
Figure 10-5 VI-2 Site Plan
Figure 10-6 VI-3 Site Plan

Figure 10-7 VI-4 Site Plan

LIST OF TABLES

Table ES-1 Comparative Analysis of Alternatives Summary
Table 2-1 Monitoring Well Summary and Groundwater Elevation
Table 3-1 Soil Sampling Laboratory Results Summary – 2012 Sampling Event Summary
Table 3-2 Summary of Detected Analytical Data in Air
Table 3-3 Groundwater Sampling Laboratory Results – 2012 Sampling Event Summary
Table 3-4 Drinking Water Sampling Summary
Table 3-5 Summary of Detected Compounds in Swale Soils
Table 3-6 Summary of Attenuation Factors Between Indoor Air and Soil Vapor at AMAC Building
Table 3-7 Summary of Attenuation Factors Between Indoor Air and Groundwater at AMAC Building
Table 4-1 Selection of COCs for Groundwater
Table 4-2 Selection of COCs for Indoor Air
Table 4-3 COPC Characteristics
Table 5-1 Occurrence, Distribution, and Selection of Contaminants of Potential Concern – Surface Soil
Table 5-2 Occurrence, Distribution, and Selection of Contaminants of Potential Concern – Total Soil
Table 5-3 Comparison of Maximum Essential Nutrient Concentrations to Recommended Dietary Allowances/Adequate Intakes
Table 5-4 Surface Soil Background Comparisons
Table 5-5 Occurrence, Distribution, and Selection of Contaminants of Potential Concern – Groundwater
Table 5-6 Occurrence, Distribution, and Selection of Contaminants of Potential Concern – Indoor Air
Table 5-7 Exposure Point Concentration Summary – Surface Soil
Table 5-8 Exposure Point Concentration Summary – Total Soil
Table 5-9 Exposure Point Concentration Summary – Groundwater
Table 5-10 Exposure Point Concentration Summary – Indoor Air
Table 5-11 Values Used for Daily Intake Calculations – Current AMAC Worker – Soil Exposure
Table 5–12 Values Used for Daily Intake Calculations – Current AMAC Worker – Groundwater Exposure
Table 5–13 Values Used for Daily Intake Calculations – Current AMAC Worker – Indoor Air Exposure
Table 5–14 Values Used for Daily Intake Calculations – Current AMAC Client – Soil Exposure
Table 5–15 Values Used for Daily Intake Calculations – Current AMAC Client – Groundwater Exposure

Table of Contents, Continued

Table 5–16 Values Used for Daily Intake Calculations – Current AMAC Client – Indoor Air Exposure
Table 5–17 Values Used for Daily Intake Calculations – Current Trespasser
Table 5–18 Values Used for Daily Intake Calculations – Current Site Worker
Table 5–19 Values Used for Daily Intake Calculations – Future Construction Worker
Table 5–20 Values Used for Daily Intake Calculations – Future Commercial/Industrial Worker – Soil Exposure
Table 5–21 Values Used for Daily Intake Calculations – Future Commercial/Industrial Worker – Groundwater Exposure
Table 5–22 Values Used for Daily Intake Calculations – Future Commercial/Industrial Worker – Indoor Air Exposure
Table 5–23 Values Used for Daily Intake Calculations – Future Residents – Soil Exposure
Table 5–24 Values Used for Daily Intake Calculations – Future Residents – Groundwater Exposure
Table 5–25 Values Used for Daily Intake Calculations – Future Residents – Indoor Air Exposure
Table 5–26 Dermally Absorbed Dose per Event (DA_{event}) Calculations – Entire Site Groundwater
Table 5-27 Inhalation Exposure per Shower (E)
Table 5-28 Indoor VOC Generation Rate (S)
Table 5-29 Concentration Leaving Shower Droplet after Time T_S (C_{WD})
Table 5-30 Adjusted Overall Mass Transfer Coefficient (Ka_L)
Table 5-31 Overall Mass Transfer Coefficient (K_L)
Table 5-32 Liquid-Film Mass Transfer Coefficient ($k_{l\ (VOC)}$)
Table 5-33 Gas-Film Mass Transfer Coefficient ($k_{g\ (VOC)}$)
Table 5-34 COPC-Specific Henry's Law Constant (H) and Molecular Weight (MW)
Table 5–35 Non–Cancer Toxicity Data – Oral/Dermal
Table 5–36 Non–Cancer Toxicity Data – Inhalation
Table 5–37 Cancer Toxicity Data – Oral/Dermal
Table 5–38 Cancer Toxicity Data – Inhalation
Table 5–39 Calculation of Cancer Risks – Mutagenic Mode of Action – Future Residential Exposure to Entire Site Total Soil
Table 5–40 Calculation of Cancer Risks – Mutagenic Mode of Action – Future Residential Exposure to Entire Site Groundwater
Table 5–41 Calculation of Cancer Risks – Mutagenic Mode of Action – Current Trespasser Exposure to Launcher Area Surface Soil
Table 5–42 Calculation of Cancer Risks from Trichloroethylene – Mutagenic Mode of Action – Future Residential Exposure to Groundwater
Table 5–43 Calculation of Cancer Risks from Trichloroethylene – Mutagenic Mode of Action – Future Residential Exposure to Indoor Air
Table 5–44 Summary of Cancer Risks and Noncancer Hazard Indices
Table 5–45 Calculation of COPC Cancer Risks and Noncancer Hazards – AMAC Staff – Soil Exposure

Table of Contents, Continued

Table 5–46 Calculation of COPC Cancer Risks and Noncancer Hazards – AMAC Staff – Groundwater Exposure
Table 5–47 Calculation of COPC Cancer Risks and Noncancer Hazards – AMAC Staff – Indoor Air Exposure
Table 5–48 Calculation of COPC Cancer Risks and Noncancer Hazards – AMAC Client – Soil Exposure
Table 5–49 Calculation of COPC Cancer Risks and Noncancer Hazards – AMAC Client – Groundwater Exposure
Table 5–50 Calculation of COPC Cancer Risks and Noncancer Hazards – AMAC Client – Indoor Air Exposure
Table 5–51 Calculation of COPC Cancer Risks and Noncancer Hazards – Trespasser – Soil Exposure
Table 5–52 Calculation of COPC Cancer Risks and Noncancer Hazards – Site Worker – Soil Exposure
Table 5–53 Calculation of COPC Cancer Risks and Noncancer Hazards – Construction Worker – Soil Exposure
Table 5–54 Calculation of COPC Cancer Risks and Noncancer Hazards – Commercial/Industrial Worker – Soil Exposure
Table 5–55 Calculation of COPC Cancer Risks and Noncancer Hazards – Commercial/Industrial Worker – Groundwater Exposure
Table 5–56 Calculation of COPC Cancer Risks and Noncancer Hazards – Commercial/Industrial Worker – Indoor Air Exposure
Table 5–57 Calculation of COPC Cancer Risks and Noncancer Hazards – Age-Adjusted Residents – Soil Exposure
Table 5–58 Calculation of COPC Cancer Risks and Noncancer Hazards – Adult Residents – Soil Exposure
Table 5–59 Calculation of COPC Cancer Risks and Noncancer Hazards – Child Residents – Soil Exposure
Table 5–60 Calculation of COPC Cancer Risks and Noncancer Hazards – Age-Adjusted Resident – Groundwater Exposure
Table 5–61 Calculation of COPC Cancer Risks and Noncancer Hazards – Adult Resident – Groundwater Exposure
Table 5–62 Calculation of COPC Cancer Risks and Noncancer Hazards – Child Resident – Groundwater Exposure
Table 5–63 Calculation of COPC Cancer Risks and Noncancer Hazards – Resident – Indoor Air Exposure
Table 5–64 Summary of Receptor Risks and Hazards for COPCs – AMAC Staff – Soil
Table 5–65 Summary of Receptor Risks and Hazards for COPCs – AMAC Staff – Groundwater
Table 5–66 Summary of Receptor Risks and Hazards for COPCs – AMAC Staff – Air
Table 5–67 Summary of Receptor Risks and Hazards for COPCs – AMAC Client – Soil
Table 5–68 Summary of Receptor Risks and Hazards for COPCs – AMAC Client – Groundwater

Table of Contents, Continued

Table 5–69 Summary of Receptor Risks and Hazards for COPCs – AMAC Client – Air
Table 5–70 Summary of Receptor Risks and Hazards for COPCs – Trespasser
Table 5–71 Summary of Receptor Risks and Hazards for COPCs – Site Worker
Table 5–72 Summary of Receptor Risks and Hazards for COPCs – Construction Worker
Table 5–73 Summary of Receptor Risks and Hazards for COPCs – Commercial/Industrial Worker – Soil
Table 5–74 Summary of Receptor Risks and Hazards for COPCs – Commercial/Industrial Worker – Groundwater
Table 5–75 Summary of Receptor Risks and Hazards for COPCs – Commercial/Industrial Worker – Air
Table 5–76 Summary of Receptor Risks and Hazards for COPCs – Age-Adjusted Resident – Soil
Table 5–77 Summary of Receptor Risks and Hazards for COPCs – Adult Resident – Soil
Table 5–78 Summary of Receptor Risks and Hazards for COPCs – Child Resident – Soil
Table 5–79 Summary of Receptor Risks and Hazards for COPCs – Age-Adjusted Resident – Groundwater
Table 5–80 Summary of Receptor Risks and Hazards for COPCs – Adult Resident – Groundwater
Table 5–81 Summary of Receptor Risks and Hazards for COPCs – Child Resident – Groundwater
Table 5–82 Summary of Receptor Risks and Hazards for COPCs – Resident
Table 5–83 Risk Summary – AMAC Staff – Soil
Table 5–84 Risk Summary – AMAC Staff – Groundwater
Table 5–85 Risk Summary – AMAC Staff – Air
Table 5–86 Risk Summary – AMAC Client – Soil
Table 5–87 Risk Summary – AMAC Client – Groundwater
Table 5–88 Risk Summary – Site Worker
Table 5–89 Risk Summary – Commercial/Industrial Worker – Groundwater
Table 5–90 Risk Summary – Commercial/Industrial Worker – Air
Table 5–91 Risk Summary – Age-Adjusted Resident – Soil
Table 5–92 Risk Summary – Age-Adjusted Resident – Groundwater
Table 5–93 Risk Summary – Adult Resident – Groundwater
Table 5–94 Risk Summary – Child Resident – Groundwater
Table 5–95 Summary of Cumulative Cancer Risks
Table 5–96 Summary of Cumulative Non–Cancer HIs
Table 6-1 Surface Soil Summary Table
Table 6-2 Drainageway Soil Summary Table
Table 6-3 Surface Soil Background Summary Table
Table 6-4 Soil Benchmarks – Phytotoxicity and Soil Invertebrate/Microbe
Table 6-5 Soil Benchmarks – Wildlife
Table 6-6 Soil Screening
Table 6-7 Drainageway Soil Screening
Table 6–8 COPEC List

Table 6–9 Exposure Point Concentrations – Site Soil
Table 6–10 COPEC Concentrations in Plants Due to Root Uptake
Table 6–11 Values Used to Estimate COPEC Concentrations in Plants
Table 6–12 COPEC Concentrations in Soil Invertebrates
Table 6–13 Values Used to Estimate COPEC Concentrations in Soil Invertebrates
Table 6–14 Estimated EPCs – Terrestrial Plants and Soil Invertebrates
Table 6–15 Calculation of Field Metabolic Rates
Table 6–16 AE and GE of Anticipated Prey Items
Table 6–17 COPEC Dose Ingested Terms in Herbivorous Birds (Song Sparrow)
Table 6–18 COPEC Dose Ingested Terms in Invertivorous Birds (American Robin)
Table 6–19 COPEC Dose Ingested Terms in Herbivorous Mammals (Deer Mouse)
Table 6–20 COPEC Dose Ingested Terms in Invertivorous Small Mammals (Short–Tailed Shrew)
Table 6–21 Estimated Daily Intake – Song Sparrow – Site
Table 6–22 Estimated Daily Intake – American Robin – Site
Table 6–23 Estimated Daily Intake – Deer Mouse – Site
Table 6–24 Estimated Daily Intake – Short–tailed Shrew – Site
Table 6–25 Avian Toxicity Reference Values (TRVs)
Table 6–26 Mammalian Toxicity Reference Values (TRVs)
Table 6–27 Sample by Sample Phytotoxicity Summary
Table 6–28 Sample by Sample Soil Invertebrate Toxicity Summary
Table 6–29 Hazard Quotients – Song Sparrow – Site
Table 6–30 Hazard Quotients – American Robin – Site
Table 6–31 Hazard Quotients – Deer Mouse – Site
Table 6–32 Hazard Quotients – Short–tailed Shrew – Site
Table 6–33 Summary of Exposure Point Concentrations for COPECs – Background Soil
Table 6–34 Estimated Daily Intake – Song Sparrow – Background
Table 6–35 Estimated Daily Intake – American Robin – Background
Table 6–36 Estimated Daily Intake – Deer Mouse – Background
Table 6–37 Estimated Daily Intake – Short–tailed Shrew – Background
Table 6–38 Hazard Quotients – Song Sparrow – Background
Table 6–39 Hazard Quotients – American Robin – Background
Table 6–40 Hazard Quotients – Deer Mouse – Background
Table 6–41 Hazard Quotients – Short–tailed Shrew – Background
Table 6–42 Incremental Risks – Song Sparrow
Table 6–43 Incremental Risks – American Robin
Table 6–44 Incremental Risks – Deer Mouse
Table 6–45 Incremental Risks – Short–tailed Shrew
Table 6–46 Surface Soil Background Comparisons – Food Chain Modeling Dataset
Table 6–47 Surface Soil Background Comparisons – Site Upland Dataset
Table 6–48 Surface Soil Background Comparisons – Drainageway Dataset
Table 6–49 Site Metals Risks Excluding COPECs with Concentrations Similar to Background

Table 6–50 Summary of Major Uncertainties in the Screening-level Ecological Risk Assessment
Table 6–51 Ecological Risk Summary
Table 8–1 Summary of Cancer Risks and Noncancer Hazard Indices
Table 8–2 Proposed Preliminary Remediation Goals for Groundwater
Table 8–3 Proposed Preliminary Remediation Goals for Indoor Air
Table 9–1 Groundwater Remedial Action Objectives, General Response Actions, Technology Types and Process Options
Table 9–2 Groundwater Remedial Technology Screening
Table 9–3 Indoor Air Remedial Action Objectives, General Response Actions, Technology Types and Process Options
Table 9–4 Soil Gas Remedial Technology Screening Groundwater
Table 11–1 Detailed Analysis of Groundwater Remedial Alternatives
Table 11–2 Detailed Analysis of Vapor Intrusion Remedial Alternatives
Table 11–3 Detailed ARAR and TBC Analysis Groundwater Treatment Alternatives
Table 11–4 Detailed ARAR and TBC Analysis Soil Vapor Intrusion
Table 12–1 Comparative Analysis of Alternatives Summary

APPENDICES

Appendix A Analytical Data
  A.1 Historic Data
  A.2 2012 RI/FS Data
Appendix B Soil Boring Logs
Appendix C Human Health Risk Assessment ProUCL Output
Appendix D SLERA Appendices
  D.1 Ecological Risk Assessment ProUCL Output
  D.2 Sample by Sample Comparison of Detected Soil Concentrations with Soil-based Phytotoxicity Benchmarks
  D.3 Sample by Sample Comparison of Detected Soil Concentrations with Soil-based Soil Invertebrate/Microbe Benchmarks
Appendix E Feasibility Study Appendices
  E.1 Detailed Cost Estimates
  E.2 Estimation of Time to Achieve PRGs

Acronyms and Abbreviations

1,2-DCA	1,2-Dichloroethane
ABS	dermal absorption factor
ABS_{GI}	fraction of contaminant absorbed in the gastrointestinal tract
ADAF	Age-Dependent Adjustment Factors
ADD	average daily dose
AE	assimilation efficiency
AF	soil-to-skin adherence factor
AFB	Air Force Base
AFNS	Acid Fueling/Neutralization Station
AI	Adequate Intakes
AMAC	Adult Multiple Alternative Center
amsl	above mean sea level
APH	air-phase petroleum hydrocarbon
ARAR	Applicable or Relevant and Appropriate Requirements
AST	above ground storage tank
AT	averaging time
ATSDR	Agency for Toxic Substances & Disease Registry
Avatar	Avatar Environmental, LLC
B	ratio of permeability coefficient
BAF	bioavailability factor
BCF	bioconcentration factor
bgs	below ground surface
BERA	baseline ecological risk assessment
Br	soil to plant concentration factor – reproductive
Bv	soil to plant concentration factor – vegetative
BW	body weight
BTEX	benzene, toluene, ethylbenzene, and xylene
CalEPA	California Environmental Protection Agency
C_{INV}	COPEC concentration in soil invertebrates
cm^2	square centimeters
cm^2/day	square centimeters per day
C_S	COPEC concentration in soil
C_{TP}	COPEC concentration in terrestrial plants
C_w	COPC concentration in water
C_a	COPC concentration in air
CENAE	Corps of Engineers, New England District
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CF	conversion factor
CFR	Code of Federal Regulations
C_i	Concentration in the i^{th} prey item
cis-1,2-DCE	cis-1,2-dichloroethylene
CMC	criteria maximum concentration

Acronyms and Abbreviations, Continued

CMR	Code of Maine Regulations
COC	contaminants of concern
COPC	contaminants of potential concern
COPEC	contaminant of potential ecological concern
CSF	cancer slope factor
CSM	conceptual site model
C_{soil}	concentration in soil
CTE	central tendency exposure
CVOC	chlorinated volatile organic compound
cy	cubic yards
D_{HB}	dose ingested for herbivorous birds
D_{HM}	dose ingested for herbivorous mammals
D_{IB}	dose ingested for insectivorous birds
D_{ISM}	dose ingested for insectivorous small mammals
DA_{event}	absorbed dose per event
DC	direct contact
DERP	Defense Environmental Restoration Program
DNAPL	dense non-aqueous phase liquid
DO	dissolved oxygen
DOD	Department of Defense
DRO	diesel-range organics
DW	dry weight
DW	drinking water well
E	Inhalation exposure per shower
Eco-SSL	Ecological Soil Screening Level
ED	exposure duration
EDQL	ecological data quality level
EEL	estimated exposure level
EEQ	ecological effects quotient
EF	exposure frequency
EPA	Environmental Protection Agency
EPC	exposure point concentration
EPH	extractable petroleum hydrocarbon
EqP	equilibrium partitioning
ERA	ecological risk assessment
ERL	effects range-low
ERM	effects range-median
ESL	ecological screening level
ESV	ecological screening value
ET	exposure time
EU	exposure unit
EV	event frequency
F_{INV}	fraction of diet comprised of soil invertebrates

Acronyms and Abbreviations, Continued

F_{TP}	fraction of diet comprised of terrestrial plants
FA	fraction absorbed water
FCM	food chain modeling
FEMA	Federal Emergency Management Agency
FI	fraction ingested
FIR	food intake rate
FIRM	Flood Insurance Rate Map
FMR	free metabolic rate
f_{oc}	fraction of organic carbon content
FOD	frequency of detection
FOE	frequency of exceedance
FS	Feasibility Study
FT	foraging time
ft	feet
FUDS	Formerly Used Defense Site
g WW/g BW-day	grams of wet weight per gram of body weight per day
GE	gross energy
GI	gastrointestinal
GPR	ground-penetrating radar
gpm	gallons per minute
GRO	gasoline-range organics
GW	Groundwater
Hg	mercury
HHRA	Human Health Risk Assessment
HI	hazard index
HPL	hydrophysical logging
HQ	hazard quotient
hr/event	hours per event
hr/day	hours per day
IAT	Indoor Air Targets
INPR	Inventory Project Report
IR	Incremental Risk
IR_{HB}	food ingestion rate of herbivorous birds
IR_{HM}	food ingestion rate of herbivorous mammals
IR_{IB}	food ingestion rate of invertivorous birds
IR_{ISM}	food ingestion rate of invertivorous small mammals
$IR_{S\text{-}HB}$	soil ingestion rate for herbivorous birds
$IR_{S\text{-}HM}$	soil ingestion rate for herbivorous mammals
$IR_{S\text{-}IB}$	soil ingestion rate for invertivorous birds
$IR_{S\text{-}ISM}$	soil ingestion rate for invertivorous small mammals
$IR_{\text{Soil-Target Receptor Feeding Guild}}$	soil ingestion rate
$IR_{\text{Target Receptor Feeding Guild}}$	body weight normalized food intake rate
IRIS	Integrated Risk Information System

Acronyms and Abbreviations, Continued

IRS	soil ingestion rate
IRW	water ingestion rate
JP-4	jet petroleum 4
K_d	soil-water partitioning coefficient
kg	kilogram
K_p	dermal permeability coefficient
kcal	kilocalorie
kcal/g BW-day	kilocalories per gram of body weight per day
kcal/g WW	kilocalories per gram of wet weight
kg DW/kg BW-day	kilograms of dry weight per kilogram of body weight per day
kg WW/kg BW-day	kilograms of wet weight per kilogram of body weight per day
K_{oc}	organic carbon partitioning coefficient
L/day	liters per day
LADD	lifetime average daily dose
LOAEL	lowest observed adverse effect level
LOEC	lowest observed effect concentration
LOQ	limit of quantitation
LTMP	Long-Term Monitoring Program
MCL	Maximum Contaminant Level
MECDC	Maine Center for Disease Control and Prevention
MEDEP	Maine Department of Environmental Protection
MEG	Maximum Exposure Guideline
m^3/kg	meters cubed per kilogram
mg/cm^2	milligrams per centimeter squared
mg/cm^2-event	milligrams per centimeter squared per event
mg/day	milligrams per day
mg/kg	milligrams per kilogram
mg/kg-day	milligrams per kilogram per day
$(mg/kg\text{-}day)^{-1}$	inverse of milligrams per kilogram per day
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mg COPEC/kg BW-day	milligrams of contaminant of potential ecological concern per kilogram of body weight per day
mg COPEC/kg DW soil	milligrams of contaminant of potential ecological concern per kilogram of dry weight soil
mg COPEC/kg WW	milligrams of contaminant of potential ecological concern per kilogram of wet weight
mm	millimeter
MOA	mode of action
MRL	Minimal Risk Level
MTBE	methyl-tert-butyl-ether
MW	monitoring well
mv	millivolts

NAPL	non-aqueous phase liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ND	non-detect
NHL	non-Hodgkin lymphoma
NOAEL	no observed adverse effect level
Nobis	Nobis Engineering, Inc.
O&M	operation and maintenance
ORP	oxidation/reduction potential
OTV	Optical Televiewer
pH	potential of hydrogen
P_{INV}	proportion of soil invertebrates diet that is contaminated
P_S	proportion of ingested soil that is contaminated
P_T	proportion of terrestrial plants diet that is contaminated
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethylene
PDI	Pre-Design Investigation
PEF	particulate emission factor
P_i	proportion of the i^{th} prey item in the diet
POE	point-of-entry
PPRTV	Provisional Peer-Reviewed Toxicity Values
PRG	preliminary remediation goal
PVA	present value analysis
PSI	Preliminary Site Investigation
RAG	Remedial Action Guideline
RAGS	Risk Assessment Guidance for Superfund
RAO	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RDA	Recommend Daily Allowances
redox	reduction/oxidation
RfC	reference concentration
RfD	reference dose
RI	Remedial Investigation
RL	reporting limit
RME	reasonable maximum exposure
RSL	Regional Screening Levels
SA	exposed skin surface area
SARA	Superfund Amendments and Reauthorization Act
SIM	selective ion monitoring
SLERA	Screening-Level Ecological Risk Assessment
SMDP	scientific/management decision point
SQL	sample quantitation limit
SSL	soil screening level

Acronyms and Abbreviations, Continued

SVOC	semi-volatile organic compound
t_{event}	event duration
τ_{event}	lag time per event
TBC	to-be-considered
TCE	trichloroethylene
TDI	total daily intake
TEC	threshold effect concentration
TEL	threshold effect level
THQ	target hazard quotient
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TR	target risk
trans-1,2-DCE	trans-1,2-dichloroethylene
TRV	toxicity reference value
UCL	upper confidence limit
UF	uncertainty factor
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
UPL	upper prediction limit
URF	unit risk factor
USACE	U.S. Army Corps of Engineers
USAF	United States Air Force
UST	underground storage tank
UU/UE	unlimited use and unrestricted exposure
VI	Vapor Intrusion
VFW	Veterans of Foreign Wars
VM	Vapor Mitigation
VOC	volatile organic compound
VPH	volatile petroleum hydrocarbon
WSP	wire-line straddle packer
WW	wet weight

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Executive Summary

INTRODUCTION

This Remedial Investigation (RI) / Feasibility Study (FS) Report was prepared for the Former LO-58 NIKE Battery Launch Site (the Site) in Caribou, Maine. The Former LO-58 Site is one of several Formerly Used Defense Sites (FUDS) in northern Aroostook County, Maine. The overall objectives of this Report were: 1) to characterize the nature and extent of contamination; 2) to evaluate the environmental fate and transport of Site-related contamination; 3) to assess the potential risks to human health and the environment posed by contamination at the Site; and 4) to use this information in the FS to support the evaluation and development of potential remedial alternatives for the Site.

SITE BACKGROUND

The Former LO-58 Site is a 17-acre land parcel located at 253 Van Buren Road (Route 1) in Caribou, Aroostook County, Maine (see Figure 1-1). The Site is owned currently by the Lister-Knowlton Veterans of Foreign Wars (VFW) Post 9389. The LO-58 Nike Missile Launch Battery was a part of the LO-58 Site facility which also included a control area and housing area located approximately 2 miles east of the launch area. At the time of its closure, the LO-58 Site consisted of the former Nike Missile Launcher Area, the former Generator Building, the former Test Building, the Acid Fueling/Neutralization Station (AFNS), the Former Warhead Building, and the former Barracks Building. Additionally, the LO-58 Site consisted of smaller areas including the former Sentry Station, the former Canine Kennel and Exercise Area, the former Ajax Transfer Rack, and the former Acid Storage Shed, all of which have been reduced to concrete pads and footings (Weston, 2011) (see Figure 1-2).

The VFW currently uses the former Barracks Building as its headquarters for meetings and social functions, and leases the former Generator Building to the Adult Multiple Alternative Center (AMAC). The only other portion of the LO-58 Site currently utilized is the southern portion of the former Launcher Area which serves as a shooting range for the City of Caribou Police Department and Customs and Border Patrol.

Two separate bedrock water supply wells provide drinking water to the LO-58 Site. DW-01 provides potable water for AMAC and DW-02 provides potable water for the former Barracks Building, now used by the VFW. A point-of-entry (POE) activated carbon water filtration system was installed and is monitored by U.S. Army Corps of Engineers (USACE) to remove volatile organic carbon (VOC) contaminants which are present in well DW-01. Historically, concentrations of trichloroethylene (TCE) in untreated water have exceeded the applicable Federal Maximum Contaminant Level (MCL) for drinking water of 5 micrograms per liter (µg/L).

Various environmental investigations have been conducted at the LO-58 Site by various parties for the purpose of identifying environmental concerns, risk, and/or hazards associated with the former defense site. Figure 1-4 presents the Site plan with historical sample locations.

REMEDIAL INVESTIGATION

The purpose of the RI field program was to collect the data needed to complete a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) compliant baseline risk assessment and feasibility study.

Following the field investigations, a Human Health Risk Assessment (HHRA) and a Screening-Level Ecological Risk Assessment (SLERA) were performed. The findings and conclusions of the RI follow.

Field Investigation

- Soil, groundwater, soil gas, and indoor air have been impacted by releases of petroleum hydrocarbons and chlorinated solvents related to the historical operations of the LO-58 Nike Site.
- Low levels of these contaminants have been identified in select soil samples.
- Petroleum contamination, coexisting with low level solvent contamination in groundwater, has been identified in monitoring well MW-05; which has attenuated over time.

- No widespread source of soil contamination by chlorinated volatile organic compounds (CVOCs) has been identified by extensive soil sampling across the Site.
- Two localized sources of CVOC in soil contamination have been identified at the Site at the locations depicted on Figure 3-3.
- Elevated levels of petroleum compounds and CVOCs have been detected in soil gas beneath the AMAC Building and in indoor air within the AMAC Building.
- Complete exposure pathways to human receptors exist at the Site for CVOCs in indoor air at the AMAC Building.
- Based on the observed concentrations of CVOC in groundwater and in indoor air at the AMAC Building, it does not appear likely that CVOCs present in indoor air originate in groundwater beneath the building; but may be related to soils above the water table adjacent to the building.
- CVOCs and petroleum hydrocarbons have been detected in untreated water from AMAC Building well DW-01.
- Depth profiling of groundwater entering DW-01 indicates petroleum hydrocarbons and CVOCs infiltrate into the well at multiple depths through fractures observed in the well boring.
- No evidence of site-specific contamination has been identified in the three other sampled drinking water supply wells that are located on downgradient abutting properties (DW-02 at the former Barracks Building, 271 and 241 Van Buren Rd.).

Human Health Risk Assessment

- Current receptor cancer risks and noncancer hazard indices (HIs) across all media were either within or below the Environmental Protection Agency (EPA) acceptable cancer risk range of 1E-06 to 1E-04 and were less than the noncancer target benchmark of 1.0. With the exception of the AMAC staff worker at the AMAC Building Area with a total cancer risk of 3.1E-05, current receptor cancer risks were below MEDEP’s acceptable cancer risk level of 1E-05.
- The cumulative cancer risk (4.9E-04) for the hypothetical future resident slightly exceeded the upper end of EPA’s risk range, as well as MEDEP’s acceptable cancer risk risk level of 1E-05. The future commercial/industrial worker also had a cumulative cancer risk greater than MEDEP’s acceptable risk level with a total cancer risk of 2.2E-05. The hypothetical future resident cumulative noncancer HI (12.1) exceeded the noncancer threshold of 1.0. The primary risk drivers for a hypothetical

future resident are TCE for AMAC Building indoor air and 1-methylnaphthalene, benzo(a)pyrene, dibenzo(a,h)anthracene, and manganese for entire site groundwater.

Screening-Level Ecological Risk Assessment

- During the SLERA process, contaminants of potential ecological concern (COPECs) were identified, the potential for wildlife exposure was evaluated, and a conservative analysis of the consequent ecological risk was conducted. No ecologically significant risks were identified for exposures to Site or drainageway soils.

FEASIBILITY STUDY

Based on the results of the field investigation, HHRA, and SLERA, a CERCLA FS was performed to evaluate potential remedial alternatives at LO-58. Two types of remedial alternatives were developed to meet the identified Remedial Action Objectives (RAOs). Groundwater (GW) alternatives were developed to address the contaminated bedrock groundwater at the Site. Vapor Intrusion (VI) alternatives were developed to address the contaminants of concern (COCs) in indoor air, which are currently migrating into the AMAC facility, and could potentially migrate into future buildings at the Site. The Remedial Action Objectives (RAOs) identified are as follows:

Protection of Human Health Groundwater RAO:

- Prevent ingestion of water containing contaminants of concern in excess of MCLs, a cumulative cancer risk (for all contaminants of concern) in excess of 1E-04, and cumulative target organ-specific non-cancer risk in excess of 1.0.

Protection of Human Health Indoor Air RAO:

- Prevent exposure to indoor air contaminants of concern in excess of preliminary remediation goals (PRGs) that pose cumulative cancer risk greater than 1E-04 (for contaminants of concern) or organ-specific excess non-carcinogenic risks greater than HI of 1.0.

Five GW alternatives were identified:

1) Alternative GW1: No Action.

2) Alternative GW2: Limited Action — Continued POE Treatment of DW-01, Institutional Controls, Long-term Monitoring, and Five-year Reviews.
3) GW3: Installation of New Drinking Water Supply Line, Institutional Controls, Long-term Monitoring, and Five-year Reviews.
4) GW4: In-Situ Treatment of Bedrock Groundwater, Installation of New Drinking Water Supply Line, Institutional Controls, Long-term Monitoring, and Five-year Reviews.
5) GW5: Groundwater Extraction, Treatment, and Discharge, Institutional Controls, Long-term Monitoring, and Five-year Reviews.

Four VI alternatives were identified:

1) Alternative VI1: No Action.
2) Alternative VI2: Limited Action — Institutional Controls, Long-term Monitoring, and Five-year Reviews.
3) Alternative VI3: Active Subslab Vapor Mitigation, Institutional Controls, Long-term Monitoring, and Five-year Reviews.
4) Alternative VI4: Vapor Barrier Installation, Institutional Controls, Long-term Monitoring, and Five-year Reviews.

A detailed analysis of the alternatives was performed to provide information necessary to facilitate the selection of a specific remedy. The detailed analysis of alternatives was conducted in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP; 40 CFR 200300.430(e)(9)) and the *Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA, 1994a; EPA, 1988a and b).

The comparative analysis was then performed to compare the relative performance of each alternative to the nine evaluation criteria specified in the NCP (40 CFR 300.430(e)(9)(iii)). This comparison assists in the selection of a remedy for the Site by identifying the advantages and disadvantages of each alternative relative to the NCP evaluation criteria. Table ES-1 presents the results of the comparative analysis of alternatives.

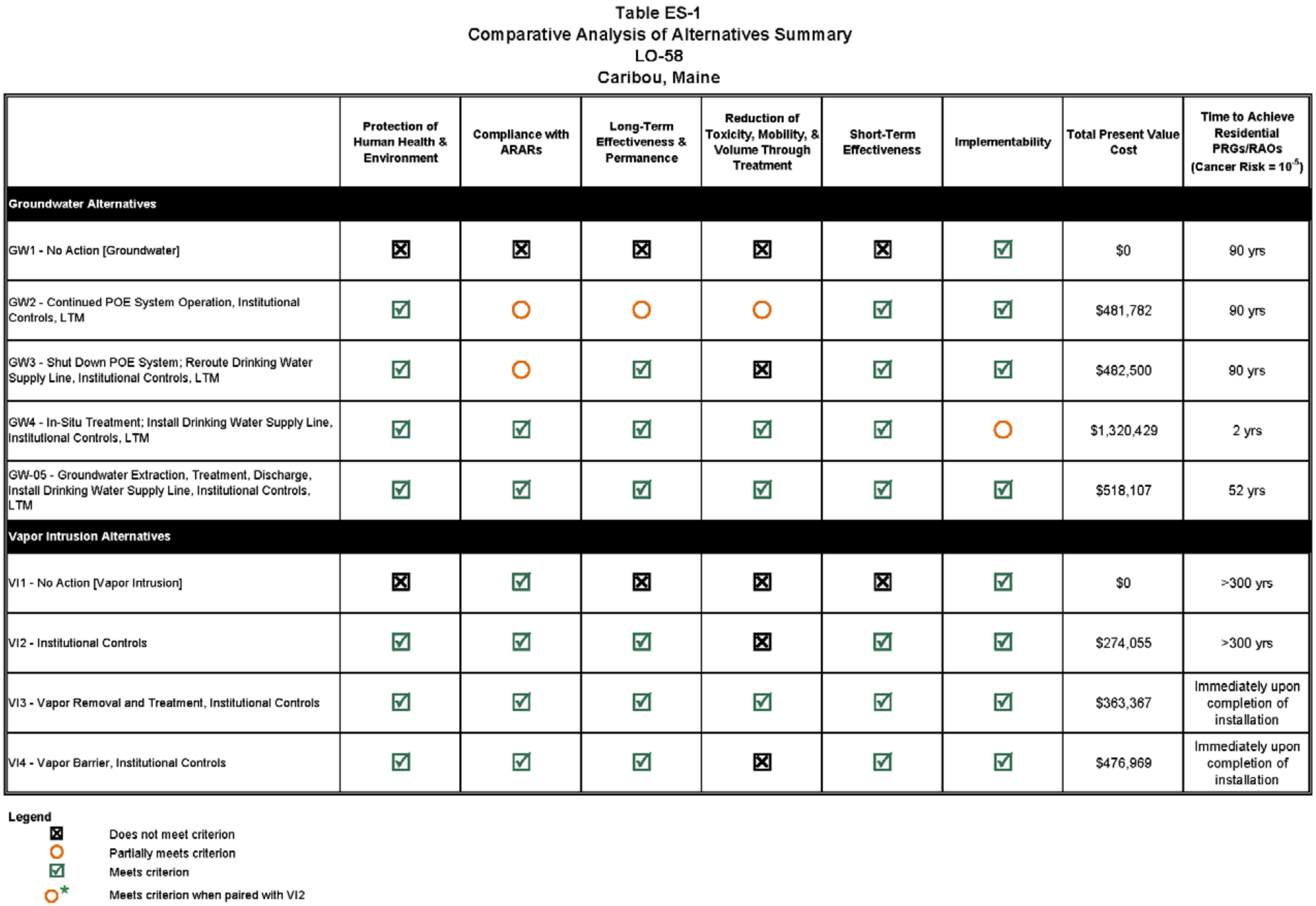

Table ES-1
Comparative Analysis of Alternatives Summary
LO-58
Caribou, Maine

	Protection of Human Health & Environment	Compliance with ARARs	Long-Term Effectiveness & Permanence	Reduction of Toxicity, Mobility, & Volume Through Treatment	Short-Term Effectiveness	Implementability	Total Present Value Cost	Time to Achieve Residential PRGs/RAOs (Cancer Risk = 10^{-5})
Groundwater Alternatives								
GW1 - No Action [Groundwater]	☒	☒	☒	☒	☒	☑	$0	90 yrs
GW2 - Continued POE System Operation, Institutional Controls, LTM	☑	○	○	○	☑	☑	$481,782	90 yrs
GW3 - Shut Down POE System; Reroute Drinking Water Supply Line, Institutional Controls, LTM	☑	○	☑	☒	☑	☑	$482,500	90 yrs
GW4 - In-Situ Treatment; Install Drinking Water Supply Line, Institutional Controls, LTM	☑	☑	☑	☑	☑	○	$1,320,429	2 yrs
GW-05 - Groundwater Extraction, Treatment, Discharge, Install Drinking Water Supply Line, Institutional Controls, LTM	☑	☑	☑	☑	☑	☑	$518,107	52 yrs
Vapor Intrusion Alternatives								
VI1 - No Action [Vapor Intrusion]	☒	☑	☒	☒	☒	☑	$0	>300 yrs
VI2 - Institutional Controls	☑	☑	☑	☒	☑	☑	$274,055	>300 yrs
VI3 - Vapor Removal and Treatment, Institutional Controls	☑	☑	☑	☑	☑	☑	$363,367	Immediately upon completion of installation
VI4 - Vapor Barrier, Institutional Controls	☑	☑	☑	☒	☑	☑	$476,969	Immediately upon completion of installation

Legend

☒	Does not meet criterion
○	Partially meets criterion
☑	Meets criterion
○*	Meets criterion when paired with VI2

1. INTRODUCTION

This RI/FS Report was prepared by Avatar and Nobis for the USACE under Contract No. W912WJ-11-D-0002, FUDS Project Number D01ME007702. This report presents the RI results and data evaluation conducted for the Former LO-58 NIKE Battery Launch Site (the Site) in Caribou, Maine. It was prepared based on data developed during the investigations detailed herein, earlier investigations, remedial actions performed by the property owners, Maine Department of Environmental Protection (MEDEP), or by the USACE. The Former LO-58 Site is one of several FUDS in northern Aroostook County, Maine. Avatar and Nobis used information developed in the RI and the Human Health and Ecological Risk Assessments to produce an FS. The FS develops and evaluates a range of remedial alternatives designed to eliminate, reduce, or control risks to human health and the environment that may result from exposure to Site-related contamination. Based on the results of the Site investigations, the FS, and comments from project stakeholders, including the general public, a Decision Document will be prepared for approval by the USACE, MEDEP, and other stakeholders.

This report was prepared in accordance with the *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA, 1988a and b). It is consistent with CERCLA of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986; and the NCP.

1.1 PURPOSE OF REPORT

The overall objectives of the RI are: 1) to characterize the nature and extent of contamination; 2) to evaluate the environmental fate and transport of Site-related contamination; and 3) to assess the potential risks to human health and the environment posed by contamination at the Site, and 4) to use this information in the FS to support the evaluation and development of potential remedial alternatives for the Site.

To meet these overarching objectives, this RI:

- Compiled and evaluated available Site data;

- Obtained additional data required to characterize the source and the nature and extent of contamination in the soil, groundwater, soil vapor, surface water, sediment, and indoor air at the Site and surrounding areas;

- Assessed the environmental fate and transport conditions of contaminants of potential concern at the Site; and

- Prepared risk assessments of the potential threats to human health and the environment posed by site-related contamination.

1.2 SITE BACKGROUND

1.2.1 Site Description

Most of the following site description is based on information presented in the *Former LO-58 Nike Battery Launch Site Final Conceptual Site Model Report* (Weston, 2011).

The Former LO-58 Site is a 17-acre land parcel located at 253 Van Buren Road (Route 1) in Caribou, Aroostook County, Maine (see Figure 1-1). The Site is owned currently by the Lister-Knowlton VFW Post 9389 and is identified by the City of Caribou Assessor's Office as Map 14, Lot 50 (Weston, 2011). The entrance to the LO-58 Site from Van Buren Road is located at latitude 46º 52′ 55″ North and longitude 68º 0′ 38″ West (USFWS, 2008). Consistent with the typical location of Nike Missile Batteries, the LO-58 Site is located on a topographic high, east of Van Buren Road. Elevations at the LO-58 Site vary by approximately 60 ft, from approximately 540 ft above mean sea level (amsl) at the former Barracks Building, which is located at the bottom of the hill near Van Buren Road, to approximately 600 ft amsl at the former Launcher Area, which is situated near the topographic high for the property (Weston, 2011).

The LO-58 Nike Missile Launch Battery was a part of the LO-58 Site facility which also included a control area and housing area located approximately 2 miles east of the launch area. At the time of its closure, the LO-58 Site consisted of the former Nike Missile Launcher Area, the former Generator Building, the former Test Building, the AFNS, the former Warhead Building, and the former Barracks Building. Additionally, the LO-58 Site consisted of smaller areas including the former Sentry Station, the former Canine Kennel and Exercise Area, the former Ajax Transfer Rack, and the former Acid Storage Shed, all of which have been reduced to concrete pads and footings (Weston, 2011) (see Figure 1-2).

Unpaved areas of the LO-58 Site consist of grassland and scrub-shrub habitat, as early forest succession takes place in formerly mowed areas. There are no surface water bodies or wetlands present on the LO-58 Site (USFWS, 2008). The nearest wetlands are located 0.2 miles to the northeast, within the floodplain of Hardwood Brook (USFWS, 2008). Information from MEDEP and on-site observations do not indicate the presence of Significant Wildlife Habitat on the LO-58 Site or in its vicinity (MEDEP, 2007). According to the Critical Natural Resources Map for the City of Caribou, Maine, there are no critical natural resource areas on the LO-58 Site; however, such areas are located along Hardwood Brook located approximately 0.5 miles north of the LO-58 Site (City of Caribou, Undated). Based on these results, it was concluded that there are no ecological receptors of particular significance on the LO-58 Site.

Two separate bedrock water supply wells provide drinking water to the LO-58 Site. One deep bedrock well, designated DW-02, is located approximately 100 ft southwest of the former Barracks Building in the parking area and provides potable drinking water to the former Barracks Building (Figure 1-2). The well is situated in a 4-ft by 4-ft concrete vault beneath the parking area and access to the wellhead is acquired through a manhole. A POE chlorine-based, water-softening and bacterial treatment system has been installed on the water supply to address hardness and elevated bacteria levels which have been reported in the water supply; no other treatment has been part of this system. The treatment system is located in a utility room located in the eastern corner of the former Barracks Building (Weston, 2007).

In 1996, a 6-inch diameter, 58-ft deep bedrock water supply well (DW-01) was installed approximately 25 ft east of the former Generator Building to provide water service to Adult Multiple Alternative Center (AMAC) which occupies the building (Figure 1-2). This building was previously served by DW-02; however, the supply line that carried water from the well to the AMAC Building was reportedly damaged when a portion of it froze during the winter and no longer functioned properly. A POE activated carbon water filtration system was installed and is monitored by USACE to remove any contaminants which are present in well DW-01.

Historically, concentrations of TCE in untreated water have exceeded the applicable Maine Maximum Exposure Guideline (MEG) of 4 µg/L. According to the Corps of Engineers, New England District (CENAE), the pre-treatment drinking water samples collected occasionally contain detectable concentrations of TCE. The post-treatment drinking water samples have not contained detectable concentrations of TCE.

Drinking water well TCE concentrations exceeded Maximum Contaminant Levels (MCLs) in 10/2000, 12/2002, 9/2003, 9/2004, 9/2005, and 10/2007, and MEGs on all of the above referenced dates, and also 5/2001, 5/2006, 10/2006, 5/2007, 6/2009, and 10/2009.

The former Barracks Building is served by a private septic system, which is located to the east of the building (Figure 1-2). The system was installed in 2008, but there are no known as-built plans for the system. The AMAC Building is served by a separate private septic system which includes 1,000-gallon and 750-gallon capacity septic tanks located to the west of the building (Figure 1-2). A leaching bed for the septic system is situated to the northwest of the building across the access road. The current septic system for the AMAC Building was installed in 2005 as a replacement for the original septic system. The original septic system consisted of a 1,000-gallon septic tank and a leaching trench. The location of the original leaching trench for the AMAC Building is unknown. The location of the current leach field is depicted on Figure 1-2.

All private properties near the LO-58 Site are served by private drinking water wells and private septic systems, as municipal water supply and sanitary sewer are not available to any properties in the vicinity of the LO-58 Site. The nearest off-site drinking water well is located at the Morin property which abuts the LO-58 Site to the southwest. The drinking water well for this property is located approximately 750 ft west of the former Launcher Area.

Stormwater and snowmelt from the LO-58 Site infiltrates the subsurface in unpaved areas or flows overland into catch basins and drainage swales. Surface water runoff generally flows north and northwest, with the exception of drainage from the area surrounding the former Barracks Building which flows along the terrain grade toward the east. Surface water runoff from the LO-58 Site flows to a drainage swale which channels surface water north from the property (Weston, 2011).

1.2.2 Site History

The LO-58 Site was acquired from the Town of Caribou in 1955 by the U.S. Department of Defense (DOD) for the construction of a Nike missile launching facility. This Site was one of four Nike Ajax sites placed around Loring Air Force Base for the protection of the United States Air Force (USAF) Strategic Air Command B-52 Stratofortresses as well as northeastern approaches to the United States. These sites remained operational until the LO-58 Site was deactivated by the DOD in 1966. Following its decommissioning as a military facility in 1969, the Site was conveyed to the City of Caribou and used for storage of municipal property. In 1970, the property was purchased by the current owner the Lister-Knowlton VFW Post 9389.

Between 1955 and 1957, the LO-58 Launch Site was constructed as part of the LO-58 Site facility. The Launch Area originally consisted of the former Nike missile launcher area, the former Generator Building, the former Test Building, the AFNS, and the former Barracks Building. The LO-58 Site began operations in 1957. The launcher facility was originally designed to carry and deploy the Ajax-type guided missile. The Ajax missile used a blend of jet petroleum-4 (JP-4), inhibited red fuming nitric acid, and approximately one pint of unsymmetrical dimethylhydrazine to make the mixture hyperbolic, and hence capable of spontaneous ignition without the need for an additional ignition source. Reportedly, the missiles were periodically de-fueled at the AFNS so the maintenance checks could be performed. There were reportedly 10 Ajax missiles within each of the three missile silos (see Figure 1-3).

In 1960, the LO-58 Site operations converted to the Hercules missile. According to information provided by Mr. Donald Bender of Farleigh Dickinson University, several changes occurred at Nike missile launching sites as a result of the conversion from Nike Ajax to Nike Hercules missiles. Some of these changes included the construction of the Warhead Building within the AFNS area, the construction of a larger Test Building, and an upgrade to the launchers, missile elevators, motors, and related power elements associated with the three on-site missile silos. After conversion, each silo contained six Hercules missiles (see Figure 1-3).

At the time of its closure, the major components of the LO-58 Site included the former Nike Missile Launcher Area, the former Generator Building, the former Test Building, the AFNS, the former Warhead Building, and the former Barracks Building (Figure 1-2). Additional minor components of the LO-58 Site comprised the former Sentry Station, the former Canine Kennel and Exercise Area, the former Ajax Transfer Rack, and the former Acid Storage Shed which have been reduced to concrete pads and footings. Several components of the former launch Site have since been deconstructed, including the subsurface portion of the former Nike Missile Launcher Area, which was closed in 1994, and the aboveground portion of the former Warhead Building which was demolished in spring 2007 (following a fire during the summer of 2006), leaving only the concrete foundation slab in place. The only other activity at the LO-58 Site since the decommissioning of the Nike Missile Battery Launch facility was a small farm machinery repair shop that operated for less than a year in the former Test Building (Weston, 2011).

The VFW currently uses the former Barracks Building as its headquarters for meetings and social functions, and leases the former Generator Building to the AMAC. Since 1994, the former generator building (AMAC Building) has had 2 or 3 additions built by AMAC over the life of their lease. The only other original buildings that remain standing are the former sentry station and the former Missile Assembly and Test Building. An empty 500-gallon fuel oil above ground storage tank (AST) is located behind the former Test Building. AMAC had a new storage building constructed west of the Test Building at the location of a block shed which was removed. The septic system serving AMAC was improved, and the drain field was relocated across the driveway/road from the AMAC Building. The only other portion of the LO-58 Site currently utilized is the southern portion of the former Launcher Area, which serves as a shooting range for the City of Caribou Police Department and Customs and Border Patrol.

1.2.3 Previous Investigations

Various environmental investigations have been conducted at the LO-58 Site by various parties for the purpose of identifying environmental concerns, risk, and/or hazards associated with the former defense site. The investigations are summarized below. Figure 1-4 presents the Site plan with historical sample locations as detailed in the following sections.

1.2.3.1 Summary of Pre-1996 Investigations

According to available documents, including an Inventory Project Report (INPR; CENAE, 1993) for the LO-58 Site, at least three site visits had been performed between the mid-1980s and 1993 for the purpose of identifying environmental hazards associated with the former defense site. The inspections identified documents indicating that three fuel storage tanks were historically used at the facility, which included a 2,000-gallon underground storage tank (UST) associated with the former Barracks Building, a 500-gallon fuel oil AST located outside the former Missile Assembly & Test Building (Test Building), and a 4,000-gallon fuel UST located adjacent to the southwest corner of the former Generator & Frequency Changer Building (Generator Building). According to available records, including the INPR (CENAE, 1993) and Site summary sheets, the former Generator Building had been expanded and an AST had been installed to fuel the building's heating system.

Records reviewed indicated that the 2,000-gallon UST had been removed and the 500-gallon AST had been utilized by a previous tenant at the property; and therefore, was not eligible for removal under the Defense Environmental Restoration Program (DERP). Representatives from CENAE did not find any indication that the 4,000-gallon UST was still present at the property and assumed that it had been removed, although no specific documents confirming the removal were found. Based on these findings, CENAE recommended that no further Federal action be taken regarding the remaining 500-gallon AST (Weston, 2011).

In addition to identifying former fuel storage tanks, the pre-1996 CENAE inspections also indicated that the acid neutralization pit and refueling area were still in place, but concluded that they posed no threat to the environment and, therefore, required no further action. The only recommendation for action at the LO-58 Site made as a result of the inspections was regarding the three former missile magazines (silos). The VFW indicated that they had no beneficial use of the magazines, and therefore, the inspections recommended that the hydraulic fluid be drained and the magazines sealed (Weston, 2011).

1.2.3.2 Site Closure Activities

Closure activities associated with the three silos at the LO-58 Site were performed by Mason and Maine Environmental Engineering Company between August 1994 and October 1994. The closure of each silo included: the collection of samples of infiltrated water within each for laboratory analysis for polychlorinated biphenyls (PCBs) and flashpoint; removal and disposal of the water; removal and disposal of hydraulic systems; and capping the three silos with concrete planks. Aboveground closure demolition work was also conducted, which consisted of the removal of several vent pipes, manholes, and bulkhead doors (Mason Environmental Services, Inc., 1995).

1.2.3.3 1996 Groundwater Investigation

In fall 1996, MEDEP responded to a complaint made by the current owner, concerning water odors from DW-01, which serves the AMAC Building. Two rounds of groundwater sampling and analysis (EPA Method 8260) performed by MEDEP documented and confirmed the presence of TCE contamination. The first round of sampling was performed on October 8, 1996. The analytical results of this sample indicated the presence of TCE at a concentration of 8.6 µg/L, which was above the applicable Maine MEG of 5 µg/L. The results of the second round of sampling, performed on October 21 1996, indicated the presence of TCE at 8.8 µg/L. MEDEP immediately installed a dual, granular-activated carbon filtration POE treatment system and initiated a monitoring program. Since 1996, TCE has consistently been detected in samples of untreated water collected as part of this monitoring program, with concentrations remaining fairly steady over time. The post-treatment drinking water samples have not contained detectable concentrations of TCE.

1.2.3.4 1998 Maine Department of Environmental Protection Geophysical Investigation

During a Site visit on May 21, 1998, MEDEP staff investigated an area located southwest of the former Generator Building (AMAC Building), where the 4,000-gallon fuel UST was located during the time the LO-58 Site was operated by the military. Although this tank had reportedly been removed, a magnetometer survey of the area detected a significant anomaly approximately 3 ft east and 9 ft south of the southwest corner of the building. This magnetometer "hit" suggested that a large metal object may still exist in this portion of the property. A subsequent geophysical survey consisted of two phases of investigation: a preliminary metal detection survey to identify the location of medium to large buried metal objects, and a more sensitive ground-penetrating radar (GPR) survey to identify physical characteristics of those objects. The results of the GPR survey indicate that the metallic response observed during the magnetometer survey by representatives of MEDEP was not due to the presence of a UST in the area. The GPR profiles in this area showed strong but narrow hyperbolic reflectors that are indicative of a small-diameter metal pipe extending outwards from the corner of the former Generator Building, possibly associated with the septic system.

1.2.3.5 Expanded Water Supply Monitoring

Following the 21 May 1998 site visit, DW-02, which serves the former Barracks Building, was added to the ongoing quarterly monitoring program. Because this well is located topographically downhill from DW-01, where TCE had been identified in groundwater, it was added to the program as a precautionary measure to determine if the former Barracks Building drinking water well also had been impacted. The well was sampled seven times between 17 August 1998 and 2 February 2000 for volatile organic compounds (VOCs) by EPA Method 8260 (Weston, 2011). No VOCs were detected in the samples which had reporting limits (RL) between 1 and 5 µg/L with a single exception. The sample collected on 8 July 1998, contained 1 µg/L dichloromethane which was below its 48 µg/L MEG.

1.2.3.6 1998 Site Inspection

In October 1998, representatives of Weston and MEDEP performed a walkover of the LO-58 Site to identify potential areas of concern regarding the release of hazardous substances to the subsurface. During the site walk, several areas of the LO-58 Site were identified as potential sources of contamination including the former Launcher Area, the former AFNS, and the former Test Building. At the former Launcher Area, ten catch basins were located on the concrete pad adjacent to the missile silos. The catch basins were connected to drainage pipes that carried runoff away from the pad and into drainage swales along the northwestern and northeastern corners of the former Launcher Area. Because historical information pertaining to the use and maintenance of the missiles suggested that they were periodically cleaned with a TCE-based solution, it was hypothesized that runoff of this solution could have entered the catch basins where it would have migrated to the drainage swales in the grassy areas surrounding the pad. One of the drainage swales was observed to be between the former Launcher Area and the former Generator Building (currently operated as the AMAC) in the approximate location where the bedrock water supply well for the AMAC facility was installed. This suggested that the TCE concentrations detected in the water supply could be due to historical use of TCE at the LO-58 Site.

Additional areas of concern identified during the site walk included two additional drainage pipe outfalls and drainage swales located adjacent to the former AFNS, the former Test Building and associated missile transfer rack (due to the unclear nature of "tests" that were performed at this location), the former Acid Storage Shed, and former Generator Building UST and septic system (Weston, 2011).

1.2.3.7 1999 Preliminary Site Investigation

Weston performed a PSI at the property in the summer of 1999 to evaluate subsurface conditions at the LO-58 Site by performing geophysical and passive soil vapor surveys, as well as a Geoprobe® soil boring and soil sampling program. Figure 1-4 includes the sampling locations for the PSI at the LO-58 Site. The objective was to assess if the source of the TCE contamination detected in the on-site bedrock water supply well was due to former activities of the DOD during its operation of the property, and to assess if additional investigations were warranted.

Weston subcontractor Northeast Geophysical Services of Bangor, Maine performed a geophysical survey near the former Generator Building on 23 June 1999. The geophysical survey consisted of two phases of investigation; a preliminary metal detection survey to identify the location of medium to large buried metal objects, and a more sensitive GPR survey to identify physical characteristics of those objects. The results of the GPR survey indicate that the metallic response observed during the magnetometer survey by representatives of MEDEP was not due to the presence of a UST in the area. The GPR profiles in this area showed strong but narrow hyperbolic reflectors that are indicative of a small-diameter metal pipe extending outwards from the corner of the former Generator Building.

Weston initiated a passive soil vapor survey at the LO-58 Site on 22 June 1999. A total of 75 EMFLUX® soil vapor probes were installed at locations AS-01 to AS-10, FP-01 to FP-12, GB-01 to GB-09, LP-01 to LP-22, MA-01 to MA-03, PR-01 to PR-08, and WB-01 to WB-04, in the vicinity of former Generator Building and surroundings; the former Test Building and surroundings; the former Acid Storage Shed and surroundings; the former AFNS area and surroundings; the former Launcher Area; and the drainage system outfalls and associated drainage swales located around the perimeter of the operations area. Figure 1-4 depicts the locations of these soil vapor sample locations. Weston removed all but 16 of the soil vapor samplers on 12 July 1999 (The 16 remaining soil vapor probes could not be located), and shipped them for laboratory analysis of VOCs by EPA Method 8260B. The analytical results of the soil vapor survey indicated that low levels of benzene, toluene, ethylbenzene, and xylene (BTEX) compounds, TCE, tetrachloroethane, naphthalene, chloromethane, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene may exist in the subsurface.

In October 1999, a Geoprobe® soil boring and soil sampling investigation was performed to characterize the Site soils, determine the depth of the overburden groundwater table (if present), explore the depth to bedrock at the property, and sample potentially contaminated soil zones identified by the passive soil vapor survey. A total of 40 soil borings, identified as SB-01 to SB-40, were advanced in the overburden at the LO-58 Site. Figure 1-4 depicts the locations of these soil borings. The borings were advanced to the top of the bedrock surface at each location, which was encountered at depths ranging between approximately 1 and 19 ft below ground surface (bgs). Soil samples were collected from the 0- to 4-ft depth interval from 15 of the 40 soil boring locations and submitted to ESS Laboratory for laboratory analysis of VOCs by EPA Method 8260B, gasoline-range organics (GRO) by Maine HETL Method 4.2.17, and diesel-range organics (DRO) by Maine HETL Method 4.1.25.

The analytical results of the soil samples collected indicated the presence of acetone in 16 of the 17 samples collected at concentrations ranging from approximately 0.0068 to 0.0551 milligrams per kilogram (mg/kg). TCE was detected in two soil samples, SB-13 and SB-34, at concentrations of 0.0011 and 0.009 mg/kg, respectively. Neither of these substances were detected above their respective MEDEP Remedial Action Guidelines (RAG). No other VOCs were detected in the soil samples collected from the LO-58 Site. DRO was detected in soil samples SB-04, SB-09, and SB-13 at concentrations of 4, 10, and 36 mg/kg, respectively. The MEDEP Remediation Standard for DRO is 10 mg/kg. There were no other detections of DRO, and no detections of GRO in the 17 soil samples collected from the LO-58 Site. Appendix A.1 includes a summary of the soil sample results.

Based on the results of the soil vapor survey and Geoprobe® soil boring investigation, Weston concluded that low levels of VOCs and/or DRO may exist in bedrock groundwater beneath the LO-58 Site. In addition, two soil samples collected from the property were found to contain concentrations of DRO in exceedance of the MEDEP Remediation Standard. Weston therefore recommended the installation and sampling of bedrock monitoring wells at the property (Weston, 2000b).

1.2.3.8 2001 Supplemental Site Investigation

Weston conducted a supplemental site investigation at the LO-58 Site between October 2000 and May 2001, to supplement the information obtained during the PSI performed in 1999. In addition to the information obtained during the PSI, MEDEP performed an investigation at the property in the spring of 2000 that indicated the presence of fuel-impacted soils in the vicinity of a former UST which was reportedly removed in 1994.

The objectives of the supplemental site investigation activities at the LO-58 Site were to further evaluate the source of TCE in the on-site drinking water well, to obtain further information regarding hydrogeologic conditions in bedrock, and to fill data gaps caused by the loss of 16 soil vapor probes during the PSI. The additional site investigation activities included a Geoprobe® soil boring and soil sampling program; the installation of five bedrock groundwater monitoring wells; and the collection of soil, groundwater, and drinking water samples for laboratory analysis of VOCs, DRO, and GRO.

The Geoprobe® investigation was performed to address concerns expressed by MEDEP regarding soil quality at the LO-58 Site. In particular, evaluations of soil in the vicinity of the former Launcher Pad and the AMAC were conducted. Additional areas of the property that were included in the investigation were the former Test Building and surroundings, the former Warhead Building and surroundings, and the grassy area located to the southwest of the AMAC Building. A total of 16 soil borings, identified as SB-41 to SB-56, were advanced in the overburden at the LO-58 Site. Figure 1-4 depicts the locations of these soil borings. The analytical results of soil samples collected during the investigation indicated the presence of DRO at three boring locations, SB-45, SB-54, and SB-55, at concentrations of 11, 24, and 133 mg/kg, respectively; concentrations in excess of MEDEP RAGs. Appendix A.1 includes a summary of the soil sample results.

The bedrock monitoring well installations were performed using air-hammer drilling techniques. The wells, identified as MW-01 to MW-05, were installed at the LO-58 Site to evaluate the nature and extent of groundwater contamination as well as determine the direction of groundwater flow in the local bedrock water-bearing zone. Figure 1-4 depicts the locations of these monitoring wells. Groundwater samples were collected from the bedrock monitoring wells in October 2000 and in May 2001 and submitted for laboratory analysis of VOCs, DRO, and GRO. The analytical results of the sampling indicated the presence of VOCs, DRO, and GRO in the samples. No VOCs were detected at concentrations above MEGs, but DRO and GRO were each detected in MW-05 during both rounds at a concentration in excess of their respective MEGs. GRO was also detected in MW-03 during the May 2001 sampling event at a concentration that exceeded its MEG. Drinking water samples were also collected from the two on-site bedrock wells DW-01 and DW-02. The analytical results of samples of untreated water collected from DW-01 indicated the presence of TCE and cis-1,2-dichloroethylene (cis-1,2-DCE) at concentrations below the MEDEP MEG. There were no detections of DRO in the samples of untreated water collected from DW-01, and no detections of VOCs or DRO in the untreated water samples collected from DW-02. Appendix A.1 includes a summary of the groundwater and drinking water sample results.

Based on the results of the site investigation conducted by Weston in October 1999 and the supplemental site investigation activities conducted by Weston in October 2000 and May 2001, the following conclusions were reached:

- No source areas of the chlorinated solvents detected in the AMAC drinking water supply well were detected in overburden soils at the LO-58 Site;
- Several areas existed where DRO had been detected in overburden soils at concentrations that equaled or exceeded the MEDEP RAG of 10 mg/kg;
- DRO and GRO were detected in groundwater at the LO-58 Site at concentrations that exceeded MEDEP MEGs;
- VOCs were detected in groundwater at the LO-58 Site, but at concentrations below MEDEP MEGs;
- VOCs were detected in the AMAC drinking water supply well, but at concentrations below MEDEP MEGs; and
- The general direction of groundwater across the LO-58 Site is to the north and west.

Weston concluded that no further action was warranted to locate source areas of VOC or total petroleum hydrocarbon (TPH) contamination in LO-58 Site overburden soils, and recommended the continued monitoring of the five bedrock monitoring wells and two on-site drinking water supply wells to evaluate the nature and extent of fuel-related substances within the bedrock water-bearing zone (Weston, 2001).

1.2.3.9 Long-Term Monitoring Program (LTMP)

After completion of the site investigations performed by Weston, the LTMP for the Maine FUDS program was subsequently developed and included the LO-58 Site with four other Maine FUDS locations. The LTMP included monitoring of the five bedrock monitoring wells and the two drinking water supply wells at the LO-58 Site on a semiannual basis for a period of at least two years to assess whether or not a remedial action was required in accordance with MEDEP regulations. In conjunction with the LTMP, Weston performed groundwater sampling at the monitoring and drinking water wells in December 2002, April 2003, September 2003, and May 2004 and submitted samples for laboratory analysis of GRO, DRO, and VOCs. Laboratory analytical results for samples collected during these events indicated that concentrations of DRO and GRO remain above the applicable standards in samples collected from MW-05 at the northeast corner of the former Test Building. Laboratory analytical results for samples collected from the AMAC drinking water well indicated that concentrations of TCE consistently remained at or slightly above the applicable standard of 5.0 µg/L during each sampling event. Appendix A.1 includes a summary of the groundwater and drinking water sample results.

In 2004, MEDEP requested that CENAE re-evaluate the LTMP to ensure that it complied with recent guidance issued by EPA regarding the FUDS program. These requirements include the collection of supplemental site characterization data prior to the installation of additional groundwater monitoring wells. The characterization data required included site operational histories, the identification of potential downgradient receptors, and refinement of hydrogeologic site conceptual models to better understand the nature and direction of groundwater flow at each property.

In September 2004, representatives from CENAE, MEDEP, and Weston met at MEDEP's Regional Office in Portland, Maine to discuss existing data gaps at each of the Maine FUDS and possible revision of the sampling program. During the 2-year semiannual program conducted between fall 2002 and spring 2004, results at several of the sampling locations indicated either no detection of suspected site contaminants or displayed concentrations that were below MEDEP's action levels for continued monitoring. As such, MEDEP agreed that continued monitoring of several sampling points at the five DERP-FUDS could be, at least temporarily, discontinued while the additional site characterization work was conducted. As part of the agreement between MEDEP and CENAE, MW-01, MW-02, and MW-04 were discontinued from the sampling program. Following the spring 2006 sampling round, MW-03 was also discontinued from the sampling program due to four consecutive rounds exhibiting non-detect concentrations for all compounds analyzed. Per the request of MEDEP, MW-03 was restored to the monitoring program in the spring 2007 sampling round (Weston, 2005; 2006). Appendix A.1 includes a summary of the groundwater and drinking water sample results.

1.2.3.10 2008 Geophysical/Hydrophysical Investigation

Geologic, geophysical, and hydrophysical investigations were conducted at the LO-58 Site in May 2008. The purpose of the investigation was to gather additional site-specific hydrogeologic information to further refine the CSM for groundwater flow. The investigations relied heavily on the work of COLOG, which summarized the results of the geophysical and hydrophysical investigations in the *HydroPhysics™ and Geophysical Logging Results* report, (COLOG, 2009; Weston, 2010a).

The geologic investigation included background research among available geologic references; observation and characterization of exposed bedrock at the LO-58 Site; measurement of bedrock features, including bedding planes, fold axes, and fractures; and the measurement of water levels in five bedrock monitoring wells and two bedrock drinking water wells during geophysical and hydrophysical investigations. The geophysical investigation included downhole geophysical logging of five bedrock monitoring wells (MW-01 through MW-05) and the two drinking water wells (DW-01 the AMAC Well, and DW-02 the former Barracks Building Well) at the LO-58 Site.

The hydrophysical investigation included hydrophysical logging (HPL) of DW-01 and DW-02 at the LO-58 Site. The HPL included ambient flow characterization, pumping flow characterization, and wire-line straddle packer (WSP) testing techniques. Based on the results of the HPL investigation described above, the highest-producing zones in each well were targeted for WSP testing, with the objective of distributing sampling points along the entire length of the borehole to the extent possible, and Weston performed WSP sampling at both of the drinking water wells in May 2008. The zones targeted for WSP testing were first isolated and sampled utilizing low-flow methodology, and groundwater parameters were measured to confirm equilibrium conditions were achieved during low-flow sampling. After collecting the samples, each zone was tested for transmissivity and hydraulic conductivity.

The groundwater samples were submitted to Test America Laboratories, Inc. and Analytics Analytical Laboratories, LLC for analysis for VOCs by EPA Method 524.2, 1,2-ethylene dibromide, 1,2-dibromo-3-chloropropane, and 1,2,3-trichloropronane by EPA Method 504.1, GRO by the Maine HETL Method 4.1.17 and DRO by Maine HETL Method 4.1.25. The analytical results were validated according to EPA Region 1 functional guidelines and were found to be useable, as qualified. The analytical results for DW-01 were consistent with previous analytical results for this well. Laboratory analytical results from the WSP sampling of DW-01 indicate the presence of chloroform, cis-1,2-DCE, TCE, toluene, GRO, and DRO in one or more samples collected from DW-01, and generally have identifiable trends (Weston, 2010b). None of the VOCs were detected above their applicable Maine MEGs or EPA MCLs for drinking water. However, GRO or DRO concentrations in five samples exceeded their applicable 50 µg/L Maine MEG.

The analytical results for DW-02 were generally consistent with previous analytical results, with one anomaly. Laboratory analytical results from the WSP sampling of DW-02 indicated the presence of cis-1,2-DCE, toluene, and DRO in one or more samples collected from DW-02. None of the VOCs were detected above their Maine MEGs or EPA MCLs for drinking water. However, GRO or DRO concentrations in five samples exceeded their applicable 50 µg/L Maine MEG.

1.2.3.11 2008 Through 2012 Groundwater Long-Term Monitoring Program

As part of the continuing semiannual groundwater monitoring performed at the LO-58 Site, in April and October 2008, May 2009, and October 2009, additional groundwater samples were collected from MW-03, MW-05, and DW-01 and DW-02, for analysis of GRO, DRO, and VOCs (Weston, 2008a and 2008b; Johnson Companies, Inc. [JCI], 2010a; 2010b; and 2010c). During these events, the groundwater elevation and field parameters for these wells remained consistent with previous measurements. The groundwater analytical results indicate that the concentrations of hazardous materials continued to decrease in each of these wells, with none of the GRO, DRO, and VOCs results exceeding Maine MEGs during this period. Since April 2008, the concentrations of TCE detected in DW-01 have remained below the 5.0 µg/L Maine MEG, with the exception of the July 2010 sample, which at 6.6 µg/L exceeded the Maine MEG, and the most-recent sampling in October 2012 which contained TCE at 7.4 µg/L (JCI, 2010c). Sampling of the AMAC Building POE treatment system between the filters and after the second filter was initiated in fall 2009, and indicated no detectable VOCs in the between-the-filters or post-treatment water (JCI, 2010c). Appendix A.1 includes a summary of the groundwater monitoring and drinking water sample results.

The results of the site investigations discussed above are presented in the Final Conceptual Site Model Report (Weston, 2011).

1.2.3.12 Investigation Reports

The following investigation reports have been generated thus far for LO-58.

- COLOG, Division of Layne Christensen Company, 2009. HydroPhysical™ and Geophysical Logging Results, Former Nike Battery Launch Site LO-58, Maine Formerly Used Defense Sites, Caribou, Maine. January.
- JCI, 2010a. Final Fall 2008 Monitoring Letter Report, Formerly Used Defense Sites, Northern Aroostook County, Maine. February.
- JCI, 2010b. Final Spring 2009 Monitoring Letter Report, Formerly Used Defense Sites, Northern Aroostook County, Maine. February.
- JCI, 2010c. Final Fall 2009 Monitoring Letter Report, Formerly Used Defense Sites, Northern Aroostook County, Maine. March.
- JCI, 2011. Final Spring 2010 Groundwater Sampling Report for Four Defense Environmental Restoration Program, Formerly Used Defense Sites, Caribou, Caswell, Perham, Maine. March.
- Mason (Mason Environmental Services, Inc.), 1995. Memorandum dated 27 July 1995 depicting various work progress photographs.
- Weston (Weston Solutions, Inc.), 2000. Final Preliminary Site Investigation Report, Preliminary Site Investigation at the Former Loring AFB Defense Area, Nike LO-58 Launch Area, Caribou, Maine. Contract No. DACA31-96-D-0006, Task Order 18. June.
- Weston, 2000a. Addendum Initial Site Investigation Report, Site Investigation Report at Four Defense Environmental Restoration Program, Formerly Used Defense Sites, Caswell, Perham, Presque Isle, Maine. November.
- Weston, 2001. Final Addendum to the Preliminary Site Investigation Report at the Former Loring AFB Defense Area, Nike LO-58 Launch Area, Caribou, Maine. Contract No. DACA31-96-D-0006, Task Order 18. October.
- Weston, 2004. Monitoring Well Installation and Long-term Monitoring Program Report, Monitoring Well Installation and Long-term Groundwater Monitoring for Five Defense Environmental Restoration Program Formerly Used Defense Sites, Northern Aroostook County, Maine. October.
- Weston, 2005. Final Long-term Monitoring Program Report, Long-term Monitoring for Five Defense Environmental Restoration Program Formerly Used Defense Sites, Northern Aroostook County, Maine. November.

- Weston, 2006. Final Long-term Monitoring Program Report, Long-term Monitoring for Five Defense Environmental Restoration Program Formerly Used Defense Sites, Northern Aroostook County, Maine. August.

- Weston, 2007. Final Long-term Monitoring Program Report, Long-term Groundwater Monitoring for Five Defense Environmental Restoration Program Formerly Used Defense Sites, Northern Aroostook County, Maine. November.

- Weston, 2008a. Final Sampling Results: Fall 2007 LTMP Round, Five Defense Environmental Restoration Program Formerly Used Defense Sites, Northern Aroostook, Maine. January.

- Weston, 2008b. Long-term Groundwater Monitoring for Five Defense Environmental Restoration Program Formerly Used Defense Sites, Northern Aroostook County, Maine. February.

- Weston, 2010a. Final Borehole Hydrophysics and Geophysics Report, Former LO-58 Nike Battery Launch Site, Formerly Used Defense Site, Caribou, Aroostook County, Maine. June.

- Weston, 2010b. Draft Conceptual Site Model, Former LO-58 Nike Battery Launch Site, Formerly Used Defense Site, Caribou, Aroostook County, Maine. August.

- Weston, 2011. Final Conceptual Site Model, Former LO-58 Nike Battery Launch Site, Formerly Used Defense Site, Caribou, Aroostook County, Maine. August

2. SITE CHARACTERISTICS

2.1 GENERAL SITE CHARACTERISTICS AND OWNERSHIP HISTORY

As discussed in Section 1, the LO-58 Site is comprised of a 17-acre parcel located at 253 Van Buren Road (Route 1) in Caribou, Aroostook County, Maine. The general site characteristics and ownership history is presented in Sections 1.2.1 and 1.2.2.

The Site is currently improved with several former Nike facility buildings. The former Barracks Building, an approximately 8,300 square-foot structure located approximately 200 ft east of Van Buren Road, is owned and operated by the Lister-Knowlton VFW Post 9389. The former Barracks Building is located at roughly the topographic low of the Site, with the Site’s terrain ascending up in a northeastward direction towards the former Nike Launcher area. The VFW currently uses the former Barracks Building as their headquarters for meetings and functions, and leases the former Generator Building to AMAC, a daycare facility for handicapped adults.

The former Generator Building is an approximately 3,750-square foot single story structure located approximately 550 ft east of Van Buren Road and accessed by a paved right-of-way extending east from the former Barracks Building parking area. The former Generator Building is located at the top of the hill east of the former Barracks Building and adjacent west to the former Nike Launcher Area.

Each of the underground missile vaults at the former Launcher Area has been decommissioned and the vaults are no longer accessible. The only other portion of the LO-58 Site that is currently used is the southernmost portion of the former Launcher Area which is used as a shooting range by the City of Caribou Police Department (Weston, 2011).

2.2 SITE UTILITIES

Municipal water supplies and sanitary sewer service are not available to any properties in the vicinity of the LO-58 Site. Section 1.2.1 presents the water supply and septic systems available for the Site.

Both the former Barracks and AMAC Buildings are provided fuel oil via 275-gallon ASTs. Both ASTs are situated indoors where they are protected from the elements and concrete floors provide secondary containment for potential releases. A 500-gallon fuel oil AST, which is empty and no longer used, remains in the concrete cradle behind the former Test Building. This AST is not subject to removal by the Formerly Used Defense Sites program.

2.3 SURFACE FEATURES

The LO-58 Site is situated along the sides and on the summit of a small hill located along U.S. Route 1, in the approximate center of Caribou, Maine. The highest portion of the Site is undeveloped and covered in shrub vegetation and tall grasses. Located to the north of the high point is the former Launcher Area on a graded and paved (poor condition and overgrown) flat area in the eastern portion of the Site that was cut into the side of the hill. The former Warhead Building is located north of the former Launcher Area and is approximately 15 ft lower in elevation than the former Launcher Area. The area around the former Warhead Building has been overgrown with shrubs, young trees, and tall grasses. A large earthen berm surrounds the former Warhead Building slab foundation area to the north, east, and south. The top of the berm to the south extends out eastward and is level with the former Launcher Area elevation. The berm slopes down and sharply to the northwest, north, and northeast.

The Former Missile Assembly and Test Building, AMAC Building Garage, and the AMAC Building are located west of the former Launcher Area and former Warhead Building. These areas are accessed by a bituminous concrete access road and a paved parking area is located south of the Former Missile Assembly and Test Building and the AMAC Building Garage. The access road descends the western-facing slope to the VFW Post Headquarters located at the western edge of the Site. Undeveloped and overgrown terrain slopes sharply down and towards the west on either side of the access road.

The topographic low for the Site exists in a drainage swale located at the base of the hill, approximately 150 ft east of the former Barracks Building. The swale begins at the discharge of a 3-foot diameter corrugated steel drainage culvert and extends to the north/northeast approximately 300 ft towards the newly constructed off-site Access Road located north of the

Site. The drainage culvert conveys drainage from the former Launcher Area, the former Warhead Assembly and Test Building area, the AMAC Building area, and the former Barracks Building. Based on observations made during field investigations, it appears that this swale primarily conveys stormwater drainage from the former Barracks Building parking lot. West and northwest of the swale, the ground surface slopes back up towards the rear of the former Barracks Building, and is improved with manicured lawn and a bituminous concrete access area surrounding the former Barracks Building.

A chain-link fence surrounds the property along the parcel perimeter and terminates at the northern and southern extents of the parcel’s west edge abutting Van Buren Road. The perimeter fence is in good condition. The only access to the Site is provided by two bituminous concrete driveways on the northern and southern edges of the former Barracks Building parking area, located west of the former Barracks Building. The two access driveways have a gentle slope upward to Van Buren Road, located slightly higher than the elevation of the former Barracks Building and associated parking areas.

2.4 METEOROLOGY

The Site is situated within a temperate climate characterized by wide variations in seasonal and daily temperatures. The following climate data were obtained between 1971 and 2000 from the Caribou, Maine COOP Weather Station Number 171175. The average annual daily temperature is 39.2°F, with the average high temperature of 48.9°F and the average low of 29.5°F. The maximum average low temperature recorded over the period is 54.8°F in July, while the maximum average high temperature recorded was 76.3°F, also in July. The minimum average low temperature for the period is -0.3°F in January and the minimum average high temperature of 19.3°F was also reported in January. The average annual precipitation for the period was 37.44 inches, with the driest month being February with an average of 2.06 inches of precipitation falling. Conversely, the wettest month recorded is August with approximately 4.15 inches of precipitation (NOAA, 2002).

2.5 SURFACE WATER HYDROLOGY

Aside from intermittent ponding of stormwater or snowmelt discharging to the swale discussed previously in Section 2.3, no surface water bodies are located on or adjacent to the LO-58 Site. Stormwater either infiltrates into the subsurface in unpaved portions of the Site, or follows overland flow routes into catch basins and drainage swales. Following the topography at the LO-58 Site, surface water runoff flows generally north, northwest, and west towards the drainage swale, except for the areas around the former Barracks Building where runoff flows eastward toward the drainage swale. Paved portions of the Site are drained by catch basins or drainage swales, both of which direct runoff to the drainage swale.

2.5.1 Regional Watershed

The former LO-58 Nike Site is located in the Aroostook River Watershed. The Aroostook River Watershed has a catchment area of approximately 2,400 square miles in northeastern Maine and western New Brunswick, Canada (University of Maine, 2013). The Aroostook River begins at the confluence of Millinocket Stream and Munsungan Stream located in Maine Township 8, approximately 88 miles upstream from the LO-58 Site. The river meanders in a northeast direction through Masardis, Ashland, Presque Isle, and then Caribou, Maine. At its closest point, the Aroostook River comes within approximately 1.3 miles south of the LO-58 Site, and then continues to meander east, becoming a confluence with the St. Johns River in New Brunswick, Canada. The nearest tributary entering the Aroostook River in the vicinity of LO-58 is Longfellow Brook, which is located 0.42 miles from the Site. The landscape drained by the Aroostook Watershed is predominantly undeveloped forested land area, with small isolated towns and surface water bodies located sporadically across the region.

2.5.2 Floodplain

The LO-58 Site is located in Zone C (area of minimal flooding), and is located outside of the 500-year floodplain, based on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Community Panel No. 230014 0008C. A small area approximately 0.25 miles north of the LO-58 Site is identified as Zone A, indicating it lies in an area within the 100-year floodplain.

2.6 GEOLOGY

2.6.1 Topography

The LO-58 Site is situated on a small hill located along U.S. Route 1, in the approximate center of Caribou, Maine. The Site generally grades radially from a topographic high of approximately 610 ft amsl located in the southern portion of the Site to a low elevation of approximately 530 ft amsl along the northwestern property boundary.

Located to the north of the high point is the former Launcher Area, which is located on a man-made terrace at approximately 585 ft amsl. The Former Missile Assembly and Test Building, AMAC Building Garage, and the AMAC Building are located west of the former Launcher Area and former Warhead Building at an elevation of 565 ft amsl. The access road descends the western-facing slope to a low of approximately 540 ft amsl located at the VFW Post Headquarters located at the western edge of the Site. The topographic low elevation of approximately 530 ft amsl occurs in a drainage swale located at the base of the hill, approximately 150 ft east of the former Barracks Building.

2.6.2 Soil and Overburden Geology

2.6.2.1 Soil Description

Based on the Aroostook County Soil Survey, Northeastern Part (USDA, 2008a), soils at the LO-58 Site are primarily mapped as Caribou gravelly loam, with slopes varying from 0 to 15%. Caribou soils are well drained soils formed on loamy till plains and ridges and have moderate permeability (0.6 to less than 2.0 inches per hour) (USDA, 2008b).

2.6.2.2 Overburden Geology

Based on the Surficial Geologic Map of Maine (MGS, 1985), overburden underlying the property is primarily glacial till consisting of a heterogeneous mix of sand, silt, clay, and stones with local occurrences of boulders, which were deposited during glaciation. The glacial till is generally massive and may contain beds and lenses of variably washed and stratified sediments. Subsurface investigations at the LO-58 Site have generally confirmed these mapped subsurface conditions, although no inclusions of washed or stratified sediments have been noted.

Site-specific observations document that overburden thickness at the LO-58 Site varies depending on location, and ranges from 0 ft bgs at the former Launcher Area where the overburden had been excavated to approximately 16 ft bgs near the former Test Building. Bedrock outcrops are present along the southern edge of the former Launcher Area (Weston, 2011). Figure 2-1 presents an isopach map of overburden thickness at the LO-58 Site.

2.6.2.3 Bedrock Geology

As noted above, the depth to bedrock at the Site varies depending on location. Bedrock topography was mapped using boring information obtained during the subsurface investigation performed by Weston in 1999 and 2001. Figure 2-2 presents a contour map of bedrock elevations at the LO-58 Site. Observation of the bedrock surface in the vicinity of the former Launcher Area, as well as previous soil boring records indicate that there is little or no weathered bedrock at the overburden-bedrock interface. Vertical seismic profiling did not identify acoustically-incompetent bedrock at the LO-58 Site (Weston, 2011). A competent bedrock surface is consistent with the geologic history of the LO-58 Site, which indicates that any weathered bedrock would have been eroded during the final Wisconsin-age glacial advance, and that there has been insufficient time for appreciable bedrock weathering during the subsequent 12,000 years. No rock quality designation data are available for any of the bedrock wells at the LO-58 Site. Figure 2-2 indicates a notable linear depression in the bedrock surface which is present between locations SB-22 and SB-43 (see Figure 1-4 for soil boring locations). This may be indicative of a surface fracture zone; this fracture orientation was generally consistent with fractures observed during geophysical logging of DW-01.

2.6.2.4 Lithology

Based on the 1:62,500-scale Geologic Map of the Caribou and Northern Presque Isle Quadrangles, Maine and observations made at the Site, bedrock beneath the LO-58 Site is mapped as the Silurian Spragueville Formation (MGS, 1985). The Spragueville Formation comprises interbedded pelite and limestone and/or dolostone rocks of Silurian age (MGS, 1985). This formation is weakly metamorphosed and contains local occurrences of prehnite and pumpellyite. The Spragueville Formation contains distinctive, rounded nodules resulting from bioturbation (Lopez, 2003). The Spragueville Formation is interpreted as submarine fan sediments that are closely related to the older Carys Mills Formation (Lopez, 2003).

Observations of bedrock in outcrops in the Launcher Area of the LO-58 Site confirm that the local bedrock is gray, “nubbly”, interbedded, weakly metamorphosed mudstone and limestone. The bedding surfaces are clearly visible in the rock, both in outcrops and in Optical Televiewer (OTV) logs of boreholes obtained in 2009, and contain the “nubbly” bioturbation (i.e., disruption of sediments by feeding and burrowing organisms) features associated with the Spragueville Formation (Lopez, 2003). Consistent with available information regarding the thickness and extent of the Spragueville Formation, no geologic contacts were encountered on or beneath the LO-58 Site. Consistent with descriptions of the Spragueville Formation, the limestone beneath the LO-58 Site does not exhibit karst features. No evidence of karst features was noted in on-site outcrops or in the Optical or Acoustical Televiewer logs obtained in 2009. The nearest contact with another geologic unit, the Siluro-Ordivician Carys Mills Formation, is located approximately 900 ft northwest of the LO-58 Site (MGS, 1985).

2.6.2.5 Bedrock Fabric

Based on the *Geologic Map of the Caribou and Northern Presque Isle Quadrangles, Maine* and other geologic references (MGS, 1985; Lopez, 2003), bedrock underlying the property is located on the east limb of the Chapman Synclinorium. The axis of the synclinorium trends north-northeast and dips to north. The Chapman Synclinorium was formed during the first deformational or compressional phase of the Acadian Orogeny, which occurred during the lower to middle Devonian Period, and resulted in a major, single, and steeply dipping north-south cleavage in the bedrock (Lopez, 2003).

The *Geologic Map of the Caribou and Northern Presque Isle Quadrangles, Maine* identifies the bedrock bedding at the LO-58 Site as striking North 70º East and dipping 12º East, as well as a foliation striking North 5º West and dipping 78º West (MGS, 1985). Site-specific observations, from both bedrock outcrops and OTV logs, indicate that the local bedrock is folded in two directions: the major folds are broad to tight with axes oriented North 30º East, parallel to the axis of the Chapman Synclinorium; the fold axes are also folded broadly on North 20º West axes.

Three joint sets are present in the local bedrock:

- a near vertical set striking North 45º East and dipping 80º West which is associated with the Acadian Orogeny;
- another steeply-dipping set striking North 45º East and dipping 85º East which is roughly perpendicular to the first; and
- a shallow-dipping set of sheeting joints that is roughly parallel to the ground surface and bedding and decreases in frequency with depth, related to the relief of downward pressure due to erosion and glacial unloading (Billings, 1972; COLOG, 2009).

The near-vertical sets of joints, particularly the set striking North 45º East and dipping 85º East, are often filled with calcite.

The planar features in bedrock that are intercepted by DW-01 and DW-02 were measured during geophysical investigations conducted by COLOG, and plotted as tadpoles on the geophysical logs, as well as plotted onto Schmidt stereonets. Figure 2-3 presents a stereonet plot of bedding planes and measured joints obtained during the 2009 Geophysical Investigation in support of the 2011 CSM.

The stereonet plots for DW-01 show two clusters of data; one for the low-angle features (near-horizontal joints and bedding) which has about 90º of variability from North 45º West to North 45º East, dipping West, and a second pair of steeply dipping features (near-vertical joints) which are further grouped in two clusters, one at North 25º West and a smaller cluster at North 65º West, both dipping East.

The figure includes feature ranks (ranked from 0 for fractures with minimum flow capacity to 5 for fractures with maximum flow capacity) indicate that both the low angle and steeply-dipping features contain members where significant flow is present (COLOG, 2009). The stereonet plots for DW-02 are more complicated, in as much as they represent a greater length of bedrock borehole data. The primary data cluster for DW-02 is centered on steeply-dipping features (near-vertical joints) oriented North 45º East and dipping East which has approximately 45º of lateral spread. The feature rank plot reveals that there are a small number of features which do not appear on the contour plot due to low frequency. Within these data are a set of steeply-dipping features (North 45º West to North 45º East, with a slight concentration around North 45º East, dipping West); there are relatively few low-angle features in this dataset (Weston, 2010a).

Thus, the results indicate that the upper 60 ft of bedrock have similar fracturing characteristics at DW-01 and DW-02. However, the deeper bedrock (below approximately 70 ft) surrounding DW-02 contains very few sheeting fractures, and the aperture and water-bearing potential of the steeper fractures are not as significant, this pattern does not appear in the bedrock surrounding DW-01 because the well is not deep enough. Thus, the difference noted in relative fracture density and orientations are artifacts of the different borehole depths (58 ft versus 283 ft), not differences in the nature of the shallow (i.e., <58 ft) bedrock at the two well locations.

As shown on Figure 2-2 a linear depression in the bedrock surface, that may be indicative of a fracture zone, is located on an east-west trend approximately 75 ft southwest of the former Warhead building. The orientation of the linear depression, approximately North 70º West, is near-coincident with the North 65º West cluster of joints noted in the geophysical log of DW-01 described above. This supports the hypothesis that the feature is a surficial expression of a fracture zone.

2.7 HYDROGEOLOGY

2.7.1 Overburden Hydrogeology

As discussed above, overburden underlying the property is primarily glacial till. The till is generally massive, but may contain beds and lenses of variably washed and stratified sediments. Observations made during the soil boring programs are consistent with these observations. The overburden at the Site consists of fill in most places underlain by a till which may consist of dense, poorly sorted gravel to silt. No stratified sediments were observed during the boring program. It would be expected that the hydraulic characteristics of the overburden would be variable but generally have medium to low permeability.

Overburden groundwater was not encountered at the Site during April and October 2012 Field Investigations. Subsurface investigations at the Site have indicated that there is little or no saturated thickness in the overburden (Weston, 2011). Surface water that infiltrates the overburden percolates downward until coming in contact with the bedrock surface. At the bedrock surface, groundwater flows along the surface of the bedrock until reaching a permeable fracture (Weston, 2011).

2.7.2 Bedrock Hydrogeology

As noted in Subsection 2.5.3, no significant thickness of weathered bedrock is present at the Site, and overburden groundwater is assumed to infiltrate from the overburden into fractures in the bedrock. The fine-grained nature of the bedrock (mudstone and limestone) beneath the Site would be unlikely to result in significant quantity of interconnected pores. In addition, although solution cavities are common in certain limestone deposits, neither the available geologic literature nor local or regional observations of karst topography indicate that the limestone of the Spragueville Formation is subject to solution cavities (MGS, 1985).

Thus, groundwater flow through bedrock at the Site is likely primarily via fracture flow. It may be concluded that the orientation, length, width, and interconnectedness of joints in the bedrock beneath the Site will dominate groundwater flow direction and contaminant distribution within groundwater (Freeze & Cherry, 1979).

2.7.2.1 Bedrock Groundwater Elevation

Figure 2-4 depicts the groundwater elevations measured in October 2012. Bedrock groundwater elevations range from approximately 528.88 ft amsl in MW-01 to 548.38 ft amsl in MW-04.

Table 2-1 summarizes the depth to groundwater measurements obtained in October 2012 and associated groundwater elevation calculations. During this sampling event, depth to groundwater ranged between 57.1 ft bgs at MW-04 (the well at the highest elevation) and 41.5 ft bgs at MW-03. On average, the groundwater elevation was approximately 19 ft lower during the 2012 groundwater elevation survey than during the Weston’s May 2008 groundwater elevation survey. The depth to water data was reviewed and the measurements in 2012 and 2008 were taken in a consistent manner and are comparable. The bedrock aquifer underlying the LO-58 property has minimal storativity. As such, the aquifer responds rapidly to precipitation events (or lack thereof). Examination of the variation of water elevations between previous sampling events indicate a wide range (albeit less than 19 feet [ft]) in depth to water measurements. The 2012 groundwater elevation survey was performed in October, which is at the end of the annual dry season. Available precipitation data for the 2012 summer indicates a relatively dry period leading up to the October 1, 2012 groundwater elevation survey. It is likely that this condition contributed to the lower than normal ground water elevations. Thus, groundwater conditions during the 2012 investigations represent dryer (i.e., significantly lower water table elevations) than the work done by Weston in 2008.

2.7.2.2 Bedrock Groundwater Flow Velocity and Transmissivity

The investigations conducted by Weston and COLOG in 2009 on DW-01 and DW-02 provide the data required to estimate volumetric flow rates and specific discharge rates for the bedrock fractures examined. These investigations included natural gamma logging, three-arm caliper logging, fluid electrical conductivity logging, normal resistivity logging, single point resistance/spontaneous potential/current logging, induction logging, vertical seismic profile logging, acoustic and optical televiewer logging, full-wave form sonic logging, and HydroPhysical Logging™. HydroPhysical ™ logging involves borehole pumping followed by pumping and injecting deionized water to evaluate changes in fluid electrical conductivity, which is processed and evaluated to estimate borehole inflow at test locations.

Under pumping conditions of DW-01 and DW-02, the results provide the data required to calculate interval-specific inflow rates. The equivalent transmissivity of the fractures at each well was estimated using the Hvorslev equation which assumes steady-state radial flow in an unconfined aquifer. By evaluating the results under the two pressure conditions (ambient and production conditions), the interval specific equivalent transmissivity was calculated for each identified water-producing interval (COLOG, 2009).

Maximum fracture transmissivity was observed in the central portion of DW-01 at depths between 40.4 to 48.6 ft bgs (530.6 to 522.4 ft amsl) and 52.7 to 53.6 ft bgs (518.3 to 517.4 ft amsl). The estimated equivalent transmissivities were quite variable, varying by over two orders of magnitude between adjacent sample intervals. Estimated equivalent transmissivities in DW-01 ranged between 129 ft^2/day at the depth interval between 40.4 and 48.6 ft bgs and 8.5 ft^2/day at the top of the borehole (27.3 and 31.7 ft bgs/543.7 and 539.3 ft amsl).

Maximum groundwater flow into DW-02 occurs in the top portion of the well at depths of 19.5 to 19.6 ft bgs (527 to 526.9 ft amsl), 30.4 to 31.6 ft bgs (516.1 to 514.9 ft amsl), 38.2 to 41.8 ft bgs (508.3 to 504.7 ft amsl), and 44.9 to 51.4 ft bgs (501.6 to 495.1 ft amsl). Equivalent transmissivities in DW-02 ranged between 216 ft^2/day at the depth interval between 30.4 and 31.6 ft bgs (516.1 and 514.9 ft amsl) and 0.2 ft^2/day at the depth interval between 227.4 and 228.2 ft bgs (319.1 and 318.3 ft amsl).

Although a pumping test was performed on DW-01, a storativity calculation could not be performed using the provided data. During a dry period between late April and late May, 2008, a 10-foot decrease in the groundwater elevations was observed. This drop resulting from minimal recharge suggests that the storage coefficient in the bedrock is low.

Beyond assessments performed at DW-01 and DW-02, Weston also installed pressure transducers in each of the five monitoring wells that existed at the time and the two drinking water wells, DW-01 and DW-02. Precipitation records for the Caribou Airport for the period that the pressure transducers were in place were obtained. Comparison of the precipitation records to the pressure transducer data summaries indicated that there appears to have been a fairly rapid (approximately 6-hour) response in DW-01 and DW-02 to the rainfall event on May 8, 2008, where a slight increase in potentiometric elevation was noted. However, a similar response was not noted during the May 20, 2008 rainfall event in part due to interference by pumping activities at DW-01. The relatively rapid response is consistent with the relatively thin overburden deposits at the LO-58 Site and the limited storage capacity of the bedrock (Weston, 2010a).

2.7.2.3 Bedrock Groundwater Horizontal Gradients

In a homogenous porous media, the vertical and horizontal groundwater flow direction, as determined by potentiometric surface elevations, can be assumed to be relatively constant near and between wells. For this reason, overburden groundwater horizontal gradients can often be defined and depicted graphically. However, in fractured bedrock aquifers, hydraulic gradient, fracture orientation and connectivity dominates groundwater flow direction. Consequently, potentiometric surface information alone is not adequate to define the direction of groundwater flow. Because of the anisotropic and heterogeneous flow systems in bedrock aquifers, it is difficult to make specific statements regarding groundwater horizontal gradients without comprehensive, site-specific data such as that collected using hydrophysical logging methods (Weston, 2010a).

Figure 2-4 depicts the overall bedrock groundwater elevation as defined by the monitoring well network for October 2012. The overall bedrock groundwater horizontal potentiometric gradient at the LO-58 Site is northerly beneath the eastern and central portions of the LO-58 Site, and north-westerly beneath the western portion of the LO-58 Site, generally consistent with topography. Seasonal variations in the shape of the potentiometric surface appear to be minimal, as the shape of the surface is similar for both the May 2008 and October 2012 synoptic bedrock gauging events.

The complexity of the bedrock groundwater horizontal potentiometric gradients is illustrated by the results of synoptic potentiometric head measurements performed by Weston in May 2008. The location of DW-01 near the center of the LO-58 Site monitoring network is nearly ideal for the characterization of bedrock groundwater horizontal potentiometric gradients and flow directions, as it is uniquely surrounded by other bedrock groundwater monitoring points.

Synoptic hydraulic head measurements obtained during pumping of DW-01 in 2008 showed strong responses in three bedrock wells (MW-01, MW-03, and MW-05), indicating that these four locations are connected by a preferential flow pathway. However, there was no observable response at DW-02, which is located to the west, and either hydraulically-downgradient or cross-gradient of DW-01.

Although the May 2008 overall bedrock groundwater horizontal gradients indicate the potential for flow from DW-01 to DW-02, the groundwater elevation survey results (which represent actual, rather than theoretical conditions, and thus bear much greater weight) do not indicate such a connection (Weston, 2010a).

As part of the 2008 investigations, bedrock groundwater depths were measured in each of the five monitoring wells at the Site on April 30, 2008, upon installation of the pressure transducers, and on May 21, 2008, upon the retrieval of transducers. Bedrock groundwater depths were measured in DW-01 and DW-02 at the LO-58 Site on May 5 and 6, 2008, respectively, upon installation of the pressure transducers, and on May 21, 2008, upon transducer retrieval. The first groundwater depths for the drinking water wells were measured shortly following their shut down and the removal of their pumps and associated piping, and are not considered to represent equilibrium conditions. Thus, the May 21, 2008, groundwater depth data are likely to be the most representative of the undisturbed potentiometric surface in the bedrock.

Comparing the results of the 2008 elevation survey (conducted when DW-01 was not pumping) to the 2012 survey (conducted when DW-01 was pumping) provides an independent evaluation of the impact of DW-01 on the observed groundwater elevations. The results of the comparison indicate that pumping DW-01 was observed to have the largest impact on water levels in MW-01 and MW-03. Although there is a hydraulic connection between DW-01 and MW-05, the drawdown observed at MW-05 (which is closer to DW-01) was less than those observed at the other two wells. This result is indicative of groundwater flow through fractured bedrock. The orientation of the preferential flow pathway is consistent with the North 70º West fracture set identified in earlier discussions in Section 2.6.2.5 Bedrock Fabric.

2.7.2.4 Bedrock Groundwater Vertical Gradients

Testing conducted during the drinking water well investigations identified primarily horizontal flow across DW-01 and downward vertical flow within the fluid column in DW-02. The location of a well within a groundwater flow system significantly influences the presence and magnitude of vertical gradients at any point in the system. In a fractured bedrock environment, the direction of groundwater flow within a well is also impacted by the interconnectedness of the individual fractures surrounding the well and the hydraulic head difference between the fractures.

There is a highly interconnected network of fractures around DW-01 that results in limited vertical groundwater flow within this well (i.e., limited vertical gradients were identified during the testing of DW-01). The exception to this general statement is the shallowest depth interval of DW-01, which has temperature/potential of hydrogen (pH) and pressure transducer data that indicates that it is isolated from the fractures immediately below it.

However, in DW-02, upward vertical gradients are observed. The differential head, (i.e., the difference in hydraulic head between different depths in the well), gradually increases with depth with the deepest fracture interval (265.0 to 284.0 ft bgs) having a pressure head of approximately 130 ft. The relatively strong differential potentiometric head that exists between the upper and middle fractures results in vertical groundwater flow from the middle fractures to the upper fractures within the well (COLOG, 2009).

2.8 DEMOGRAPHY AND LAND USE

Caribou is located in Aroostook County ME and had a population of 8,172 in 2011 with a population density of 103 people per square mile. The land area is 79.3 square miles. The town is at an elevation of 442 ft. The census block that includes the Site has a population of 1,357 consisting of 610 households. The median income of this census block is $45,581 (USA.COM, 2013).

The Site is maintained for a variety of uses. Members of the VFW use the former Barracks Building regularly for social functions including bingo games, dances, and meetings. In addition, VFW members perform landscaping activities in the vicinity of the former Barracks Building, including lawn maintenance. Staff and clients at AMAC use the former Generator Building five days a week, and regularly take walks around the eastern portion of the Site. The southern portion of the former Launcher Area serves as a shooting range for the City of Caribou Police Department and Customs and Border Patrol personnel.

According to the City of Caribou Zoning Map, the Site and its immediate vicinity are zoned as Residential District R-3. Residential District R-3 is intended for the kinds of uses which have traditionally dominated rural New England - forestry and farming, farm residence, and a scattering of varied uses not inconsistent with a generally open, non-intensive pattern of land use. Properties in the vicinity of the LO-58 Site include a mix of commercial and residential uses. According to the Caribou Land Use Table, the current uses of the property, i.e., Private Club and Day Care, are permitted within R-3 Residential District (City of Caribou, 2008). Current, non-residential uses of parcels in the immediate vicinity of the property include, Automobile

(Vehicle) Body Shop or Graveyard and Building Materials, Storage and Sale, and are permitted within Residential District R-3 with Planning Board approval (City of Caribou, 2008).

Avatar personnel performed a visual survey of the surrounding properties during site reconnaissance in July and September 2012. Residential properties, associated farm land, and a new highway (Caribou Bypass) abut the Site along Route 1 to the north and west. The property that abuts the Site to the south is used as a single-family residence and an automobile maintenance facility identified as Morin’s Auto Detailing. Haney’s Building Supply is located across Route 1 to the southwest. This property includes a residence and a building materials showroom and storage. The remaining property to the east and southeast comprises undeveloped land and farmland.

2.9 ECOLOGY

A comprehensive discussion of the ecology of the LO-58 Site including habitats and the flora and fauna potentially inhabiting those areas is presented in the “Ecological Setting” of the screening-level ecological risk assessment (SLERA), Section 6.1.1.

3. NATURE AND EXTENT OF CONTAMINATION

Section 3 summarizes the analytical results collected from the field investigations performed to characterize the nature and extent of chemical contamination in groundwater, soil, sediment, soil gas, and indoor air at the former LO-58 Site. Investigations performed prior to 2012 have been summarized in Section 1.2.3 and in the CSM produced by Weston in August 2011. The purpose of the 2012 field investigations was to fill data gaps identified in the CSM Report and collect data needed to complete a CERCLA compliant RI/FS.

In the subsections below, the analytical results will be compared to available screening values, which include the EPA MCLs, the EPA regional screening levels (RSLs), the Maine MEGs, and the Maine RAGs. These evaluations are made for data comparison purposes only. Evaluation of applicable, or relevant and appropriate regulations are presented in Section 8.1 of this document.

3.1 REMEDIAL INVESTIGATIONS

In addition to the sampling events summarized in Section 1.2.3, Avatar/Nobis conducted field investigations on two occasions to collect field data to investigate the nature and extent of contamination at the Site and to support both the human health and ecological risk assessments. The objective of the initial sampling effort (mobilization #1), performed April 20 through April 22, 2012, was to collect a round of indoor and sub-slab air samples from the AMAC Building during the heating season, install an overburden monitoring well near the drainage ditch, collect sediment samples, and to collect overburden groundwater and surface water samples.

The objective of the second field effort (mobilization #2), performed September 30 through October 10, 2012, was to collect a second round of indoor and sub-slab air samples from the AMAC Building, sample Site surface and subsurface soils including drilling 17 Geoprobe$^{®}$ soil borings, sample on-site and off-site drinking water wells, sample on-site monitoring wells, and sample surface water, should it be available. Each mobilization is discussed in detail in the Field Trip Report (Avatar, 2013a). Data collected during the 2012 field investigations were included with the Field Trip Report in the following Appendices:

Appendix A	Boring Logs
Appendix B	Groundwater Measurement Log Sheet

Appendix C	Field Equipment Calibration Logs
Appendix D	Field Sampling Data Sheets
	D-1. Monitoring Well Development Forms
	D-2. Surface Water
	D-3. Soil, Sediment, Sludge
	D-4. Low-Flow Groundwater
	D-5. Liquid Phase (Drinking Water)
	D-6. Helium Tracer Test Procedures and Field Notes
Appendix E	Indoor Air Sampling Building Inventory Sheets
Appendix F	Summa Canister Sampling Log
Appendix G	Photographs
Appendix H	Survey Data
Appendix I	Laboratory Results Summary Tables
	I-1. Air Data
	I-2. Drinking Water Data
	I-3. Groundwater Data
	I-4. Soil Data
	I-5. Sediment Data
	I-6. Investigation Derived Waste Sample Data
Appendix J	Chain of Custody Forms
Appendix K	Laboratory Reports (on CD)

Only the boring logs and the analytical data summary tables are included in this RI/FS Report Appendices. See the Field Trip Report Appendices for the other data.

3.2 BACKGROUND INVESTIGATIONS

In some cases, naturally occurring subsurface materials can contribute to elevated concentrations of inorganic constituents that might otherwise be identified as contamination. Therefore, three surficial background samples (plus one duplicate) were collected in the southeastern corner of the Site. The purpose of the sampling was to provide site-specific information on background levels of chemicals in areas presumably unaffected by contaminant release sources. It is noted that the quantity of background samples may not be sufficient for statistical comparative analyses.

Chemicals detected at the Site may be attributable to multiple sources including: naturally occurring sources (such as metals in soils and sediments); contamination pervasive in the area (i.e., pesticide use associated with farming in the area); and to Site-related releases.

In addition to background soil sampling, a background ambient air sample was collected outside of the former Generator Building (AMAC Building) to act as a baseline for indoor air sample comparison. Figure 3-1 and Figure 3-2 illustrate the background soil and ambient air sampling locations, respectively. Tables 3-1 and 3-2 contain summaries of the analytical results for the soil and air results (including background sampling), respectively.

3.2.1 Soil

Multiple VOCs and semi-volatile organic compound (SVOCs) were detected in the three background samples (plus one duplicate), including several polycyclic aromatic hydrocarbons (PAHs). PAHs can be produced as byproducts of combustion including naturally occurring brush fires, as well as wood burning stoves. They are also a component of petroleum products including fuel oil. PAHs in soil may also result from vehicular exhausts and emissions from wearing of tires and asphalt. Once airborne, PAHs are subsequently deposited on soils, vegetation, and hard surfaces by airborne deposition.

Metals were detected above laboratory RLs in each of the four samples (Table 3-1). The MEDEP May 2013 RAGs includes background values for most metals. All of the background soil samples exceeded one or more MEDEP RAGs. An additional evaluation of soil background conditions is included in Section 5.

3.2.2 Ambient Air

Several organic compounds were detected in the ambient air samples during both rounds of sampling (Table 3-2). Air-phase petroleum hydrocarbon (APH) fractions were detected during both sampling events. Petroleum-related VOCs also were detected in the VOC analysis. In addition to petroleum-related VOCs, carbon tetrachloride was detected in the ambient air sample during both sample events, and chloroform was detected in the ambient air sample during the April 22, 2012 sampling event.

Nationwide ambient air organic compounds were estimated by EPA for the year 1996 (EPA, 1996a). These estimates were made by county for each state in the country. Background ambient air concentrations were also estimated in this analysis. Comparing the ambient air sample to the EPA estimated background concentrations for Aroostook County indicates that the measured ambient air concentration for benzene and carbon tetrachloride (EPA estimated 1996 background concentrations of 0.48 milligrams per cubic meter [mg/m^3] and 0.88 mg/m^3 respectively) were below the estimated background concentrations for Aroostook County.

The ambient air samples were collected on the northern side of the AMAC Building. Wind roses for Caribou, ME indicate that wind was blowing predominantly from the north on April 22, 2012 and predominantly from the west southwest on October 7, 2012. Thus, the air samples were collected from a generally upwind direction but it is possible that the presence of the AMAC Building may have had a limited impact on the ambient air samples.

3.3 SOILS

Detected concentrations of chemicals in surface and subsurface soil collected in the 2012 Site investigations are provided in Table 3-1 and in Figure 3-3. Laboratory summary tables are provided in Appendix A.2. Previously collected soil data is summarized in Appendix A.1, and includes data collected from soil borings performed between 1999 and 2001 by Weston in support of the PSI and Supplemental Site Investigations. Boring logs for borings completed in 2012 are provided in Appendix B.1.

For screening and evaluation purposes, soil data obtained in the most recent boring investigation is compared with the MEDEP RAGs for Sites Contaminated with Hazardous Substances, updated May 8, 2013. Where applicable, the results are also screened against the MEDEP Risk-Based Soil Remediation Guidelines for Petroleum Target Compounds (MEDEP, 2009).

3.3.1 VOCs in Soils

In 1999, a passive soil vapor sample collection program was completed. The program included the installation of 75 vapor probes, 59 of which were collected three weeks later for laboratory VOC analysis. The remaining 16 were not located. The results identified areas of petroleum-related soil vapor contamination proximal to the former Launcher Area, the former Warhead

Building, and areas south and west of the AMAC Building. Tetrachloroethylene (PCE) was reported in soil vapor samples collected from the launcher area, an area south of the AMAC Building. Subsequent soil sampling was initiated based on these initial passive soil vapor results.

Soil samples collected from 1999 and 2000 identified VOCs including 2-butanone (a.k.a methyl ethyl ketone), acetone, carbon disulfide, and TCE at concentrations below the applicable MEDEP RAG screening levels. Acetone, 2-butanone, and carbon disulfide were detected in soils at several sample locations across the Site. Due to continued detection of TCE at low-concentration in pre-treatment drinking water samples collected from the Site, the detections of TCE in soil samples may be indicative of source areas for groundwater contamination.

TCE has been identified in soil samples at two areas on the Site. One area is located east of the AMAC Building and includes SB-13 and SB-13R. The second area is adjacent to and west of the AMAC Building and includes SB-34 and B-14 (see Figure 3-3).

TCE was detected at a concentration of 1.1 J micrograms per kilogram (µg/kg) in boring SB-13 (collected from approximately 9 ft below grade) located at the western edge of the former Launcher Area. TCE was detected at one location in 2012, duplicate samples collected from SB-13R had TCE concentrations of 11 µg/kg and 9.8 µg/kg. These samples were collected from a location slightly west of the existing soil boring SB-13 at a depth of between 9 and 10 ft bgs (similar to that of SB-13).

A second area of TCE in soil occurred at soil boring SB-34 which had a TCE concentration of 9 µg/kg at a depth between 12 and 12.5 ft bgs. This sample is located immediately west of the AMAC Building. TCE was also detected at 0.82 J µg/kg at a depth between 6 and 8 ft bgs at B-14 which is located west of the AMAC Building. Although these detections of TCE are below MEDEP direct contact and groundwater leaching screening values, they are indicative of TCE contamination in soil in these areas.

Numerous soil borings have been advanced and several soil samples have been collected from areas between the former Launcher Area and AMAC Building; however, none of these samples contained detectable concentrations of TCE. This suggests that the presence of the solvent in soil samples is not contiguous between the two areas and that these detections are indicative of two separate release areas. This conclusion is consistent with the interpretation presented in the CSM.

In October 2012, additional soil borings were advanced in areas west, south and southwest of the AMAC Building in an attempt to further delineate potential sources adjacent to the AMAC Building which may be associated with the former septic system. Soil samples were collected from depths ranging from the surface up to 8 ft bgs (e.g., the bedrock surface). However, only a single sample (below sample quantitation) exhibited TCE at B-14 between 6 and 8 ft bgs.

Additional VOCs were detected in fall 2012 soil samples collected from the Site including: 1,2-dichlorobenzene, 1,4-dichlorobenzene, 2-butanone, 4-isopropyltoluene, 4-methyl-2-pentanone, acetone, carbon disulfide, methyl acetate, methyl iodide, n-butylbenzene, o-xylene, toluene, and total xylenes. Of these substances, 2-butanone, 4-isopropyltoluene, 4-methyl-2-pentanone, acetone, methyl acetate, methyl iodide, n-butylbenzene, and toluene were detected at similar (or higher) concentrations in the background samples as indicated in the table below.

Analyte	**Background Min Concentration (µg/kg)**	**Background Max Concentration (µg/kg)**	**Field Sample Min Concentration (µg/kg)**	**Field Sample Max Concentration (µg/kg)**
2-Butanone	23	40	6	33
4-Isopropyltoluene	3.4	3.4	0.17	0.33
4-Methyl-2-pentanone	20	26	2	5.4
Acetone	380	640	20	590
Methyl acetate	52	1300	1.7	42
Methyl iodide	1.1	2.4	0.72	3
n-Butylbenzene	0.66	0.77	0.4	0.75
Toluene	0.19	0.45	0.25	0.3

The presence of methyl acetate in the background samples at significantly higher concentrations than in the field samples for the Site suggest the presence of an unknown source in the area. The location, nature, and extent of this source is not known. It should be noted however, that the maximum detection in the background samples of 1,300 µg/kg is many times below the May 2016 residential direct contact RSL (7,800 µg/kg).

Detections of the remaining substances including 1,2-dichlorobenzene, carbon disulfide, o-xylene, and total xylenes were reported at concentrations that are generally below the laboratory RLs. Carbon disulfide was detected above laboratory RLs, but the concentrations are well below MEDEP direct contact and groundwater leaching screening levels.

Soil sampling results indicate that three locations are possible sources of petroleum or VOC contamination to DW-01:

- In the AMAC Building source area, CVOCs have been detected at SB-34 and B-14. To estimate the limits of this source area, the location of the former septic system was also used, as it is likely that historical discharge to the septic system contributed to soil contamination in the area.
- VOC and petroleum hydrocarbons have been identified in soils at SB-13 and SB-13R, and
- Petroleum hydrocarbons have been identified in the vicinity of SB-45/MW-05.

Figure 3-3 provides the estimated limits of soil VOC source areas of groundwater contamination at SB-13/SB-13R and in the area adjacent to the AMAC Building. For purposes of estimating the extent of contamination in the vicinity of SB-45/MW-05, the limit of the soil source area was estimated by drawing a line through the approximate midpoints between borings with elevated levels of contamination and the nearest surrounding “clean” borings.

3.3.2 SVOCs in Soils

Soil samples were collected at the Site and analyzed for SVOCs via SW486 Method 8270D and also 8270C (PAHs using selective ion monitoring [SIM]). Additionally, PAHs were analyzed separately as part of the extractable petroleum hydrocarbon (EPH) sample analyses. Because the SVOC methodology utilizes an analytical procedure that is more sensitive than that used in the EPH analysis, the SVOC results will be used in the comparison to regulatory standards.

The soil samples analyzed by SW846 8270D identified consistently low concentrations of numerous SVOCs including PAHs, methylnaphthalenes, and phthalates throughout the Site area. None of the detections were reported in excess of MEDEP screening criteria. These compounds were evaluated during the Risk Assessments as detailed in Sections 5 and 6.

Soil samples collected from boring B-01 in fall 2012 and analyzed for PAHs using the EPH method contained concentrations of benzo(a)pyrene and benzo(b)fluoranthene, exceeding the Residential MEDEP screening criteria. These same chemicals were detected in the SVOC analysis, but at concentrations that were an order of magnitude lower.

3.3.3 Metals in Soils

Metals concentrations were evaluated in the 23 soil samples collected in the fall of 2012. A number of the metals exceeded the RAGs residential soil criteria. The spatial distribution of the metals concentrations does not indicate the presence of a release of metals to the environment, but rather background concentrations of these naturally occurring substances.

Boring B-02 collected at a depth of 6.0 to 8.0 ft bgs had the maximum observed concentration for barium, beryllium, chromium, cobalt, magnesium, nickel and potassium. However, there is no evidence of historical use of metals in this area that would result in a metals release. In addition, none of the surrounding soil samples indicate elevated levels of these metals in soil. Thus, it does not appear that the presence of elevated levels of these metals at this location are the result of a release in this area.

3.3.4 PCBs in Soils

Due to advantageous physical properties, PCBs have historically been used in dielectric fluids within transformers, capacitors, and other electrical equipment and in lubricants and pneumatic systems. Thirty-six soil samples were collected and analyzed for PCBs. Low concentrations of PCBs (below quantitation limits) were reported in samples collected from B-01 and B-08. Neither of these reported values exceeded MEDEP screening levels. No source of PCB contamination at the Site was identified during the soil sampling.

3.3.5 Petroleum Hydrocarbons in Soils

Historically, diesel-range organics (DRO) concentrations were detected at levels exceeding the applicable MEDEP RAGs. Locations included SB-09, SB-13, SB-55, and SB-54 in the former Launcher Area, SB-04 north of the former Warhead Building foundation slab, and SB-45 adjacent north of the former Missile Assembly and Test Building (Figure 3-3).

Recent soil sampling results from the re-sampled SB-13R and SB-55R boring locations indicated that EPH concentrations were not detected from either of these locations. EPH fractions were detected in soil borings SB-06 and SB-14; however, the concentrations were well below the MEDEP Risk-Based Soil Remediation Guidelines for Petroleum Target Compounds.

3.4 GROUNDWATER

No overburden groundwater was encountered at the former LO-58 Site. Overburden monitoring well MW-06 was installed along the northwestern property boundary in fall 2012 to investigate if shallow groundwater is discharging to the swale between the former Barracks Building and the former Launcher Area. However, the monitoring well was consistently dry, indicating that at the time of this monitoring, Site-related groundwater was not being discharged to the swale.

Groundwater analytical data collected during the 2012 Site investigation is summarized in Table 3-3 and shown on Figure 3-4. Lab data is provided in Appendix A.2. A summary of the results of earlier groundwater sampling is included in Appendix A.1. The Appendix includes data collected beginning in 2000 by Weston in support of the Supplemental Site Investigations and LTMPs. This Section will also discuss groundwater data obtained from on-site drinking water wells in order to better delineate the nature and extent of contamination at the Site.

Table 3-3 compares the groundwater sampling results from the most recent October 2012 investigation to the February 2016 MEDEP RAGs Guidance (MEDEP, 2013).

3.4.1 VOCs in Groundwater

As shown on Figure 3-1, five bedrock monitoring wells are present at the Site. Prior investigations have shown concentrations of several VOCs in MW-03 and MW-05 that were below MCLs. Additionally, bedrock potable supply well DW-01 was also shown to contain concentrations of VOCs including cis-1,2-DCE, chloroform, and TCE (above MCLs).

As shown on Table 3-3, during the fall 2012 sampling event, no detections of VOCs were reported in MW-01, MW-02, MW-03, or MW-04. Consistent with prior investigations, numerous petroleum-related VOCs were detected at low concentrations in the groundwater sample collected from MW-05.

MW-03 is located approximately 150 ft southwest (downgradient) of the AMAC Building (former Generator Building), and was installed in an area downgradient of a former 4,000-gallon fuel oil UST formally located west of this building. Since the installation of MW-03 in 2000, groundwater samples collected from this well have contained sporadic low concentrations of several VOCs, including cis-1,2-DCE, methyl-tert-butyl-ether (MTBE), tetrahydrofuran, TCE, and toluene. None of the VOCs reported in MW-03 exceeded MCLs or MEDEP screening criteria. Although the results of historical sampling at MW-03 has exceeded total petroleum hydrocarbons-gasoline-range organics (TPH-GRO) MEGS, the most recent round of groundwater sampling did not identify any exceedance of the volatile petroleum hydrocarbons (VPH) MEG.

Located immediately north of the former Missile Assembly and Test Building and approximately 20 ft east of a former 500-gallon fuel AST, MW-05 has contained the most frequently detectable concentrations of VOCs of the five bedrock monitoring wells installed at the Site. In previous sampling rounds, the most consistently detected VOCs include sec-butylbenzene, tert-butylbenzene, isopropylbenzene, p-isopropyltoluene, n-propylbenzene, TCE, and 1,2,4-trimethylbenzene. However, none of these were detected above MCLs or MEDEP screening criteria.

During the fall 2012 groundwater sampling round, 10 VOCs were reported in groundwater samples collected from MW-05 including: 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 4-isopropyltoluene, ethylbenzene, isopropylbenzene, xylenes, naphthalene, n-propylbenzene, sec-butylbenzene, and tert-butylbenzene. These compounds are commonly associated with releases of petroleum products.

Of the detected concentrations, only C_9 and C_{10} petroleum hydrocarbons and naphthalene exceeded MEDEP screening criteria. Due to the low concentrations observed in MW-05 which is adjacent to the presumed source area (the former 500-gallon fuel oil AST), it appears that the groundwater contamination in this area is not widespread. The presence of naphthalene is likely associated with historical releases of fuel oil to the ground surface from the nearby AST; however, the concentrations detected in the SVOC analytical fraction (higher sensitivity method) were below the Maine RAGs. Additional details pertaining to the release of petroleum constituents to groundwater are discussed in Section 4 of this RI report.

3.4.1.1 VOCs in Drinking Water Wells

Groundwater samples have been collected from private drinking water supply wells DW-01 and DW-02 since 2000. As the water supplied by DW-01 is treated by a POE system, the results discussed herein are for samples collected prior to any treatment. Table 3-4 summarizes the 2012 drinking water results, and Figure 3-5 provides a time-series chart for TCE concentrations in DW-01.

The analytical results of untreated groundwater samples collected from DW-01 indicated the consistent presence of TCE and cis-1,2-DCE, and sporadic detections of chloroform and trans-1,2-dichloroethylene (trans-1,2,-DCE). Note that several detections of TCE were reported in excess of MEDEP screening criteria.

Similar sampling of the drinking water supply well located in the parking lot of the former Barracks Building (DW-02) indicated several sporadic low concentrations of 1,2-dibromomethane, 1-4-dichlorobenzene, and isopropyl-benzene, all of which were detected below MEDEP screening criteria.

In May 2008, depth profiling of VOCs in groundwater was conducted in both drinking water supply wells utilizing WSP. As part of this profiling effort, groundwater samples were collected from discrete depth intervals in DW-01. The results of this sampling indicated the presence of TCE and cis-1,2-DCE as well as toluene in nearly all tested intervals. However, each of the detected VOCs was reported at concentrations below their respective MEDEP screening criteria.

The concentrations of TCE and cis-1,2-DCE detected appeared to be somewhat consistent throughout the length of the borehole. Note that toluene was detected in an equipment rinse blank; however, it had not been detected in sample DW-01 prior to or since the WSP groundwater sample collection. Therefore, the single toluene detection is unlikely to be the result of a release from the Site.

Similar WSP groundwater sampling was performed on the potable water supply well DW-02. The groundwater sample analytical results indicated that low concentrations (0.23 J µg/L – below sample quantitation limit) of cis-1,2-DCE was reported at a depth of between 188 and 192 ft bgs. Fall 2012 samples of DW-02 did not exhibit detectable concentrations of cis-1,2-DCE.

During the fall 2012 groundwater sampling round, two additional water samples from off-site potable water supply wells were collected from bedrock wells located approximately 730 ft west of the Site (DW-03) and approximately 950 ft northwest of the Site (DW-04). No VOCs were detected in the two additional drinking water samples.

Based upon the multiple rounds of groundwater sample results collected from between 2000 and 2012, the bedrock groundwater VOC contamination is limited to MW-03, MW-05, and DW-01. As presented in Section 2.7.2.3 of this report, each of these wells appears to be hydraulically connected as they responded during a pumping test performed in 2008.

The highest detections of TCE in DW-01 have consistently occurred during periods of depressed groundwater levels. Conversely, high groundwater elevations have correlated with lower TCE concentrations in DW-01. This general correlation between groundwater elevation and TCE contamination in DW-01 may be the result of bedrock aquifer responses to pumping stress under different recharge conditions. This relationship could also result from dilution of groundwater contamination during times of high aquifer recharge.

Due to the lack of an identified widespread contaminant source mass, the relatively low and uniform presence of the petroleum hydrocarbons and CVOCs in groundwater samples collected during the sampling of isolated depths in DW-01 suggest that the fractures feeding DW-01 may be interconnected with MW-05 and other areas where low concentrations of VOCs in soil are present.

3.4.2 SVOCs in Groundwater

As shown on Table 3-3, numerous SVOCs were detected at concentrations in excess of MEDEP screening criteria. Although detections of SVOCs were reported in each of the monitoring wells with the exception of MW-02 and MW-04, the highest SVOC detections were reported in MW-

05. The SVOCs reported in MW-05 are primarily naphthalene compounds, 1,1'-biphenyl, and PAHs. Benzo(a)pyrene was reported in excess of risk screening values in several groundwater samples, and 1,1'-biphenyl, 1-methylnaphthalene, dibenzofuran, naphthalene, and dibenz(a,h)anthracene were detected in one well at a concentrations exceeding the risk screening criteria. However, the maximum concentrations of 1,1'-biphenyl, benzo(a)pyrene dibenz(a,h)anthracene, and naphthalene were detected below their respective MCLs/Maine MEGs. As with much of the VOC contamination detected in this monitoring well, it is likely that the SVOC detections are also associated with releases of petroleum associated with the presence of the nearby fuel oil AST.

As summarized on Table 3-4, several SVOCs were also detected in drinking water samples collected from the water supply wells located at the Site as well as from off-site wells. None of these SVOCs were reported at levels in excess of MCLs or MEDEP screening criteria. The most diverse array of SVOCs was reported in DW-01. SVOCs were not detected in the drinking water sample collected from the well located in the parking lot of the former Barracks Building.

Several SVOCs were detected in DW-03 and DW-04 off-site private potable supply wells. The concentrations were well below screening criteria and were generally detected below the laboratory quantitation limits. Given the low solubilities associated with these SVOCs and the distances between the suspected Site to these drinking water wells, these dilute concentrations are not likely associated with releases from the Site.

3.4.3 Metals in Groundwater

As presented on Table 3-3, of the 23 metals analyzed for, 15 were positively detected in Site groundwater samples. Of those 15 metals, only cadmium and manganese in MW-05 were reported in excess of the MCLs or MEDEP screening criteria. The cadmium concentration was reported at 1 J µg/L, which is equal to the MEDEP criteria. Additionally, this result was reported below the laboratory quantitation, and was not repeated in the duplicate sample collected from this well, suggesting a possible false positive.

The concentrations of metals reported in MW-05 were generally higher than those reported in the remaining samples. However, with the exception of aluminum and manganese, the concentrations of the metals appear to be somewhat consistent across the Site. The aluminum concentration detected in MW-01 (the most upgradient sample) was notably higher than those reported in the remaining samples. The manganese detections in MW-05 were several orders of magnitude higher than the concentration detected in the remaining samples.

The geochemical parameters monitored during the groundwater sampling event were generally consistent across the Site. However, the oxidation/reduction potential (ORP) and the dissolved oxygen (DO) reported during sample collection from MW-05 were different than what was recorded in the remaining samples. With the exception of MW-05, the ORP values reported throughout the Site ranged between 89 and 185 millivolts (mv), while the ORP reported in MW-05 was -25 mv. Similarly, the DO measured in the wells other than MW-05 were generally high, between 8.5 and 10.2 milligrams per liter (mg/L), while the DO reported in MW-05 was significantly lower at 0.7 mg/L. Groundwater exhibiting reducing conditions, coupled with low DO, elevated iron and manganese concentrations, and no detectable nitrate, suggests that the biodegradation of groundwater contamination in the area of MW-05 is likely occurring. Additional data such as dissolved and total iron, dissolved and total manganese, sulfate, and dissolved carbon dioxide from MW-05 and select monitoring wells (both upgradient and downgradient) would be required to definitively determine if the geochemical conditions are the result of the biological activity.

Table 3-4 presents a summary of the metals in drinking water samples. Of the 15 metals detected in drinking water samples, only lead (in DW-01) and sodium (in DW-02) were detected above MEDEP screening criteria. The metals results from DW-03 and DW-04 were nearly identical and were well below screening criteria.

Published statewide background groundwater concentrations are not available. A comparison of detected metals concentrations was made to background concentrations in bedrock groundwater documented in the Loring Air Force Base Operable Units 4 and 12 Records of Decision. In general, the metals concentrations detected at the LO-58 Site were consistent with or below these background concentrations. Manganese was detected in monitoring well MW-05 at a concentration well above the background. This elevated manganese concentration is likely due to ongoing biological activity in this area, possibly due to previous petroleum releases in this area.

3.4.4 PCBs in Groundwater

No PCBs were detected in groundwater or drinking water samples collected during the fall 2012 investigation. Based upon this data and the absence of PCBs in soil samples above EPA RSLs or MEDEP RAGS, PCBs are not a chemical of concern at the former LO-58 Nike Site.

3.4.5 Other Inorganic Substances in Groundwater

The fall 2012 investigation also evaluated the potential presence of hydrazines and nitrates/nitrites in Site groundwater. Hydrazines were not detected in any groundwater or drinking water samples.

Nitrate was reported at low concentrations in monitoring wells MW-01, MW-02, and MW-03 and in each of the drinking water samples. Nitrite was reported only in monitoring well MW-04 and in drinking water well DW-01. None of the nitrate/nitrite concentrations reported exceeded MCLs. Nitrate was not detected in monitoring well MW-05.

3.5 DRINKING WATER

During the October 2012 sampling event, water samples were collected from four water supply wells. Samples were collected from on-site wells DW-01 and DW-02, and from residential wells located at 271 (DW-04) and 241 (DW-03) Van Buren Road which are the nearest residences where access could be obtained. These residences abut the Site to the north and south. The results of the water sampling are included in Table 3-4 and Figure 3-4. Results are discussed above under Groundwater.

3.6 SURFACE WATER

No surface water was observed during the field investigations so it was not possible to collect surface water samples. As part of the RI investigation, surface water samples were proposed for collection from within the swale in between the former Barracks Building and the former Launcher Area. However, on two separate field mobilizations in 2012, field personnel observed little to no water within the swale. During two periods of consistent heavy rainfall, accumulating surficial runoff from the former Barracks Building parking area was observed to enter a catch basin in the parking area and discharge into the swale.

Based on discussions between the project team and the CENAE, it was decided that no surface water samples would be obtained, as there was no surface water indicative of Site-related runoff other than overland stormwater flow from impervious surfaces in the former Barracks Building parking area.

Monitoring well MW-06 was installed to evaluate the amount and quality of groundwater discharging to the swale from the Site. However, groundwater was not observed in MW-6 at any time during the two sampling events (including during periods of consistent heavy rainfall). Based on this information, it does not appear that Site-related groundwater is discharging to the surface water swale.

3.7 DRAINAGEWAY SOILS

Three drainageway samples were obtained along the swale discussed in Section 2.3. Figure 3-1 illustrates the sampling locations. Drainageway sampling results are attached in Table 3-5. Drainageway sampling was first performed in 2012 in support of the Remedial Investigation. However, as discussed above, no running or standing water was observed passing over the material collected at the three soil sampling locations. Based on observations of the substrate in the swale and downgradient drainage, the absence of wetland indicators (i.e., vegetation, soil hydric conditions), it was determined that the swale and drainage substrate was most indicative of terrestrial soils. Therefore, the term “terrestrial” indicates upland, non-hydric soil. However, because these samples were identified initially as potential sediment at the time they were collected, the sample nomenclature (i.e., SD) was retained in this report.

Comparison of the drainageway soil analytical data to ecological screening values (ESV) is presented in Table 3-5. The ESVs used for this screening is the lower of the phytotoxicity and soil invertebrate toxicity screening values presented in the Ecological Risk Assessment Table 6-4.

3.7.1 VOCs in Drainageway Soils

Due to sample preservation issues, swale samples were collected twice during Site investigations for VOC analysis. Although other holding time requirements were met, the samples collected on April 21, 2012, did not meet the sample holding time requirements for VOCs. Therefore, additional drainageway sampling was conducted on October 7, 2012 and these samples met holding time requirements. The results from the second sampling event are discussed below.

As shown on Table 3-5, all three of the drainageway samples contained several VOC analytes detected above laboratory reporting limits. Swale sample SD-01, located approximately 350 ft northeast of the chain link fence along the northern Site boundary (running perpendicular to the swale), contained a concentration of 2-hexanone of 97 µg/L. This concentration is presumably unrelated to the Site, as the other two upstream drainageway locations on the Site property (SD-02 and SD-03) did not contain any concentrations of 2-hexanone. In addition, 2-hexanone was not detected in any of the groundwater samples or any of the 2012 soil boring samples.

All three of the drainageway samples collected contained acetone; however, acetone was detected at comparable concentrations in the three background sampling locations in the southeastern region of the Site. These samples were collected using EnCore® samples and preserved with sodium bisulfate. Several studies have found that certain naturally occurring compounds, including humic acids, will decompose when exposed to sodium bisulfate to form acetone (Clausen, 2004; USACE, 1998; DEP Workgroup, 2005). It is likely that the acetone detections are an artifact of the sampling and preservation methodology and not believed to be Site-related.

Drainageway sampling location SD-03, located at the most upstream/upgradient area of the swale, contained an estimated concentration of 0.88 µg/kg of carbon disulfide. Carbon disulfide was also detected at comparable concentrations in various soil boring samples, generally at deeper sampling intervals than shallow intervals. Detected concentrations were generally found on the eastern region of the Site, in the vicinity of the former Launcher Area.

3.7.2 SVOCs in Drainageway Soils

The detected SVOC results are attached in Table 3-5. SVOC results indicate that multiple analytes were detected above both ESVs and human health RSL values. Numerous PAHs were detected in one or more drainageway samples. The carcinogenic PAHs which may be a result of combustion of organic material are generally more prevalent in soils and drainageway soil compared to groundwater and surface water.

The results indicate that most of these PAHs are found in their highest concentrations at drainageway sampling location SD-03, and concentrations decrease with distance away from SD-03. Location SD-03 is also the closest sampling point to the former Barracks Building parking lot and associated parking lot stormwater runoff, which may be contributing to the higher concentrations of PAHs in soil at this location. Although PAHs have been identified in Site surface and subsurface soils, many of the various PAHs have not been observed in concentrations as high as those identified at SD-03, indicating that the source of these PAHs in swale soils may be the nearby parking lot.

3.7.3 Metals in Drainageway Soils

Metals occur naturally in the geologic materials and, as a result, they are ubiquitous in soils. Metals samples were collected from each of the three drainageway sampling locations in 2012. The results of the metals analysis in drainageway soils are summarized in Table 3-5. Laboratory detected concentrations of metals identified in drainageway samples SD-01 through SD-03 appeared similar to concentrations detected at background sample locations BK-01 through BK-03. Metals detected at concentrations exceeding the human health RSL standards include arsenic and chromium. Metals detected at concentrations exceeding the ESV standards include aluminum, arsenic, barium, beryllium, chromium, copper, iron, manganese, selenium, vanadium, and zinc. Exceedances and concentrations were generally consistent at all drainageway sampling locations.

3.7.4 PCBs in Drainageway Soils

PCBs are an exclusively anthropogenic contaminant and are not naturally occurring. Detected PCB sample results are attached in Table 3-5. Because of their high affinity for soil and low solubility, PCBs would be expected to be identified in soils at locations where PCB surface spills have occurred. PCB concentrations were extremely low in drainageway samples collected. The PCB Aroclor 1260 was detected above laboratory reporting limits in sample SD-03, and at lower concentrations in samples SD-02 (and the associated duplicate); however, the concentrations were well below screening values.

3.8 AIR

Three separate sampling events have been documented at the Site in which soil vapors have been sampled at the Site. The first soil gas investigation was performed in 1999 by Weston in support of the Preliminary Site Investigation (Weston, 2000b). The investigation included the installation of subsurface passive vapor probes that were analyzed for VOCs in order to evaluate potential soil contamination that may be contributing to TCE contamination in drinking water well DW-01.

The most commonly occurring compounds in the 1999 soil gas investigation were the BTEX compounds – benzene, toluene, ethylbenzene, and xylenes. BTEX compounds were detected at 43 of the 45 locations where VOCs were reported above laboratory reporting limits (BEACON, 1999). BTEX soil gas concentrations were observed consistently beneath the former Launcher Area with highest results located along the northern edge of the former Launcher Area. BTEX concentrations were also observed in the vicinity of the former Warhead Building.

In an effort to identify the source of the petroleum-related, PCE, and TCE contamination detected in the 1999 soil vapor samples, numerous soil boring samples were collected from throughout the former Launcher Area and former Warhead Building. Low concentrations of these constituents were reported in several of the soil samples; however, none of these detections were above screening criteria.

The next two most commonly occurring compounds at the Site were PCE and 1,2,4-trimethylbenzene, both detected in a total of six soil gas probe locations (BEACON, 1999). Five of the six probes where PCE was detected were located at the former Launcher Area, and the sixth was installed in the grassy area located to the southwest of the pad. Four of the six probes where 1,2,4-trimethylbenzene was detected also were located at the former Launcher Area. The remaining two probes were installed in the drainage swale leading away from the concrete pad at the former AFNS area. TCE was detected at only two locations (FP-02 and FP-06), both in the vicinity of the former Warhead Building.

The second and third soil vapor sampling investigations were performed more recently, and involved the installation of sub-slab soil vapor points in the AMAC Building, with subsequent soil gas and indoor air sampling in April and October 2012. Samples were collected over an 8-hr time period using deployed SUMMA canisters and regulators, which is a different approach to the long-duration soil vapor probe passive sampling that was performed in 1999. The air results of both sampling rounds are presented in Table 3-2. Figure 3-2 identifies the sampling locations as well as a summary of the results of the investigations. Analytical data is provided in Appendix A-2.

3.8.1 Sub-Slab Soil Gas

Soil gas sampling points were installed in the northwest corner of the AMAC Building in what is now the administrative office (SV-01), and the western corner of the building in what is now the physical therapy room (SV-02). An approximately 2-3” void space was observed between the bottom of the concrete floor and the underlying soil at both installation locations. The void space was greater at SV-01 than at SV-02. This void may extend underneath the entire building, and may facilitate the distribution of vapors beneath the building. However, additions to the building were constructed at different times and the quality of the construction of the building slab would be expected to be variable. The reason for the void space is not known.

As summarized on Table 3-2, sub-slab soil gas sampling identified multiple VOCs and air-phase petroleum hydrocarbons (APH). Although not applicable to soil gas, chemicals were detected in sub-slab soil gas at concentrations exceeding the EPA Residential RSL values including ethylbenzene, naphthalene, 1,2,4-trimethylbenzene, 1,4-dichlorobenzene, 1,4-dioxane, benzene, bromodichloromethane, carbon tetrachloride, chloroform, isopropyl alcohol, TCE, trichlorofluoromethane, and APH. The compounds that exceeded the EPA Industrial RSL values included naphthalene, 1,2,4-trimethylbenzene, bromodichloromethane, chloroform, and TCE. Both 1,2,4-trimethylbenzene and TCE are contaminants that have consistently been detected in

DW-01, which is the source of potable water to the AMAC Building. Isopropyl alcohol has not been observed anywhere at the Site; however, it is used extensively in disinfectant sprays, wipes, and gels within the AMAC Building. The wastewater produced at the AMAC Building is discharged to an underground septic system which is located on the southern side of the building and may be acting as a source of these vapors. Chloroform is a chemical byproduct that is produced in the breakdown of TCE. However, it has only been observed infrequently in Site groundwater in previous sampling rounds, and was also detected in the April 2012 ambient air background sample.

No Maine RAGs have been established for sub-slab soil gas, therefore, the indoor air (residential) RAGs were used for screening. The APH (C_5-C_8 and C_9-C_{12} aliphatic ranges) detected in the sub-slab samples exceeded the Maine RAGs for residential indoor air. The C_9-C_{10} aromatic carbon range did not exceed Maine residential indoor air RAGs.

Sub-slab soil gas concentrations are higher in soil gas samples collected beneath the physical therapy room at SV-02. This location is closest to the building's former septic tank, which may be located near a source of indoor air contamination. Additionally, SV-02 is located closer to the area that was observed to contain low flux rates of TCE in soil gas in 1999.

3.8.2 Indoor Air

Indoor air samples were obtained from two locations within the AMAC Building: one inside the main rear living area adjacent to the kitchen (IA-02) and one inside the physical therapy room (IA-01). Indoor air samples were obtained to evaluate VOC concentrations within the AMAC Building and to investigate how possible vapor intrusion of sub-slab soil gas may be impacting the living and working space of the building.

As shown on Table 3-2, many VOC and APH analytes were detected in indoor air that were detected in the sub-slab soil gas, including BTEX constituents, naphthalene, carbon tetrachloride, chloroform, and TCE. TCE was detected in every indoor air sample in both rounds of indoor air sampling, at concentrations that exceeded the applicable residential and industrial RSL values of 0.21 $\mu g/m^3$ and 0.88 $\mu g/m^3$, respectively.

Other analytes that exceeded both residential and industrial indoor air RSL standards were chloroform and naphthalene. Although each is a possible laboratory contaminant, no evidence in the analytical data package suggested that the results were erroneous. Although the indoor air concentrations of the select contaminants were relatively similar, chloroform and TCE concentrations appeared slightly higher in the main living space (IA-02) compared with the concentrations in the physical therapy room.

The indoor APH concentrations are generally consistent between the April and October sampling rounds, indicating minimal seasonal differences. Additionally, the concentrations are generally lower than the corresponding results from sub-slab samples. Chloroform, naphthalene, and trichloroethene all had detected concentrations exceeding their respective Maine residential indoor air RAGs.

Although bulk household chemicals (such as cleaning agents, sanitizers and soaps, air fresheners, paints, and stains) were removed prior to air sample collection, it should be noted that numerous anthropogenic sources of indoor air contamination such as carpeting, insulation, and wood finishing products, may still exist.

3.9 CONTAMINANT SOURCES

Based on the results of the investigations conducted at the Site, including the 1999 passive soil vapor probe sample collection, four primary types of contamination are present at the Site:

1) petroleum contamination in groundwater associated with the presence of the AST behind the former missile assembly building;

2) surface soil contamination likely resulting from the release of combustion byproducts in the vicinity of the AMAC Building;

3) chlorinated solvent contamination in soil adjacent to the AMAC Building and a second area in the former Launcher Area resulting from historical spills related to facility maintenance and/or discharges to on-site septic systems; and

4) detected groundwater TCE contamination that is indicative of a potential source area(s) located below the groundwater surface (which is within bedrock).

The chlorinated VOC (CVOC) source reported in 1999 from the passive soil vapor probe sampling may be the result of the historical spills described above, or other limited areas of soil, bedrock, or groundwater that have not yet been discovered. Additional information regarding this source is described below in Section 3.9.2.

Figure 3-3 depicts the extent of the historical distribution of fuel and CVOCs in soil at the Site. In addition to the above petroleum and CVOC sources, acetone has been consistently detected in soil across the Site; however, the detections are at low levels and no specific source of this material has been identified. Additionally, acetone may be the result of a sample preservation interaction with natural organic material contained in the sample. The former USTs and ASTs associated with the former Nike Battery themselves are no longer considered sources, as they have been removed.

The concentrations of petroleum constituents and CVOCs detected in groundwater at the Site are well below their solubility limits. Based on the observed concentrations of these constituents in groundwater, it does not appear that the hazardous materials released to soil/overburden reached the water table as a non-aqueous phase liquid (NAPL). Thus, it is unlikely that significant amounts of NAPL are acting as sources of groundwater contamination at the Site.

3.9.1 Petroleum Source Areas

The Site historically included three fuel storage tanks: a 2,000-gallon UST associated with the current former Barracks Building, a 500-gallon fuel oil AST located outside the former Test Building, and a 4,000-gallon fuel UST located adjacent to the southwest corner of the former Generator Building (beneath the footprint of the current AMAC Building). Records indicate that the 2,000-gallon UST has been removed, the 500-gallon AST remains in place, and a series of geophysical investigations have failed to locate the 4,000-gallon UST, which is presumed to have been removed.

There is no documentation of soil conditions noted during the removal of USTs at the LO-58 Site so there is no evidence of a release or release mechanisms at these locations (i.e., spills, subsurface leaks, deliberate on-site disposal). It is presumed that a combination of surficial spills and discharges, as well as possible subsurface releases (i.e., via leaking USTs or product transfer piping) resulted in the observed distribution of petroleum contamination in groundwater at the LO-58 Site.

The COPCs associated with fuel have been detected in soil, soil vapor, and indoor air samples. Figure 3-3 depicts the results of the soil sampling including the detected petroleum constituents in soil at the Site. Figure 3-4 summarizes locations where petroleum compounds were detected in groundwater above their applicable screening standards.

Low-concentrations of substances consistent with the combustion of petroleum fuel products, including naphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene were reported in surface soil samples collected from areas proximal to the AMAC Building (previously the Generator Building).

3.9.2 Chlorinated Solvent Source Areas

TCE and other compounds were commonly used as part of missile maintenance activities. Two areas have been identified where CVOCs have been released to soils. CVOCs have also been identified in soil gas during several site investigations.

3.9.2.1 CVOCs in Soils

The CVOCs have been detected at soil sample locations SB-13/SB-13R, which are in the northeastern corner of the former Launcher Area, and boring SB-34, which is immediately southwest of the AMAC Building. TCE was also detected at a low concentration in 2012 boring B-14, located approximately 11 ft west of the AMAC Building.

PCE was detected in 1999 soil vapor flux samples in the northeastern portion of the former Launcher Area. However, follow-up soil sampling at four locations in this area only detected TCE in one soil sample (SB-13) and no PCE. Soil boring SB-13R was advanced adjacent to SB-13 in 2012 to further assess this area. TCE was detected in SB-13/SB-13R at depths of between 9-9.5 ft bgs and 8-10 ft bgs respectively. Again, no PCE or TCE was detected in the surface soil sample collected from SB-13R, although acetone, 2-butanone, and methyl acetate (which may be a degradation product of 2-butanone) were detected in this surface soil sample. These detections may indicate that either parts cleaning/degreasing took place in the vicinity of SB-13/SB-13R or that this area received runoff containing this material from the paved areas surrounding the silos.

A second source area of CVOCs in soil has been identified south and west of the AMAC Building. These areas are indicated by TCE detections in boring SB-34, which is immediately west of the AMAC Building and in boring B-14, located approximately 11 ft west of the AMAC Building. The soil sample at B-14 was collected at the depth of inferred bedrock/refusal. This boring is down slope from the AMAC Building both on the bedrock topographic surface and on the ground surface topography.

The extent of CVOC contamination in soil near the AMAC Building has been partially bounded by clean (i.e., no CVOCs detected) deep soil samples collected from soil borings B-1 and B-2, which are located south of the building. These samples were collected at the depth of probe refusal (presumably the bedrock surface). Shallow soil samples (0-4 ft bgs) have been previously collected at SB-49, SB-35, SB-39, SB-51 and SB-52. However, because these were surface soil samples, it is possible that they would not have detected deeper contamination.

Figure 3-3 provides an estimated footprint of the possible areas of soil contamination at the Site. Based on the sampling results at SB-39 and SB-52, it is anticipated that the soil CVOC contamination is between a depth of 4 ft (the bottom of these soil samples) and the bedrock surface. Some contamination may have migrated into the surface of the bedrock but it is not possible to speculate the vertical extent of potentially impacted bedrock. Although the results of sampling at B-14 do indicate the presence of CVOCs in soil, it has not been included in the source area outline because the concentrations are below screening levels.

3.9.2.2 CVOCs in Soil Vapor and Indoor Air

In addition to the PCE detected in 1999 soil vapor flux samples collected from the northeastern portion of the former Launcher Area discussed above, PCE was also detected during soil vapor flux evaluations near the AMAC Building in 1999. Vapor flux probe PR-05, located southwest of the AMAC Building, identified low levels of this compound. Unfortunately, numerous other vapor flux probes that were placed around the AMAC Building and the surrounding area were not found (possibly removed by residents) so no additional soil vapor flux data is available closer to the AMAC Building.

There is evidence of a potential source of TCE near the AMAC Building exhibited by the detection of TCE in all of the sub-slab soil gas samples collected below the AMAC Building. TCE was also detected in all of the indoor samples collected from the AMAC Building. Figure 3-3 depicts the results of the soil sampling including all of the detected CVOCs in soil at the Site. Figure 3-4 illustrates the various CVOCs in groundwater.

Table 3-6 presents the calculated attenuation factors between the indoor air and the sub-slab vapor for COCs at the AMAC Building (i.e., the ratio of the indoor air concentrations to the sub-slab vapor concentration). The attenuation factors were calculated for compounds that were detected in both the indoor air and soil vapor at SV-02 and IA-01 (these sample points are in the same room).

In its *Draft Final Guidance for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Sources to Indoor Air* (EPA VI Guidance; EPA, 2013a), EPA suggests an attenuation factor of 0.03 for attenuation of vapor from sub-slab soil gas into indoor air. With the exception of chloroform, all of the calculated dilution factors are an order of magnitude higher than the EPA suggested values. This indicates that the floor of the AMAC Building provides little attenuation of the soil vapor. This result is likely partially attributable to the void spaces that were observed beneath the floor slabs during installation of the soil vapor sampling probes.

In addition to the attenuation of the soil vapor into the building, the attenuation between the groundwater concentration and indoor air can also be calculated. These values are presented in Table 3-7 for compounds that were detected in both groundwater and indoor air.

In the EPA document entitled *EPA's Vapor Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings* (the EPA Database; EPA, 2012a), the EPA presents the results of a statistical evaluation of measured attenuation factors as a function of depth to groundwater. Average attenuation factors appear to decrease logarithmically with depth. The deepest interval presented in the EPA Database is for depths greater than 5 meters. The average attenuation factor for this data is 0.0002, which is an order of magnitude lower than that measured with Site data. Thus, the indoor air CVOC concentrations are higher than what would be expected due only to measured groundwater contamination levels and based on the EPA attenuation factor database.

Based on site-specific factors, the predicted indoor air concentrations resulting from vapor migration from contaminated groundwater beneath the AMAC Building would be expected to be significantly lower than average because of the following.

- Depth to groundwater beneath the AMAC Building is approximately 46 ft (~14 meters) below the ground surface. As noted above, attenuation factors would be expected to decrease logarithmically with depth resulting in lower predicted indoor concentrations.
- The nature of the unconsolidated material above the bedrock beneath the building is a dense till. The EPA Database indicates that sites with fine-grained soil have average attenuation factors up to a factor of 10 less than sites with coarse-grained soils.
- The water table is located in bedrock. The tortuous nature of vapor flow through the bedrock would be anticipated to result in complex vapor flow patterns of contaminated vapors which may produce additional dilution of soil vapors in the bedrock.

Based on the above, it appears unlikely that CVOCs observed in the indoor air at the AMAC Building are resulting from vapors originating from the groundwater.

Additionally, the influent well water is treated to below limits of quantitation (LOQs) reporting limits prior to the tap; therefore, it does not appear likely that the water supply is providing a pathway for CVOCs into the building.

It is possible that there is a source of TCE contamination in soil (i.e., above the bedrock surface) near the AMAC Building which is acting as a source of CVOC contamination into the indoor air. Based on the soil sampling results, it is most likely that a source, if it is present, is likely to the west and/or south of the building and deeper in the soil. This assertion is based on the following lines of evidence:

- The unexpectedly high indoor air/groundwater attenuation factor discussed above;

- The currently identified areas of soil contamination appear to have inadequate mass to result in the level of groundwater contamination observed in DW-01;
- The soil vapor sampling results indicating higher CVOC concentrations in sub-slab soil at SV-2;
- The presence of Site-related CVOCs (carbon tetrachloride and chloroform) in ambient air samples may be indicative of CVOC vapor emissions from the soil;
- The presence of petroleum-related constituents in indoor air may be indicative of contaminated soils left behind after the undocumented removal of the 4,000-gallon fuel oil UST in this area; and
- The former presence of the septic system in this area which may have received discharges of solvents during operation of the building as a generator building.

3.9.2.3 CVOCs in Groundwater

The presence of TCE in DW-01 may be indicative of a source of TCE contamination beneath the water table in the bedrock. This assertion is based on the following evidence:

- Leaching of unsaturated material by precipitation does not appear to be adequate to produce the mass flux of TCE necessary to produce the concentrations of TCE observed in DW-01; and
- The inverse correlation between water table elevation and concentration of TCE in DW-01 (i.e., low water table elevation is correlated with high TCE concentration in DW-01) is indicative of a source of TCE below the water table.

4. CONTAMINANT FATE AND TRANSPORT

This section presents the assessment of fate and transport processes for contaminants at the Site. The physical and chemical properties of contaminants and the environmental media they are found in (e.g., soil, groundwater, air, and environmental receptors) are all factors that determine the transport and eventual fate of these contaminants. Figure 4-1 provides a CSM for the overall fate and transport of chemicals of interest and their associated sources. The subsequent sections describe the detailed chemical characteristics, locations, transport, and ultimate deposition of the chemicals of interest: VOCs (most notably TCE) and PAHs.

The following potential source areas have been identified at the Site, and are also listed on Figure 4-1.

- Historical fuel-related spill(s) related to the 500-gallon AST located behind the former Missile Assembly and Test Building. This source area has been identified due to concentrations of DRO historically detected at boring SB-45, groundwater concentrations of naphthalene and VPH hydrocarbon fractions at MW-05 that exceed current Maine MEGs, and the presence of elevated manganese concentrations in groundwater samples collected from MW-05 (indicating likely biological activity possibly resulting from past petroleum releases in the area).

- The minimal surface soil PAH contamination in the vicinity of the AMAC Building. This potential source area will not be considered further in this evaluation.

- Historical chlorinated solvent spills related to former facility maintenance. This source area has been identified due to low concentrations of TCE in recent soil borings SB-13 and SB-13R. This release may contribute to groundwater concentrations in DW-01 that exceed the MCL and Maine MEG for TCE.

- VOCs that potentially have been spilled during the active utilization of the Generator (now AMAC) Building or discharged to the AMAC Building septic system and subsequently to soil surrounding the AMAC Building. This material appears to be contributing to soil vapor concentrations of CVOCs detected in sub-slab soil gas and indoor air.

- Detected groundwater contamination is indicative of a potential source area(s) located below the groundwater surface (which appears to be within bedrock). This source may be the result of the historical spills described above or other limited areas that have not yet been discovered.

This section describes the physical, chemical and biological processes that have affected the fate and transport of chemical constituents within and downgradient of the Site. The primary influences affecting the fate and transport of chemicals in the environment at the Site include:

- The physical properties of the chemicals, including state (i.e., solid, liquid, gas), density/specific gravity, solubility in water, and propensity for volatilization and/or adsorption to soil;
- The environmental media in which the chemicals are released (i.e., air, soil, water) and the spatial and temporal changes of the character of the media encountered by a chemical as it moves through the environment;
- The physical, chemical and biologic processes that affect the mobility of the chemicals and/or transform the chemicals into degradation products; and
- Hydrogeologic characteristics of the aquifer.

4.1 CONTAMINANT CHARACTERISTICS

The potential contaminant sources and characteristics that may be causing soil, groundwater, and air contamination at the Site were discussed in Section 3.8. The nature and environmental properties of the particular chemical contaminants identified at the Site are detailed in this section.

COCs at the Site are identified based on the detailed risk evaluation performed in Sections 5 and 6. A detailed screening of detected contamination based on a comparison of the detected concentrations in each media against Applicable or Relevant and Appropriate Requirements (ARARs) is performed in Section 8.3. The COCs are selected based on the results of this ARAR evaluation and are included in Table 4-1 and Table 4-2 for groundwater and indoor air respectively. The COCs in groundwater at the Site are TCE, C_9-C_{10} Aromatic Hydrocarbons, 1-methylnaphthalene, and manganese.

The indoor air COCs are 1,2-Dichloroethane (1,2-DCA), chloroform, naphthalene, and TCE. Although sub-slab soil vapor concentrations exceeded Maine Indoor Air RAGs for C_5-C_8 Aliphatics and C_9-C_{12} Aliphatics, no concentrations in indoor air were detected above Maine Indoor Air RAGs. Therefore, these contaminants were not selected as COCs. Additionally, although no COCs were identified in soils, the possible presence of TCE in soil near the AMAC building may require additional response actions if the presence of this material in this area is confirmed. The characteristics of these contaminants will be discussed in the following sections.

4.1.1 Chemical Properties and Partitioning

Differing water solubility and vapor pressure, among other factors, result in the variable partitioning of VOCs between soils, water, and air following release to the environment. The following describes the most significant chemical properties that influence the fate and transport of the chemicals that are released into the environment.

- *Sorption*—Sorption is the process by which chemicals in either a liquid or gas phase become physically and/or chemically associated with the surface of a solid phase. The sorption of organic chemicals is primarily governed by the amount of naturally occurring organic carbon present in the matrix of the soil or aquifer and the chemical's susceptibility to sorption to organic carbon. Organic carbon is typically present as coatings on the surfaces of the solid matrix (e.g., sediment grains, fractured bedrock surfaces) of the aquifer or as particulate organic matter. Grain size also will affect sorption, with finer-grained material (e.g., clay) sorbing more than coarse-grained material (e.g., sand).

The soil-water partitioning coefficient (Kd) is used as an indicator for the propensity of an organic chemical to adsorb to naturally occurring organic carbon. Kd is the organic carbon partition coefficient (Koc) multiplied by the mass fraction of organic carbon content (foc). The affinity of a chemical to adsorb to organic carbon, as reflected by its Kd, influences the mobility and/or attenuation of the chemical. Organic chemicals with a higher Kd will adsorb to organic carbon more readily than chemicals with a lower Kd.

The migration rates of organic chemicals in groundwater that adsorb onto organic matter and/or fine-grained sediment in the aquifer are attenuated or retarded relative to the natural groundwater flow rate. Consistent with this principle, the migration rate of an organic chemical with a higher Koc is more strongly retarded as a result of sorption to organic carbon and/or fine-grained sediment in the aquifer, as compared to the migration rate for a chemical with a lower Kd. In general, CVOCs and low molecular weight PAH compounds, such as naphthalene, have low to moderate Kd values as compared to the higher molecular weight compounds.

Accordingly, in soil and aquifers containing measurable total organic carbon (TOC) and/or fine-grained material, the higher molecular weight compounds (assuming stronger sorption) will migrate at a slower rate than the CVOCs and low molecular weight PAHs. Therefore, higher molecular weight compounds would not be expected to migrate far from a source area in most soil environments and aquifers.

- *Aqueous Solubility*—Aqueous solubility is a measure of the maximum mass of a chemical that can exist in an aqueous phase at equilibrium with the pure chemical. This chemical property is used, along with other properties, to assign relative potentials for a chemical to leach into an aqueous phase from a source material, such as contaminated soil. Chemicals with high solubilities will tend to leach more easily and to remain in aqueous solution than chemicals with lower aqueous solubilities. In general, high solubility chemicals, such as the CVOC compounds, are more mobile in the environment than chemicals with moderate solubilities, such as the low molecular weight PAH compounds (e.g., naphthalene).

- *Volatilization*—Volatilization is the process by which a fraction of a chemical in a solid or liquid phase partitions into a gas phase. Henry's Law coefficient describes the equilibrium partitioning of an environmental contaminant between air and water (concentration in air/concentration in water). The extent to which this process proceeds is measured by the Henry's Law Coefficient which can be related to the vapor pressure of a particular chemical. In general, chemicals with higher vapor pressures, such as CVOCs, volatilize more readily than chemicals with low vapor pressures, such as PAHs. For these reasons, CVOCs dissolved in groundwater is more likely to migrate to soil vapor and migrate through unsaturated soil, eventually releasing to the atmosphere. Low molecular weight PAHs have low vapor pressures relative to CVOCs. Therefore, although volatilization of these compounds does occur, the extent of volatilization of PAHs is much lower than would be expected with CVOCs.

- *Biodegradation*–Biodegradation is the degradation of organic chemicals as the result of the metabolic activity of microbes, including bacteria and fungi that are typically present in most natural environments. The processes that facilitate biodegradation have been extensively investigated and well documented and have been demonstrated to be effective in reducing concentrations of a wide range of organic compounds within soil, groundwater, and surface water.

Biological processes which take place in the natural environment can modify and destroy organic compounds at the point of introduction (surface discharge) or during their transport within soil, groundwater, or surface water. Although rates of degradation are highly variable and are directly influenced by physical and chemical conditions in the environmental media, in general, CVOC compounds are more readily degraded under anaerobic (oxygen-poor) conditions in soil, groundwater, and surface water. Petroleum compounds are more readily degraded under aerobic (i.e., oxygen-rich) conditions.

CVOCs and volatile petroleum hydrocarbons that have been identified as COCs at the Site have similar characteristics in that they have relatively high vapor pressures (i.e., they are all volatile). They have varied solubility, sorption coefficients, and persistence in the environment. Table 4-3 provides the chemical parameters important to CVOC and volatile petroleum hydrocarbon fate and transport.

All of the above parameters are used in conjunction with site-specific conditions to predict the most likely exposure pathway for a given chemical in the environment.

4.1.1.1 CVOC/Volatile Petroleum Hydrocarbon Partitioning

These compounds are likely to be mobile in the environment because of their relatively high vapor pressures and water solubility. The vapor pressures of the CVOCs and VPHs of interest range from 2.2 millimeters (mm) mercury (Hg) to 157 mm Hg and the water solubilities range from 28 (naphthalene) to 8,700 mg/L (1,2-DCA). Because these compounds are volatile, they are considered to be a potentially significant source of vapor emissions to air.

Most of the VOCs of interest have a specific gravity above 1 (i.e., denser than water), with the exception of the C_9-C_{10} Aromatics. If the denser components are present as a pure-phase liquid (dense non-aqueous phase liquid [DNAPL]), they will migrate down through standing water until they rest on a more resistant unit. Because dense NAPLs flow down the topographic surface of the most resistant geologic unit rather than by gradient-driven groundwater flow, assessing the source of these compounds can be difficult. Due to the historical and current concentrations detected at the Site, there is a very low probability that significant quantities of DNAPL exist at the Site.

4.1.2 Metals Mobility and Partitioning

Metals behavior in the environment is much more complex than that of organic compounds. Metal mobility is primarily controlled by ORP and pH. Based on the groundwater at a site, metals can be present in the environment in a variety of oxidation states. In many cases, they can also partition between the dissolved phase and organic matter. They can also form a range of complexes with ligands in the environment which, in some cases, may have different mobilities. Metals are typically more mobile at low pHs. Low pH can place metal into solution and cause them to desorb from soil.

Because metals are naturally occurring, in some cases, it is difficult to distinguish levels of metals that result from a release of materials to the environment and levels that represent background conditions.

The primary metals of interest at this Site are cobalt and chromium. Two categories of processes will largely control the mobility of these metals in groundwater: 1) adsorption and desorption reactions, which is characterized by the soil/water distribution coefficient and 2) oxidation/reduction reactions.

Cobalt

The mobility of cobalt in soil is primarily controlled by how strongly it is adsorbed by soil constituents. Cobalt may be sorbed to mineral oxides such as iron and manganese oxide, crystalline materials such as clay, and natural organic substances in soil. Sorption of cobalt to soil occurs rapidly (within 1-2 hours). Soil-derived metal oxide materials were found to adsorb greater amounts of cobalt than other materials examined, although substantial amounts were also adsorbed by organic materials (ATSDR, 2012b). Organic complexing agents, such as those obtained from plant decay, may increase cobalt mobility in soil.

The distribution coefficient of cobalt can vary considerably in response to pH, reduction/oxidation (redox) conditions, ionic strength, and the amount of dissolved organic matter (ATSDR, 2012b). The sorption of cobalt has been shown to increase with increase in the pH of the aqueous phase and soil surface area (Payne, et. al, 2009).

Cobalt concentrations in soil samples collected from the Site suggest minimal variation between developed portions of the property and background portions. Additionally, the positive detections of cobalt in groundwater are limited to MW-05, which exhibits elevated manganese concentrations and the reduced/anoxic conditions of groundwater is likely impacted by the biodegradation of petroleum contamination.

Because cobalt concentrations in soil do not indicate a release of this material to the environment as a result of Site activities, it is anticipated that the cobalt detected in groundwater at MW-05 is the result of mobilization of naturally occurring cobalt in soil due to the reduced/anoxic conditions of groundwater in this area and the presence of cobalt in groundwater in this area will be limited by the extent of reduced/anoxic groundwater at the site. Thus, the localized cobalt concentrations in groundwater will be expected to be immobilized once the groundwater system returns to a more natural state and/or when the dissolved cobalt impacted groundwater migrates beyond the area of active biodegradation.

Chromium

The Agency for Toxic Substances & Disease Registry (ATSDR) indicates that mobility of chromium in soil is dependent upon the speciation, which is a function of redox potential and the pH of the soil. In most soil, chromium will be present predominantly in the trivalent chromium (III) oxidation state. This form has very low solubility and low reactivity, resulting in low mobility in the environment (ATSDR, 2012a).

Under oxidizing conditions, hexavalent chromium (VI) may be present in soil as CrO_4^{-2} and $HCrO_4^{-1}$. In these forms, chromium is relatively soluble and mobile. However, a leachability study comparing the mobility of several metals, including chromium, in soil demonstrated that chromium had the least mobility of all of the metals studied. These results support previous data finding that chromium is not very mobile in soil, especially in the trivalent oxidation state, which is its typical oxidation state. The vertical migration pattern of chromium in this soil indicates that little leaching is taking place.

In addition to the low mobility of hexavalent chromium in groundwater, the soil sampling results do not indicate the presence of a source of chromium contamination at the Site. The chromium concentrations reported in Site soil were consistent between the developed areas and the background locations, suggesting that the chromium detections in soil were of natural deposits, and not the result of a site-related release. As discussed above, naturally-occurring (presumably stable) chromium exists in the trivalent oxidation state. Therefore, there is no reason to believe that chromium detected during Site sampling is present in the hexavalent state, but rather, that it is present in the trivalent state.

4.1.3 Degradation

Many organic compounds are subject to degradation in both groundwater and in air. The following provides a brief summary of degradation mechanisms of the COCs at the Site.

C_9-C_{10} Aromatics/Naphthalene

Aromatic petroleum compounds (including naphthalene) are readily degraded in groundwater under aerobic conditions. Biodegradation of petroleum compounds in groundwater has been documented in numerous case studies. During aerobic biodegradation of the organic chemicals, oxygen is consumed in a process that converts the chemical constituents into carbon dioxide and water. Accordingly, in groundwater containing dissolved BTEX, and where biodegradation is actively occurring and DO is being consumed, DO concentrations will be lower inside the plume as compared with those outside the plume (Barker, et. al., 1987).

The geochemical parameters monitored during the groundwater sampling event were generally consistent across the Site. However, the ORP and the DO reported during sample collection from MW-05 were different than what was recorded in the remaining samples. With the exception of MW-05, the ORP values reported throughout the Site ranged between 89 and 185 mv, while the ORP reported in MW-05 was -25 mv. Similarly, the DO measured in the wells other than MW-05 were generally high, between 8.5 and 10.2 mg/L, while the DO reported in MW-05 was significantly lower at 0.7 mg/L. Groundwater exhibiting reducing conditions, coupled with low DO, elevated iron and manganese concentrations, and no detectable nitrate suggests that the biodegradation of groundwater contamination in the area of MW-05 is likely occurring due to previous petroleum contamination. Additional data such as dissolved and total iron, dissolved and total manganese, sulfate, and dissolved carbon dioxide from MW-05 and select monitoring wells (both upgradient and downgradient) would be required to definitively determine if the geochemical conditions are the result of the biological activity.

Biodegradation of petroleum compounds can also take place under anaerobic conditions, but it generally takes place at a slower rate.

1,2-Dichloroethane

Chlorinated solvents, such as 1,2-DCA primarily degrade by the progressive loss of the halogens (chlorine). Degradation of chlorinated solvents normally occurs under anaerobic conditions, primarily through reductive dechlorination. 1,2-DCA normally degrades into chloroethane, and ethane and carbon dioxide; however, the degradation process may not continue, dependent upon the microbes present. Much of the 1,2-DCA is lost due to volatilization.

Chloroform

Dissolved chloroform in groundwater may be degraded biologically to methylene chloride, then to chloromethane, then methane as part of the reductive dechlorination process. However, chloroform is extremely toxic to microorganisms, with appreciable inhibition of microbial activity at 1 mg/L and death of almost all de-chlorinating microorganisms as concentrations approach 100 mg/L. Various reports have suggested that aerobic degradation may occur under some circumstances, but that chloroform generally degrades more readily in anaerobic conditions (ATSDR, 1997a).

Chloroform may degrade abiotically to a limited degree. It has a negligible rate of hydrolysis in water (half-life of 25 to 37 years at a pH of 9 and 1,850 to 3,650 years at a pH of 7). Chloroform will volatilize to soil gas much faster than biodegradation would take place.

Trichloroethene

As is typical with chlorinated solvents, TCE will biologically degrade under anaerobic conditions in groundwater by reductive dechlorination. The process produces cis-1,2-DCE, trans-1,2-DCE, and 1,1-DCE as daughter products, although cis-1,2-DCE is the most common daughter product. These daughter products can degrade to vinyl chloride and then ethane or carbon dioxide. Reductive dechlorination has been well demonstrated at a number of CVOC release sites. However, as with 1,2-DCA, the degradation process may not continue, dependent upon the microbes present and frequently stops at DCE.

In addition, TCE readily volatilizes to the vadose zone and subsequently into the air or structure above.

4.2 POTENTIAL ROUTES OF MIGRATION

The following section describes the potential routes of migration from the various sources discussed above. Figure 4-1 presents the various migration routes, in addition to the transport mechanisms which would facilitate the migration of Site contaminants.

Many factors influence the rate of constituent movement through soils. These include the physical/chemical properties of the constituents (e.g., solubility, density) as listed in Table 4-3, and the physical/chemical properties of the environment (e.g., rainfall, percolation rate, soil permeability, porosity, particle size distribution, organic carbon content).

The following subsections discuss the various transport mechanisms and their applicability to observed COCs.

4.2.1 Soil Migration Routes

As illustrated in Figure 4-1, contamination associated with Site soil can migrate in several different ways, including mechanical redistribution of the material, volatilization, windblown fugitive dust, precipitation and subsequent infiltration, and erosion/runoff.

COC concentrations in Site soil samples do not suggest the presence of a wide-spread contaminant source, but appear to support the presence of small areas of soil contamination. Additionally, the data suggests that native concentrations of naturally occurring metals in soil may be contributing to limited groundwater contamination via precipitation infiltration.

AMAC Building indoor air contamination may be the result of migration of the volatilization of soil contaminants into soil vapor in areas proximal to the AMAC Building.

4.2.2 Groundwater Migration Routes

The primary transport processes for contaminants in groundwater include advection, mechanical dispersion, and molecular diffusion. Of these transport processes, the major contaminant transport process at the Site is advection, or the movement of contaminated groundwater with the bulk flow of the groundwater. This is the principal process by which dissolved and suspended phase contaminants are transported at the Site.

Advection of contaminated groundwater into DW-01 creates a complete exposure pathway at the Site. As illustrated in Figure 2-2, the bedrock groundwater elevation slopes to the north and northwest. However, due to the fact that groundwater is present in fractured bedrock, it is not possible to directly infer the direction of groundwater flow from the potentiometric surface.

4.2.3 Surface Water/Sediment Migration Routes

Surface water and sediment do not appear to be acting as a migration route. As indicated in Sections 3.5 and 3.6, surface water associated with the Site has never been identified during Site investigations. No groundwater has been observed in monitoring well MW-06 which is installed in the immediate vicinity of the surface water swale. This indicates bedrock groundwater does not discharge to surface water at the Site.

4.2.4 Air Migration Routes and Transport Pathways

Volatilization into indoor air is one of the primary exposure pathways that are active at the Site. As discussed in Section 3.8.2, it appears that the source of indoor air contamination may be related to soil contamination in the soil adjacent to the AMAC Building. This assertion is supported by the measured attenuation factors between indoor air and soil gas (Table 3-6) which are quite high indicating that the building slab does not pose a significant barrier to migration of soil vapors into the AMAC Building. This may be attributable, in part to void spaces observed beneath the building foundation slab and the underlying soil. The presence of the void space beneath the slab may have resulted in an increased amount of cracking of the slab producing preferential soil vapor migration pathways in the portions of the floor that overlie any void spaces. This would result in higher degree of communication between the soil gas and the indoor air.

Contaminated soils related to the former fuel oil AST, and AMAC septic tank may also provide an additional source of volatile soil contamination by petroleum hydrocarbons and CVOCs.

4.3 CONTAMINANT MIGRATION

The following sections describe the historical or currently observed migration of COPCs identified at the Site. Each section discusses the applicable migration routes and Site characteristics affecting the migration of contaminants.

4.3.1 Contaminant Migration in Soil

With the termination of releases and/or disposal activities at the LO-58 Site in 1969, the concentrations of COCs in soil at the Site would decrease due to natural attenuation processes, including degradation of contaminants, dissolution into vadose zone water, and volatilization.

Concentrations of DRO at soil sample locations SB-09, SB-13, SB-45, SB-54, and SB-55 exceed MEDEP RAGs and were considered indicative of potential sources of soil and groundwater contamination. Soil sample data collected in 2012 indicate that the historical concentrations of VOCs and GRO, in addition to most of the previously documented concentrations of DRO, are below current MEDEP RAGs. The only soil sample currently containing concentrations of petroleum constituents that exceed currently MEDEP RAGs is B-03.

The low concentrations of contaminants in soil implies that natural attenuation has decreased the concentrations of hazardous substances to such a degree that they generally do not require remediation. The petroleum contamination observed in B-03 is indicative of an ongoing source of petroleum contamination that may be related to the former UST that appears to have been removed without any record of confirmational soil sampling.

4.3.2 Contaminant Migration in Groundwater

As discussed in Section 3.4, groundwater beneath the LO-58 Site has been documented to contain VOCs related to fuel and chlorinated solvents, most notably TCE. Due to the lack of documentation of on-site disposal procedures, it is assumed that the COCs migrated vertically from the contaminated soil source areas to the bedrock surface. Contamination may have entered bedrock either directly or via dissolution into vadose zone water, recharging the bedrock aquifer.

The concentrations of COCs detected in groundwater are well below their maximum solubilities, a condition which indicates that there is no significant NAPL source in the subsurface. However, a small isolated source may exist in the bedrock aquifer.

The presence of increasing ratios of breakdown products of TCE in DW-01 and MW-03 appears to indicate that degradation of TCE is occurring naturally at the Site. However, this degradation occurs under anaerobic conditions and available groundwater DO and ORP data do not indicate significant areas of anaerobic conditions at the Site. Thus, it is presumed that CVOC degradation is occurring in groundwater beneath the source areas (e.g., MW-05) where the combination of DRO/GRO and chlorinated solvents may result in the anaerobic conditions that favor biodegradation of CVOCs.

The combination of the available information regarding groundwater flow paths with the locations of the soil/overburden sources of COCs identifies the contaminant migration paths for the Site. Figure 3-3 illustrates presumed source areas for CVOC contamination. It should be noted that the CVOC source areas included in Figure 3-3 differ from that which was based on the 1999 soil-vapor screening investigation. In that investigation, TCE concentrations of between 0.01 J and 0.04 J nanograms per liter (ng/L) were reported in the Launcher Area. Concentrations at this low level are not indicative of CVOC source contamination. Additionally, subsequent soil and groundwater investigations conducted in this area did not identify CVOC source areas. Therefore, estimated source areas have been modified as presented in Figure 3-3.

Data obtained during the 2009 Geophysical Assessment indicate that monitoring wells MW-01, MW-03, and MW-05 are directly hydraulically connected to DW-01 (COLOG, 2009). During three separate transmissivity pumping events in DW-01, groundwater levels in all five monitoring wells were monitored with transducers. Groundwater levels in MW-01, MW-03, and MW-05 appeared to rise immediately upon initiating the three different injection tests, and appeared to return to normal conditions upon completing the tests in DW-01. In their 2011 CSM, Weston described the zone of influence for DW-01 as having an east/west running anisotropy, as evidenced by the groundwater level fluctuations in the three identified monitoring wells and bedrock fracture orientation data detailed in Section 2.6.

Thus, the area of influence of DW-01 identified by Weston has an elliptical shape with the major axis of the ellipse trending to the northeast. This orientation of the area of influence indicates that groundwater infiltration through the two areas of TCE in soil contamination identified in Figure 3-3 would likely be captured by DW-01.

4.3.3 Contaminant Migration in Sediment/Surface Water

There are no known surface water bodies that have been identified at the Site. However, field observations indicate that intermittent surface water does pond in the topographic low, fed primarily from surface runoff from the former Barracks Building parking lot. Soils in the receiving swale are subject to erosion and transport during periods of high stormwater flow. Aside from the paved surface, erosion of the upgradient soils and consequent runoff is limited due to the heavily vegetated landscape upslope of the drainage. As depicted in Figure 4-1, this exposure pathway is considered to be limited for all receptors under both current and foreseeable future use scenarios.

4.3.4 Contaminant Migration in Soil Gas and Indoor Air

Indoor air contamination is the primary complete exposure pathway for volatile contaminants detected at the Site. It appears that soil contamination may be present near the AMAC Building which may be the source of vapors detected beneath the building foundation slab and in the air within the building.

Groundwater contamination has been documented at both MW-05 and DW-01, wells located within approximately 150 ft of the AMAC Building footprint. However, as described in Section 3.9.2.2, it does not appear likely that groundwater contamination is the source of the vapors observed at the building. The former septic tank may be a source of CVOCs. This structure is located less than 100 ft away from the building’s western extent. Sub-slab soil gas concentrations from beneath the AMAC Building indicate VOCs have migrated into the sub-slab soil vapor beneath the building, at concentrations above applicable Toxicity Screening Values. These soil vapor concentrations are highest in the portion of the building that is closest to the former septic tank.

The results of groundwater sampling at DW-01 and MW-05 indicate low concentrations of CVOCs. However, the detected concentrations of COCs, most notably TCE, remain fairly constant.

5. HUMAN HEALTH RISK ASSESSMENT

The objective of this HHRA is to evaluate the contamination that may be present in Site soil, groundwater, and indoor air to estimate the potential risks (cancer and noncancer) associated with human contact with these media with consideration given to the current and reasonably anticipated future uses of the Site. An HHRA serves multiple roles in the decision-making process, including:

- Estimating the potential risks to exposed individuals if no actions are taken (i.e., baseline conditions);
- Assisting in determining the need for remedial action; and
- Providing a basis for determining cleanup goals.

This HHRA followed the *Final Remedial Investigation/Feasibility Study Work Plan for the Former LO-58 NIKE Battery Launch Site* (Avatar, 2013b). This work plan outlines the approach for the HHRA and was submitted to CENAE and MEDEP for review prior to the conduct of this HHRA. This HHRA incorporates the technical comments of these agencies.

This HHRA was developed using EPA guidance and meets the intent of CERCLA. Published guidance from MEDEP was also considered. The HHRA was based on site-specific information and the following guidance and methods:

- *EPA Risk Assessment Guidance for Superfund (RAGS), Volume I;*
    1. *Human Health Evaluation Manual, Part A* (EPA, 1989a).
    2. *Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment* (EPA, 2004).
    3. *Human Health Evaluation Manual, Part F, Supplemental Guidance for Inhalation Risk Assessment* (EPA, 2009).
- *EPA Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"* (EPA, 1991);
- *EPA Exposure Factors Handbook* (EPA, 1997a);
- *EPA Supplemental Guidance for Developing Soil Screening Levels* (EPA, 2002a);

- *EPA Child Exposure Factors Handbook* (EPA, 2008a);
- *EPA Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)* (EPA, 2002b);
- *EPA's Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites* (EPA, 2002c);
- *EPA Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors* (EPA, 2014);
- *EPA Regional Screening Level Table* (EPA, 2016a);
- Other relevant EPA risk assessment guidance;
- *MEDEP Guidance for Human Health Risk Assessments for Hazardous Substance Sites in Maine* (MEDEP, 2011); and
- *Maine Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances* (MEDEP, 2016).

5.1 DATA EVALUATION

The objective of the data evaluation is to present the data available to assess Site risks, evaluate the usability of the data, outline the approach used to summarize the data, and identify the COPCs. The data evaluation process involves the following tasks:

- Identification of the media of potential concern;
- Evaluation of the data usability;
- Establishment of the guidelines for data reduction;
- Evaluation of the data for use in the risk assessment; and
- Description of the COPCs selection approach.

The following subsections describe each of these tasks.

5.1.1 Media of Concern

Based on the previous investigations, a site visit to the area, an analysis of data gaps, and the current and reasonably anticipated future uses, the following media are of potential concern to human receptors and are evaluated in the HHRA:

- Soil (surface and subsurface);
- Groundwater; and
- Indoor air (resulting from the vapor intrusion pathway).

Based on previous investigations and available historical information, there was no indication of disposal activities occurring in the vicinity of the former Barracks Building Area. Therefore, it is assumed that this area poses no risk from contaminant exposure to human health.

5.1.1.1 Soil

Due to data quality issues, data compatibility, and potential natural attenuation since earlier sampling events, historical soil data were not used in the HHRA. Soil data used in the HHRA consists only of those samples collected as part of the current RI.

5.1.1.2 Groundwater

Due to potential natural attenuation since previous sampling events, only groundwater data obtained through the LTMP from the past five years (2008-2012) were incorporated in the HHRA. Additional groundwater data used in this HHRA consists of those samples collected as part of the current RI.

5.1.1.3 Indoor Air

Due to data quality issues, data compatibility, and potential natural attenuation since the earlier sampling events, historical indoor and outdoor air data were not used in the HHRA. Air data used in the HHRA consists only of those samples collected as part of the current RI. Although soil vapor samples were collected as part of the current RI, only AMAC Building indoor air sample results were included in the HHRA. Indoor air samples are more representative of actual exposure concentrations that the receptors are currently exposed to or would likely be exposed to in the future.

5.1.2 Guidelines for Data Reduction

The following guidelines for data reduction were used to produce the data summaries for each medium. These approaches are consistent with EPA RAGS (EPA, 1989a).

- If an analyte is not identified in any sample for a given medium because it is reported as a nondetect (ND, indicated by a "U" qualifier), it was not addressed for that medium.

- Analytical results with an "R" qualifier (indicating that the data was rejected during the validation process) were not retained in the data set.

- All "U" qualified data represent samples for which the analyte was not present or was below the sample-specific quantitation limit (SQL) or LOQ. These data are considered non-detects (NDs) and were retained in the data set at the full LOQ.

- "J" qualified analytical data indicate that the reported concentrations are estimated. These data were evaluated as positive detections in the HHRA and were retained in the data set at the measured concentration.

- If a sample duplicate was collected and analyzed, the average of the two detected concentrations was used for subsequent calculations unless there was a greater than 50% difference in soil concentrations or a 30% difference in water concentrations, in which case the higher of the two concentrations was used. For indoor air samples, the maximum of the two detected concentrations was used. In the case of a detected sample and a nondetect duplicate, the detected concentration was carried through subsequent calculations.

The data by medium for use in the risk assessment have been summarized. Summary tables have been prepared and present the following information:

- List of analytes detected;
- Range of detected concentrations;
- Location of maximum detected concentration;
- Frequency of detection; and
- Range of LOQs.

Summaries for two soil data groupings were presented: one for the surface soil (0 to 1 ft bgs) and one for the surface/subsurface soil (0 to 10 ft bgs), hereafter referred to as "total soil". Surface soil data were used to evaluate those receptors who are not expected to routinely contact soil at a depth greater than 1 ft bgs. Total soil data were used to evaluate future receptors (i.e., future residents) who may contact the total soil as a result of the mixing of soils from 0 to 10 ft bgs which may occur during construction activities.

Subsection 5.2.5 presents a detailed discussion of the development of exposure units (EUs) in order to represent reasonable exposure areas to current and potential future receptors.

Tables 5-1 (surface soil) and 5-2 (total soil) present the data summaries for both the AMAC Building Area and Launcher Areas, as well as the entire Site (AMAC Building and Launcher Areas combined). Detected analytes include VOCs, SVOCs, PAHs, one PCB compound (Aroclor 1260), and inorganics-principally metals.

Table 5-5 presents the data summaries for groundwater at the AMAC Building Area, as well as the entire Site (AMAC Building and Launcher Areas combined). Detected analytes include VOCs, SVOCs, PAHs, aliphatic and aromatic hydrocarbons, DRO and GRO, and inorganics.

Table 5-6 presents a summary of the indoor air data collected from the AMAC Building Area. Detected analytes include VOCs, PAHs, and aliphatic and aromatic hydrocarbons.

Tables 3-1 through 3-4 present the analytical results for all of the samples included in the HHRA evaluation for each of the evaluated exposure media.

5.1.3 Selection of Contaminants of Potential Concern

5.1.3.1 Approach

A COPC selection process was conducted to identify a subset of analytes that are detected in the media at levels that could pose a potential risk to exposed human receptors. The criteria that were used to determine COPCs include:

- Non-detection – If an analyte was not detected in any samples for a given medium, it was not evaluated as a COPC for that medium; and
- A comparison of maximum detected concentrations to risk-based criteria – Comparisons were made to the EPA RSLs (EPA, 2016a).
- Essential nutrients – For metals considered to be essential nutrients (calcium, magnesium, potassium, and sodium), the maximum concentrations in soil were used to calculate a maximum daily intake for children. The maximum intake levels were compared to Recommend Daily Allowances (RDAs) and Adequate Intakes (AIs) – if the maximum intake of the essential nutrient was greater than the RDA or AI, it was selected as a COPC.

COPCs in soil, groundwater, and indoor air were determined by comparing the maximum detected concentrations for each analyte in each medium to medium-specific human health benchmarks calculated based on conservative exposure assumptions.

For screening purposes, a target hazard quotient (THQ) for noncancer based criteria of 0.1 was used to account for potential additivity or cumulative effects of multiple contaminants on similar organs. A target risk (TR) for cancer based criteria of one-in-a-million (expressed as 1E-06) was used. In cases where an analyte has both a cancer and noncancer screening value, the lower (i.e., more stringent) of the two values was used for screening. When an analyte did not have a screening criterion available, a suitable surrogate analyte was identified and the screening value for the surrogate analyte was used in the COPC selection process. The analytes for which surrogate screening values were used are noted on the COPC screening tables. There were cases where a suitable surrogate could not be identified for an analyte and a comparison to screening criteria could not be performed. These analytes were not carried forward in the risk assessment. The uncertainty associated with not evaluating these analytes is discussed further in the Uncertainty Analysis (see Section 5.5.1).

If the maximum detected, medium-specific concentration for an analyte was less than its screening criterion, that analyte was eliminated from consideration as a COPC in that medium and was not evaluated further in the risk assessment. Analytes that exceeded their respective screening criteria were retained as COPCs and evaluated in the risk assessment. The metals in soil that exceeded their screening values were also compared with background soil concentrations, where available.

5.1.3.2 Soil

The maximum detected concentrations in the surface soil and total soil datasets were compared with residential soil RSLs (EPA, 2016a). For a more-informed comparison, Site soil concentrations were also compared with Maine’s RAGs for soil (Tables 5-1 and 5-2) (MEDEP, 2016). The comparisons with Maine standards are for informational purposes only. With the exception of arsenic, all of the detected analytes in soil were below their respective Maine RAGs value.

5.1.3.2.1 Results

Tables 5-1 and 5-2 present the COPC selection process for the analytes that were detected in the surface and total soil, respectively. The following table summarizes those analytes that exceeded their respective screening criteria:

Soil COPCs		
AMAC Building Area (Surface Soil)	**Launcher Area (Surface Soil)**	**Entire Site (Total Soil)**
Benzo(a)anthracene	Benzo(a)pyrene	Benzo(a)anthracene
Benzo(a)pyrene	Aluminum	Benzo(a)pyrene
Benzo(b)fluoranthene	Arsenic	Benzo(b)fluoranthene
Dibenzo(a,h)anthracene	Chromium	Dibenzo(a,h)anthracene
Aluminum	Cobalt	Aluminum
Arsenic	Iron	Arsenic
Chromium	Manganese	Chromium
Cobalt	Thallium	Cobalt
Iron		Iron
Manganese		Manganese
		Thallium

5.1.3.2.2 Essential Nutrients

No toxicity values were available to evaluate the presence of calcium, magnesium, potassium, and sodium. The presence and possible exposures to these inorganic compounds in soil were evaluated as essential dietary nutrients. The maximum intakes were compared to RDAs/AIs. The results of this comparison are presented in Table 5-3 and indicate that the nutrient-based reference values are substantially greater than the intake that could occur as a result of ingesting soil with the maximum detected concentrations. As a result, these compounds are unlikely to contribute significantly to total risks and no further evaluation of these compounds was performed.

5.1.3.2.3 Background

Certain metals detected in the on-site media are naturally occurring. As discussed in Appendix B of EPA's *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites*, although a comparison to background concentrations is not a criterion for selecting COPCs, it is useful in determining the degree to which the on-site metals concentrations are similar to naturally occurring levels (EPA, 2002c). Background comparisons were limited to metals only. Site (AMAC Building Area and Launcher Area) maximum detected metal concentrations were compared with site-specific maximum detected background concentrations. Site maximum detected metal concentrations were also compared with regional background 90% upper prediction limits (UPLs) provided in *Summary Report for Evaluation of Concentrations of Polycyclic Aromatic Hydrocarbons (PAHs) and Metals in background Soils in Maine* (AMEC, 2012) and MEDEP's *Maine Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances* (MEDEP, 2016). Table 5-4 presents the results of the surface soil background comparisons for both the AMAC Building and Launcher Areas. The results of the surface soil background comparisons and their significance to Site risks are discussed further in the Risk Summary (Section 5.6). The following soil COPCs were found to have maximum detected concentrations less than the maximum detected site-specific background concentration and/or the regional background UPL (unless otherwise noted, the maximum detected Site concentration was less than both the site-specific and regional background values):

Metal	AMAC Building Area	Launcher Area
Antimony	---	X
Arsenic	X	X
Barium	X	X
Beryllium	X (Regional only)	X (Regional only)
Cadmium	X	---
Chromium	X (Regional only)	X
Cobalt	---	X
Copper	X (Site-specific only)	X (Site-specific only)
Lead	X	X (Site-specific only)
Manganese	X	X
Mercury	X	---
Selenium	X (Site-specific only)	---
Thallium	---	X
Vanadium	X	X
Zinc	X (Regional only)	X (Regional only)

5.1.3.3 Groundwater

To select COPCs in groundwater, the maximum detected concentrations were compared with the tap water RSLs (EPA, 2016a). As with soil, Site concentrations were also compared with Maine's MEGs for drinking water (Table 5-5) (MEDEP, 2016). With the exception of trichloroethene, C_9-C_{10} Aromatic Hydrocarbons, C_{11}-C_{22} Aromatic Hydrocarbons, lead, and manganese, all of the detected analytes in groundwater were below their respective Maine MEG value.

5.1.3.3.1 Results

Table 5-5 presents the COPC selection process for the analytes that were detected in groundwater. The following table summarizes those analytes that exceeded their respective screening criteria:

Groundwater COPCs	
AMAC Building Area	**Entire Site**
1,1-Biphenyl	1,1-Biphenyl
cis-1,2-Dichloroethene	1,2,4-Trimethylbenzene
Trichloroethene	1-Methylnaphthalene
Chromium	Benzo(a)anthracene
Manganese	Benzo(a)pyrene
	cis-1,2-Dichloroethene
	Dibenzo(a,h)anthracene
	Dibenzofuran
	Naphthalene
	Trichloroethene
	Cadmium
	Chromium
	Cobalt
	Manganese
	Nitrate

5.1.3.4 Indoor Air

Indoor air COPCs were determined by comparing Site levels with residential indoor air RSLs (EPA, 2016a). For a more-informed comparison, indoor air concentrations were compared against MEDEPs Indoor Air Targets (IATs; Table 5-6) (MEDEP, 2016). Chloroform, naphthalene, and trichloroethene were the only detected analytes in indoor air that exceeded their respective IAT value.

5.1.3.4.1 Results

Table 5-6 presents the COPC selection process for the analytes that were detected in indoor air. The following table summarizes those analytes that exceeded their respective screening criteria:

Indoor Air COPCs
AMAC Building Area
Benzene
Chloroform
Ethyl benzene
Naphthalene
Trichloroethene

5.2 EXPOSURE ASSESSMENT

The objective of the exposure assessment is to characterize the nature, extent, and magnitude of potential exposure of human receptors to COPCs considering the current and the reasonably anticipated future uses of the Site. The exposure assessment involves several elements, including:

- Evaluating the exposure setting, which includes describing the local land and water uses;
- Developing a CSM, which includes describing the source of contamination, the transport and release mechanisms, the exposure media, the exposure routes, and the potentially exposed populations;
- Calculating the exposure point concentrations (EPCs) for each COPC for each of the exposure scenarios and routes of exposure;
- Identifying the exposure models and parameters that were used to calculate the exposure doses; and
- Calculating the exposure doses for both cancer and noncancer effects.

Doses and risks were estimated based on the reasonable maximum exposure (RME). The RME is a high-end description of risk defined by EPA guidance (1992a) as:

"… a plausible estimate of the individual risk for those persons at the upper end of the risk distribution. The intent of this description is to convey an estimate of risk in the upper range of the distribution, but to avoid estimates which are beyond the true distribution."

5.2.1 Exposure Setting

Local Land Use

As discussed previously, the former Barracks and AMAC Buildings are used on a regular basis by several groups. The former Barracks Building is used for different activities including VFW functions as well as social activities (e.g., community bingo). The Adult Multiple Alternative Center (AMAC) leases the AMAC Building from the VFW for the instruction and development of a variety of life skills for adults with disabilities. Almost all of the activities occur indoors. However, when weather permits, AMAC staff and clients use the backyard of the AMAC Building as well as the eastern portion (i.e., the former Launcher Area) of the LO-58 Site for outdoor activities including occasional walks. The LO-58 Site and its immediate surroundings are located in Residential District 3. Zoning for this district limits land use to such activities as forestry and farming, farm residence, and various other uses not inconsistent with a generally open, non-intensive pattern of land use (Weston, 2011). Properties surrounding the LO-58 Site include a mix of commercial, residential, farmland, and undeveloped land (WESTON, 2011).

Local Water Use

Both the former Barracks Building and the AMAC Building are supplied with potable drinking water from bedrock wells located on Site and both buildings are served by private septic systems. A POE, activated carbon water filtration system has been installed, maintained, and monitored for the removal of organic contaminants which are present in the AMAC Building drinking water well (Weston, 2011). Although the AMAC Building drinking water well is filtered, the exposure was based on the absence of any water treatment methods. Because municipal water supply and sanitary sewer systems are not available, all properties in the area of the LO-58 Site are served by private drinking water supplies (groundwater wells) and septic systems. There are no permanent surface water bodies associated with the LO-58 Site.

5.2.2 Conceptual Site Model for Human Exposures

A CSM describes: 1) the contaminant source(s); 2) the release and transport mechanisms; 3) the exposure media; 4) the exposure routes; and 5) the potentially exposed human populations. An exposure pathway is the link between environmental releases and local populations that might come into contact with, or be exposed to, environmental contaminants. The primary objective of the CSM is to identify the complete and incomplete exposure pathways. A complete pathway has all of the five components listed above; whereas an incomplete pathway is missing one or more. Figure 5-1 presents the CSM for human exposure at the LO-58 Site. Each element of the CSM is described in detail in the following sections.

Source of Contamination

As discussed previously in Section 1.2.2, the COPCs attributable to releases from the LO-58 Site are VOCs associated with fuels formerly used and stored at the LO-58 Site and chlorinated solvents associated with historical missile maintenance. There is no documentation of the actual release mechanisms for the fuels and chlorinated solvents. However, it is presumed that a combination of surficial spills and discharges as well as subsurface discharges resulted in the observed distribution of COPCs in soil/overburden at the LO-58 Site (Weston, 2011).

There appear to be two soil/overburden sources at the LO-58 Site: one located west of the AMAC Building and a second located near the former Launcher Area and former Fueling Platform at the LO-58 Site (Weston, 2011).

The former USTs and ASTs are no longer considered sources at the LO-58 Site. However, residual contamination in Site soils relating to the former USTs and ASTs remain sources of fuel-related COPCs (Weston, 2011).

Release and Transport Mechanisms

There are four mechanisms that can release and transport COPCs at the Site: erosion and surface runoff; wind erosion/volatilization; leaching to and migration of contaminants in groundwater; and migration of volatile COPCs through the vadose zone into buildings. Surface water runoff occurs during rainfall and snowmelt when COPCs in the soil are released through soil erosion and transported to other areas on site via site drainage. Wind erosion of soils can also play a role in releasing COPCs from soil. This holds true where activities such as heavy truck traffic on unpaved roads and other construction-related activity is occurring (EPA, 2002a). Dust emissions may be an important route of exposure if future construction activities occur. Moreover, VOCs present in the soil can volatilize and be inhaled during outdoor activities. The third release and transport mechanism is leaching to groundwater. Following release to the ground surface, infiltration would transport COPCs through the soil column to the groundwater and migrate laterally depending on the flow gradient. VOCs present in the soil and groundwater can migrate through the vadose zone and potentially infiltrate buildings located above the contamination.

Exposure Media and Routes of Exposure

As mentioned previously, it is assumed that the former Barracks Building Area poses no risk to human health. The LO-58 Site was evaluated as two exposure areas for current use: the AMAC Building Area and the Launcher Area. The LO-58 Site was evaluated as two current use exposure areas based on differences in exposure time and land use. The AMAC Building Area exposure is based on AMAC staff and clients indoor exposure throughout a work week, as well as outdoor Site worker activities; whereas the Launcher Area is based on AMAC staff and client exposure while walking throughout the area, occasional trespassing, and outdoor Site worker activities. The entire LO-58 Site area was evaluated for future use. This is based on the assumption that future development may occur Site-wide.

For the human health assessment, the potentially contaminated media include soils, groundwater, and indoor air. COPCs in soil may be incidentally ingested and absorbed through the skin. In addition, dust or VOCs released from the soil into the air would be available for inhalation. COPCs in groundwater may also be ingested, absorbed through the skin while bathing/showering, and inhaled during showering. The inhalation while showering pathway was evaluated for only those COPCs determined to be volatile. VOCs present in indoor air resulting from vapor intrusion would be available for inhalation by building inhabitants.

5.2.3 Exposure Scenarios

5.2.3.1 Potentially Exposed Populations

The HHRA focused on those human populations likely to be exposed to each of the potentially contaminated Site media currently and/or in the future. This approach ensures that the range of risks over various population subgroups are characterized for potential activities and land/water uses. These exposed populations, based on area and exposure time-frame, are as follows.

AMAC Building Area – Current Users

- **AMAC Building Staff** – Staff members of the AMAC Building could be exposed to surface soils, groundwater, and possibly COPCs in indoor air within the AMAC Building Area EU.
- **AMAC Building Clients –** Clients visiting the AMAC Building could be exposed to surface soils, groundwater, and possibly COPCs in indoor air within the AMAC Building Area EU.
- **Site Worker** – A Site worker at the AMAC Building Area EU could be exposed to surface soils during typical activities such as cutting lawns, landscaping activities, maintaining utilities, and other tasks that could require contact with soils.

Launcher Area – Current Users

- **AMAC Building Staff** – Staff members of the AMAC Building could be exposed to surface soils within the Launcher Area EU.
- **AMAC Building Clients** – Clients visiting the AMAC Building could be exposed to surface soils in the Launcher Area EU.
- **Trespasser –** Individuals who trespass within the Launcher Area EU could be exposed to Site surface soils.
- **Site Worker** – A Site worker at the Launcher Area EU could be exposed to surface soils during typical activities such as cutting lawns, landscaping activities, maintaining utilities, and other tasks that could require contact with soils.

Entire Site Area – Future Users

- **Future Construction Worker –** It is possible that future construction activities could expose workers to total soil (depth of 10 ft bgs) from the entire Site.
- **Future Commercial/Industrial Worker –** Following development, it is possible that the Site area could be used for commercial/industrial purposes. Future commercial/industrial workers could be exposed to total soil, groundwater, and possibly COPCs in indoor air from the entire Site.
- **Hypothetical Future Residents –** It was conservatively assumed that the entire Site area could be developed for residential purposes in the future. The future residents are exposed to total soil and groundwater from the entire Site. Future residents could also be exposed to indoor air resulting from the vapor intrusion pathway.

Note that, based on previous investigations and available historical information, there is no indication of contamination in the vicinity of the former Barracks Building. Therefore, human receptors at the former Barracks Building were not evaluated for potential exposure to contaminants.

5.2.4 Exposure Point Concentrations

EPCs are the COPC concentrations that a receptor is assumed to contact during exposure to Site COPCs. The subsections below present the methods used to calculate the EPCs using EPA's ProUCL software program, Version 4.1.01 (EPA, 2011). The list below presents the process for determining the EPCs.

- If less than 8 samples were collected within a data grouping, the EPC is the maximum detected concentration.
- Similarly, if 8 or more samples were collected within a data grouping, but the data set contains fewer than 4 detected concentrations, the EPC is the maximum detected concentration.
- If 8 or more samples were collected within a data grouping and the data set contains at least 4 detected concentrations, but the data set contains less than 50% detects, a nonparametric-based upper confidence limit (UCL)/EPC is considered. The nonparametric-based value is derived using either Kaplan-Meier (KM) or bootstrapping estimation procedures, unless there are fewer than 10 detects. If there are fewer than 10 detects, the bootstrapping estimates are not considered.

- If 8 or more samples were collected within a data grouping and the data set contains at least 50% detected concentrations, the appropriate distribution of the data set are determined and UCLs/EPCs are selected as guided by the ProUCL supporting documentation. If the recommended UCL exceeds the maximum detected concentration, a Chebyshev-based UCL is selected as the EPC if possible. If the Chebyshev-based UCL is still higher than maximum detected concentration, the maximum concentration is selected as the EPC.

ProUCL calculates 95% UCLs using 15 different computation methods, 5 parametric and 10 non-parametric. Parametric methods rely on the estimation of parameters (such as the mean or the standard deviation) describing the distribution of the variable of interest in the population; non-parametric methods do not.

The five parametric UCL computation methods include:

- Student's-t UCL;
- Approximate gamma UCL using chi-square approximation;
- Adjusted gamma UCL (adjusted for level significance);
- Land's H-UCL; and
- Chebyshev inequality based UCL (using Minimum Variance Un-biased Estimators (MVUEs) of parameters of a lognormal distribution).

The 10 non-parametric methods included in ProUCL are:

- The central limit theorem (CLT) based UCL;
- Modified-t statistic (adjusted for skewness) based UCL;
- Adjusted-CLT (adjusted for skewness) based UCL;
- Chebyshev inequality based UCL (using sample mean and sample standard deviation);
- Jackknife method based UCL;
- UCL based upon standard bootstrap;
- UCL based upon percentile bootstrap;
- UCL based upon bias - corrected accelerated (BCA) bootstrap;

- UCL based upon bootstrap-t; and
- UCL based upon Hall's bootstrap.

Supporting documentation (ProUCL outputs) for the calculation of the UCLs is presented in Appendix C.1. The soil, groundwater, and indoor air EPCs used in the HHRA are presented in Tables 5-7 through 5-10.

5.2.5 EUs

Exposure units have been developed based on the current and future land use as well as the limited knowledge of the potential for contaminant distribution in soil. Under the current land use conditions, three (3) EUs were evaluated. As presented in Figure 1-2, these EUs include:

<u>AMAC Building Area</u> – This 0.3-acre EU includes the AMAC Building and the approximately 1/4 acre of mowed lawn immediately adjacent to the building. The outdoor lawn area is frequented by AMAC staff and AMAC clients. The lawn area is used for outdoor recreation and outdoor eating by staff and clients alike. As this area represents the area of most likely exposure to AMAC staff and clients in terms of frequency of exposure and exposure duration, it was evaluated as a discrete EU.

<u>Launcher Area</u> – This 15-acre area is currently off limits to the public. Staff and clients of AMAC occasionally take walks in this area. The only other portion of the LO-58 Site currently utilized is a small area in the southern portion of the former Launcher Area which serves as a shooting range (handguns) for the City of Caribou Police Department and the U.S. Customs and Border Patrol. Nevertheless, the Launcher Area has been known to attract trespassers who meander the acreage for recreation and wildlife observation. Because it is assumed for this assessment that there is no preference for any particular area within the Launcher Area and the surrounding fields, there is an equal probability that a trespasser would be exposed at any location throughout the Launcher Area. As such, the Launcher Area was evaluated as a discrete EU.

<u>Entire Site</u> – Under future scenarios, land use may hypothetically include residential and/or commercial development of the Launcher Area and the surrounding fields. As a consequence,

the location of homes or commercial properties would determine the potential for exposure to contaminants in soil. In this case, the EU would be the footprint of the individual residential or commercial property. That is, it would be assumed that a child or an adult living at a given residence would be most highly exposed to contaminants in soil on that property (i.e., the yard). As this scenario is purely hypothetical and the spatial configuration of any of these properties is unknown, and because the distribution of potential soil contamination across the landscape would be expected to vary, potential exposure and consequent risk was based on a conservative estimate of the EPC with the use of the maximum contaminant concentrations or the upper 95% UCL of the mean for the entire Site.

5.2.6 Exposure Equations and Parameters

This section presents the equations and parameters that were used to estimate the chronic daily intakes (exposure doses) of the COPCs for each receptor through the applicable exposure pathways. Where site-specific information was available, that information was used in the estimates of exposure. In the absence of site-specific information, exposure was estimated using standard values recommended by EPA and/or MEDEP. The text and the cited exposure equation tables (presented in Tables 5-1 through 5-25) in the following sections present the assumptions used in this exposure assessment.

Exposure doses are dependent upon the magnitude, frequency, and duration of exposure. They are estimated by combining the COPC concentration (i.e., the EPC) and the exposure parameters. The exposure doses are expressed as intakes in milligrams of COPC per kilogram of body weight per day (mg/kg-day). Two types of doses were calculated in this risk assessment. The first, the lifetime average daily dose (LADD), which is averaged over a 70-year lifetime, was used to estimate cancer risk. The second, the average daily dose (ADD), which is averaged over the actual exposure duration for each receptor, was used to estimate noncancer health effects. The following list presents the exposure parameters that were used to estimate COPC intakes related to potential exposure at the LO-58 Site.

- Exposure frequency (EF) – represents the number of days per year (days/year) that a human receptor is engaged in a particular activity that could result in exposure.

- Exposure duration (ED) – represents the total length of time in years that a receptor engages in an activity that could result in exposure.

- Exposure time (ET) – represents the number of hours per day (hr/day) that a receptor engages in an activity that could result in exposure.

- Body weight (BW) – represents the average receptor body weight over the exposure period, expressed in kilograms (kg).

- Averaging time (AT) – represents the period over which exposure is averaged, expressed in days. Averaging time is dependent on the type of evaluation: cancer or noncancer. The cancer AT is based on a 70-year lifetime for all age groups, which equals 25,550 days (i.e., 70 years x 365 days/year). The noncancer AT equals the receptor-specific ED multiplied by 365 days/year.

- Soil ingestion rate (IRS) – represents the amount of soil that is incidentally ingested on a daily basis, expressed in units of milligram per day (mg/day).

- Water ingestion rate (IRW) – represents the amount of drinking water that is ingested on a daily basis, expressed in units of milliliters per hour (L/day).

- Fraction ingested (FI) – a unitless term that represents the fraction of soil that is ingested from the contaminated source.

- Exposed skin surface area (SA) – represents the amount of skin exposed to contaminated soil or groundwater, expressed in units of square centimeters per day (cm^2/day).

- Soil-to-skin adherence factor (AF) – describes the amount of soil that adheres to the skin per surface area unit, expressed as milligrams per square centimeter (mg/cm^2).

- Dermal absorption factor (ABS) – a unitless, COPC-specific term that represents the fraction of COPC that is assumed to penetrate the skin after dermal exposure with contaminated soils. The ABS factors were obtained from EPA's dermal risk assessment guidance (EPA, 2004). In the event that no ABS were available in EPA's dermal risk assessment guidance, default values as presented in EPA guidance were used.

- Particulate emission factor (PEF) – a site-specific value that relates the concentration of a COPC in soil to the concentration of dust particles in air, expressed as cubic meters per kilogram (m^3/kg). The default PEF of 1.36E+09 m^3/kg was used (EPA, 2002a).

- Event frequency (EV) – a receptor- and site-specific value that describes the number of events, relating to dermal contact with groundwater, a receptor is exposed to, expressed as events per day (events/day).

- Event duration (t_{event}) – a receptor- and site-specific value that represents the length of time spent during a single event related to dermal contact with groundwater, expressed as hours per event (hr/event).

To ensure that risk estimates are conservative and protective of human health, intakes based on a combination of upper-end, typically the upper 90th or 95th percentile, and average exposure factors termed the RME, were calculated (EPA, 1992a).

5.2.6.1 AMAC Staff

Current AMAC staff members could be exposed to surface soil, groundwater (AMAC Building Area EU only), and indoor air during the workday (AMAC Building Area EU only). Staff members are assumed to spend the work day both indoors and outdoors with potential exposure to COPCs in soil occurring through incidental ingestion, dermal contact, and inhalation of dust or VOC emissions released from soil. It was also assumed that an AMAC staff member could be exposed to groundwater COPCs through ingestion, as well as exposed to VOCs through inhalation of indoor air impacted from the vapor intrusion pathway. Tables 5-11 through 5-13 present the exposure parameters and models that were used for the AMAC staff.

The soil EF for the AMAC staff member was 150 days/year, which equates to exposure 5 days per week for thirty weeks (MEDEP, 2011). The groundwater and indoor air EF for the AMAC staff member was 250 days/year, which equates to exposure 5 days a week for 50 weeks (EPA, 2014). Based on interviews conducted during the July 2011 site visit, a site-specific ED of 35 years was assumed for the AMAC staff. The adult BW is 80 kg (EPA, 2014). The IRS value for outdoor commercial workers of 100 mg/day was used (EPA, 2014). The IRW value for indoor commercial workers of 2.5 L/day was used (EPA, 2014). A value of 1.0 was used for the soil FI. An FI value of 0.5 was used for groundwater ingestion indicating that 50% of their drinking water is ingested while at work and 50% is ingested while at home. The exposed SA was 3,527 cm^2/day (equating to the 50th percentile values for head, forearms, and hands) (EPA, 2014). The 50th percentile soil-to-skin AF value for commercial workers of 0.12 mg/cm^2 was used (EPA, 2014). It was assumed that the AMAC staff members are on Site for eight hours. One hour was assumed for outdoor air exposure and seven hours was assumed for indoor air exposure (professional judgment).

5.2.6.2 AMAC Client

Current AMAC clients could be exposed to surface soil, groundwater (AMAC Building Area EU only), and indoor air during their visit to the AMAC Building Area (AMAC Building Area EU only). Clients are assumed to spend time both indoors and outdoors during their visit to the AMAC Building Area. It was assumed that AMAC clients would be exposed to COPCs in surface soil through incidental ingestion, dermal contact, and inhalation of dust or VOC emissions released from soil. It was also assumed that an AMAC client could be exposed to groundwater COPCs through ingestion, as well as exposed to VOCs through inhalation of indoor air impacted from the vapor intrusion pathway. Tables 5-14 through 5-16 present the exposure parameters and models that were used for the AMAC client.

The soil EF for the AMAC client was 150 days/year, which equates to exposure 5 days per week for thirty weeks (MEDEP, 2011). The groundwater and indoor air EF for the AMAC client was 250 days/year, which equates to exposure 5 days a week for 50 weeks (EPA, 2014). Based on interviews conducted during the July 2011 site visit, a site-specific ED of 10 years was assumed for the AMAC client. The adult BW is 80 kg (EPA, 2014). The IRS value for outdoor commercial workers of 100 mg/day was used (EPA, 2014). The IRW value for indoor commercial workers of 2.5 L/day was used (EPA, 2014). A value of 1.0 was used for the soil FI. An FI value of 0.5 was used for groundwater ingestion indicating that 50% of their drinking water is ingested while at work and 50% is ingested while at home. The exposed SA was 3,527 cm^2/day (equating to the 50th percentile values for head, forearms, and hands) (EPA, 2014). The 50th percentile soil-to-skin AF value for commercial workers of 0.12 mg/cm^2 was used (EPA, 2014). It was assumed that AMAC clients are on site for five hours. Twenty-five minutes was assumed for outdoor air exposure and four hours and forty-five minutes was assumed for indoor air exposure (professional judgment).

5.2.6.3 Launcher Area Trespasser

Launcher Area trespassers could be exposed to surface soil COPCs while visiting the Site. Surface soil exposure pathways include incidental ingestion, dermal contact, inhalation of dust or VOC emissions released from soil. Table 5-17 presents the exposure parameters and models that were used to estimate Launcher Area trespasser exposure to soil.

The older child trespasser EF of 36 days/year (3 days per month) was assumed based on professional judgment. The ED of 7 years was used for the trespasser (EPA, 2002a). The older child body weight of 52 kg and adult/older child IRS of 100 mg/day was used (EPA, 2008a; EPA, 2014). A value of 0.5 was used for the FI, indicating that 50% of ingested soil is assumed to come from the Site. The older child SA of 5,000 cm^2/day (equating to the 50th percentile values for head, hands, forearms, and lower legs) was used (EPA, 2004). The older child AF value based on the 50th percentile for youth soccer players of 0.04 mg/cm^2 was used (EPA, 2004). It was assumed that the trespassers would be on site for 2 hours/day (EPA, 2002a).

5.2.6.4 Site Worker

Site workers could be exposed to surface soil COPCs while performing routine activities, such as mowing lawns, grounds upkeep, utility maintenance, and overall site maintenance. Two Site worker populations were evaluated in the HHRA. It was assumed that Site worker exposure is occurring at the present time in the AMAC Building and Launcher Area EUs. Surface soil exposure pathways include incidental ingestion, dermal contact, inhalation of dust or VOC emissions released from soil. Table 5-18 presents the exposure parameters and models that were used to estimate Site worker exposure to soil.

The outdoor commercial worker EF of 150 days/year was used for the utility/maintenance worker (MEDEP, 2011). The commercial worker ED of 25 years was used (EPA, 2014). The adult BW is 80 kg (EPA, 2014). The IRS for an outdoor commercial worker of 100 mg/day was used (EPA, 2014). A value of 1.0 was used for the FI. The SA was 3,527 cm^2/day (equating to the 50th percentile values for head, forearms, and hands) (EPA, 2014). The 50th percentile AF value for outdoor commercial workers of 0.12 mg/cm^2 was used (EPA, 2014). It was assumed that the Site workers would be on site for eight hours (EPA, 2014).

5.2.6.5 Future Construction Worker

Given the potential for construction activities at the Site, a construction worker scenario was evaluated for the entire site. The construction worker is a worker who is involved with the construction of new buildings or other structures. The construction worker was assumed to be exposed to total soil (i.e., 0-10 ft bgs). Exposure pathways include incidental soil ingestion, dermal contact with soil, inhalation of dust or VOC emissions released from soil. Table 5-19 presents the exposure parameters and models that were used.

The EF for the construction worker was 130 days/year, which equates to exposure 5 days a week for six months (e.g., 5 days/week x 4.33 weeks/month x 6 months). An ED of 0.5 years was used (EPA, 2002a). The adult BW is 80 kg (EPA, 2002a). The IRS value for construction workers of 330 mg/day was used (EPA, 2002a). A value of 1.0 was used for the FI. The exposed SA was 3,527 cm^2/day (equating to the 50th percentile values for head, forearms, and hands) (EPA, 2014). The 95th percentile soil-to-skin AF value for construction workers of 0.3 mg/cm^2 was used (EPA, 2004). It was assumed that the construction workers would be on site for eight hours (EPA, 2014).

5.2.6.6 Future Commercial/Industrial Worker

A future commercial/industrial worker was evaluated based on the likelihood of future office use for the entire site. Employees are assumed to spend the majority of the work day indoors with exposure to COPCs through incidental ingestion, dermal contact, and inhalation of dust or VOC emissions released from soil. It was assumed that the commercial/industrial worker is exposed to total soil. It was also assumed that a commercial/industrial worker would be exposed to groundwater COPCs through ingestion, as well as exposed to VOCs through inhalation of indoor air impacted from the vapor intrusion pathway. Tables 5-20 through 5-22 present the exposure parameters and models that were used for the future commercial/industrial worker.

The soil EF for the commercial/industrial worker was 26 days/year, which equates to exposure 1 day a week for six months (e.g., 1 day/week x 4.33 weeks/month x 6 months) (MEDEP, 2011). The groundwater and indoor air EF for the commercial/industrial worker was 250 days/year, which equates to exposure 5 days a week for 50 weeks (EPA, 2014). An ED of 25 years was used (EPA, 2014). The adult BW is 80 kg (EPA, 2014). The IRS value for indoor commercial workers of 50 mg/day was used (EPA, 2014). The IRW value for indoor commercial workers of 2.5 L/day was used (EPA, 2014). A value of 1.0 was used for the soil FI. An FI value of 0.5 was used for groundwater ingestion indicating that 50% of their drinking water is ingested while at work and 50% is ingested while at home. The exposed SA was 3,527 cm^2/day (equating to the

50th percentile values for head, forearms, and hands) (EPA, 2014). The 50th percentile soil-to-skin AF value for groundskeepers of 0.12 mg/cm^2 was used (EPA, 2014). It was assumed that the commercial/industrial workers would be on site for eight hours (EPA, 2014).

5.2.6.7 Hypothetical Future Residents

A future residential scenario was evaluated to determine an upper-bound on the level of risks posed by the Site contamination. The potential future residential exposure scenario provides the baseline risk in order to evaluate if unlimited use and unrestricted exposure (UU/UE) are achieved under current site conditions. If current site conditions do not allow for UU/UE, then the residential scenario is used to provide perspective regarding required risk reduction to achieve UU/UE during risk management decision making. It was assumed that future residents could contact total soil as a result of mixing that is expected to occur during construction activities and site groundwater assuming it is used as a potable source. Soil exposure pathways include incidental soil ingestion, dermal contact with soil, inhalation of outdoor dust, and inhalation of VOCs released from soil. Groundwater exposure pathways include drinking water ingestion, dermal contact while bathing/showering, and inhalation of VOCs while showering. It was also assumed that a future resident would be exposed to VOCs through inhalation of indoor air impacted from the vapor intrusion pathway. Indoor air exposure was estimated based on indoor air results from the AMAC Building. Tables 5-23 through 5-25 present the exposure parameters and models that were used to estimate the future residential exposure.

The child and adult BWs are 15 kg and 80 kg, respectively (EPA, 2014). For soil exposure, an EF of 350 days/year was used (EPA, 2014). An ED of 26 years (20 years as an adult and 6 years as a child) was used (EPA, 2014). The IRS for the child and adult was 200 mg/day and 100 mg/day, respectively (EPA, 2014). A value of 1.0 was used for the FI. The exposed SAs for the child and adult resident of 2,373 cm^2/day (50th percentile value for head, hands, forearms, lower legs, and ft) and 6,032 cm^2/day (50th percentile value for head, hands, forearms, and lower legs) were used (EPA, 2014). Median soil-to-skin AFs of 0.2 mg/cm^2 (children playing in wet soil) and 0.07 mg/cm^2 (residential gardeners) were used for the child and adult, respectively (EPA, 2014). It is assumed that the residents would be on site for 24 hours.

For groundwater exposure, an EF of 350 days/year was used (EPA, 2014). The child and adult IRWs was 0.78 L/day and 2.5 L/day, respectively (EPA, 2014). It was assumed that the child and adult bathe/shower once a day (EPA, 2004). The dose model for dermal contact while bathing/showering follows the approach presented in the dermal risk assessment guidance (EPA, 2004). The median SA was 6,378 cm^2 for the child and 20,900 cm^2 for the adult. The child bathing time or event duration (t_{event}) was 0.54 hour/event. The assumed adult showering time was 0.71 hour/event (EPA, 2014). COPC-specific values needed to calculate dermally absorbed doses were either obtained from the appropriate tables in the dermal guidance or estimated using EPA estimation software. The COPC-specific values along with the calculated absorbed dose per event values (DA_{event}) are presented in Table 5-26.

For the showering exposure pathway, an inhalation rate while showering of 15 L/min was assumed (Foster and Chrostowski, 1987). The inhalation exposure per shower (E) was calculated using the Foster and Chrostowski model (Foster and Chrostowski, 1987 and 2003). The exposure models and parameters used to calculate the shower exposure pathway are presented in Tables 5-27 through 5-34.

5.3 TOXICITY ASSESSMENT

The primary purpose of the toxicity assessment is to identify the toxicity values for the COPCs used in the estimation of potential cancer risks and noncancer health effects. It also provides a description of the terms that are used to estimate toxic effects (i.e., cancer and noncancer effects) along with the data sources. Tables 5-35 through 5-38 present the available toxicity values (oral, dermal, and inhalation) for each COPC, as well as the source, the EPA weight-of-evidence category, the route of administration, and the critical effect.

5.3.1 Cancer Effects

For cancer effects, the toxicity values are expressed as either cancer slope factors (CSFs) in units of milligrams of COPC per kilogram of body weight per day $(mg/kg\text{-}day)^{-1}$ or inhalation unit risk factors (URFs) in units of per micrograms of COPC per cubic meter $(\mu g/m^3)^{-1}$. The cancer potency of a contaminant is directly proportional to the CSF/URF value; the higher the CSF/URF, the more potent the contaminant is as a carcinogen.

EPA has assigned each contaminant a “weight-of-evidence” category that represents the likelihood of the chemical being a human carcinogen (EPA, 1989a). Six weight-of-evidence categories exist:

- A – Human carcinogen;
- B1 – Probable human carcinogen, limited human data are available;
- B2 – Probable human carcinogen, sufficient evidence in animals and inadequate or no evidence in humans;
- C – Possible human carcinogen;
- D – Not classifiable as to human carcinogenicity; and
- E – Evidence of non-carcinogenicity for humans.

As of 2005, EPA revised the weight-of-evidence categories to include the following five cancer hazard descriptors (EPA, 2005a):

- Carcinogenic to humans;
- Likely to be carcinogenic to humans;
- Suggestive evidence of carcinogenic potential;
- Inadequate information to assess carcinogenic potential; and
- Not likely to be carcinogenic in humans.

COPCs that are classified in categories A through C following the 1989 weight-of-evidence classification and in the first three categories according to the 2005 classification system are generally carried through the risk characterization step if CSFs or URFs have been developed.

For carcinogens that act with a mutagenic mode of action (MOA) for carcinogenesis, EPA recommends application of Age-Dependent Adjustment Factors (ADAFs) to the cancer slope factor to address early lifetime exposures and the increased susceptibility of children to carcinogens (EPA, 2005b). This approach was followed in the HHRA and is discussed further in Section 5.4.1.

5.3.2 Noncancer Effects

Noncancer effects refer to adverse health effects other than cancer. Noncancer effects can include, for example, central nervous system damage, reproductive effects, and other systemic effects. For noncancer effects, the toxicity values are expressed as either reference doses (RfDs) in units of mg/kg-day for exposure through ingestion and dermal contact or reference concentrations (RfCs) in units of micrograms of COPC per cubic meter ($\mu g/m^3$) for exposure through inhalation. The premise of noncancer toxicity values is that there is an exposure level below which adverse health effects, even in sensitive populations, are not expected to occur. An RfD or RfC is inversely proportional to the toxic potency of a contaminant.

5.3.3 Sources of Toxicity Values

When available, CSFs and RfDs were obtained from the following sources in the order presented (EPA, 2003a).

- Tier 1 – Integrated Risk Information System (IRIS; EPA, 2016b).
- Tier 2 – EPA's Provisional Peer Review Toxicity Values (PPRTVs) as summarized in the EPA RSL table (EPA, 2016a).
- Tier 3 – Other Toxicity Values summarized in the EPA RSL table including California EPA (CalEPA) values, ATSDR Minimal Risk Levels (MRLs), and toxicity values developed by various State agencies.

5.3.4 Dermal Exposure

Toxicity values have not been developed for the dermal absorption pathway. Dermal toxicity values were derived from the oral toxicity values as described in EPA dermal risk assessment guidance (EPA, 2004). In general, the oral CSFs and oral RfDs are expressed as administered doses (i.e., the amount of a contaminant administered per unit time and weight). Conversely, exposures resulting from the dermal pathway are expressed as absorbed doses. Therefore, it is necessary to make an adjustment to the oral toxicity value to account for the contaminant-specific absorption efficiency.

The fraction of a COPC that is absorbed in the gastrointestinal tract (ABS_{GI}), is a critical factor when adjusting from an administered to an absorbed dose. The ABS_{GI} values that were used in this HHRA were obtained from EPA (EPA, 2004). In the event that no ABS_{GI} values were available, the EPA recommended default values were used. The oral CSFs and oral RfDs were each adjusted to an absorbed dose using different methods. The dermal CSF (CSF_d) was derived by dividing the oral CSF by the ABS_{GI} as shown below.

$$CSF_d = \frac{CSF_o}{ABS_{GI}}$$

Where:

CSF_d = Dermal cancer slope factor $(mg/kg\text{-}day)^{-1}$

CSF_o = Oral cancer slope factor $(mg/kg\text{-}day)^{-1}$

ABS_{GI} = Fraction of contaminant absorbed in the gastrointestinal tract (unitless)

The dermal reference dose (RfD_d) was derived by multiplying the oral RfD by the ABS_{GI} as shown below:

$$RfD_d = RfD_o \text{ x } ABS_{GI}$$

Where:

RfD_d = Dermal reference dose (mg/kg-day)

RfD_o = Oral reference dose (mg/kg-day)

ABS_{GI} = Fraction of contaminant absorbed in the gastrointestinal tract (unitless)

5.4 RISK CHARACTERIZATION

5.4.1 Risk Characterization Estimates

The objective of the risk characterization is to integrate the information developed in the exposure assessment and the toxicity assessment to provide an estimate of the potential risk associated with exposure to COPCs. Both cancer risks and noncancer health effects were evaluated for the RME scenario. Carcinogenic risks were calculated for those COPCs with evidence of carcinogenicity and for which cancer slope or unit risk factors are available. Noncancer health effects were evaluated for COPCs (i.e., including carcinogens) for which reference doses or reference concentrations are available.

5.4.1.1 Cancer Risk

Potential cancer risks were calculated by multiplying the estimated LADD for a COPC through an exposure route by the CSF or URF, as follows:

$$\text{Risk} = \text{LADD} * \text{CSF or URF}$$

Where:

LADD = Lifetime average daily dose; intake averaged over a 70-year lifetime as mg COPC/kg-body weight per day or µg/m^3

CSF = COPC- and route-specific cancer slope factor $(\text{mg/kg-day})^{-1}$

URF = COPC-specific inhalation unit risk factor $(\mu g/m^3)^{-1}$

Cancer risks were summed across the relevant pathways for a given receptor and exposure scenario to yield a cumulative lifetime risk for that specific scenario (e.g., future residential). The level of total cancer risk that is of concern is a matter of personal, community, and regulatory judgment. EPA’s cancer risk range is an increased risk of developing cancer, based on a plausible upper-bound estimate of risk. In general, the EPA considers excess cancer risks that are below about 1 chance in 1,000,000 (1E-06) to be so small as to be negligible and do not require remedial action, and risks above 1E-04 to be sufficiently large that some sort of remediation is desirable. Excess cancer risks that range between 1E-06 and 1E-04 are generally considered to be acceptable. However, MEDEP considers cancer risks in excess of 1E-05 to be unacceptable and may require remedial action.

Carcinogens That Act with a Mutagenic Mode of Action

For carcinogens that act with a mutagenic mode of action for carcinogenesis, EPA recommends application of ADAFs to cancer toxicity values to address early lifetime exposures and the increased susceptibility of children to carcinogens (EPA, 2005b). The RSL table presents those COPCs exhibiting a mutagenic mode of action for carcinogenesis.

The ADAFs for specific age-groups classes are presented below:

Age (years)	ADAF (unitless)
0 – <2	10
2 – <16	3
≥16	1

Residential lifetime exposure factors were divided into two age groupings: child – 0 to 6 years and adult – 6 to 26 years. Potential risk to an individual resident was assessed using the following:

Age (years)	Exposure Factors	Exposure Duration (years)	ADAF (unitless)
0 – <2	Child	2	10
2 – <6	Child	4	3
6 – <16	Adult	10	3
16 – <26	Adult	10	1

Total Risk for lifetime exposures = Risk $_{0-<2}$ + Risk $_{2-<6}$ + Risk $_{6-<16}$ + Risk $_{16-<26}$

Tables 5-39 and 5-40 present the results of the residential MOA calculations for both soil and groundwater exposure, respectively.

Potential risk to an older child trespasser (11-18 years) was assessed using the following:

Age (years)	Exposure Factors	Exposure Duration (years)	ADAF (unitless)
11 – <16	Adult	5	3
16 – <18	Adult	2	1

Total Risk for older child trespasser exposures = Risk 11 – <16 + Risk 16 – <18

Table 5-41 presents the results of the older child trespasser MOA calculations for soil exposure.

TCE

As discussed in the IRIS *Trichloroethylene Assessment Summary* (EPA, 2013b), TCE is carcinogenic by a mutagenic mode of action for induction of kidney tumors. There is also more limited evidence for non-Hodgkin lymphoma (NHL) and liver carcinogenicity. In order to account for the mutagenic mode of action for kidney tumors, EPA recommends applying ADAFs when estimating kidney cancer risks from early life exposure to TCE. However, NHL and liver cancer must also be accounted for in the cancer risk estimates. To accommodate all three carcinogenic effects, a cancer risk was derived for each age group (0 – <2, 2 – <6, 6 – <16, and 16 – <26), including adjusted kidney cancer potency values and unadjusted potency values for liver cancer and NHL. These risks were then summed across age groups to obtain the total risk for the exposure period of interest. Tables 5-42 and 5-43 present the results of the residential MOA calculations for TCE for both groundwater and indoor air exposure, respectively.

5.4.1.2 Noncancer Health Effects

Potential noncancer health effects were evaluated by the calculation of hazard quotients (HQs) and hazard indices (HIs). An HQ is the ratio of the exposure duration ADD through a given exposure route to the COPC-specific RfD or RfC. The RfDs and RfCs presented in this HHRA are all based on chronic exposure as presented in Tables 5-35 and 5-36. The HQ-RfD/RfC relationship is illustrated by the following equation:

$$HQ = ADD/RfD \text{ or } RfC$$

Where:

HQ = Hazard quotient.

ADD = Average daily dose; estimated daily intake averaged over the exposure duration (mg/kg-day).

RfD = Reference dose (mg/kg-day).

RfC = Reference concentration (µg/m^3).

HQs were summed to calculate HIs for each scenario. HIs were calculated for each exposure route, and a total hazard index (HI) was calculated based on exposure to the COPCs from exposure routes for each receptor. HIs of less than one indicate that adverse health effects associated with the exposure scenario are unlikely to occur and that remedial action is not warranted.

5.4.2 Risk Characterization Results

Table 5-44 summarizes the cancer and non-cancer results, identifies those COPCs that are primary contributors to cancer risks greater than 1E-06 or hazard indices greater than 1.0 for each of the evaluated scenarios at each EU. Table 5-44 also summarizes the cumulative cancer risks and noncancer HIs across all media for each receptor scenario.

Tables 5-45 through 5-63 present the RAGS Part D Tables 7 for the following receptors:

- AMAC staff member (Tables 5-45 through 5-47);
- AMAC client (Tables 5-48 through 5-50);
- Launcher Area trespasser (Table 5-51);
- Site worker (Table 5-52);
- Future construction worker (Table 5-53);
- Future commercial/industrial worker (Tables 5-54 through 5-56); and
- Hypothetical future resident (Tables 5-57 through 5-63).

The following sections discuss media-specific results, including hazard indices and cancer risks for each of the above receptors.

5.4.2.1 AMAC Staff

Tables 5-64 through 5-66 present the RAGS Part D Tables 9 for the AMAC staff member at both the AMAC Building and Launcher Areas (soil only). The total soil, groundwater, and indoor air cancer risks for the AMAC staff member were within EPA's acceptable cancer risk range. Soil and indoor air exposure at the AMAC Building Area slightly exceeded MEDEP's acceptable cancer risk level of 1E-05. However, soil exposure at the Launcher Area and groundwater exposure at the AMAC Building Area were below 1E-05. The total soil, groundwater, and indoor air HIs for the AMAC staff member were less than the noncancer threshold of 1.0. Table 5-44, as well as the following, present a summary of cancer risks and noncancer HIs for the AMAC staff member.

- The total soil cancer risks for the AMAC staff member at the AMAC Building and Launcher Areas were within EPA's acceptable cancer risk range of 1E-06 to 1E-04, with total cancer risks of 1.2E-05 and 7.8E-06, respectively (see Table 5-64). The primary COPCs contributing to the greatest risk at both areas were arsenic and chromium with total arsenic cancer risks of 3.7E-06 at both sites and total chromium cancer risks of 7.3E-06 and 4.1E-06, respectively. The total soil HIs at the AMAC Building and Launcher Areas for the AMAC staff member were 0.12 for both sites and were less than the noncancer threshold of 1.0.

- The total groundwater ingestion cancer risk for the AMAC staff member at the AMAC Building Area was at the low end of EPA's acceptable cancer risk range of 1E-06 to 1E-04 with a total cancer risk of 7.8E-06 (see Table 5-65). The primary contributors were trichloroethene and chromium with total cancer risks of 1.4E-06 and 6.4E-06, respectively. The total groundwater HI at the AMAC Building Area for the AMAC staff member was 0.18, which was less than the noncancer threshold of 1.0.

- The total indoor air cancer risk for the AMAC staff member at the AMAC Building Area was within EPA's acceptable cancer risk range of 1E-06 to 1E-04 with a total cancer risk of 1.1E-05 (see Table 5-66). The primary contributors were chloroform, naphthalene, and trichloroethene with total cancer risks of 3.1E-06, 5.1E-06, and 1.6E-06, respectively. The total indoor air HI at the AMAC Building Area for the AMAC staff member was 0.51, which was less than the noncancer threshold of 1.0.

5.4.2.2 AMAC Client

Tables 5-67 through 5-69 present the RAGS Part D Tables 9 for the AMAC client at both the AMAC Building and Launcher Areas (soil only). The total soil, groundwater, and indoor air cancer risks for the AMAC client were within EPA's acceptable cancer risk range. Soil, groundwater, and indoor air exposure for the AMAC client at both the AMAC Building and Launcher Areas were below MEDEP's acceptable cancer risk level of 1E-05. The total soil, groundwater, and indoor air HIs for the AMAC client were less than the noncancer threshold of 1.0. Table 5-44, as well as the following, present a summary of cancer risks and noncancer HIs for the AMAC client.

- The total soil cancer risks for the AMAC client at the AMAC Building and Launcher Areas were at the low end of EPA's acceptable cancer risk range with total cancer risks of 3.3E-06 and 2.2E-06, respectively (see Table 5-67). Arsenic and chromium were the primary contributors at both areas with total arsenic cancer risks of 1.1E-06 at both sites and total chromium cancer risks of 2.1E-06 and 1.2E-06, respectively. The total soil HIs at the AMAC Building and Launcher Areas for the AMAC client were 0.12 for both sites and were less than the noncancer threshold of 1.0.

- The total groundwater ingestion cancer risk for the AMAC client at the AMAC Building Area was at the low end of EPA's acceptable cancer risk range with a total cancer risk of 2.2E-06 (see Table 5-68). Chromium was the primary contributor with a total cancer risk of 1.8E-06. The total groundwater HI at the AMAC Building Area for the AMAC client was 0.18, which was less than the noncancer threshold of 1.0.

- The total indoor air cancer risk for the AMAC client at the AMAC Building Area was at the low end of EPA's acceptable cancer risk range with a total cancer risk of 2.2E-06 (see Table 5-69). Although the total cancer risk exceeds 1E-06, none of the individual COPC cancer risks exceed 1E-06. The total indoor air HI at the AMAC Building Area for the AMAC client was 0.35, which was less than the noncancer benchmark of 1.0.

5.4.2.3 Launcher Area Trespasser

Table 5-70 presents the RAGS Part D Table 9 for the Launcher Area trespasser. The total soil cancer risk for the Launcher Area trespasser was below EPA's acceptable cancer risk range. Soil exposure for the Launcher Area trespasser was below MEDEP's acceptable cancer risk level of 1E-05. The total soil HI for the Launcher Area trespasser was less than the noncancer threshold of 1.0. Table 5-44, as well as the following, present a summary of cancer risks and noncancer HIs for the trespasser.

- The total soil cancer risk (4.6E-07) for the Launcher Area trespasser was below EPA's acceptable cancer risk range (see Table 5-70). The soil total HI was 0.021 which was less than the noncancer threshold of 1.0.

5.4.2.4 Site Worker

Table 5-71 presents the RAGS Part D Table 9 for the Site worker at both the AMAC Building and Launcher Areas. The total soil cancer risks for the Site worker were within EPA's acceptable cancer risk range. Soil exposure for the Site worker at both the AMAC Building and Launcher Areas was below MEDEP's acceptable cancer risk level of 1E-05. The total soil HIs for the Site worker were less than the noncancer threshold of 1.0. Table 5-44, as well as the following, present a summary of cancer risks and noncancer HIs for the Site worker.

- The total soil cancer risks for the Site worker at the AMAC Building and Launcher Areas were at the low end of EPA's acceptable cancer risk range with total cancer risks of 8.5E-06 and 5.7E-06, respectively (see Table 5-71). Arsenic and chromium were the primary contributors at both areas with total arsenic cancer risks of 2.6E-06 and 2.7E-06, respectively and total chromium cancer risks of 5.3E-06 and 3.0E-06, respectively. The total soil HIs at the AMAC Building and Launcher Areas for the Site worker were 0.13 and 0.12, respectively. Both HIs were less than the noncancer threshold of 1.0.

5.4.2.5 Future Construction Worker

Table 5-72 presents the RAGS Part D Table 9 for the future construction worker for the Entire Site. The total soil cancer risks for the construction worker was less than EPA's acceptable cancer risk range. Soil exposure for the construction worker for the Entire Site was below MEDEP's acceptable cancer risk level of 1E-05. The total soil HI for the construction worker was less than the noncancer threshold of 1.0. Table 5-44, as well as the following, present a summary of cancer risks and noncancer HIs for the construction worker.

- The total soil cancer risk for the construction worker evaluated for the Entire Site was less than EPA's acceptable cancer risk range of 1E-06 to 1E-04 with a total cancer risk of 3.2E-07 (see Table 5-72). The total soil HI was 0.34 which was less than the noncancer threshold of 1.0.

5.4.2.6 Future Commercial/Industrial Worker

Tables 5-73 through 5-75 present the RAGS Part D Tables 9 for the future commercial/industrial worker for the Entire Site. The total soil, groundwater, and indoor air cancer risks for the commercial/industrial worker were either less than or within EPA's acceptable cancer risk range. Soil and indoor air exposure for the commercial/industrial worker for the Entire Site were below MEDEP's acceptable cancer risk level of 1E-05. However, groundwater exposure for the Entire Site slightly exceeded 1E-05. The total soil, groundwater, and indoor air HIs for the commercial/industrial worker were less than the noncancer threshold of 1.0. Table 5-44, as well as the following, present a summary of cancer risks and noncancer HIs for the commercial/industrial worker.

- The total soil cancer risk for the commercial/industrial worker evaluated for the Entire Site was less than EPA's acceptable cancer risk range with a total cancer risk of 5.4E-07 (see Table 5-73). The total soil HI was 0.011 which was less than the noncancer threshold of 1.0.
- The total groundwater ingestion cancer risk for the commercial/industrial worker evaluated for the Entire Site was within EPA's acceptable cancer risk range with a total cancer risk of 1.2E-05 (see Table 5-74). 1-Methylnaphthalene and chromium were the largest contributors with total cancer risks of 5.9E-06 and 4.6E-06, respectively. The total groundwater HI was 0.98 which was less than the noncancer threshold of 1.0.
- The total indoor air cancer risk for the commercial/industrial worker evaluated for the Entire Site was at the low end of EPA's acceptable cancer risk range with a total cancer risk of 9.1E-06 (see Table 5-75). The primary contributors were chloroform, naphthalene, and trichloroethene with total cancer risks of 2.5E-06, 4.2E-06, and 1.3E-06, respectively. The total indoor air HI was 0.58 which was less than the noncancer benchmark of 1.0.

5.4.2.7 Hypothetical Future Resident

Tables 5-76 through 5-82 present the RAGS Part D Tables 9 for the hypothetical future resident for the Entire Site. The total soil, groundwater, and indoor air cancer risks for the age-adjusted hypothetical future resident were either slightly greater than (soil and groundwater) or within (indoor air) EPA’s acceptable cancer risk range. The primary contributors to the total soil cancer risk were benzo(a)pyrene, arsenic, and chromium. The primary contributors to the total groundwater cancer risk were 1-methylnaphthalene, benzo(a)pyrene, dibenzo(a,h)anthracene, and chromium. Soil, groundwater, and indoor air exposure for the hypothetical future resident for the Entire Site exceeded MEDEP’s acceptable cancer risk level of 1E-05. The total soil, groundwater, and indoor air HIs for the hypothetical future adult and child residents were greater than the noncancer threshold of 1.0, with the exception of the total soil HI for the adult resident. Although the child resident soil HI exceeded 1.0, none of the individual COPCs had HQs greater than 1.0. Similarly, although the adult resident groundwater HI exceeded 1.0, none of the individual COPCs had HQs greater than 1.0. The primary contributors to the HI exceedances were manganese for the adult and child resident (groundwater), and trichloroethene for the child/adult (indoor air). Table 5-44, as well as the following, present a summary of cancer risks and noncancer HIs for the resident.

- The age-adjusted future hypothetical resident for the Entire Site slightly exceeded EPA’s acceptable cancer risk range with a total soil cancer risk of 1.3E-04 (see Table 5-76). The primary contributors to the total cancer risk were benzo(a)pyrene (3.9E-06), arsenic (7.1E-06), and chromium (1.2E-04). The adult and child residents evaluated for the Entire Site had total soil HIs of 0.12 and 1.2, respectively (see Tables 5-77 and 5-78). Although the child resident HI slightly exceeded the noncancer threshold of 1.0, none of the individual COPCs had total HQs greater than 1.0.

- The age-adjusted resident for the Entire Site slightly exceeded EPA’s acceptable cancer risk range with a total groundwater cancer risk of 3.1E-04 (see Table 5-79). The primary contributors to the total cancer risk were 1-methylnaphthalene (4.7E-05), benzo(a)pyrene (1.2E-04), dibenzo(a,h)anthracene (7.6E-05), and chromium (5.9E-05). The adult and child residents evaluated for the Entire Site had total groundwater HIs of 3.2 and 5.1, respectively (see Tables 5-80 and 5-81). The primary contributor to the adult and child resident HIs was manganese with total HIs of 1.9 and 3.1, respectively. The primary target organ response associated with manganese exposure in is the nervous system.

- The age-adjusted resident for the Entire Site was within EPA's acceptable cancer risk range with a total indoor air cancer risk of 4.2E-05 (see Table 5-82). Chloroform and naphthalene were the primary contributors with total cancer risks of 1.1E-05 and 1.8E-05, respectively. The child/adult resident evaluated for the Entire Site had a total indoor air HI of 2.4. The primary contributor to the total indoor air HI was trichloroethene with a total HQ of 1.9. The immune system, the cardiovascular system, and developmental effects are the primary target organs associated with noncancer effects of trichloroethene exposure. These target organs had total HIs of 1.9, which exceed the noncancer threshold of 1.0.

Tables 5-83 through 5-94 present the RAGS Part D Tables 10 for the following receptors:

- AMAC staff member (Tables 5-83 through 5-85);
- AMAC client (Tables 5-86 and 5-87);
- Site worker (Table 5-88);
- Future commercial/industrial worker (Tables 5-89 and 5-90); and
- Hypothetical future resident (Tables 5-91 through 5-94).

5.4.2.8 Soil Background Comparisons

The metals found to be primary contributors to total soil cancer risk and/or total soil HIs at the LO-58 Site were arsenic and chromium. As discussed previously in Section 5.1.3.2.3, Table 5-4 presents the results of the soil background comparisons. As shown, arsenic levels in the AMAC Building and Launcher Areas in surface soil were below both site-specific and regional background levels. Chromium levels in surface soil at the AMAC Building Area were above the site-specific background maximum concentration, but were below the regional background UPL. Chromium levels at the Launcher Area were below both the site-specific and regional background levels.

5.4.2.9 Cumulative Risks

Tables 5-95 and 5-96 present the cumulative cancer risks and noncancer HIs across all media for each receptor scenario, respectively. As shown and discussed previously, with the exception of the hypothetical future resident, all of the remaining cancer risks and noncancer HIs were within EPA's acceptable cancer risk range or below the noncancer threshold of 1.0. The AMAC staff member, the commercial/industrial worker, and the hypothetical future resident all had total cancer risks greater than MEDEP's acceptable cancer risk level of 1E-05.

5.5 UNCERTAINTY ANALYSIS

The goal of an uncertainty analysis in a risk assessment is to provide information to the appropriate decision makers (i.e., risk managers) about the key assumptions, their inherent uncertainty and variability, and the impact of this uncertainty and variability on the estimates of risk. The uncertainty analysis shows that risks are relative in nature and do not represent an absolute quantification. The subsections that follow identify the major uncertainties inherent in the HHRA process by report section to determine if the calculated risks may have been overestimated or underestimated, and the approximate degree to which this may have occurred.

5.5.1 Data Evaluation

- **Elevated quantitation limits –** Although not detected in any samples, the following analytes had detection limits in exceedance of their respective EPA RSL value:

Soil	Groundwater	Indoor Air
1,2,3-Trichloropropane	1,1,2,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane
Bis(2-Chloroethyl) Ether	1,1,2-Trichloroethane	1,1,2-Trichloroethane
Hexachlorobenzene	1,1-Dimethylhydrazine	1,2-Dibromoethane
4,6-Dinitro-2-Methylphenol	1,2,3-Trichloropropane	1,3,5-Trimethylbenzene
Hexachlorocyclopentadiene	1,2,4,5-Tetrachlorobenzene	Butadiene
N-Nitrosodimethylamine	1,2,4-Trichlorobenzene	Chlorodibromomethane
N-Nitroso-Di-N-Propylamine	1,2-Dibromo-3-Chloropropane	cis-1,2-Dichloroethene
Bis(2-Chloroethyl) Ether	1,2-Dichloroethane	trans-1,2-Dichloroethylene
Hexachlorobenzene	1,2-Dichloropropane	
2,6-Dinitrotoluene	1,4-Dichlorobenzene	
4,6-Dinitro-2-Methylphenol	1,4-Dioxane	
Hexachlorocyclopentadiene	2,4,6-Trichlorophenol	
N-Nitrosodimethylamine	2,4-Dichlorophenol	
N-Nitroso-Di-N-Propylamine	2,4-Dinitrophenol	
Thallium	2,4-Dinitrotoluene	
1,2,3-Trichloropropane	2,6-Dinitrotoluene	
1,2-Dibromo-3-Chloropropane	2-Chlorophenol	
Bis(2-Chloroethyl) Ether	2-Hexanone	
Hexachlorobenzene	2-Nitroaniline	
2,6-Dinitrotoluene	3,3'-Dichlorobenzidine	

Soil	**Groundwater**	**Indoor Air**
4,6-Dinitro-2-Methylphenol	4,6-Dinitro-2-Methylphenol	
Hexachlorocyclopentadiene	4-Chloroaniline	
N-Nitrosodimethylamine	4-Nitroaniline	
N-Nitroso-Di-N-Propylamine	Aniline	
Thallium	Antimony	
	Aroclor 1016	
	Aroclor 1221	
	Aroclor 1232	
	Aroclor 1242	
	Aroclor 1248	
	Aroclor 1254	
	Aroclor 1260	
	Arsenic	
	Atrazine	
	Azobenzene	
	Benzaldehyde	
	Benzene	
	Beryllium	
	Bis(2-Chloroethoxy)Methane	
	Bis(2-Chloroethyl) Ether	
	Bis(2-Ethylhexyl)Phthalate	
	Bromodichloromethane	
	Carbon Tetrachloride	
	Chloroform	
	Hexachlorobenzene	
	Hexachlorobutadiene	
	Hexachlorocyclopentadiene	
	Hexachloroethane	
	Hydrazine	
	Mercury	
	Monomethyl Hydrazine	
	Nitrobenzene	
	N-Nitrosodimethylamine	
	N-Nitroso-Di-N-Propylamine	
	Pentachlorophenol	
	Pyridine	
	Selenium	
	Silver	
	Thallium	

Although these analytes above with elevated detection limits are likely not site-related, it is possible that site risks are slightly underestimated as a result of this but the degree to which they are underestimated cannot be determined.

- **J-Qualified data** – As per longstanding EPA risk assessment guidance (e.g., the 1989 *Risk Assessment Guidance for Superfund, Volume I – Human Health Evaluation Manual (Part A)* page 5-15 and the 1992 *Guidance for Data Usability in Risk assessment (Part A)* page 113), J-qualified concentrations are used the same way as unqualified data within a dataset. Although there are reliability issues with J-qualified values, for risk assessment purposes, they are used as-is at the qualified concentration with the appropriate weight given to the value in any conclusions and subsequent decision-making process. The most important uncertainties associated with the use of J-qualified data include: 1) potentially eliminating a chemical as a COPC when it should be evaluated, if the maximum positive detection is J-qualified and the value is estimated low and 2) potentially retaining a chemical as a COPC when it should be eliminated if the maximum positive detection is J-qualified and the value is estimated high. Several detected concentrations included in the HHRA were identified as J-qualified. In particular, benzo(a)pyrene and dibenz(a,h)anthracene J-qualified detections in groundwater contribute to cancer risks in exceedance of 1E-05 (1.3E-04 and 8.3E-05, respectively). All of the detected concentrations for these two COPCs were J-qualified and are therefore not quantifiably reliable. The incorporation of J-qualified data uncertainty to the overall results of the HHRA, but it is not possible to determine whether the risks would be underestimated or overestimated.

- **Omission of historical data in the HHRA** – As discussed previously in Section 5.1.3, the data that were used in the HHRA do not include historical data, with the exception of groundwater which includes data obtained through the LTMP from the past five years. This adds uncertainty to the overall results of the HHRA, but it is not possible to determine whether the risks would be underestimated or overestimated.

- **Limited data in the AMAC Building Area** – As mentioned previously, only data collected as part of this RI (with the exception of groundwater) were included in the

HHRA. There were limited samples taken within the AMAC Building Area. This adds uncertainty to the overall results of the HHRA, but it is not possible to determine whether the risks would be underestimated or overestimated.

- **Analytes without screening values** – A number of detected analytes did not have screening values available and were not carried through the risk assessment process. Because toxicity criteria were not available for these analytes (as demonstrated by a lack of health-based screening concentrations), risks (cancer and noncancer) could not be estimated. It is possible that site risks are slightly underestimated as a result of this but the degree to which they are underestimated cannot be determined.
- **Chromium Evaluation –** For conservatism and due to a lack of speciation data, the toxicity and cancer risk characterizations for total chromium were evaluated through use of hexavalent chromium CSFs and URFs as presented on the EPA RSL table (EPA, 2016a). The use of hexavalent chromium CSFs and URFs to evaluate risks from exposures to total chromium in the absence of speciation data presents a conservative approach and likely overestimates risks from total chromium.
- **Indoor Air Samples –** Indoor air samples collected from the AMAC Building Area were collected in areas assumed to have the highest contaminant levels. Exposure estimates based on indoor air data where the highest levels of contaminants would occur (rather than the office area where the majority of exposure time occurs) combined with conservative exposure parameters likely overestimates the indoor air risks, but the degree to which they are overestimated cannot be determined.

5.5.2 Exposure Assessment

- **The selection of exposure scenarios** – It is likely that the scenarios evaluated overstate realistic exposures, and thus overestimate the actual site risks. For example, the evaluation of a future residential scenario would significantly overestimate potential site risks given the current conditions and anticipated future land uses.
- **The selection of exposure assumptions** – The exposure assumptions directly influence the calculated doses (chronic daily intakes), and ultimately the calculation of

risk. The RME concept was used to estimate the exposure potential for each of the receptors that were evaluated in the HHRA. The RME is defined as the "maximum exposure that is reasonably expected to occur at the Site" (EPA, 1989a). In most cases, these assumptions contribute to an overestimation of plausible real-life exposures, and a resulting overestimation of risk.

- **Calculation of 95% UCLs –** As presented in Section 5.2.4, where applicable, one-side 95% UCLs were calculated and used as the EPCs. A conservative approach of using the full LOQ for nondetects was followed for all COPCs in this HHRA. The resulting value represents a conservative estimate of the COPC concentration to which an individual could be exposed in any given exposure unit during the defined exposure duration and frequency. It is likely that using the full LOQ overestimates the Site risk to some degree.

5.5.3 Toxicity Assessment

- **The use of cancer slope factors and reference doses** – Both cancer risks and noncancer health effects were evaluated using EPA-approved or provisional toxicity criteria. The CSFs and RfDs are derived to be health protective and tend to overestimate true toxicity in humans. Therefore, risk calculations, which are partially based on toxicity estimates, may be overstated in general. The exact degree of overestimation cannot always be determined and each COPC must be evaluated on a case-by-case basis.

- **Lack of toxicity values for dermal exposure –** Toxicity values for dermal exposures have not been developed by EPA. Oral RfDs and oral CSFs were adjusted and used to assess toxicity from dermal exposures following guidelines provided by EPA. The dermal route of exposure can result in different patterns of distribution, metabolism, and excretion than occur from the oral route. When oral toxicity values for systemic effects are applied to dermal exposures, uncertainty in the risk assessment is introduced because these differences are not taken into account. Because any toxicity differences between oral and dermal exposure would depend on the specific COPC, use of oral toxicity factors can result in the overestimation or underestimation of risk.

It is not possible to make a general statement about the direction or magnitude of this uncertainty.

- **Dermal carcinogenicity of PAHs –** The majority of animal and human studies of PAH exposure strongly suggest that the carcinogenic effects resulting from exposure occur at the Site of contact or administration (e.g., skin tumors from dermal contact, gastrointestinal [GI] tumors from oral contact) (ATSDR, 1995). There is little evidence that PAHs produce systemic tumors following dermal contact (ATSDR, 1995). In order to justify the extrapolation of an oral CSF to a dermal CSF, an assumption must be made that the type of cancer produced by oral administration is the same as that which would be expected following dermal contact (i.e., that dermal contact with PAHs would produce gastrointestinal tumors). Because this is not believed to be the case, even though dermal absorption has been quantified for PAHs, extrapolation of the oral CSF to the dermal route of exposure introduces a high level of uncertainty into the analysis. Although it is unlikely that GI tumors would be produced by dermal contact with PAHs, because there is evidence that dermal contact with PAHs may cause skin cancer, the only available data (i.e., the oral CSF) was used to quantify potential cancer risk from dermal contact with PAHs. This approach introduces a high degree of uncertainty into the analysis, and may overestimate the dermal cancer risks from PAHs to a significant degree.

5.5.4 Risk Characterization

- **APHs in Sub-slab –** APHs including C_5-C_8 Aliphatic Hydrocarbons, C_9-C_{10} Aromatic Hydrocarbons, and C_9-C_{12} Aliphatic Hydrocarbons were detected in indoor air samples below their respective MEDEP IATs and were therefore not carried forward in the HHRA as COPCs. However, detections of C_5-C_8 Aliphatic Hydrocarbons and C_9-C_{12} Aliphatic hydrocarbons in sub-slab samples did exceed their screening criteria. Based on the levels detected in sub-slab, there is potential future risk to the hypothetical future resident based on exposure to these contaminants. It is possible that site risks in indoor are slightly underestimated as a result of this but the degree to which they are underestimated is uncertain.

- **COPCs without toxicity criteria** – A number of COPCs did not have screening values available to characterize human health risks and noncancer effects. It is possible that site risks are slightly underestimated as a result of this. In order to characterize potential noncancer health effects, surrogate toxicity criteria were applied according to the following:

    - 1,2,3-Trimethylbenzene RfD used as a surrogate for 1,2,4-trimethylbenzene;
    - Pyrene RfD used as a surrogate for benzo(a)anthracene, benzo(a)pyrene, and dibenz(a,h)anthracene; and
    - Fluoranthene RfD used as a surrogate for benzo(b)fluoranthene.

    Based on the above surrogates, the only changes to total HIs would occur in groundwater. The commercial/industrial worker groundwater HI would increase from 0.98 to 1.1. The hypothetical child resident groundwater HI would increase from 3.2 to 4.1. Lastly, the hypothetical adult resident groundwater HI would increase from 5.1 to 6.5.

5.6 RISK SUMMARY

5.6.1 Summary of Risks

5.6.1.1 AMAC Staff

The total soil cancer risks for the AMAC staff member at the AMAC Building and Launcher Areas were within EPA’s acceptable cancer risk range with a total cancer risk of 1.2E-05 and 7.8E-06, respectively. The total soil HIs at the AMAC Building and Launcher Areas for the AMAC staff member were 0.12 for both areas and were less than the noncancer threshold of 1.0.

The total groundwater cancer risks for the AMAC staff member at the AMAC Building Area was at the low end of EPA’s acceptable cancer risk range with a total cancer risk of 7.8E-06. The total groundwater HI at the AMAC Building Area for the AMAC staff member was 0.18, which was less than the noncancer threshold of 1.0.

The total indoor air cancer risk for the AMAC staff member at the AMAC Building Area was within the low end of EPA's acceptable cancer risk range with a total cancer risk of 1.1E-05. The total indoor air HI at the AMAC Building Area for the AMAC staff member was 0.51, which was less than the noncancer threshold of 1.0.

Soil and indoor air exposure at the AMAC Building Area slightly exceeded MEDEP's acceptable cancer risk level of 1E-05. However, soil exposure at the Launcher Area and groundwater exposure at the AMAC Building Area were below 1E-05.

5.6.1.2 AMAC Client

The total soil cancer risks for the AMAC client at the AMAC Building and Launcher Areas were at the low end of EPA's acceptable cancer risk range with total cancer risks of 3.3E-06 and 2.2E-06, respectively. The total soil HIs at the AMAC Building and Launcher Areas for the AMAC client were 0.12 for both areas and were less than the noncancer threshold of 1.0.

The total groundwater cancer risk for the AMAC client at the AMAC Building Area was at the low end of EPA's acceptable cancer risk range with a total cancer risk of 2.2E-06. The total groundwater HI at the AMAC Building Area for the AMAC client was 0.18, which was less than the noncancer threshold of 1.0.

The total indoor air cancer risk for the AMAC client at the AMAC Building Area was at the low end of EPA's acceptable cancer risk range with a total cancer risk of 2.2E-06. The total indoor air HI at the AMAC Building Area for the AMAC client was 0.35, which was less than the noncancer benchmark of 1.0.

Soil, groundwater, and indoor air exposure for the AMAC client at both the AMAC Building and Launcher Areas were below MEDEP's acceptable cancer risk level of 1E-05.

5.6.1.3 Launcher Area Trespasser

The total soil cancer risk (4.6E-07) for the Launcher Area trespasser was below EPA's acceptable cancer risk range. The soil total HI was 0.021 which was less than the noncancer threshold of 1.0.

Soil exposure for the Launcher Area trespasser was below MEDEP's acceptable cancer risk level of 1E-05.

5.6.1.4 Site Worker

The total soil cancer risks for the Site worker at the AMAC Building and Launcher Areas were at the low end of EPA's acceptable cancer risk range with total cancer risks of 8.5E-06 and 5.7E-06, respectively. The total soil HIs at the AMAC Building and Launcher Areas for the Site worker were 0.13 and 0.12, respectively. Both HIs were less than the noncancer threshold of 1.0.

Soil exposure for the Site worker at both the AMAC Building and Launcher Areas was below MEDEP's acceptable cancer risk level of 1E-05.

5.6.1.5 Future Construction Worker

The total soil cancer risk for the construction worker evaluated for the Entire Site was less than EPA's acceptable cancer risk range with a total cancer risk of 3.7E-07. The total soil HI was 0.34 which was less than the noncancer threshold of 1.0.

Soil exposure for the construction worker for the Entire Site was below MEDEP's acceptable cancer risk level of 1E-05.

5.6.1.6 Future Commercial/Industrial Worker

The total soil cancer risk for the commercial/industrial worker evaluated for the Entire Site was less than EPA's acceptable cancer risk range with a total cancer risk of 5.4E-07. The total soil HI was 0.011 which was less than the noncancer threshold of 1.0.

The total groundwater cancer risk for the commercial/industrial worker evaluated for the Entire Site was within EPA's acceptable cancer risk range with a total cancer risk of 1.2E-05. The total groundwater HI was 0.98 which was less than the noncancer threshold of 1.0.

The total indoor air cancer risk for the commercial/industrial worker evaluated for the Entire Site was at the low end of EPA's acceptable cancer risk range with a total cancer risk of 9.1E-06. The total indoor air HI was 0.58 which was less than the noncancer benchmark of 1.0.

Soil and indoor air exposure for the commercial/industrial worker for the Entire Site were below MEDEP's acceptable cancer risk level of 1E-05. However, groundwater exposure for the Entire Site slightly exceeded 1E-05.

5.6.1.7 Hypothetical Future Resident

The age-adjusted future hypothetical resident for the Entire Site slightly exceeded EPA's acceptable cancer risk range with a total soil cancer risk of 1.3E-04. The adult and child residents evaluated for the Entire Site had total soil HIs of 0.12 and 1.2, respectively.

The age-adjusted resident for the Entire Site slightly exceeded EPA's acceptable cancer risk range with a total groundwater cancer risk of 3.1E-04. The adult and child residents evaluated for the Entire Site had total groundwater HIs of 3.2 and 5.1, respectively.

The age-adjusted resident for the Entire Site was within EPA's acceptable cancer risk range with a total indoor air cancer risk of 4.2E-05. The child/adult resident evaluated for the Entire Site had total indoor air HI of 2.4.

Soil, groundwater, and indoor air exposure for the hypothetical future resident for the Entire Site exceeded MEDEP's acceptable cancer risk level of 1E-05.

5.6.2 Risk Drivers

As presented below and discussed further in Section 5.7, the only receptor risks in exceedance of the acceptable EPA cancer risk range was the hypothetical future residential exposure scenario. The remaining receptors all had cancer risks and/or total HIs less than the acceptable EPA cancer risk range and noncancer benchmark of 1.0.

5.6.2.1 AMAC Staff

The total soil cancer risks for the AMAC staff member at the AMAC Building and Launcher Areas were 1.2E-05 and 7.8E-06, respectively. The primary COPCs contributing to the greatest risk at both areas were arsenic and chromium with total arsenic cancer risks of 3.7E-06 at both sites and total chromium cancer risks of 7.3E-06 and 4.1E-06, respectively. The total soil HIs at the AMAC Building and Launcher Areas for the AMAC staff member were both less than 1.0.

The total groundwater cancer risk for the AMAC staff member at the AMAC Building Area was 7.8E-06. The primary contributors were trichloroethene and chromium with total cancer risks of 1.4E-06 and 6.4E-06, respectively. The total groundwater HI at the AMAC Building Area for the AMAC staff member was less than 1.0.

The total indoor air cancer risk for the AMAC staff member at the AMAC Building Area was 1.1E-05. The primary contributors were chloroform, naphthalene, and trichloroethene with total cancer risks of 3.1E-06, 5.1E-06, and 1.6E-06, respectively. The total indoor air HI at the AMAC Building Area for the AMAC staff member was less than 1.0.

5.6.2.2 AMAC Client

The total soil cancer risks for the AMAC client at the AMAC Building and Launcher Areas were 3.3E-06 and 2.2E-06, respectively. Arsenic and chromium were the primary contributors with total arsenic cancer risks of 1.1E-06 at both sites and total chromium cancer risks of 2.1E-06 and 1.2E-06, respectively. The total soil HIs at the AMAC Building and Launcher Areas for the AMAC client were less than 1.0.

The total groundwater cancer risk for the AMAC client at the AMAC Building Area was 2.2E-06. Chromium was the primary contributors with a total cancer risk of 1.8E-06. The total groundwater HI at the AMAC Building Area for the AMAC client was less than 1.0.

The total indoor air cancer risk for the AMAC client at the AMAC Building Area was 2.2E-06. Although the total cancer risk exceeded 1E-06, none of the individual COPC cancer risks exceeded 1E-06. The total indoor air HI at the AMAC Building Area for the AMAC client was less than 1.0.

5.6.2.3 Launcher Area Trespasser

The total soil cancer risk for the Launcher Area trespasser was 4.6E-07. The soil total HI was less than 1.0.

5.6.2.4 Site Worker

The total soil cancer risks for the Site worker at the AMAC Building and Launcher Areas were 8.5E-06 and 5.7E-06, respectively. Arsenic and chromium were the primary contributors at both areas with total arsenic cancer risks of 2.6E-06 and 2.7E-06, respectively and total chromium cancer risks of 5.3E-06 and 3.0E-06, respectively. The total soil HIs at the AMAC Building and Launcher Areas for the Site worker were less than 1.0.

5.6.2.5 Future Construction Worker

The total soil cancer risk for the construction worker evaluated for the Entire Site was 3.7E-07. The total soil HI was less than 1.0.

5.6.2.6 Future Commercial/Industrial Worker

The total soil cancer risk for the commercial/industrial worker evaluated for the Entire Site was 5.4E-07. The total soil HI was less than 1.0.

The total groundwater cancer risk for the commercial/industrial worker evaluated for the Entire Site was 1.2E-05. 1-Methylnaphthalene and chromium were the largest contributors with total cancer risks of 5.9E-06 and 4.6E-06, respectively. The total groundwater HI was less than 1.0.

The total indoor air cancer risk for the commercial/industrial worker evaluated for the Entire Site was 9.1E-06. The primary contributors were chloroform, naphthalene, and trichloroethene with total cancer risks of 2.5E-06, 4.2E-06, and 1.3E-06, respectively. The total indoor air HI was less than 1.0.

5.6.2.7 Hypothetical Future Resident

The age-adjusted future hypothetical resident for the Entire Site had a total soil cancer risk of 1.3E-04. The primary contributors to the total cancer risk were benzo(a)pyrene (3.9E-06), arsenic (7.1E-06), and chromium (1.2E-04). Although the child resident HI slightly exceeded 1.0 (total HI of 1.2), none of the individual COPCs had total HQs greater than 1.0.

The age-adjusted resident for the Entire Site had a total groundwater cancer risk of 3.1E-04. The primary contributors to the total cancer risk were 1-methylnaphthalene (4.7E-05), benzo(a)pyrene (1.2E-04), dibenzo(a,h)anthracene (7.6E-05), trichloroethene (6.5E-06), and chromium (5.9E-05). The primary contributor to the adult and child resident HIs (3.2 and 5.1, respectively) was manganese with a total HQ of 1.9 and 3.1, respectively. The primary target organ response associated with manganese exposure is the nervous system.

The total indoor air cancer risk for the age-adjusted resident for the Entire Site was 4.2E-05. Chloroform and naphthalene were the primary contributors with total cancer risks of 1.1E-05 and 1.8E-05, respectively. The primary contributor to the total indoor air HI (2.4) was trichloroethene with a total HQ of 1.9. The immune system, the cardiovascular system, developmental effects are the primary target organs associated with noncancer effects of trichloroethene exposure. These target organs had a total HI of 1.9, which exceeded 1.0.

5.7 HUMAN HEALTH RISK ASSESSMENT CONCLUSIONS

With the exception of the hypothetical future residential scenario, the soil exposure risk results were either within or below the EPA acceptable cancer risk range and less than an HI of 1.0. The primary contributors to soil risks were benzo(a)pyrene, arsenic, and chromium. As mentioned previously in Section 5.1.5, arsenic soil levels were found to be less than both the site-specific and regional background concentrations and are therefore not likely attributable to site-related activities. Of these contributing COPCs, only chromium was found with a total cancer risk exceeding 1E-05 with a total soil risk of 1.2E-04 (see Table 5-44). As discussed in Sections 4.1.2 and 5.5.1, chromium was conservatively evaluated as hexavalent chromium, which likely overestimates the reasonably anticipated risks due to chromium exposure. Additionally, although detected soil concentrations of chromium were slightly higher than the maximum detected site-specific background concentration for the AMAC Building Area, they were within the range of site-specific background concentration and were below regional background concentrations (see Table 5-4). Therefore, none of the soil COPCs are likely attributable to site-related activities and should not be considered for remedial action.

As with soil exposure, with the exception of the hypothetical future residential scenario, all of the groundwater exposure risk results were within the EPA acceptable cancer risk range and less than an HI of 1.0. The groundwater risks were primarily driven by several VOCs including 1-

methylnaphthalene, benzo(a)pyrene, dibenzo(a,h)anthracene, and chromium with total groundwater risks of 4.7E-05, 1.2E-04, 7.6E-05, and 5.9E-05, respectively (see Table 5-44). Manganese was the only COPC with a total HQ greater than the noncancer benchmark of one for both the adult and child resident (HIs of 1.9 and 3.1, respectively). As noted previously, the AMAC Building drinking water well is filtered, and the exposure for this EU was based on the absence of any water treatment methods. Additionally, chromium levels were likely overestimated based on the assumption of exposure to hexavalent chromium (see discussion in Section 4.1.2). Chromium soil levels were also within the range of background concentrations and likely not attributable to site-related activities (see Table 5-4). It should be noted that although manganese had total HIs greater than 1.0, manganese concentrations in soil were found below or within the range of site-specific and regional background concentrations. (see Table 5-4 and Section 4.1.2). Soil to groundwater migration of chromium is likely not a concern because the background comparisons have indicated that these are naturally occurring at the site. Therefore, the primary risk drivers for the residential groundwater scenario are 1-methylnaphthalene, benzo(a)pyrene, dibenz(a,h)anthracene, and manganese.

The indoor air cancer risks were all within EPA’s acceptable cancer risk range for all receptors. The primary contributors to indoor risks were chloroform and naphthalene. TCE slightly exceeded the noncancer benchmark of 1.0 with a total residential HQ of 1.9. As noted in Section 5.5.1, indoor air samples were collected from the AMAC Building Area in areas where the highest contaminant levels were expected to occur. These locations were not in the primary office area where the majority of exposure occurs. Exposure estimates based on these indoor air data combined with conservative exposure parameters likely overestimate indoor air risks. Chloroform and naphthalene were the only COPCs that had indoor air cancer risks in exceedance of 1E-05. TCE was the only COPC with a total HQ greater than one (total HQ of 1.9; see Table 5-44). Therefore, the primary contributors to residential indoor air exposure are chloroform, naphthalene, and TCE.

Cumulative cancer risks and noncancer HIs across all media for each receptor scenario, respectively are all within EPA’s acceptable cancer risk range or below the noncancer threshold of 1.0, with the exception of the hypothetical future resident. The cumulative cancer risk (4.9E-

04) for the hypothetical future resident slightly exceeds the upper end of EPA’s risk range. The hypothetical future resident cumulative noncancer HI (12.1) exceeded the noncancer threshold of 1.0. However, based on the conservatism and uncertainties discussed previously, these risks to the hypothetical future resident are likely overestimated.

6. SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT (SLERA)

The SLERA documents the potential exposure and consequent risks to ecological receptors exposed to soil and drainageway soil contamination within the study area. The objective of this SLERA is to characterize and quantify, where appropriate, the current impact of contamination on the Site from historical activities as well as the potential baseline ecological risk (i.e., risks that might exist if no remediation, land-use controls, or institutional controls were applied at the Site). In addition, the SLERA provides a basis for supporting a determination that No Further Action is needed or a more realistic and comprehensive evaluation of the ecological risks in a Baseline Ecological Risk Assessment (BERA) is required. During the SLERA process, contaminants of potential ecological concern (COPECs) are identified, the potential for wildlife exposure is evaluated, and a conservative analysis of the consequent ecological risk is conducted.

The SLERA does not recommend remedial alternatives; rather, it provides one of the bases for risk management decisions for the Site. Decisions regarding the need for remedial action would be made based on the BERA which would determine the levels of chemicals that can remain on site and still be adequately protective of ecological receptors; as well as provide a basis for comparing potential impacts of various remedial alternatives in the FS process.

This SLERA was conducted in accordance with the *Remedial Investigation/Feasibility Study Work Plan, Former LO-58 NIKE Battery Launch Site, Caribou, Maine* (Avatar, 2013b).

The primary sources of guidance in developing the work plan and subsequent SLERA include:

- Environmental Quality – Risk Assessment Handbook, Volume II: Environmental Evaluation (USACE, 2010); and
- Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (hereafter, referred to as the Guidance; EPA, 1997b).

This Guidance describes a progressive and iterative process that is consistent with and incorporates the basic and fundamental approach to performing ecological risk assessments (ERAs) outlined by EPA's Risk Assessment Forum in its *Framework for Ecological Risk Assessment* (Framework) (EPA, 1992b) and *Guidelines for Ecological Risk Assessment* (Guidelines) (EPA, 1998).

The Guidance outlines an 8-step process and several scientific/management decision points (SMDPs). An SMDP represents a significant communication point for the interaction of the risk manager and the risk assessment team. The purpose of the SMDP is to evaluate the relevant information and to re-evaluate the scope, focus, and direction of the ERA.

This SLERA covers Step 1 – Screening-level problem formulation and ecological effects evaluation and Step 2 – Screening-level preliminary exposure estimates and risk calculation and the first SMDP outlined in the 8-step ERA process (Figure 6-1).

In Step 1, the following information is provided:

1) a description of habitats potentially affected;
2) a list of flora and fauna present or potentially present for these habitats;
3) the preliminary CSM (e.g., pathways by which the receptors may be exposed);
4) the preliminary assessment and measurement endpoints;
5) the data available to evaluate the Site; and
6) the screening benchmarks appropriate to use to screen for ecological risk.

In Step 2, site-specific concentration data are compared with benchmarks to determine if the potential for ecological risk exists; and, if so, the chemicals of potential ecological concern (COPECs) for each exposure medium are defined.

In addition to and incorporated within the framework of the Guidance discussed previously, the following documents also were used in the development of the SLERA.

- *Guidelines for Ecological Risk Assessment* (EPA, 1998).
- *Framework for Ecological Risk Assessment* (EPA, 1992b).
- *Wildlife Exposure Factors Handbook, Volumes I and II* (*EPA 600R-93/187a and 187b*) (EPA, 1993b).
- *Risk Assessment Guidance for Superfund (RAGS), Volume II: Environmental Evaluation Manual (EPA 540/1-89/001)* (EPA, 1989b).
- *Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference Document (EPA 600/3-89/013)* (Suter II, 1989).

- *Ecological Risk Assessment Issue Papers (EPA/630R-94/009)* (Suter II et al., 1994).
- ECO Updates, Volumes 1-4 (EPA Office of Solid Waste and Emergency Response) (EPA, 1991-1994).
- *Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities* (*EPA 530-D-99-001A*) (EPA, 1999).

The site-specific SLERA is discussed in detail below.

6.1 SCREENING-LEVEL PROBLEM FORMULATION AND ECOLOGICAL EFFECTS EVALUATION (STEP 1)

The initial Problem Formulation step in the SLERA includes the evaluation and aggregation of the data available for the Site and the identification of conservative ecological screening values (ESVs) for use in the risk calculation in Step 2.

The technical components of Step 1 in the ERA process are as follows:

- Ecological Setting;
- Preliminary CSM;
- Preliminary Endpoints;
- Site Studies and Available Data;
- Data Evaluation and Reduction;
- Data Summary; and
- Development of Screening-Level Benchmarks.

6.1.1 Ecological Setting

This description of the ecological setting is based on a one-day field reconnaissance conducted by Avatar in July 2011, as well as information presented in historical documents associated with the LO-58 Site.

6.1.1.1 Terrestrial Setting

The Former LO-58 Nike Battery Launch Site is a 17-acre site in Caribou, Maine in northern Aroostook County. The principal man-made features of the Site include the Former Launcher Area, the AMAC Building and associated out-buildings, and main access road. Although the former Barracks Building is also on the Site, that area has not been shown to have been affected by past contamination.

The former Launcher Area sits on the top of a broad hill whose north slope was excavated to provide a flat surface for the launch pads. The former Launcher Area sits at an elevation of 585 ft amsl. The surface soils of the former Launcher Area are largely paved with asphalt and concrete. However, because the majority of this area has not been used for nearly 40 years, various grasses and early stage herbaceous plants as well as woody shrubs and small trees have emerged through eroding seams and cracks in the paved areas. The southern portion of the former Launcher Area is currently a shooting range used by the City of Caribou Police Department and Customs and Border Patrol Officers. Adjacent to the former Launcher Area to the south, the crest of the original hill stands approximately 15 ft above the pads (average elevation ~ 600 ft amsl). Although this area may have been used and maintained (i.e., mowed) during the operation of the Site, the area has gone to seed and is currently a grass field with pioneer shrubs and trees interspersed. At the time of the site reconnaissance, the height of grasses was about 2 ft. To the north and west of the former Launcher Area, hillsides slope to the adjacent valley. The hillsides are dominated by herbaceous field and scrub-shrub habitat characteristic of early successional vegetative communities. As much of the Site is characterized by hillside slopes, most of the soils are well-drained.

There are no permanent surface water bodies or wetlands present on the LO-58 Site. A natural valley at a topographic low of 532 ft amsl in the northern portion of the Site is located between the former Barracks Building and the AMAC Building. At the bottom of the valley, a drainage swale about 100 ft in width represents the only potential surface water feature on site. The swale appears to originate off-site approximately 600 ft upgradient of the Site.

This swale is generally dry except during the season of snowmelt and heavy precipitation, principally in spring. It receives surface runoff from the former Barracks Building Area and a portion of the former Launcher Area as well as the AMAC Building Area which sit atop the hill to the south. It also receives runoff from the facing slopes on either side of the swale. The extent to which groundwater discharges to this swale was investigated in 2012 with the installation of a well immediately upgradient of the swale. No water was observed in this well and it was concluded that groundwater from upslope was not contributing a base flow to the swale. To date, no groundwater seepage has been observed. At the time of the reconnaissance, dominant vegetation in the swale included cow vetch, thistle, burdock, and grass species.

This drainage swale exits off-site into an open field on the other side of the Site fence line. Upon leaving the Site, the drainage swale is no longer present and the shallow drainage through the field appears to be braided and flow confused. The newly constructed bypass around the town of Caribou intercepts the overland flow at the base of the field, approximately 500 ft from the Site fence line (see Figure 6-2). Stormwater flow leaving the field is directed northward under the new road through a series of culverts. On the downslope side of the new road, stormwater flow discharges to a narrow natural drainage which extends into a heavily wooded, mixed hardwood forest. This drainage meanders through the forest where it eventually discharges to a palustrine forested wetland bordering Hardwood Brook. Hardwood Brook begins north of Route 161 at Thomas Road and flows to the southeast before converging with Otter Brook, east of Route 1, which flows south to the Aroostook River.

As noted previously, except for periods of snowmelt and heavy precipitation, this drainage is dry. During the site visit, no vegetation characteristic of a wetland community was observed. Based on the vegetative characteristics, the absence of hydric soils, and the limited periods of surface water runoff, this swale does not support a wetland community nor would it support an ephemeral aquatic invertebrate or vertebrate community. It therefore was concluded that this swale represents terrestrial habitat.

6.1.1.1.1 Terrestrial Habitat – Vegetation

Terrestrial (upland) habitat comprises greater than 90% of the Site and is dominated by fallow grassy field and scrub-shrub habitat characteristic of early successional vegetative communities. Although there is woodland edge habitat, it is generally limited to off-site at the northern fence line as well as a few minor areas on site.

Tree species observed in the terrestrial habitat on site were generally saplings, although a few larger trees are scattered in patches throughout the property. Dominant species included:

- White birch, Betula papyrifera
- Red maple, *Acer rubrum*
- American beech, Fagus grandifolia
- White ash, Fraxinus americana
- Sugar maple, Acer saccharum
- Northern red oak, *Quercus rubra*

Shrub, forb and grass species observed included:

- Maple leaf viburnum, *Viburnum acerfolium*
- Common burdock, *Arctium minus*
- Yarrow, Achillea millefolium
- Knapweed, Centaurea maculosa
- Staghorn sumac, *Rhus typhina*
- Common mullein, Verbascum thapsus
- Thistle, Cirsium spp.
- Timothy, Phleum pratense
- Rough stemmed goldenrod, *Solidago rugosa*
- Asters, Aster spp.
- Orchardgrass, Dactylis glomerata
- Cow vetch, Vicia cracca
- Smooth bromegrass, *Bromus inermis*

6.1.1.1.2 Terrestrial Habitat – Birds

A variety of resident and non-resident (e.g., breeding) ground foraging birds (i.e., those feeding on soil invertebrates, insects, fungi, nuts/acorns, ground cover seed/berries) are expected to use this site throughout the year for food. Some of the more common species, representing a variety of feeding strategies, that may be expected include:

- Kildeer, Charadrius vociferous
- Gray catbird, Dumetella carolinensis
- Horned lark, Eremophila alpestris
- Chipping sparrow, *Spizella passerina*
- Mourning dove, Zenaida macroura
- Eastern kingbird, *Tyrannus*
- Tree swallow, Tachycineta bicolor
- Song sparrow, Melospiza melodia
- Black-billed cuckoo, Coccyzus erythropthalmus
- Red-eyed vireo, *Vireo olivaceous*
- Black-capped chickadee, *Poecile atricapillus*
- Blue jay, Cyanocitta cristata
- Common nighthawk, *Chordeiles minor*
- White-throated sparrow, *Zonotrichia albicollus*
- Whip-poor-will, Caprimulgus vociferous
- Brown-headed cowbird, *Molothrus ater*
- White-breasted nuthatch, *Sitta carolinensis*
- American crow, Corvus brachyrhynchos
- Downy woodpecker, *Picoides pubescens*
- House finch, Carpodacus mexicanus
- Northern flicker, *Colaptes auratus*
- American robin, Turdus migratorius
- Least flycatcher, *Empidonax minimu*s
- Eastern phoebe, *Sayornis phoebe*

In addition, predatory birds that may feed on small mammals on site include:

- Sharp-shinned hawk, *Accipiter striatus*
- American kestrel, *Falco sparverius*
- Red-shouldered hawk, *Buteo lineatus*
- Great Horned owl, *Bubo virginianus*
- Red-tailed hawk, *Buteo jamaicensis*
- Barred owl, *Strix varia*
- Rough-legged hawk, *Buteo lagopus*

6.1.1.1.3 Terrestrial Habitat – Mammals

Fields and edges on site are expected to provide food and cover for a variety of mammals. Some of the more common species that may be expected include:

- Northern short-tailed shrew, *Blarina brevicauda*
- Woodchuck, Marmota monax
- Masked shrew, *Sorex cinereus*
- Striped skunk, *Mephitis*
- Deer mouse, Peromyscus maniculatus
- Raccoon, Procyon lotor
- House mouse, *Mus musculus*
- Red fox, *Vulpes*
- Meadow jumping mouse, *Zapus hudsonius*
- White-tailed deer, Odocoileus virginianus
- Eastern chipmunk, *Tamias striatus*

In addition to the avian and mammalian fauna that may potentially inhabit the LO-58 Site, reptiles and amphibians may also represent a component of the faunal community. Potential herptiles include the northern redback salamander (*Plethodon cinereus*), the Eastern American toad (*Bufo americanus*), common garter snake (*Thamnophis sirtalis*), and northern ring-necked snake (*Diadophis punctatus*).

6.1.2 Preliminary Conceptual Site Model

Based on the habitat types and potential contaminant migration, a preliminary CSM was developed for LO-58. Together with Figure 6-3, the CSM narrative presented herein outlines the exposure pathways, exposure media, and routes of exposure, ecological receptors for each potentially affected habitat, and exposure areas.

Potential ecological exposure pathways illustrate ways in which stressors (e.g., contaminants) are transferred from a contaminated medium to ecological receptors. The following is a list of exposure pathways by which terrestrial receptors may be exposed to chemical contamination at the LO-58 Site.

- Vascular plants – direct contact with soil
- Soil invertebrate community – ingestion and direct contact with soil
- Birds and mammals – direct and indirect ingestion of soil contaminants (i.e., incidental ingestion of surface soil while foraging and consumption of plants and soil fauna that may have accumulated site contaminants)

Although the inhalation of contaminants associated with fugitive dust is a potential exposure pathway for birds and mammals, the pathway is expected to be a relatively minor source of exposure; and, therefore was not included.

6.1.2.1 Potentially Exposed Populations

The SLERA cannot evaluate potential adverse effects to every plant, animal, or community present and potentially exposed at the LO-58 Site. Therefore, receptors that are ecologically significant, of high societal value, highly susceptible, and/or representative of broader groups are typically selected for inclusion in the SLERA. The following is a list of communities and representative target receptors evaluated in the SLERA.

- Vascular plants
- Soil invertebrates/microbes
- Herbivorous birds/mammals (song sparrow – *Melospiza melodia* and deer mouse – *Peromyscus maniculatus*)
- Invertivorous bird/mammals (American robin – *Turdus migratorius* and short-tailed shrew – *Blarina brevicauda*)

6.1.2.2 Exposure Areas

Because of its small size and the homogeneity of available habitat, as well as the expected similarity of the spatial distribution of contaminants, the LO-58 Site was treated as a single exposure area in the SLERA.

6.1.3 Preliminary Assessment and Measurement Endpoints

Endpoints are defined as ecological characteristics (e.g., invertebrate survival) that may be adversely affected by site contaminants (EPA, 1992b). In the ERA process, two distinct types of endpoints are identified: assessment endpoints and measurement endpoints.

Assessment endpoints are “explicit expressions of environmental values to be protected, operationally defined as an ecological entity and its attributes” (EPA, 1998).

A measurement endpoint is defined as “a measurable ecological characteristic that is related to the valued characteristic chosen as the assessment endpoint.” Measurement endpoints link the conditions existing on site to the goals established by the assessment endpoints through the integration of modeled, literature, field, or laboratory data (Maughan, 1993).

It is desirable to have more than one measurement endpoint for each assessment endpoint (if the assessment cannot be measured directly), thereby providing multiple lines of evidence for the evaluation. However, in the SLERA (i.e., Steps 1 and 2 of the ERA process), the COPEC selection process facilitates the timely identification of those chemicals at levels with the potential to cause harm to the ecological receptors on site. As such, the preliminary measurement endpoints for Screening Level 1 are medium-specific benchmarks that were used as conservative screening levels to determine initial COPECs as noted below.

Screening Level 1		
Receptor	**Assessment Endpoint**	**Measurement Endpoint**
Terrestrial Plants	Plant growth, yield, or germination	Hazard quotient (HQ) based on COPEC soil concentration comparison with the most sensitive soil-based ecological benchmark.
Invertebrates	Growth, reproduction, or activity	
Herbivorous Mammals	Survival, growth, or reproduction	
Invertivorous Mammals	Survival, growth, or reproduction	
Herbivorous Birds	Survival, growth, or reproduction	
Invertivorous Birds	Survival, growth, or reproduction	

The approach for selecting benchmarks is presented in Section 6.1.6.

6.1.4 Available Data

Surface soil chemistry data (0-1 or 0-2 ft bgs) used in the SLERA were collected in 2012 as part of the RI site investigation. Specifically, data from 17 soil samples plus three drainageway locations were available. Three background soil samples also were collected in 2012. A more detailed description of sample collection, analysis, and justification is provided in Section 2.

Surface Soil Samples	
Sample ID	**Sample Type**
LO58-SB01-0002	Surface Soil
LO58-SB02-0002	Surface Soil
LO58-SB03-0002	Surface Soil
LO58-SB04-0002	Surface Soil
LO58-SB05-0002	Surface Soil
LO58-SB06-0002	Surface Soil
LO58-SB07-0002	Surface Soil
LO58-SB08-0001	Surface Soil
LO58-SB09-0002	Surface Soil
LO58-SB10-0002	Surface Soil
LO58-SB11-0001	Surface Soil
LO58-SB12-0001	Surface Soil
LO58-SB13-0002	Surface Soil
LO58-SB14-0001	Surface Soil
LO58-SB15-0001	Surface Soil
LO58-SS01-100212	Surface Soil
LO58-SS02-100212	Surface Soil
LO58-SD01-042112	Drainageway, downgradient off-site
LO58-SD01-100712	Drainageway, downgradient off-site
LO58-SD02-042112	Drainageway, downgradient onsite
LO58-SD02-100712	Drainageway, downgradient onsite
LO58-SD03-042112	Drainageway, upgradient onsite
LO58-SD03-100712	Drainageway, upgradient onsite
LO58-BK01-0001	Background
LO58-BK02-0001	Background
LO58-BK03-0001	Background

6.1.5 Data Evaluation and Reduction

Data included in this SLERA soil dataset are the 17 soil samples, plus the one onsite downgradient drainageway location. Two of the soil samples (LO58-SS01 and LO58-SS02) were analyzed only by Method 8082 (Aroclors); therefore, the majority of the non-Aroclor analytes have been analyzed in only 16 samples. The drainageway soil dataset includes all three drainageway samples (i.e., one each onsite-upgradient, onsite-downgradient, and off-site-downgradient), except for analytes (e.g., naphthalene) that were analyzed using methods 8260 (VOCs) and 8720 (SVOCs). The results from the spring sediment sample 8260 analyses were out of holding time, so the 8270 results were used. The sediment locations were resampled in the fall for 8260, so additional sample results were available for those few chemicals analyzed under both methods.

The background dataset is comprised of the three aforementioned soil background samples. The HHRA and SLERA employ similar methodologies for data evaluation and reduction. Please refer to Subsections 5.1.2 and 5.1.3 for details.

Summary statistics for the SLERA datasets are presented in Tables 6-1 through 6-3. Analytical data are provided in Appendix A.2.

6.1.6 Development of Screening-Level Benchmarks

Ecological benchmarks represent medium-specific contaminant concentrations considered protective of biota inhabiting that medium. Ecological benchmarks were obtained from a variety of sources including Federal and State regulatory values, EPA and other agency reports, and scientific literature. At the Site, the potential direct exposure medium is soils only.

The initial screening ecological benchmark screening was completed on a generic receptor-specific basis for soil and drainageway soil. The values selected were based on the hierarchies presented below for phytotoxicity, soil invertebrate/microbe toxicity, and wildlife toxicity. Note that if a soil invertebrate/microbe value was not available, a benthic invertebrate toxicity value was substituted if available. The benchmarks selected for use in this assessment are presented in Tables 6-4 and 6-5 and described below.

Phytotoxicity Hierarchy

1) Ecological Soil Screening Levels (Eco-SSLs; EPA, 2003b, 2003c, 2005c, 2005d, 2005e, 2005f, 2005g, 2005h, 2005i, 2005j, 2005k, 2006a; 2007b 2007c, 2007d, 2007e, 2007f; 2007g, 2007h, 2007i, 2008b)—The EPA has developed Eco-SSLs for seventeen of the inorganics and four organics. The Eco-SSLs are "concentrations of contaminants in soil that are protective of ecological receptors that commonly come into contact with soil or ingest biota that live in or on soil." These values can be used to identify COPECs during Step 2 of the Superfund Ecological Risk Assessment process. The Eco-SSLs are not designed to be used as cleanup levels.

   Eco-SSLs for plants were derived in a similar manner as the wildlife Eco-SSL toxicity reference values. The general approach included: 1) conducting literature searches; 2) screening identified literature with exclusion and acceptability criteria; 3) extracting, evaluating, and scoring test results for applicability in deriving an Eco-SSL; and 4) deriving the soil concentration. The Eco-SSL is the geometric mean of the toxicity values at the highest bioavailability score (from step #3 above) for which sufficient data exists (>3 data points) (see EPA, 2003d for more details).

2) Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants (Efroymson et al., 1997c)—Phytotoxicological benchmarks were derived by rank-ordering the lowest observed effect concentration (LOEC) values drawn from the literature. The 10th percentile LOEC value was selected as the benchmark, so the "assessor should be 90% certain of protecting plants growing in the site soil." Rigorous criteria were applied when selecting studies to be included in the generation of these benchmarks.

3) Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities (EPA, 1999)—The terrestrial plant toxicity reference values (TRVs) were based on bulk soil exposures. Toxicity values were first identified from the following secondary sources: 1) Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants: 1997 Revision (Efroymson et al., 1997c); 2) ECOTOXicology Database System (EPA, 1996c); and 3) EPA Region 5 Ecological Data Quality Levels Database (PRC 1995). Original studies were obtained, when possible, and prioritized. Uncertainty factors were applied as appropriate (see Chapter 5 of EPA, 1999 for more details). For chemicals without toxicity data, surrogate values were adopted if appropriate. If an appropriate surrogate TRV was not available, no TRV value was identified.

Soil Invertebrate/Microbe Toxicity Hierarchy

1) Ecological Soil Screening Levels (Eco-SSLs; EPA, 2003b, 2003c, 2005c, 2005d, 2005e, 2005f, 2005g, 2005h, 2005i, 2005j, 2005k, 2006a; 2007b 2007c, 2007d, 2007e, 2007f; 2007g, 2007h, 2007i, 2008b)—The EPA has developed Eco-SSLs for seventeen of the inorganics and four organics. The Eco-SSLs are "concentrations of contaminants in soil that are protective of ecological receptors that commonly come into contact with soil or ingest biota that live in or on soil." These values can be used to identify COPECs during Step 2 of

the Superfund Ecological Risk Assessment process. The Eco-SSLs are not designed to be used as cleanup levels.

Eco-SSLs for soil invertebrates were derived in a similar manner as the wildlife Eco-SSL toxicity reference values. The general approach included: 1) conducting literature searches; 2) screening identified literature with exclusion and acceptability criteria; 3) extracting, evaluating, and scoring test results for applicability in deriving an Eco-SSL; and 4) deriving the soil concentration. The Eco-SSL is the geometric mean of the toxicity values at the highest bioavailability score (from step #3 above) for which sufficient data exists (>3 data points) (see EPA, 2003d for more details).

2) Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Processes (Efroymson et al., 1997b)—Earthworm and microbial heterotroph benchmarks were derived using the same methodology used to generate the phytotoxicological benchmarks (Efroymson et al., 1997c). Toxicity benchmarks were derived by rank-ordering lowest observed effect concentration (LOEC) values gathered from an extensive literature search, then selecting the 10th percentile LOEC value as the benchmark. Earthworm benchmarks were derived for several metals and SVOCs; microbial heterotroph benchmarks were derived for numerous metals and a few organic compounds.

3) Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities. (EPA, 1999)—The soil invertebrate TRVs were based on bulk soil exposures. Toxicity values were first identified from the following secondary source: *Toxicological Benchmarks for Potential Contaminants of Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process* (Efroymson et al., 1997b). Scientific literature was then searched for toxicity values for outstanding compounds. Original studies were obtained, when possible, and prioritized. Uncertainty factors were applied as appropriate (see Chapter 5 of EPA, 1999 for more details). For chemicals without toxicity data, surrogate values were adopted if appropriate. If an appropriate surrogate TRV was not available, no TRV value was identified.

<u>Wildlife Food Chain-based Toxicity Hierarchy</u>

1) Ecological Soil Screening Levels (Eco-SSLs; EPA, 2003b, 2003c, 2005c, 2005d, 2005e, 2005f, 2005g, 2005h, 2005i, 2005j, 2005k, 2006a; 2007b 2007c, 2007d, 2007e, 2007f; 2007g, 2007h, 2007i, 2008b)—The EPA has developed Eco-SSLs for seventeen of the inorganics and four organics. The lower (i.e., most conservative) of the avian and mammalian Eco-SSL for a specific chemical were selected for use in the COPEC screening. The Eco-SSLs are "concentrations of contaminants in soil that are protective of ecological receptors that commonly come into contact with soil or ingest biota that live in or on soil." These values can be used to identify COPECs during Step 2 of the Superfund Ecological Risk Assessment process. The Eco-SSLs are not designed to be used as cleanup levels.

The general approach for deriving Eco-SSL toxicity values included: 1) conducting literature searches; 2) screening identified literature with exclusion and acceptability criteria; 3) extracting, evaluating, and scoring test results for applicability in deriving an Eco-SSL; and 4) deriving the soil concentration. The Eco-SSL is the geometric mean of the toxicity values at the highest bioavailability score (from step #3 above) for which sufficient data exists (>3 data points) (see EPA, 2003d for more details).

The wildlife Eco-SSLs were back-calculated from a hazard quotient of 1.0 and indicate a soil concentration at which adverse effects are unlikely. A generic food-chain model was used to estimate the relationship between the concentration of the contaminant in soil and the dose for the receptor (mg per kg body weight per day). The TRV represents a receptor-class specific estimate of a no-observed adverse effect level (dose) for the respective contaminant for chronic exposure.

2) Preliminary Remediation Goals for Ecological Endpoints (Efroymson et al., 1997a)—Wildlife preliminary remediation goals (PRGs) for soil were derived by iteratively calculating exposure estimates using different soil concentrations and soil-to-biota contaminant uptake models. Uptake models for plants, earthworms, and small mammals were derived from various sources. Because diets dramatically influence exposures and sensitivity to contaminants varies among species, PRGs were developed for six species: short-tail shrew, white-footed mouse, red fox, white-tailed deer, American woodcock, and red-tailed hawk. In this SLERA, the avian or mammalian species that provided the most conservative estimate of exposure were used (i.e., short-tail shrew and American woodcock). Remediation goals based on wildlife exposure are derived from lowest observed adverse effect level (LOAEL) values. To convert these LOAEL-based values to no observed adverse effect levels (NOAEL), a conversion factor of 10 was applied to all values (i.e., the wildlife PRGs were divided by 10 prior to inclusion in the SLERA).

3) Toxicological Benchmarks for Wildlife: 1996 Revision Food–based benchmarks (Sample et al., 1996)—NOAEL- and LOAEL-based values of contaminants in food were calculated for numerous receptors. Toxicity values identified in the document were integrated with the amount of food consumed to derive the concentration. For the purposes of this assessment, it was assumed the concentrations in soil are equivalent to the concentrations in dietary items. The lowest class-specific NOAEL-based value from the species ingesting terrestrial-based food items was used in this screening.

4) Resource Conservation and Recovery Act (RCRA) Ecological Screening Levels (ESLs) (EPA Region 5, 2003)—The ESLs (previously known as ecological data quality levels [EDQLs]) are the initial tool utilized in assessing adverse risk to the environment through the RCRA Corrective Action and Permit programs within Region 5. The ESLs provide protective benchmarks for over 200 contaminants and four environmental media, including air, water, sediment, and soil. With few exceptions, the majority of soil ESLs are based on exposure to a masked shrew (*Sorex cinereus*).

6.2 SCREENING-LEVEL PRELIMINARY EXPOSURE ESTIMATES AND RISK CALCULATION (STEP 2)

The potential for ecological risk associated with chemical contamination of soil at the LO-58 Site was assessed using a two-level screening approach. This approach serves as the screening-level ecological effects/risk characterization with which to evaluate whether past site activities and current levels of contamination: 1) clearly indicate little or no potential for adverse effects to ecological resources at LO-58; 2) clearly indicate the potential for adverse effects to ecological resources at LO-58; or 3) indicate that the available data are inadequate to make a determination.

The result of this screening process is a determination of whether the LO-58 Site is suitable for a finding of No Significant Impact or requires further evaluation either by conducting a BERA and/or the collection of additional data. It also provides a final list of COPECs and refines the focus of any further evaluations that may be required.

6.2.1 Level 1 Screening Methodology

For the Level 1 ecological screening analysis, the maximum detected concentration for each chemical in soil was compared with soil-based ecological screening-level values that represent potential scenarios of ecological exposure. The screenings are presented in Tables 6-6 and 6-7.

In general, a chemical was selected as a COPEC if the maximum detected concentration exceeded the screening benchmark or if a screening benchmark was not available for any of the potential receptors. Soil direct contact and drainageway soil COPECs were based on the phytotoxicity and soil invertebrate screenings; whereas, food chain modeling COPECs were based on screening against avian and mammalian food chain-based benchmarks. Essential nutrients (i.e., calcium, chloride, magnesium, potassium, and sodium) are not expected to pose any substantial ecological risk to receptors at the Site and were not considered COPECs. The COPEC list is presented in Table 6-8.

6.2.2 Level 2 Screening Methodology

For the Level 2 screening analysis, medium-specific chemical concentrations used to directly assess exposure are summarized for each COPEC carried forth from Level 1. For receptors with no or little ability to migrate (e.g., terrestrial plants and soil invertebrates such as earthworms,), sample-by-sample comparisons with medium-based TRVs are performed. For avian and mammalian receptors, dietary exposure modeling was performed using an estimated EPC as the basis of exposure.

This section is divided into two parts, exposure and effects evaluation and the risk characterization. The former presents the calculation of exposures (e.g., EPCs and exposure models) and the effects data (i.e., TRVs). The latter presents the results of the integration of exposure and effects, as well as any refinements to the risk estimate (e.g., comparisons with background data). This portion of the screening assessment also discusses the uncertainties associated with the screening methodologies and the conclusions based on the Level 2 Screening.

6.2.2.1 Exposure Evaluation

Based on the preliminary assessment and measurement endpoints and the results of the Level 1 Screening, receptors selected for a Level 2 Screening are below.

Screening Level 2		
Receptor	**Assessment Endpoint**	**Measurement Endpoint**
Terrestrial Plants	Support of a functioning plant community	HQ based on COPEC soil concentration comparison with literature-based phytotoxicity values.
Soil Invertebrates	Support of a functioning soil invertebrate community	HQ based on COPEC soil concentration comparison with literature-based effect values.
Herbivorous Birds	Support of a functioning herbivorous bird community	HQ based on dietary intake of COPECs by the song sparrow using site-specific soil concentrations and modeled dietary concentrations compared with literature-based effect values.
Invertivorous Birds	Support of a functioning invertivorous bird community	HQ based on dietary intake of COPECs by the American robin using site-specific soil concentrations and modeled dietary concentrations compared with literature-based effect values.
Herbivorous Mammals	Support of a functioning herbivorous mammal community	HQ based on dietary intake of COPECs by the deer mouse using site-specific soil concentrations and modeled dietary concentrations compared with literature-based effect values.

Screening Level 2		
Receptor	**Assessment Endpoint**	**Measurement Endpoint**
Invertivorous Mammals	Support of a functioning invertivorous mammal community	HQ based on dietary intake of COPECs by the short-tailed shrew using site-specific soil and invertebrate concentrations compared with literature-based effect values.

6.2.2.1.1 EPC Calculation

EPCs are the COPEC concentrations that a receptor is assumed to be exposed to within an exposure area. In general, the human health and ecological risk assessments employ the same methodologies for calculating upper-bound EPCs for soils for use in the RME scenarios. Please refer to Subsection 5.2.4 for details. One variation to note is that in order to not skew results towards concentrations found around the AMAC Building (where 3 to 5 samples were taken in close proximity), the maximum detected concentration from those samples was used as the representative concentration and used in the UCL/EPC calculations instead of the 3 to 5 individual points. For the central tendency exposure (CTE) scenarios, EPCs employed in the SLERA is the arithmetic average soil concentration, unless it is higher than the RME EPC, in which case the median concentration was used.

For this SLERA, EPCs are only calculated for dietary exposure modeling from soil to birds and mammals. The exposure area for the wildlife receptors is the Site only; therefore, as noted in Subsection 6.1.5, the soil dataset is 18 samples (the 17 soil samples modified as noted above, plus the one onsite drainageway sample). The drainageway is not considered an appropriate wildlife habitat to evaluate (linear habitat and too small to contribute significantly to dietary exposures); therefore, EPCs were not calculated for the drainageway soil dataset.

EPCs for the Site soil are presented in Table 6-9. ProUCL Outputs are presented in Appendix D.1.

CALCULATION OF PLANT EPCS

Site-specific plant concentrations were not available with which to evaluate herbivore exposure to COPECs; therefore, plant concentrations were estimated. Chemical-specific values/equations were selected as noted in the Eco-SSL guidance document (EPA, 2007a). For chemicals not listed in the Eco-SSL guidance, the following approaches/hierarchy of sources were employed:

Organic Compounds:

- Chemical-specific value from Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities (EPA, 1999).
- Develop default concentrations or bioconcentration factors (BCFs) for nonionizing compounds based on Eco-SSL guidance.
- For PAHs, use linear regression (soil to plant concentration) for rinsed plant foliage for PAH as appropriate (i.e., low or high molecular weight PAH) (Figure 4; EPA, 2007a).
- For non-PAHs with log K_{ow} values ranging from 3 to 8, use linear regression (log K_{ow} to log bioaccumulation factor) for rinsed plant foliage.
- If a BCF cannot be developed based on any of these methods, default to 1 (EPA, 2007a).
- Note, volatiles are assumed to not bioaccumulate to any significant degree and plant concentrations were not estimated (EPA, 2007a).

Inorganic Compounds:

- Measured value or regression equation from Empirical Models for the Uptake of Inorganic Chemicals from Soil by Plants (Bechtel-Jacobs, 1998) were used as recommended. Any regression equation used met the criterion in the Eco-SSL guidance (i.e., slope must be significantly different from 0 and R2 is ≥ 0.2).
- Chemical-specific values were used (Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities, EPA, 1999) but only if the reference is not *A Review and Analysis of Parameters for Assessing Transport of Environmentally Released Radionuclides through Agriculture* (Baes et al., 1984). This exception is because The Protocol (EPA, 1999) uses the soil to plant concentration factor – vegetative (Bv) values; whereas the soil to plant concentration factor – reproductive (Br) values are more appropriate for the receptors modeled herein.
- Chemical-specific value for reproductive parts (Br) were used (A Review and Analysis of Parameters for Assessing Transport of Environmentally Released Radionuclides through Agriculture, 1984).

- Default to the arithmetic mean of the inorganic BCFs derived from empirical data and regression models.

Equations and inputs are presented in Tables 6-10 and 6-11.

CALCULATION OF SOIL INVERTEBRATE EPCS

Site-specific soil invertebrate concentrations were not available with which to evaluate invertivore exposure to COPECs; therefore, soil invertebrate concentrations were estimated. Chemical-specific values/equations were selected as noted in the Eco-SSL guidance document (EPA, 2007a). For chemicals not listed in the Eco-SSL guidance, the following approaches/hierarchy of sources was employed:

Organic Compounds:

- Chemical-specific value from Development and Validation of Bioaccumulation Models for Earthworms (Sample et al., 1998). The slope of the regression must be significantly different from 0 and R2 ≥ 0.2.
- Chemical-specific values were used (Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities, EPA, 1999).
- Develop default concentrations or BCFs for nonionizing compounds with log K_{ow} values ranging from 2 to 8 based on Eco-SSL guidance.
- If a BCF based on any of these methods cannot be developed, default to 1 (EPA, 2007a).
- Note, volatiles are assumed not to bioaccumulate to any significant degree and soil invertebrate concentrations were not estimated (EPA, 2007a).

Inorganic Compounds:

- Chemical-specific value was used (Development and Validation of Bioaccumulation Models for Earthworms, (1998). The slope of the regression must be significantly different from 0 and R2 ≥ 0.2.
- Chemical-specific value Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities (EPA, 1999).
- Default to the arithmetic mean of the inorganic BCFs derived from empirical data and regression models.

Equations and inputs are presented in Tables 6-12 and 6-13. Calculated terrestrial plant and soil invertebrate EPCs are presented in Table 6-14.

6.2.2.1.2 Avian and Mammalian Receptor Dietary Exposure Modeling

As was previously mentioned, four receptor-specific exposure models are considered in this SLERA. In an attempt to limit the effort expended as part of the exposure modeling process and still identify potential ecological risks, a deterministic "tiered approach" that includes a conservative worst-case (i.e., RME) and more realistic average (i.e., CTE) approach was used.

Consistent with EPA Region 1 CERCLA guidance, the RME exposure point concentration is the upper-bound average (e.g., 95% UCL) and the CTE exposure point concentration is a general average (e.g., arithmetic mean). Life history parameters are not varied as sufficient data are not available with which to estimate meaningful mean and upper-bound values. Therefore, the same input value for each life history-based exposure parameter was used in both the RME and CTE scenarios.

Exposure models used in the SLERA take the following general form:

$$\mathrm{TDI} = \mathrm{FT} \times \left[\left(\mathrm{IR}_{\text{Target Receptor Feeding Guild}} \times \sum_{i=1}^{n} \mathrm{C}_{i} \times \mathrm{P}_{i} \right) + \mathrm{IR}_{\text{Soil-Target Receptor Feeding Guild}} \times \mathrm{C}_{\text{soil}} \right]$$

Where:

TDI = Total daily intake (mg/kg BW-day) for a particular receptor
FT = Foraging time in the exposure area (unitless)
$\mathrm{IR}_{\text{Target Receptor Feeding Guild}}$ = Body weight normalized food intake rate (kg WW/kg BW-day)
C_{i} = Concentration in the i^{th} prey item (mg/kg WW)
P_{i} = Proportion of the i^{th} prey item in the diet (unitless)
$\mathrm{IR}_{\text{Soil-Target Receptor Feeding Guild}}$ = Soil ingestion rate (kg DW/kg BW-day)
C_{soil} = Concentration in soil (mg/kg DW)

Because of the difficulties in measuring intake of free-ranging wildlife, data on food intake rates (FIRs) are not available for many species. Using FIRs for captive animals potentially underestimates the intake rates because these animals do not expend as much energy as their wild counterparts do because activities for captive animals do not include behaviors such as foraging and avoiding predators. Therefore, allometric equations using measurements of free metabolic rates (FMRs) are used to determine FIRs.

The FMR represents the daily energy requirement that must be consumed by an animal to maintain among other things, body temperature, organ function, digestion, and reproduction. To maintain these physiological functions as well as to perform daily behavioral activities such as foraging, avoiding predators, defending territories, and mating, the animal must replace the lost energy by metabolizing and assimilating the energy in its food (i.e., its metabolic fuel). The balance between an animal's energy loss and replenishment is reflected in the quality and quantity of food in the animal's diet. Assuming that the animal's habitat supports a variety of food items, selection of diet may reflect a preference toward more energy-rich foods (i.e., higher gross energy), although one must consider the energy expended in pursuit of prey.

Not all food that is consumed by an animal is converted to usable energy. Depending on the digestibility of the dietary item and the physiology of a particular animal, a substantial portion of the available energy may be lost through clearance (excretion). Assimilation efficiency (AE) is a measure of the percentage of food energy (i.e., item-specific gross energy) that is assimilated across the gut wall and is available for metabolism.

The equation used to determine FIRs is as follows:

$$\mathrm{FIR\ (g\ ww/g\ BW - day)} = \frac{\mathrm{FMR}}{\sum_{i=1}^{n}\left(\mathrm{AE}_i \times \mathrm{GE}_i \times \mathrm{P}_i\right)}$$

Where:

FIR = Body weight normalized field ingestion rate (kg WW/kg BW-day)
FMR = Field metabolic rate (kilocalorie [kcal]/g BW-day; see Table 6-15)
AE_i = Assimilation efficiency of the i^{th} food item (unitless; see Table 6-16)
GE_i = Gross energy of the i^{th} food item (kcal/g WW; see Table 6-16)
P_i = Proportion of diet comprised of the i^{th} food item (unitless; see Tables 6-17 through 6-20)

Selection of Receptor Species and Dietary Exposure Models

Measurement receptors for which dietary modeling was performed was selected for each class-specific feeding guild to be representative of other species in that guild. These species are expected to be conservative surrogates for the specified feeding niche. Receptors were selected based on their ecological relevance, exposure potential, sensitivity, social or economic importance, and the availability of natural history information. Discussions regarding the specific mammalian and avian receptors are presented below. Note that specific classes or species of receptors are selected to serve as a surrogate species for all those within a particular habitat (in the case of plants) or feeding guild.

Song Sparrow

The song sparrow (*Melospiza melodia*) was selected to represent herbivorous birds. They are abundant in New England and found in a variety of habitats including brushy fields, swamps, forest edges, roadsides, hedgerows, farms, and residential areas (DeGraaf and Yamasaki, 2001).

Song sparrows tolerate a wide range of habitat conditions. In the early season, nests are usually constructed on the ground, concealed by grasses, weeds or brush. Later in the season, nests may be on the ground or elevated in shrubs or trees up to 12 ft high. In favorable habitat, song sparrows occupy territories of 0.2 to 0.6 hectares (0.5 to 1.5 acres) (DeGraaf and Yamasaki, 2001).

The diet of song sparrows consists primarily of seeds and fruits, supplemented by invertebrates in the summer (Cornell Univ., 2003). Song sparrows glean their food primarily from the ground, but also from herbs and twigs.

The exposure of the song sparrow to site-specific COPECs is assumed to be through the ingestion of plants; as well as the incidental ingestion of soil. Table 6-17 presents the exposure model and summarizes the exposure factors used to estimate COPEC exposure to the song sparrow.

American Robin

The American robin (*Turdus migratorius*) was selected to represent invertivorous birds. The American robin inhabits forests, wetlands, swamps, and habitat edges where forested areas meet agricultural and range land (EPA, 1999).

The American robin requires access to freshwater, protected nesting sites, and productive forage in areas for breeding. Breeding habitats include moist forests, swamps, open woodlands, orchards, parks, and lawns. Robins may forage on the ground, along habitat edges, stream edges, or above ground in shrubs and the lower branches of trees (EPA, 1999). The summer foraging home range of adults feeding nestlings averages approximately 0.37 acres and those feeding fledglings approximately 2 acres. Their territory during the breeding season ranges from 0.3 – 2 acres (EPA, 1993b).

Robins eat invertebrates, seeds, and fruit (EPA, 1999). Directly preceding and during the breeding season, the robin's diet consists of greater than 90% (by volume) invertebrates and some fruit. During the rest of the year, their diet consists of 80-99% (by volume) of fruits. Fruits commonly eaten include plums, dogwood, sumac, hackberries, blackberries, cherries, greenbriers, raspberries, and juniper. Invertebrates commonly taken include beetles, caterpillars, moths, grasshoppers, spiders, millipedes, and earthworms (EPA, 1993b).

The exposure of the American robin to site-specific COPECs is assumed to be through the ingestion of soil invertebrates; as well as the incidental ingestion of soil. Table 6-18 presents the exposure model and summarizes the exposure factors used to estimate COPEC exposure to the American robin.

DEER MOUSE

The deer mouse (*Peromyscus maniculatus*) was selected to represent the herbivorous mammal. The deer mouse is mainly nocturnal (EPA, 1993b, 1999), spending most of its day in a burrow underground. Deer mice commonly use more than one nest site (EPA, 1999). Their home range averages 0.02 to 2.5 acres. Population density of deer mice ranges from 3 to 36 mice per acre (Merritt, 1987).

The diet of the prairie deer mouse consists of herbaceous vegetation (e.g., sweet clover, ragweed, pokeweed, and various grasses), cultivated grains, soybeans, and corn. The woodland-dwelling cloudland deer mouse consumes a variety of seeds, berries, buds, nuts, and fungi. Although primarily an herbivore, during late summer, the deer mouse will ingest various insects (e.g., crickets, grasshoppers, ground beetles, caterpillars, earthworms, centipedes, millipedes, slugs, and spiders) (Merritt, 1987).

Because the deer mouse is ubiquitous and abundant, it represents the major herbivore component in the terrestrial food web. Predators of the deer mouse include snakes, shrews, foxes, and hawks (Merritt, 1987).

The exposure of the deer mouse to site-specific COPECs is assumed to be through the ingestion of plants; as well as the incidental ingestion of soil. Table 6-19 presents the exposure model and summarizes the exposure factors used to estimate COPEC exposure to the deer mouse.

SHORT-TAILED SHREW

The northern short-tailed shrew (*Blarina brevicauda*) was selected to represent the invertivorous small mammal. The short-tailed shrew may be found in a variety of habitats with a well-developed layer of leaf litter and humus, including grasslands, brushy thickets, meadows, old fields, and deciduous, coniferous, and mixed forest (Merritt, 1987).

Two different types of nests are constructed by the short-tailed shrew - a breeding nest and a resting nest. Both types are commonly located 6 to 16 inches below ground, or under logs, stumps, or old boards. The home range of the shrew is 0.5 to 1 acre. Population densities of the shrew range from 1 to 10 per acre (Merritt, 1987).

The short-tailed shrew’s diet includes invertebrates (e.g., spiders, centipedes, slugs, snails, and earthworms), salamanders, mice, voles, and occasionally birds. It has a preference for animal food, but also eats fungi and plant material such as roots, nuts, fruits, and berries. In winter, insect larvae and pupae serve as important food sources. Predators of the short-tailed shrew include snakes, foxes, and hawks (Merritt, 1987).

The exposure of the short-tailed shrew to site-specific COPECs is assumed to be through the ingestion of soil invertebrates; as well as the incidental ingestion of soil. Table 6-20 presents the exposure model and summarizes the exposure factors used to estimate COPEC exposure to the short-tailed shrew.

Total Daily Intakes

Exposure total daily intakes calculated for herbivorous and invertivorous birds and mammals are presented in Tables 6-21 through 6-28.

6.2.2.2 Ecological Effects Evaluation

The ecological effects evaluation is the qualitative and quantitative description of the relationship between the stressor and response (effects) in the exposed individuals, populations, or ecosystems (Sheehan and Loucks, 1994), and, more specifically, the relationship between stressors and the assessment and measurement endpoints identified during the problem formulation step (Norton et al., 1992). The characterization of ecological effects begins with an evaluation of effects data relevant to the COPECs. The majority of effects data for many of the COPECs that exist in the literature are based on toxicity tests conducted with the contaminants added to water, sediment, or food, or from tests of direct exposure to contaminated water and soil/sediment. The second largest set of effects data was gathered from field studies in which contaminated sites and reference sites were compared (Sheehan and Loucks, 1994). Specifically, for this SLERA, the following items are included in the assessment:

- Comparisons with available information on phytotoxicity;
- Comparisons with available information on invertebrate toxicity; and
- Comparisons of modeled avian and mammalian exposure doses with literature-based toxicity data.

The subsections that follow examine the relationship between stressor levels and effects, present the supporting evidence that the stressor causes the effect, and provide a link between the measurable effect and the assessment endpoint (EPA, 1998). The discussion below presents the sources from which media-based benchmarks and dose-based toxicity data were compiled.

6.2.2.2.1 Abiotic Media Toxicity Values

Phytotoxicity – To evaluate the potential for phytotoxicity at the Site, available terrestrial plant toxicity values from three sources were used. The preference hierarchy was presented in Section 6.1.6 and values used in the evaluation of phytotoxicity are presented in Table 6-4.

Soil Invertebrates – To evaluate the potential for toxicity to soil invertebrates at the Site, available soil invertebrate toxicity values from three sources were used. The preference hierarchy was presented in Section 6.1.6 and values used in the evaluation of soil invertebrates are presented in Table 6-5.

6.2.2.2.2 Wildlife TRVs

Toxicity reference values (TRVs) represent receptor-class specific estimates (in mg COPEC/kg body weight-day) of a no-observed adverse effect level (NOAEL) or a lowest observed effect level (LOAEL) for the chronic exposure to a COPEC. TRVs are used to calculate risk for food chain modeling endpoints. The NOAEL is defined by EPA as: “The highest exposure level at which there are no biologically significant increases in the frequency or severity of adverse effect between the exposed population and its appropriate control; some effects may be produced at this level, but they are not considered adverse or precursors of adverse effects.” Whereas the LOAEL is: “The lowest exposure level at which there are biologically significant increases in frequency or severity of adverse effects between the exposed population and its appropriate control group.”

To determine the TRVs for use in this risk assessment, a hierarchy of sources was searched as follows: Eco-SSLs documents, U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) *Wildlife Toxicity Assessment Reports*, EPA’s *Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities* (1999), Sample et al. (1996), EcoTox, and peer-reviewed primary literature. Studies that meet the following criteria could be used for TRV development:

- Test species similar to the target receptor;
- In vivo study;
- Oral administration via food, drinking water, or gavage (feeding study preferred);

- NOAEL or LOAEL identifiable; and
- Effects of potential "ecological significance" evaluated (e.g., lethality and reproductive effects).

Primary considerations in the TRV selection process include study species, study duration, effect level, and toxicological endpoint. The following paragraphs present the considerations that were used in the study and dose selection process.

Studies using the site-specific target wildlife species were sought preferentially. However, toxicological data for the target wildlife species were often unavailable. Therefore, studies were chosen that, to the extent possible, used species related to the target species and that had similar diets and digestive systems.

Suitable chronic exposure studies were given preference over acute studies. Chronic exposure represents the extended exposure of an organism to a chemical, generally greater than one-tenth of the typical life span of the species. Acute exposure represents either an instantaneous single-dose exposure or a continuous exposure of minutes to a few days duration.

Endpoints that could directly affect the target species at the population level were given preference (e.g., reproductive effects and mortality of adults or offspring). The next preference was given to serious histopathological effects (e.g., necrosis or damage to liver, kidney, or brain) that alter primary body functions. In the absence of preferred data, consideration was given to effects such as alterations in biochemical functions of an organ or alterations in normal behavior that could be correlated with decreased survivability. Other effects such as altered body weight, decreased liver size, and changes in blood chemistry are not readily associated with decreased survivability or longevity and were used only in the absence of the preferred toxicity data.

Best professional judgment was used to select the most appropriate studies, doses, and endpoints for use in TRV development. To develop chronic NOAEL- and chronic LOAEL-based TRVs, uncertainty factors (UFs) presented in *Standard Practice for Wildlife Reference Values Technical Guide No. 254* (USACHPPM, 2000) was applied as noted below to account for studies of less than chronic duration.

Type of Data Available	UF to Approximate a Chronic-based TRV
Subchronic	10
Acute	30
LC_{50} or LD_{50}	100 for NOAEL and 20 for LOAEL

If the NOAEL or LOAEL is unbounded, then it was assumed that the chronic LOAEL is 5 times the chronic NOAEL; and in the opposite circumstance, the chronic NOAEL was assumed to be 5 times less than the chronic LOAEL (USACHPPM, 2000).

Body scaling factors were not used to account for intertaxon variability between test species and the target receptor species. The values selected are considered conservative but for the most part realistic. The degree of conservatism built into the TRVs likely protects a range of potential wildlife receptors. Tables 6-25 and 6-26 present the avian and mammalian TRVs, respectively.

6.2.2.2.3 Risk Characterization

The risk characterization discusses the likelihood that floral and faunal populations inhabiting the LO-58 Site may be affected by potential exposure to chemical stressors (i.e., COPECs) in soil. The risk evaluation integrates information presented in the exposure assessment and effects (i.e., stressor/response profile) evaluation to estimate the potential ecological risk.

The risk characterization consists of two technical elements: risk estimation and risk description. Risk estimation integrates exposure and stressor-response information from the exposure and effects evaluations and estimates the likelihood of adverse effects for each of the assessment endpoints of concern. Moreover, a discussion of the uncertainty inherent in the screening level process and the benchmarks used for analysis, effect of background levels on risks, and the ecological significance of the results of this analysis is presented. Note that “ecological significance” indicates that adverse population effects are potentially occurring for the evaluated endpoint.

RISK ESTIMATION

In this screening assessment, risks were estimated by comparing single-point estimates of exposure (i.e., a concentration or dose) with effects levels (TRVs).

HQs were developed to determine potential effects to target receptors from exposure to COPECs in soil and prey items. The HQ approach used for this evaluation simplifies the comparison process and allows for a more standardized interpretation of the results. I.e., the HQ reflects the magnitude by which the sample concentration or dose exceeds or is less than the TRV (i.e., soil screening level, ecological benchmark, criterion or estimated dose). In general, if an HQ exceeds 1, the potential for the exposure to elicit an adverse effect is possible. Although the HQ method does not measure risk in terms of likelihood or probability of effects at the individual or population level, it does provide a benchmark for judging potential risk (EPA, 1994b).

HQs were calculated specific to measurement receptor and exposure scenario location (e.g., habitat) evaluated in this SLERA as follows:

$$HQ \quad = \quad EEL/TRV$$

Where:

HQ = Hazard quotient (unitless)

EEL = estimated exposure level (Communities: medium concentration in units of mg COPEC/kg medium; or for dietary exposure to wildlife target receptors: estimated dose in units of mg/kg BW-day)

TRV = toxicity reference value (benchmarks mg COPEC/kg medium; or for dietary exposure to wildlife target receptors: dose in mg/kg BW-day)

In general, NOAEL-based HQs between 1 and 10 are assumed to have no to minimal effects on a population. As standard reasonable uncertainty factor between the NOAEL and LOAEL is a factor of 10, the LOAEL represents the best estimate of the concentration or dose at which an effect may be observed (Sample et al., 1996). Toxicity values such as the LOAEL are estimated for individuals and not reflective of what will be seen across the population. Therefore, for this assessment it is assumed that HQs less than 10 do not indicate population-level effects.

Results

The results of the SLERA for LO-58 are presented for the soil and drainageway soils for each of the ecological communities evaluated (plant, soil invertebrate, bird, and mammal communities) as applicable.

Because the plant community, as well as the soil invertebrate community (for all practicality), are fixed in place (i.e., non-mobile), the potential risk to these communities is evaluated for each of the locations from which samples were collected. Table 6-27 presents an analysis of the potential location-specific phytotoxicity by describing the frequency of exceedance (FOE) for each chemical, i.e., the number of samples for which there were exceedances of the chemical specific phytotoxicity benchmark relative to the total number of samples collected in that study area. Individual HQs are presented in Appendix D.2. For example, the FOE for the phytotoxicity of aluminum in the Launcher Area is 13/13 which indicates that 13 of a total of 13 samples exceeded the phytotoxicity threshold for aluminum. To provide a sense of the magnitude of phytotoxic risk for each chemical, Table 6-27 also provides the extent to which the exceedances fall into one of three categories, i.e., HQ ≥ 1 and <10; HQ ≥ 10 and < 100; and HQ ≥ 100. Table 6-28 provides a similar summary for the invertebrate community and Appendix D.3 provides the individual sample by sample results.

The results of the individual community assessments are discussed below.

Plant Community

<u>Site Soils</u>

Table 6-27 presents the phytotoxicity HQs for all COPECs in site soils. Chemicals detected in site soils at concentrations shown to exhibit phytotoxicity include High Molecular Weight PAHs, aluminum, antimony, barium, beryllium, chromium, cobalt, manganese, mercury, nickel, selenium, thallium, and vanadium. For this assessment, it was assumed that chemicals exhibiting soil concentrations that exceed phytotoxicity threshold concentrations by ten-fold or more (i.e., HQ ≥10) can be more reasonably expected to exhibit phytotoxicity at the Site (Table 6-27).

In general, NOAEL-based HQs between 1 and 10 are assumed to have no to minimal effects on a population. As standard reasonable uncertainty factor between the NOAEL and LOAEL is a factor of 10, the LOAEL represents the best estimate of the concentration or dose at which an effect may be observed (Sample et al., 1996). Toxicity values such as the LOAEL are estimated for individuals and not reflective of what will be seen across the population. Therefore, for this assessment it is assumed that HQs less than 10 do not indicate population-level effects.

COPECs exhibiting soil concentrations that exceeded phytotoxicity threshold concentrations by ten-fold or more include:

- aluminum – all 16 sample concentrations were ten-fold or higher;
- barium – 2 of 3 samples around the AMAC Building and 3 of 10 samples in the Launcher area;
- beryllium – 2 of 3 samples around the AMAC Building;
- chromium – all samples;
- thallium – 1 of 1 sample in the Launcher area; and
- vanadium – 3 of 3 samples around the AMAC Building and 11 of 13 samples in the Launcher area.

Note however, that the conclusions of any HQ analysis must be tempered with an understanding of the uncertainty inherent in a screening assessment. For example, although aluminum, barium, chromium, and vanadium are identified as the primary contributors to potential impact to the vegetative community, these findings can be attributed largely to the use of very conservative ecological screening values.

The uncertainty associated with the available toxicity benchmarks for the COPECs is discussed in Section 6.2.2.2.4.

Drainageway Soils

Table 6-27 presents the phytotoxicity HQs for all COPECs in drainageway soils. Chemicals detected in drainageway soils at concentrations shown to exhibit phytotoxicity include High Molecular Weight PAHs, aluminum, antimony, arsenic, barium, beryllium, chromium, copper, manganese, selenium, and vanadium. For this assessment, it was assumed that chemicals exhibiting soil concentrations that exceed phytotoxicity threshold concentrations by ten-fold or more (i.e., HQ ≥10) can be more reasonably expected to exhibit phytotoxicity at the Site (Table 6-27).

In general, NOAEL-based HQs between 1 and 10 are assumed to have no to minimal effects on a population. As standard reasonable uncertainty factor between the NOAEL and LOAEL is a factor of 10, the LOAEL represents the best estimate of the concentration or dose at which an effect may be observed (Sample et al., 1996). Toxicity values such as the LOAEL are estimated for individuals and not reflective of what will be seen across the population. Therefore, for this assessment it is assumed that HQs less than 10 do not indicate population-level effects.

COPECs exhibiting soil concentrations that exceeded phytotoxicity threshold concentrations by ten-fold or more include:

- aluminum – all samples;
- barium – all samples;
- chromium – all samples; and
- vanadium – all samples.

Note however, that the conclusions of any HQ analysis must be tempered with an understanding of the uncertainty inherent in a screening assessment. For example, although aluminum, barium, chromium, and vanadium are identified as the primary contributors to potential impact to the vegetative community, these findings can be attributed largely to the use of very conservative ecological screening values.

The uncertainty associated with the available toxicity benchmarks for the COPECs is discussed in Section 6.2.2.2.4.

Soil Invertebrate Community

Site Soils

Table 6-28 presents the soil invertebrate toxicity HQs for all COPECs in site soils. Chemicals detected in site soils at concentrations shown to exhibit soil invertebrate toxicity include acetone, carbon disulfide, aluminum, arsenic, chromium, iron, manganese, and vanadium. For this assessment, it was assumed that chemicals exhibiting soil concentrations that exceed soil invertebrate toxicity threshold concentrations by ten-fold or more (i.e., HQ ≥10) can be more reasonably expected to exhibit soil invertebrate toxicity at the Site (Table 6-28).

In general, NOAEL-based HQs between 1 and 10 are assumed to have no to minimal effects on a population. As standard reasonable uncertainty factor between the NOAEL and LOAEL is a factor of 10, the LOAEL represents the best estimate of the concentration or dose at which an effect may be observed (Sample et al., 1996). Toxicity values such as the LOAEL are estimated for individuals and not reflective of what will be seen across the population. Therefore, for this assessment it is assumed that HQs less than 10 do not indicate population-level effects.

COPECs exhibiting soil concentrations that exceeded soil invertebrate toxicity threshold concentrations by ten-fold or more include:

- acetone – 3 of 3 samples around the AMAC Building and 12 of 13 samples in the Launcher area;
- carbon disulfide – 2 of 4 samples in the Launcher area;
- aluminum – all samples;
- arsenic – all samples;
- chromium – all samples; and
- iron – all samples.

Note however, that the conclusions of any HQ analysis must be tempered with an understanding of the uncertainty inherent in a screening assessment. For example, although acetone, aluminum, arsenic, chromium, and iron are identified as the primary contributors to potential impact the soil invertebrate community, these findings can be attributed largely to the use of very conservative ecological screening values.

The uncertainty associated with the available toxicity benchmarks for the COPECs is discussed in Section 6.2.2.2.4.

Drainageway Soils

Table 6-28 presents the soil invertebrate toxicity HQs for all COPECs in drainageway soils. Chemicals detected in site soils at concentrations shown to exhibit soil invertebrate toxicity include 2-hexanone, acetone, carbon disulfide, aluminum, arsenic, chromium, iron, manganese, vanadium, and zinc. For this assessment, it was assumed that chemicals exhibiting soil concentrations that exceed soil invertebrate toxicity threshold concentrations by ten-fold or more (i.e., HQ ≥10) can be more reasonably expected to exhibit soil invertebrate toxicity at the Site (Table 6-28).

In general, NOAEL-based HQs between 1 and 10 are assumed to have no to minimal effects on a population. As standard reasonable uncertainty factor between the NOAEL and LOAEL is a factor of 10, the LOAEL represents the best estimate of the concentration or dose at which an effect may be observed (Sample et al., 1996). Toxicity values such as the LOAEL are estimated for individuals and not reflective of what will be seen across the population. Therefore, for this assessment it is assumed that HQs less than 10 do not indicate population-level effects.

COPECs exhibiting soil concentrations that exceeded soil invertebrate toxicity threshold concentrations by ten-fold or more include:

- acetone – all samples;
- aluminum – all samples;
- arsenic – all samples;
- chromium – all samples; and
- iron – all samples.

Note however, that the conclusions of any HQ analysis must be tempered with an understanding of the uncertainty inherent in a screening assessment. For example, although acetone, aluminum, arsenic, chromium, and iron are identified as the primary contributors to potential impact the soil invertebrate community, these findings can be attributed largely to the use of very conservative ecological screening values.

The uncertainty associated with the available toxicity benchmarks for the COPECs is discussed in Section 6.2.2.2.4.

Avian and Mammalian Communities

Avian and mammalian receptors were assessed by comparing daily doses of COPECs ingested from the diet and incidental soil ingestion with NOAEL- and LOAEL-based TRVs. Again, NOAEL-based TRV represents the **highest dose at which there are not** biologically significant increases in the frequency or severity of an adverse effect; whereas the LOAEL-based TRV represents the **lowest dose at which there are** biologically significant increases in frequency or severity of an adverse effect. Food chain modeling was done for both RME (worst-case) and CTE (more realistic) scenarios. The most to least conservative of these combinations of exposures and doses is as follows:

- RME scenario, NOAEL-based TRV.
- RME scenario, LOAEL-based TRV or CTE scenario, NOAEL-based TRV (which is more conservative depends upon the relative difference between the RME/CTE EPCs and NOAEL/LOAEL TRV).
- CTE, LOAEL-based TRV.

Both the NOAEL and LOAEL values are appropriate for use in a SLERA; although if only one were to be used, it would be the more conservative NOAEL value. RME and CTE usage are analogous in that both are appropriate to use; although if only one were to be used, it would be the more conservative RME. Because there can be difficulty in drawing conclusions as to whether to proceed to a BERA when only the RME scenario, NOAEL-based TRV (i.e., worst-case unbounded) combination is used, all four combinations are presented herein.

Site

Tables 6-29 through 6-32 present the NOAEL- and LOAEL-based HQs developed for wildlife receptors for the RME and CTE scenarios. Dietary exposures of avian and mammalian receptors to COPECs resulting in NOAEL- and LOAEL-based HQs greater than one for the RME scenario are as follows:

COPEC	NOAEL-Based	LOAEL-Based
Aluminum	Song sparrow (HQ of 16) American robin (HQ of 1.5) Deer mouse (HQ of 54) Short-tailed shrew (HQ of 30)	Song sparrow (HQ of 3.2) Deer mouse (HQ of 11) Short-tailed shrew (HQ of 6.0)
Chromium	Song sparrow (HQ of 7.1) American robin (HQ of 2.6)	Song sparrow (HQ of 1.3)
Copper	Song sparrow (HQ of 1.4)	No exceedances
Iron	Deer mouse (HQ of 120) Short-tailed shrew (HQ of 62)	Deer mouse (HQ of 12) Short-tailed shrew (HQ of 6.2)
Lead	Song sparrow (HQ of 14) American robin (HQ of 7.1)	Song sparrow (HQ of 7.2) American robin (HQ of 3.5)
Selenium	Deer mouse (HQ of 16) Short-tailed shrew (HQ of 18)	Deer mouse (HQ of 8) Short-tailed shrew (HQ of 9.1)
Thallium	Short-tailed shrew (HQ of 1.8)	No exceedances
Zinc	Short-tailed shrew (HQ of 1.2)	No exceedances

Dietary exposures of avian and mammalian receptors to COPECs resulting in NOAEL- and LOAEL-based HQs greater than one for the CTE scenario (Tables 6-29 through 6-32) are as follows:

COPEC	NOAEL-Based	LOAEL-Based
Aluminum	Song sparrow (HQ of 15) American robin (HQ of 1.4) Deer mouse (HQ of 50) Short-tailed shrew (HQ of 28)	Song sparrow (HQ of 2.9) Deer mouse (HQ of 9.9) Short-tailed shrew (HQ of 5.5)
Chromium	Song sparrow (HQ of 6.4) American robin (HQ of 2.4)	Song sparrow (HQ of 1.2)
Copper	Song sparrow (HQ of 1.2)	No exceedances
Iron	Deer mouse (HQ of 110) Short-tailed shrew (HQ of 58)	Deer mouse (HQ of 11) Short-tailed shrew (HQ of 5.8)
Lead	Song sparrow (HQ of 13) American robin (HQ of 6.4)	Song sparrow (HQ of 6.4) American robin (HQ of 3.2)

COPEC	NOAEL-Based	LOAEL-Based
Selenium	Deer mouse (HQ of 16) Short-tailed shrew (HQ of 18)	Deer mouse (HQ of 8.0) Short-tailed shrew (HQ of 9.1)
Thallium	Short-tailed shrew (HQ of 1.8)	No exceedances

6.2.2.2.4 Refined SLERA

All media contain ambient levels of chemical constituents associated with numerous natural and anthropogenic sources. As this SLERA attempts to define the risk to the receptors inhabiting and/or foraging within the potential area of influence of the LO-58 site, the effect of non-site-related, ambient levels needs to be considered. As such, risks associated with site-specific background concentrations are presented below, followed by an incremental risk analysis, and a comparison between site concentrations and background concentrations (site-specific and regional).

BACKGROUND RISK ESTIMATES

Phytotoxicity

Analyte	FOE	Hazard Quotient		
		>=1 and <10	>=10 and <100	>= 100
High Molecular Weight PAHs	0/3	---	---	---
Aluminum	3/3	---	---	3
Antimony	3/3	3	---	---
Arsenic	1/3	1	---	---
Barium	3/3	---	3	---
Beryllium	3/3	3	---	---
Chromium	3/3	---	---	3
Cobalt	1/3	1	---	---
Copper	3/3	3	---	---
Manganese	3/3	3	---	---
Mercury	0/3	---	---	---
Nickel	0/3	---	---	---
Selenium	3/3	3	---	---
Vanadium	3/3	---	3	---
Zinc	0/3	---	---	---

Three of three background samples had concentrations exceeding the respective benchmarks by at least 10-fold for aluminum, barium, chromium, and vanadium.

Soil Invertebrates

Analyte	FOE	Hazard Quotient		
		>=1 and <10	>=10 and <100	>= 100
Acetone	3/3	---	3	---
High Molecular Weight PAHs	0/3	---	---	---
Aluminum	3/3	---	3	---
Antimony	0/3	---	---	---
Arsenic	3/3	---	3	---
Barium	0/3	---	---	---
Beryllium	0/3	---	---	---
Chromium	3/3	---	---	3
Cobalt	0/3	---	---	---
Copper	1/3	1	---	---
Iron	3/3	---	---	3
Manganese	3/3	3	---	---
Mercury	0/3	---	---	---
Nickel	0/3	---	---	---
Selenium	0/3	---	---	---
Vanadium	3/3	3	---	---
Zinc	0/3	---	---	---

Three of three background samples had concentrations exceeding the respective benchmarks by at least 10-fold for acetone, aluminum, arsenic, chromium, and iron.

Food Chain Modeling

Background exposure point concentrations (EPCs) and estimated daily intakes (EDIs) were calculated using the same methodology as the site EPCs and EDIs and are found in Tables 6-33 through 6-37.

Tables 6-38 through 6-41 present the NOAEL- and LOAEL-based HQs developed for wildlife receptors for the RME and CTE scenarios. Dietary exposures of avian and mammalian receptors to COPECs resulting in NOAEL- and LOAEL-based HQs greater than one for the RME scenario are as follows:

COPEC	NOAEL-Based	LOAEL-Based
Aluminum	Song sparrow (HQ of 15) American robin (HQ of 1.4) Deer mouse (HQ of 50) Short-tailed shrew (HQ of 28)	Song sparrow (HQ of 2.9) Deer mouse (HQ of 10) Short-tailed shrew (HQ of 5.6)
Antimony	Short-tailed shrew (HQ of 1.3)	No exceedances
Chromium	Song sparrow (HQ of 7.0) American robin (HQ of 2.6)	Song sparrow (HQ of 1.3)
Copper	Song sparrow (HQ of 2.7) American robin (HQ of 1.4)	No exceedances
Iron	Deer mouse (HQ of 110) Short-tailed shrew (HQ of 55)	Deer mouse (HQ of 11) Short-tailed shrew (HQ of 5.5)
Lead	Song sparrow (HQ of 19) American robin (HQ of 9.0)	Song sparrow (HQ of 9.6) American robin (HQ of 4.5)
Selenium	Deer mouse (HQ of 16) Short-tailed shrew (HQ of 19)	Deer mouse (HQ of 8.2) Short-tailed shrew (HQ of 9.2)
Zinc	Short-tailed shrew (HQ of 1.2)	No exceedances

Dietary exposures of avian and mammalian receptors to COPECs resulting in NOAEL- and LOAEL-based HQs greater than one for the CTE scenario (Tables 6-38 through 6-41) are as follows:

COPEC	NOAEL-Based	LOAEL-Based
Aluminum	Song sparrow (HQ of 14) American robin (HQ of 1.4) Deer mouse (HQ of 49) Short-tailed shrew (HQ of 27)	Song sparrow (HQ of 2.8) Deer mouse (HQ of 9.7) Short-tailed shrew (HQ of 5.4)
Antimony	Short-tailed shrew (HQ of 1.1)	No exceedances
Chromium	Song sparrow (HQ of 6.8) American robin (HQ of 2.5)	Song sparrow (HQ of 1.2)
Copper	Song sparrow (HQ of 2.6) American robin (HQ of 1.3)	No exceedances
Iron	Deer mouse (HQ of 110) Short-tailed shrew (HQ of 53)	Deer mouse (HQ of 11) Short-tailed shrew (HQ of 5.3)
Lead	Song sparrow (HQ of 18) American robin (HQ of 8.4)	Song sparrow (HQ of 8.8) American robin (HQ of 4.2)
Selenium	Deer mouse (HQ of 15) Short-tailed shrew (HQ of 18)	Deer mouse (HQ of 7.7) Short-tailed shrew (HQ of 8.8)
Zinc	Short-tailed shrew (HQ of 1.2)	No exceedances

INCREMENTAL RISK ANALYSIS

Potential risk to COPECs derived from site-related activities should be differentiated from risks associated with local reference (background) conditions. This objective is achieved by calculating the Incremental Risk (IR) for each inorganic COPEC using the HQ method, as follows:

$$IR_i = \text{site } HQ_i - \text{background } HQ_i$$

Where: HQ is the hazard quotient for COPEC i.

Background risk exceeded site risk if the IR for a particular COPEC was negative. If the IR was above 1.0, then the site risk exceeded background and the incremental risk is high enough to suggest the potential for site-related risk. IR was only calculated for ecological receptors where the site-related HQ exceeded 1.0. For this assessment, incremental risks are considered crucial for determining site-specific food chain modeling risks.

Plants and soil invertebrates are sessile or have a very limited radius of travel; therefore, phytotoxicity and soil invertebrate toxicity are location-specific. Because of the inability to assign one background concentration statistic that would be able to capture the variability of individual metals concentrations for comparison to individual sample locations, incremental risks are not calculated for phytotoxicity and soil invertebrate toxicity. This is opposed to birds and mammals, which are exposed over a larger range and an area-specific exposure point concentration can be calculated.

Tables 6-42 through 6-45 present the incremental RME NOAEL- and LOAEL-based HQs developed for wildlife receptors in the transition zone. Dietary exposures of avian and mammalian receptors to COPECs resulting in NOAEL- and LOAEL-based incremental HQs greater than one for the RME scenario are as follows:

COPEC	NOAEL-Based	LOAEL-Based
Aluminum	Song sparrow (HQ of 1.1) Deer mouse (HQ of 3.6) Short-tailed shrew (HQ of 2.0)	No exceedances

COPEC	NOAEL-Based	LOAEL-Based
Iron	Deer mouse (HQ of 15) Short-tailed shrew (HQ of 7.3)	Deer mouse (HQ of 1.5)
Thallium	Short-tailed shrew (HQ of 1.8)	No exceedances

Dietary exposures of avian and mammalian receptors resulting in NOAEL- and LOAEL-based incremental HQs greater than one for the CTE scenario (Tables 6-42 through 6-45) are as follows:

COPEC	NOAEL-Based	LOAEL-Based
Iron	Deer mouse (HQ of 8.9) Short-tailed shrew (HQ of 4.5)	No exceedances
Thallium	Short-tailed shrew (HQ of 1.8)	No exceedances

COMPARISONS BETWEEN SITE AND BACKGROUND CONCENTRATIONS

Certain metals detected in the on-site media are naturally occurring. Comparisons to background concentrations are useful in determining the degree to which the on-site metals concentrations are similar to naturally occurring levels. Background comparisons were limited to metals only. Because few site-specific background values were available, robust statistical comparisons could not be made between background and the Site.

Instead, maximum detected site metal concentrations were compared with the maximum detected site-specific background concentrations. Maximum site metal concentrations were also compared with Maine soil background levels (based on 90% UPLs) provided in the *Summary Report for Evaluation of Concentrations of Polycyclic Aromatic Hydrocarbons (PAHs) and Metals in Background Soils in Maine* (AMEC, 2012) and MEDEP's *Proposed Revisions to the Maine Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances* (MEDEP, 2016). Because of the various exposure areas and receptors, background comparisons had to be made for three different site datasets:

1) Dataset from which EPCs for avian and mammalian exposures were calculated – Site includes the 17 surface soil samples plus one site drainageway sample. Background included two soil datasets: regional as described above and the three site-specific background samples.

2) Soil data set for which sample by sample comparisons to phytotoxicity and soil invertebrate toxicity were made – Site includes the 17 surface soil samples surrounding the AMAC Building or within the Launcher area. Background included three soil datasets: regional as described above and the three site-specific background samples.

3) Drainageway soil dataset – Includes the two downstream drainageway samples (one onsite and one off-site). Note that the regional background data were not used in this comparison as it is not known how relevant those data would be to the drainageway. The background data were from the one upgradient drainageway sample. This sample is questionable for use as background because the sample is heavily influenced by runoff from the VFW parking lot and upstream properties and seems to have a higher contaminant load (particularly of phthalates, PAHs, PCBs, and some metals) than the downstream (both on- and off-site) samples.

Sample IDs associated with each site dataset are presented in the table below.

	Included in Site Dataset for Background Comparison?		
Sample ID	**EPC**	**Soil**	**Drainageway Soil**
LO58-SB01-0002	Yes	Yes	No
LO58-SB02-0002	Yes	Yes	No
LO58-SB03-0002	Yes	Yes	No
LO58-SB04-0002	Yes	Yes	No
LO58-SB05-0002	Yes	Yes	No
LO58-SB06-0002	Yes	Yes	No
LO58-SB07-0002	Yes	Yes	No
LO58-SB08-0001	Yes	Yes	No
LO58-SB09-0002	Yes	Yes	No
LO58-SB10-0002	Yes	Yes	No
LO58-SB11-0001	Yes	Yes	No
LO58-SB12-0001	Yes	Yes	No
LO58-SB13-0002	Yes	Yes	No
LO58-SB14-0001	Yes	Yes	No
LO58-SB15-0001	Yes	Yes	No
LO58-SS01-100212	Yes	Yes	No
LO58-SS02-100212	Yes	Yes	No
LO58-SD01-042112	No	No	Yes
LO58-SD01-100712	No	No	No
LO58-SD02-042112	Yes	No	Yes
LO58-SD02-100712	No	No	No
LO58-SD03-042112	No	No	No
LO58-SD03-100712	No	No	No

Note: October sampling of SD01, SD02, and SD03 were for VOCs only.

For the metals potentially indicating ecological risk for avian and mammalian exposures (i.e., dataset is all site soil plus the one site drainageway sample), the following were noted (see Table 6-46).

- Aluminum – Only site-specific background available. Maximum site concentration is greater than available background.
- Chromium – Background data available from both sources. Maximum site concentration is greater than site background, but lower than the regional value.
- Iron – Only site-specific background available. Maximum site concentration is greater than site background.
- Thallium – Only regional value available. Maximum site concentration is less than the regional value.

For the metals potentially indicating ecological risk for phytotoxicity and soil invertebrate toxicity, the following were noted for soil outside the drainageway (see Table 6-47).

- Aluminum – Only site-specific background available. Maximum concentrations near AMAC Building and Launcher area are greater than available background.
- Arsenic – Background data available from both sources. Maximum concentrations near AMAC Building and Launcher area less than background.
- Barium – Background data available from both sources. Maximum concentrations near AMAC Building and Launcher area equal to or less than background.
- Beryllium – Background data available from both sources. Maximum concentrations from both AMAC Building and Launcher areas greater than site background but not the regional value.
- Chromium – Background data available from both sources. One concentration near AMAC Building is greater than site background.
- Iron – Only site-specific background available. Maximum concentrations near AMAC Building and Launcher area greater than available background.
- Thallium – Only regional value available. The detected concentration in the Launcher area is less than the AMEC value.
- Vanadium – Background data available from both sources. Maximum concentrations from both AMAC Building and Launcher areas are less than maximum background values.

For the metals potentially indicating ecological risk for phytotoxicity and soil invertebrate toxicity, the following had site concentrations greater than the concentrations in the one available site-specific upstream drainageway sample that was available for use as background (see Table 6-50).

- Aluminum
- Arsenic
- Barium
- Chromium
- Vanadium

REFINED SLERA SUMMARY

In summary, most potential risks associated with metals are likely attributable to background conditions or input to site from off-site non-site-related sources. Table 6-49 presents a summary of the risks from metals after background concentrations have been considered.

However, when based on only the site-specific samples, the certainty of these conclusions cannot be weighted too heavily as only three upland samples and one drainageway sample were available. As noted previously, the upgradient drainageway sample is questionable for use as background because the sample is heavily influenced by runoff from the VFW parking lot and upstream properties and seems to have a higher contaminant load (particularly of phthalates, PAHs, PCBs, and some metals) than the downstream (both on- and off-site) samples.

Risks may be further reduced by factors discussed in the upcoming uncertainty analysis (Subsection 6.2.2.2.5).

Table 6-46 presents of summary of the modeling-based incremental HQs greater than one and the associated driver pathways. Soil ingestion is a driver pathway for all receptors with incremental HQs greater than one with the exception of the short-tailed shrew thallium HQs. Additionally, soil invertebrate ingestion is a driver for the short-tailed shrew HQ exceedances.

6.2.2.2.5 Risk Description

The risk description summarizes the risk estimates and interprets the significance of the evidence, resulting in a determination of whether the Site is suitable for a finding of no significant impact or requires further evaluation.

COPECs with HQs greater than 1.0 are presented in the table below. Note that the food chain modeling COPECs are based on the RME incremental risk values, which take into consideration the background contribution to risk.

	COPECs Exceeding NOAEL-based Threshold		**COPECs Exceeding LOAEL-based Threshold***	
Assessment/Receptor	**Site**	**Background**	**Site**	**Background**
Food Chain Modeling[a]				
Song Sparrow	Aluminum	---	None	---
American Robin	None	---	None	---
Deer Mouse	Aluminum Iron	---	Iron	---
Short-tailed Shrew	Aluminum Iron Thallium	---	None	---
Upland Soils				
Plants	HMW PAHs			
	Aluminum	Aluminum	Aluminum	Aluminum
	Antimony	Antimony		
		Arsenic		
	Barium	Barium	Barium	Barium
	Beryllium	Beryllium	Beryllium	
	Chromium	Chromium	Chromium	Chromium
	Cobalt	Cobalt		
		Copper		
	Manganese	Manganese		
	Mercury			
	Nickel			
	Selenium	Selenium		
	Thallium		Thallium	
	Vanadium	Vanadium	Vanadium	Vanadium

Assessment/Receptor	COPECs Exceeding NOAEL-based Threshold		COPECs Exceeding LOAEL-based Threshold*	
	Site	Background	Site	Background
Soil Invertebrates	Acetone	Acetone	Acetone	Acetone
	Carbon disulfide		Carbon disulfide	
	Aluminum	Aluminum	Aluminum	Aluminum
	Arsenic	Arsenic	Arsenic	Arsenic
	Chromium	Chromium	Chromium	Chromium
		Copper		
	Iron	Iron	Iron	Iron
	Manganese	Manganese		
	Vanadium	Vanadium		
Drainageway Soils				
Plants	HMW PAHs	HMW PAHs		
	Aluminum	Aluminum	Aluminum	Aluminum
	Antimony			
	Arsenic			
	Barium	Barium	Barium	Barium
	Beryllium	Beryllium		
	Chromium	Chromium	Chromium	Chromium
	Copper			
	Manganese	Manganese		
	Selenium	Selenium		
	Vanadium	Vanadium	Vanadium	Vanadium
Soil Invertebrates	2-Hexanone			
	Acetone	Acetone	Acetone	Acetone
	Carbon disulfide			
	Aluminum	Aluminum	Aluminum	Aluminum
	Arsenic	Arsenic	Arsenic	Arsenic
	Chromium	Chromium	Chromium	Chromium
	Iron	Iron	Iron	Iron
	Manganese	Manganese		
	Vanadium	Vanadium		
	Zinc	Zinc		

--- = Incremental risk not calculated for background.
*For plants and soil invertebrates, it is assumed that a NOAEL-based HQ >10 is the LOAEL-based threshold.

As presented in Subsection 6.2.2.2.5, and summarized below, any potential risks associated with metals are likely attributable to background conditions.

Confidence in the site/upland soils comparisons is moderate even though the site-specific background set was only three data points. All COPECs for which risks were potentially indicated had site concentrations below at least one of the two available background values (i.e., site-specific, regional).

Confidence in the drainageway comparison is lower because only one upgradient sample was available. This sample is heavily influenced by runoff from the VFW parking lot and upstream properties and seems to have a higher contaminant load (particularly of phthalates, PAHs, PCBs, and some metals) than the downstream (both on- and off-site) samples. For drainageway soils, all COPECs had concentrations less than or very similar to the upgradient drainageway concentrations. Because the organic contamination does not seem significant in the downstream samples, the metals with concentrations higher than benchmarks are similar among the upgradient and downgradient samples, and those same metals have similar concentrations in the upland and background soils, it is likely the risks are more reflective of background than site input or of overly conservative toxicity values.

Organics with concentrations greater than the 10-fold NOAEL HQ threshold included acetone and carbon disulfide based on soil invertebrate exposure only. These COPECs are not likely to affect the soil invertebrate populations because of the following.

- For acetone in upland and drainageway soils, a sediment toxicity benchmark was used as a surrogate for a soil invertebrate benchmark. This benchmark is biased low and overestimates risk. In addition, VOC samples were preserved with sodium bisulfate which can interact with humic acids to produce significant concentrations of acetone.
    - For carbon disulfide in upland soils, a sediment toxicity benchmark was used as a surrogate for a soil invertebrate benchmark and confidence in the benchmark is low. Carbon disulfide was detected in fewer than half of the site soil samples; therefore, the number of invertebrates exposed are lower and if toxicity is occurring, likely would not affect the soil invertebrate community onsite as a whole.

Although PAHs exceeded the NOAEL-based threshold, they did not exceed a LOAEL-based threshold. NOAELs are values at which there is no effect; whereas LOAELs are the lowest value at which an effect is observed. In practical application of the actual value where an effect is observed is somewhere between the two values. However, if the site concentrations/exposures are below LOAEL values, the likelihood of observing effects, let alone effects on a sufficient number of individuals to affect the site population, is quite low. Integrating the risk results, the conservative nature of the risk estimate, and the attendant uncertainties, it is our professional judgment that exposure to PAHs at the site will not adversely affect the entities evaluated by the assessment endpoints.

For more detailed results, uncertainty discussions, and an integrated risk conclusion for COPECs greater than the NOAEL-based incremental risk HQ or the LOAEL-based phytotoxicity or soil invertebrate threshold, see Table 6-51. Evidence displayed in this table is used to attempt to determine whether risks are “ecologically significant.” In this context, no significant ecological risk indicates that although the HQs may indicate potential risk, the uncertainties associated with the risk estimate and the consideration of background concentrations together suggest that the risk is overestimated and/or not related to the former Site activities.

6.2.3 Conclusions

At this point, the occasion for the first SMDP has been reached. Based on the results of the SLERA, the site managers and stakeholders must consider what further actions are needed, if any. As presented in the “Risk Description” (Section 6.2.2.2.6, Table 6-51), screening against conservative benchmarks indicated the possibility of some ecological risk. However, a refined SLERA, which included consideration of background conditions, showed no significant Site risk to ecological receptors. Remaining risk after consideration of background conditions is largely due to the use of conservative benchmarks. No ecologically significant site-related risks (i.e., risks from site-specific COPECs that could adversely affect evaluated receptor populations) were identified for exposures to site or drainageway soils. Therefore, further ecological risk evaluation of the site is not recommended.

7. REMEDIAL INVESTIGATION SUMMARY AND CONCLUSIONS

This section provides a summary of the major findings and conclusions of the field investigations, human health risk assessment and screening level ecological risk assessment.

Field Investigation

- Soil, groundwater, soil gas, and indoor air have been impacted by releases of petroleum hydrocarbons and chlorinated solvents related to the historical operations of the LO-58 Nike Site.
- Low levels of these contaminants have been identified in soil samples collected from across the Site.
- Petroleum contamination in groundwater has been identified in MW-05, but differences in sampling methods (peristaltic pumping performed previously, and bladder pumps performed as part of this RI) do not allow for a direct comparison of results over time.
- The presence of petroleum contamination in the area near to MW-05 may be promoting enhanced biological activity in the groundwater samples, thus contributing to the elevated manganese concentrations reported in the well.
- No widespread source of soil contamination by CVOCs has been identified by extensive soil sampling across the Site.
- Two localized sources of CVOCs in soil contamination have been identified at the Site at the locations depicted on Figure 3-3.
- Elevated levels of petroleum compounds and CVOCs have been detected in soil gas beneath the AMAC Building and in indoor air within the AMAC Building.
- Complete exposure pathways to human receptors exist at the Site for CVOCs in indoor air at the AMAC Building.
- Based on the observed concentrations of CVOC in groundwater and in indoor air at the AMAC Building, it does not appear likely that CVOCs present in indoor air originate in groundwater beneath the building but may be related to soils above the water table adjacent to the building.
- CVOCs and petroleum hydrocarbons have been detected in pre-treatment samples collected from the AMAC Building drinking water supply well (DW-01).
- Depth profiling of groundwater entering DW-01 indicates petroleum hydrocarbons and CVOCs infiltrate into the well at multiple depths through fractures observed in the well boring.

- No evidence of site-specific contamination has been identified in the three other sampled drinking water supply wells that are located on downgradient abutting properties (DW-02 at the former Barracks Building, 271 and 241 Van Buren Rd.).

Human Health Risk Assessment

- With the exception of the hypothetical future residential scenario, the soil exposure risk results were either within or below the EPA acceptable cancer risk range and less than an HI of 1.0. The primary contributors to soil risks were benzo(a)pyrene, arsenic and chromium. As mentioned previously in Section 5.1, arsenic soil levels were found to be less than both the site-specific and regional background concentrations and are therefore not likely attributable to site-related activities. Of these contributing COPCs, only chromium was found with a total cancer risk exceeding 1E-05 with a total soil risk of 1.2E-04 (see Table 5-44). As discussed in Section 5.5.1, chromium was conservatively evaluated as hexavalent chromium, which likely overestimates the reasonably anticipated risks due to chromium exposure. Additionally, detected concentrations of chromium in soil were within the range of site and regional background concentrations (see Table 5-4). Therefore, none of the soil COPCs are likely attributable to site-related activities and should not be considered for remedial action.

- As with soil exposure, with the exception of the hypothetical future residential scenario, all of the groundwater exposure risk results were within the EPA acceptable cancer risk range and less than an HI of 1.0. The groundwater risks were primarily driven by several COPCs including 1-methylnaphthalene, benzo(a)pyrene, dibenzo(a,h)anthracene, and chromium with total groundwater risks of 4.7E-05, 1.2E-04, 7.6E-05, and 5.9E-05, respectively (see Table 5-44). Manganese was the only COPC with a total HQ greater than the noncancer benchmark of one (HQs of 1.9 and 3.1 for the adult and child residents, respectively). As noted previously, the AMAC Building drinking water well is filtered, and the exposure for this EU was based on the absence of any water treatment methods. Additionally, chromium levels were likely overestimated based on the assumption of exposure to hexavalent chromium. Chromium soil levels were also within the range of background concentrations and likely not attributable to site-related activities (see Table 5-4). Soil to groundwater migration of chromium is likely not a concern because the background comparison has indicated that it is naturally occurring at the site. Therefore, the primary risk drivers for the residential groundwater scenario are 1-methylnaphthalene, benzo(a)pyrene, dibenz(a,h)anthracene, and manganese.

- The indoor air cancer risks were all within EPA's acceptable cancer risk range for all receptors. TCE slightly exceeded the noncancer benchmark of 1.0 with a total residential HQ of 1.9. As noted in Section 5.5.1, indoor air samples were collected from the AMAC Building Area in areas where the highest contaminant levels were expected to occur. These locations were not in the primary office area where the majority of exposure occurs. Exposure estimates based on these indoor air data combined with conservative exposure parameters likely overestimates indoor air risks. None of the individual COPCs had an indoor air cancer risk in exceedance of 1E-05. TCE was the only COPC with a total HQ greater than one (total HQ of 1.9; see Table 5-44). Therefore, the primary contributor to residential indoor air exposure is TCE.

- Cumulative cancer risks and noncancer HIs across all media for each receptor scenario were all within EPA's acceptable cancer risk range or below the noncancer threshold of 1.0, with the exception of the hypothetical future resident. The cumulative cancer risk (4.9E-04) for the hypothetical future resident slightly exceeded the upper end of EPA's risk range. The hypothetical future resident cumulative noncancer HI (12.1) exceeded the noncancer threshold of 1.0. However, based on the conservatism and uncertainties discussed previously, these risks to the hypothetical future resident are likely overestimated.

Screening Level Ecological Risk Assessment

- During the SLERA process, contaminants of potential ecological concern (COPECs) were identified, the potential for wildlife exposure was evaluated, and a conservative analysis of the consequent ecological risk was conducted. No ecologically significant risks were identified for exposures to site or drainageway soils.

8. REMEDIAL ACTION OBJECTIVES (RAOS)

This section presents the initial steps in the development of remedial alternatives to address the human health risks identified for the Site and to comply with applicable regulations. The process consists of the following steps.

- Identify applicable or relevant and appropriate requirements (ARARs) and non-regulatory guidance or criteria that must be considered in developing remedial action objectives (RAOs).
- Develop RAOs that are protective of human health and the environment and comply with ARARs. This step includes identifying the media of concern and developing RAOs that apply to each medium. The RAOs may specify the contaminants, exposure pathways and receptors, and acceptable contaminant levels for each exposure route.
- Identify Contaminants of Concern (COCs) and develop Preliminary Remediation Goals (PRGs) that permit a range of treatment and containment alternatives.

8.1 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) AND TO-BE-CONSIDERED (TBCS)

Section 300.430(f) of the National Contingency Plan (NCP) requires that on-site remedial actions at CERCLA sites meet ARARs under Federal or State environmental or facility siting laws unless there are grounds for invoking a waiver. A waiver is required if ARARs cannot be achieved. Other Federal and State advisories, criteria, or guidance, as appropriate, are to be considered in formulating the remedial action.

ARARs are promulgated, enforceable Federal and State environmental or public health requirements. ARARs requirements under CERCLA pertain to on-site activities only. There are two categories of requirements: “applicable” and “relevant and appropriate.” These categories are defined below:

- Applicable Requirements – Section 300.5 of the NCP defines applicable requirements as “those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site.”

- Relevant and Appropriate Requirements - Section 300.5 of the NCP defines relevant and appropriate requirements as “those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that, while not ‘applicable’ to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the particular site.”

Requirements promulgated under Federal or State law may be either applicable or relevant and appropriate, but they cannot be both; however, a requirement must be both relevant and appropriate in order for compliance to be required.

In cases where Federal and State ARARs exist, or where two ARARs address the same situation, the more-stringent ARAR is selected.

On-site remedial actions must only comply with the substantive requirements associated with an ARAR, but not the associated administrative requirements.

To-be-considered (TBC) guidelines/values are non-promulgated criteria, advisories, and guidance issued by the Federal or State governments. Along with ARARs, TBCs may be used to develop the interim action limits necessary to protect human health and the environment.

ARARs and TBCs are divided into three categories: chemical-specific, location-specific, and action-specific; these are briefly described in Section 8.1.1 through Section 8.1.3. The evaluation of compliance of remedial alternatives with ARARs is presented in Section 11.

8.1.1 Chemical-Specific ARARs

Chemical-specific ARARs are usually health- or risk-based numerical values, or methodologies used in the determination of numerical values, that establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment. Typically, chemical-specific requirements are set for a single chemical or a closely related group of chemicals.

One chemical-specific ARAR was identified that should be considered during RAO development:

- Federal National Primary Drinking Water Regulations: MCLs as identified in 40 Code of Federal Regulations (CFR) Part 141, Subpart B. These chemical-specific standards are generally applicable to public water systems; however, as per 40 CFR 300.430(e)(2)(i)(B), these standards may be considered relevant and appropriate when used to evaluate groundwater that either is or may be used for drinking purposes.

In addition to the chemical-specific ARARs, several TBC guidance and screening values will be utilized to assist in the RAO development and subsequent remedial action screening:

- Maine Maximum Exposure Guidelines (MEGs);
- 2012 EPA Office of Water Drinking Water Health Advisories (EPA 822-S-12-001);
- EPA Reference Doses (RFDs) and Carcinogen Assessment Group Potency Factors;
- EPA Carcinogenicity Slope Factors (CSFs);
- EPA Regional Screening Levels (RSLs) for Chemical Contamination at Superfund Sites;
- Maine Remedial Action Guidelines (RAGs) for Soil Contaminated with Hazardous Substances (effective as of February 5, 2016); and
- Maine Department of Environmental Protection; Remedial Action Guidelines for Indoor Air Exposure Pathway.

8.1.2 Location-Specific ARARs

Location-specific ARARs relate to the presence of natural or anthropogenic features or resources that are either present at or near the site, have been impacted by releases from the Site, or are invoked because of the conduct of activities solely because they are in specific areas. Typically, the location-specific ARARs are pertinent to (but not limited to):

- Floodplains and water bodies;
- Facility Siting Rules;
- Seismic areas (faults);
- Sensitive ecosystems/habitats;
- Designated wilderness areas, wildlife refuges, or wild/scenic rivers;
- Rare, threatened, or endangered species; and
- Archeological or historical resources.

The LO-58 site is not located within the 100-year floodplain. Additionally, previous investigations have not indicated that the Site is subject to remaining location-specific regulations.

8.1.3 Action-Specific ARARs

Action-specific ARARs are usually technology- or activity-based requirements or limitations on actions taken with respect to hazardous wastes. These requirements are generally focused on actions taken to remediate, handle, treat, transport, or dispose of hazardous wastes. These action-specific requirements may not in themselves determine the remedial alternative; rather, they may indicate how a selected alternative must be implemented.

The Action-Specific ARARs are specific to the activities associated with the various remedial alternatives. Therefore, these will be discussed in more detail in a subsequent section.

8.2 DEVELOPMENT OF RAOS

RAOs consist of media-specific goals for protecting human health and the environment. The RAOs specify the media and contaminants of concern, exposure routes and receptors, and PRGs for each exposure route. By specifying both exposure pathways and PRGs, the RAOs permit the development of a range of alternatives that may achieve protection by reducing exposure to contaminated media.

The following sections present components of the RAO development process: identification of the basis for taking action; principal threats evaluation; identification of media of concern; and identification of RAOs.

8.2.1 Basis for Action

In accordance with "*Rules of Thumb for Superfund Remedy Selection*" (EPA, 1997c), there is a Basis for Action for risk management if:

- Chemical-specific standards - ARARs are exceeded;
- Carcinogenic risk exceeds 1E-04 cancer risk for either current or reasonably anticipated future use;

- The HI exceeds 1 for either current or reasonably anticipated future land use; or
- Site contaminants cause adverse environmental impact.

Soil

No chemical-specific cleanup standards ARARs have been promulgated, to date. Of the soil samples collected during the RI, only one sample reported a petroleum-related compound (benzo(a)pyrene) that was at concentrations in excess of Maine RAGs. Additionally, this compound, when considered cumulatively with arsenic and chromium, also contributes to cancer risk in excess of 1E-04 for future age-adjusted residential use.

Arsenic in soil was reported in excess of the Maine RAGs Background value of 16 mg/kg in only one sample, which was collected from an area well outside of the areas of site activity and classified as a background sample. The arsenic concentrations of these background samples were higher than those detected in samples from the developed portions of the Site. This suggests that the presence and levels of arsenic are not associated with releases from the Site. Refer to the human health risk assessment for a discussion of background conditions. Chromium was reported in each soil sample collected during the RI, with a maximum detection of 61.4 mg/kg. The average chromium concentration in background samples of 33.9 mg/kg is similar to that of the developed portions of the property (33.7 mg/kg), indicating little difference in chromium presence between the two data sets. Additionally, none of the chromium concentrations exceeded the hexavalent chromium Maine RAG value for unrestricted use. Therefore, the excess risk associated with chromium (conservatively considered as hexavalent chromium in the risk assessment) is likely not associated with site-related contamination, but rather with ambient regional chromium levels in soil.

As presented on Table 8-1, the soil contamination detected at the Site may contribute to future excess risk were the Site to be used for future residential development. Of the substances contributing to excess risk, only benzo(a)pyrene may be related to former Site activity (although this may be attributable to background conditions as well). However, when considered individually, benzo(a)pyrene in soil with an estimated risk of 3.9E-06 does not present an excess risk to current or reasonably foreseeable future land use. Thus, based upon these determinations, soil will not be considered a medium requiring remediation at this site.

Groundwater

As summarized on Table 8-1, the calculated excess cancer risks due to exposure to contamination in the AMAC Building Area from drinking water consumption are less than 1E-04. The non-cancer HI for the nervous system associated with residential use exceeds a target HI of 1.0 with total HIs of 1.9 and 3.1 for the adult and child resident, respectively. Note that the calculated risk is based on the results of pre-treatment samples collected from drinking water well DW-01, which supplies potable water to the AMAC Building, and also from the groundwater samples collected from monitoring wells (MW-03 and MW-05) in the vicinity of the AMAC Building.

Excess cumulative cancer risk greater than 1E-04 was calculated under the age-adjusted residential drinking water scenario. This scenario included both drinking water and groundwater samples collected from the entire LO-58 Site. Additionally, a non-cancer HI of 8.3 was calculated and represents a potential adverse effect to the nervous system of a resident exposed to manganese in site groundwater if groundwater were used for drinking water.

Drinking water and groundwater samples collected from DW-01 and monitoring well MW-05 contained chemical concentrations of hazardous substances in excess of EPA MCLs.

There is a Basis for Action to address excess risk associated with groundwater contamination at the LO-58 Site. This is based on:

- The presence of hazardous substances in excess of chemical-specific standards in an active private drinking water supply well and contributing groundwater; and
- Excess cumulative cancer and non-cancer risks associated with reasonably-foreseeable future uses at the Site.

Indoor Air

As presented on Table 8-1, the calculated excess cumulative cancer risk associated with chemical concentrations in indoor air samples do not exceed the upper limit of cancer risk of (e.g., >1E-

04) under the current use scenario (Industrial/Commercial exposure). Additionally, the non-cancer HI associated with this exposure scenario does not exceed the target HI of 1.0.

Similarly, the excess cumulative cancer risk associated with the possible residential future use scenario yielded an excess cumulative cancer risk of 4.2E-05, which is below 1E-04. However, non-cancer health effects to the immune system based principally on the potential exposure of a possible resident to TCE in air was calculated at an HQ=2.4. This is above the acceptable threshold of 1.0. The major contributor to this excess non-cancer HI was TCE.

No chemical-specific standards have been promulgated; however, several screening values have been developed for comparison purposes. The indoor air sample analytical results were compared against the EPA RSLs for residential and industrial scenarios (which in general are lower than the Maine Indoor Air RAGs). The concentrations of naphthalene, chloroform, and TCE in indoor air samples exceeded industrial air RSL screening levels. Several additional substances were detected in ambient air samples at concentrations that exceed their respective residential air RSLs.

There is a Basis for Action to address excess risk associated with indoor air contamination at the LO-58 site. This is based on:

- excess organ-specific non-cancer risk associated with reasonably-foreseeable future uses at the Site.

8.2.2 Principal Threat Evaluation

Principal threat wastes are defined as source materials which are considered to be highly toxic or highly mobile, cannot be reliably contained, and pose a significant threat to humans if exposure were to occur. Examples of source materials include drummed wastes, contaminated soil and debris, NAPLs, and contaminated sediments and sludges. Non-source materials include groundwater, surface water and treatment residuals (EPA, 1991).

Extensive soil sampling has been performed at the Site, which has not identified soil contamination at concentrations indicative of source materials. Therefore, no Principle Threat Wastes have been identified at the Site.

8.2.3 Identification of Media of Concern

The media of concern for the Site were identified based on the results of the RI and associated site-specific human health risk assessment and the risk evaluations of potential exposure to groundwater and indoor air under a possible future residential use scenario. The media of concern for this FS are identified below.

Groundwater

Contaminants detected in bedrock groundwater and drinking water pose unacceptable risks to future Site receptors through drinking water.

Indoor Air

Although cancer and non-cancer risks associated with VOCs detected in sub-slab vapor and indoor air within the AMAC Building do not exceed upper risk thresholds under current use conditions, the risks associated with potential future residential use do exceed upper risk thresholds. Therefore, as possible future residential site use is reasonably foreseeable, soil vapor and indoor air will be considered a media of concern.

8.2.4 Identification of Remedial Action Objectives

Based upon the results of the human health risk assessment, RAOs are required to address human health risks associated with groundwater and indoor air/soil vapor. An ecological risk assessment was also performed; however, an ecological risk was not identified. Therefore, no environmental protection RAO is necessary.

Protection of Human Health Groundwater RAOs:

- Prevent ingestion of water containing contaminants of concern in excess of MCLs (or MEGs for substances with no MCL), a cumulative cancer risk (for all contaminants of concern) in excess of 1E-04, and cumulative target organ-specific non-cancer risk in excess of 1.0.

Protection of Human Health Indoor Air RAOs:

- Prevent exposure to indoor air contaminants of concern in excess of preliminary remediation goals (1E-05 risk-based) that pose cumulative cancer risk greater than 1E-04 (for contaminants of concern) or organ-specific excess non-carcinogenic HIs greater than 1.0.

8.3 CONTAMINANTS OF CONCERN (COCS)

Potential COCs were identified and evaluated based upon the results of the RI Site-Specific Human Health Risk Assessment. Medium-specific COCs that contribute to unacceptable human health risk (either by themselves or via contaminant fate and/or transport), exceed ARARs, or pose potential threats to the environment were selected for further evaluation in this FS.

8.3.1 Potential COCs

Potential groundwater COCs were identified based on the data generated during the 2012 RI and the associated risk assessments. Groundwater contaminants with estimated cancer risks greater than 1E-05 which contribute to cumulative cancer risks in excess of 1E-04, or HIs greater than 1.0, were included as potential groundwater COCs. A cancer risk greater than 1E-05 is selected for individual compounds to account for the possibility that more than one compound is at this risk level and to provide for a factor of safety to insure that the accumulation of these individual risks do not add to a cumulative site-wide risk greater than 1E-04.

Tables 4-1 and 4-2 were introduced earlier and they provide summaries of potential COCs based upon the risk assessments coupled with their respective ARARs and TBC screening values, maximum detected concentrations, and frequency of detections above screening values.

8.3.2 Selection of COCs

Potential COCs are selected as COCs if (listed below in the order of precedence):

- Maximum detected groundwater concentrations for that chemical exceed ARARs (MCLs) or the TBC (Maine RAGs/MEGs);
- Human health cancer risk results exceed 1E-05; or
- Non-cancer HI exceeds 1.0 for any target organ or human health system.

The selection of the COCs is used to facilitate the evaluation and selection of remedial technologies and process options. Chemicals that are not selected as COCs, may still be related to the release of wastes and contaminants at the LO-58 site and contribute to the overall human health risks. The primary COCs are used to represent all contaminants in the FS technology screening process. The selection of remedial technologies to address the COCs is also applicable to other Site contaminants that have similar physical or chemical characteristics.

Tables 4-1 and 4-2 present the potential COCs selected based on the result of the risk screening and evaluation process. The tables also present ARARs, TBCs, estimated maximum cancer risks and HQs, maximum concentrations, and frequency of detections above screening values.

Groundwater COCs

Of the potential COCs summarized in Table 4-1, four substances (TCE, 1-methylnaphthalene, C_9-C_{10} Aromatic Hydrocarbons, and manganese) were identified as COCs that exceeded ARARs (or in the absence of ARARs, exceeded TBCs) or contributed significantly to cancer or non-cancer risk in groundwater.

Indoor Air COCs

Of the potential COCs summarized in Table 4-2, four substances (1,2-dichloroethane, chloroform, naphthalene, and TCE) were identified as COCs in indoor air that contributed significantly to cancer or non-cancer risk.

8.4 PRELIMINARY REMEDIATION GOALS (PRGS)

PRGs are site-specific long-term numerical goals used during analysis of potential remedial alternatives. PRGs should be practical to implement, should comply with established ARARs, and also result in site-related risks that are consistent with the NCP.

According to EPA guidance, once the HHRA has been performed, PRGs should be derived from the site-specific cancer risks and noncancer HQs (EPA, 2012b). Based on the results of the HHRA presented in Section 5, PRGs were calculated using a risk ratio method based on site-specific exposure concentrations, parameters, and dose equations. The ratio between the

TR/THQ and the calculated cancer risk/noncancer HQ due to individual COPCs in a specific medium used is as follows:

EPC/Cancer Risk or Noncancer HQ = PRG/TR or THQ

Rearranging this equation allows for the site-specific calculation of PRGs using the follow equation and assumptions:

PRG = EPC * TR or THQ/ Cancer Risk or Noncancer HQ

Where:

PRG = Groundwater- or indoor air-based preliminary remediation goal (µg/L or µg/m^3)

EPC = COPC- and medium-specific exposure point concentration (µg/L or µg/m^3).

TR = 10^{-5} cancer-based

THQ = 1.0 noncancer-based

Cancer Risk = COPC- and medium-specific cancer risk based on residential exposure.

Noncancer HQ = COPC- and medium-specific hazard quotient based on residential exposure.

Groundwater PRGs

Risk-based groundwater PRGs were developed using the residential drinking water exposure scenario.

PRGs were selected primarily using the MCLs, or in the absence of an MCL a TBC (Maine RAG/MEG) was selected; however, if no MCL was promulgated or TBC established for a particular contaminant, the lower of the 1E-5 excess cancer risk-based value (for carcinogens) and the HQ=1 for non-cancer substances was selected.

These groundwater PRGs are summarized in Table 8-2.

Indoor Air PRGs

Risk-based indoor air PRGs were developed using the residential scenario. These PRGs for indoor air are summarized in Table 8-3.

The selected indoor air PRGs are based on a cancer risk of 1E-05, with the exception of TCE, which was based on the non-cancer HQ.

9. IDENTIFICATION AND SCREENING OF TECHNOLOGIES

This section is focused on the identification and screening of technologies that have the potential to be included in a remedial action alternative that, when assembled, will meet the RAO for the site. Prior to evaluating remedial technologies, the estimated volume and mass of the media of concern must be identified. The volume and mass estimates are provided below in Section 9.1; the identification and screening of technologies is presented in Section 9.2.

9.1 ESTIMATED VOLUMES AND MASS OF CONTAMINATED MEDIA

The area, depth, and volume of contaminated media, as well as the mass of contaminants requiring treatment are important considerations in the development of remedial alternatives and detailed cost evaluations. These values have been estimated for the site using the results of soil and groundwater investigations conducted between the 1980s and 2012. Appendix E.1 provides a summary of the estimates of contaminated volumes and masses used to support this Feasibility Study. Overall, the results of historical sampling by others, and recent sampling by Nobis, indicate relatively low levels of soil contamination at the site. The following resources were evaluated:

- Final Preliminary Site Investigation Report, Preliminary Investigation at the Former Loring AFB Defense Area Nike LO-58 Launch Area, Caribou, Maine (Weston, 2000b);
- Final Conceptual Site Model, Former LO-58 Nike Battery Launch Site, Formerly Used Defense Site (FUDS), Caribou, Aroostook County, Maine (Weston, 2011); and
- Results of field investigations and sampling performed at the Site and presented in this RI/FS.

Contaminated Groundwater

Drinking Water Well DW-01 currently exhibits elevated concentrations of TCE in excess of PRGs. The volume and mass of contamination in groundwater at the Site was estimated utilizing the groundwater sampling results, the estimated capture zone of DW-01 and the soil contamination source zones identified above. Because the primary exposure point to groundwater contamination at the site is through DW-01, the mass of contaminants in groundwater was estimated by evaluating the volume of groundwater within the zone of influence of DW-01. Monitoring well MW-05 also contained concentrations of 1-methylnaphthalene, C_9-C_{10} aromatic hydrocarbons, and manganese above PRGs. The zone of contaminated groundwater also includes the vicinity around monitoring well MW-05.

Contaminated Soil

Although direct exposure to soil does not pose a human health or ecological risk, soil contamination is contributing to groundwater contamination. Thus, the results of soil sampling conducted during Site investigations were used to estimate the mass of VOCs and petroleum hydrocarbons in soil within the capture zone of DW-01.

Soil sampling results indicate that three locations are possible sources of petroleum or VOC contamination to DW-01:

1) In the AMAC Building source area, CVOCs have been detected at SB-34 and B-14. To estimate the limits of this source area, the location of the former septic system was also used as it is likely that historical discharge to the septic system contributed to soil contamination in the area.
2) VOC and petroleum hydrocarbons have been identified in soils at SB-13 and SB-13R.
3) Petroleum hydrocarbons have been identified in the vicinity of SB-45/MW-05.

Figure 3-3 provides the estimated limits of soil VOC source areas of groundwater contamination at SB-13/SB-13R and in the area adjacent to the AMAC Building. These surface areas on the map were used in conjunction with the depth to bedrock in these areas to estimate the volume and mass of contamination in these two areas. For purposes of estimating the volume and mass of contamination in the vicinity of SB-45/MW-05, the limit of the soil source area was estimated by drawing a line through the approximate midpoints between borings with elevated levels of contamination and the nearest surrounding “clean” borings.

Finally, based on an analysis of the TCE concentration in DW-01, it appears likely that there is a source of TCE contamination in the bedrock beneath the water table. It is not possible to develop a detailed estimate of the mass of this material. However, an estimate was made utilizing the mass flux of TCE into DW-01. Estimated values for the volume and mass of site contaminants and contaminated media are presented below. Refer to Appendix E.1 for additional details pertaining to these contaminant mass estimates.

Dissolved Groundwater Contamination (DW-01)
Area = 104,000 ft^2
Approximate Thickness of Contaminated Zone = 33 ft
Volume of Contaminated Groundwater = 3,900,000 gallons
VOC Contaminant Mass Dissolved in Groundwater = 4.3 kilograms (kg)

TCE Source Material (DW-01)
Contaminant Mass Beneath the Water Table = 15 kg

Soil Contamination – AMAC Building Source Area (SB-34)
Area = 8,000 ft^2
Approximate Thickness of Contaminated Zone = 7 ft
Volume of Contaminated Soil = 2,075 cubic yards (cy)
Contaminant Mass in Soil = 0.025 kg

Soil Contamination – Launcher Area Source Area (SB-13 and SB-13R)
Area = 5,500 ft^2
Approximate Thickness of Contaminated Zone = 11.5 ft
Volume of Contaminated Soil = 2,350 cy
Contaminant Mass in Soil = 114 kg

Soil Contamination – MW-05/SB-45 Source Area
Area = 9,000 ft^2
Approximate Thickness of Contaminated Zone = 10 ft
Volume of Contaminated Soil = 3,350 cy
Contaminant Mass in Soil = 49 kg

9.2 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

The technology identification and screening process consists of the identification of general response actions that might be used, which consist of general categories of actions that can address the RAOs. The technology types associated with each general response action are then identified along with the specific process options for those response actions.

Once technology types have been selected, specific process options are evaluated in greater detail in order to identify representative process options that may be selected for the formulation of remedial alternatives. The RI/FS guidance suggests that the evaluation focus on the effectiveness criterion with less of an emphasis on the implementability and relative costs of the technology/process option. A summary of the focus of each of the evaluation criterion is presented below.

- Effectiveness – The effectiveness criterion focuses on the potential success of candidate process options in managing the anticipated volume and mass of contaminants while achieving RAOs, given site-specific constraints. Additionally, the effectiveness criterion considers the potential impacts to human health and the environment during implementation and how proven or reliable the process may be with respect to Site conditions or contaminants.

- Implementability – The implementability criterion consists of the technical and institutional feasibility of applying a candidate process option. The preliminary technology screening eliminates clearly unworkable or ineffective candidate process options based on technical limitations. The implementability evaluation also considers the institutional components such as: the availability of off-site treatment, storage, and disposal facilities, availability of equipment and vendors to implement the technology, and the ability to obtain permits for off-site actions.

- Relative Cost – The relative cost evaluation criterion is not weighed heavily in this screening step. Relative capital and operation and maintenance (O&M) costs are used rather than detailed estimates. The analysis is based upon engineering judgment as to whether the relative costs are “High”, “Medium”, or “Low” when compared with similar process options or other candidate technologies.

The following sections present the identification and screening of general response actions, remedial technologies, and process options that address the three identified media of concern for this FS: groundwater; soil vapor; and indoor air.

9.2.1 Groundwater Remedial Technology Evaluation

In this section, potentially viable remedial technologies and process options are identified and evaluated according to their applicability to the contaminants in groundwater and the Site subsurface conditions, their technical and institutional implementability, and relative cost.

Identification and Screening of Groundwater Technologies and Process Options

The following have been identified as COCs in groundwater at the site: TCE, 1-methylnaphthalene, manganese, and C_9-C_{10} Aromatic Hydrocarbons. Selecting technologies and developing remedial alternatives that address these hazardous substances will address the majority of the human health risks.

Table 9-1 presents the general response actions, remedial technology types, and process options that may be applicable to groundwater contaminants. The general response actions developed for groundwater include:

- No Action;
- Monitored Natural Attenuation;
- Limited Action;
- Containment;
- Collection, Treatment and Discharge; and
- In-Situ Treatment.

Evaluation and Selection of Technologies and Process Options

Table 9-2 presents the screening of the technologies and process options that are potentially applicable for remediation of site groundwater. As a result of the screening evaluation, most technology types and process options were retained with the exception of physical and thermal treatment. These technology types were eliminated largely due to limited effectiveness and implementability of treating groundwater within bedrock.

Technology types and process options that were retained for potential use in the remedial alternatives for groundwater include:

- No Action
- Monitored Natural Attenuation – Physical Processes
    - Advection
    - Dispersion
    - Diffusion
    - Sorption
- Monitored Natural Attenuation – Chemical Processes
    - Hydrolysis
    - Abiotic Reductive Dechlorination
- Monitored Natural Attenuation – Biological Processes
    - Aerobic Biodegradation
    - Anaerobic Biodegradation
- Limited Action – Institutional Controls
    - Deed restrictions, land use restrictions, zoning changes, town ordinances
- Containment – Vertical Barriers

    - Grout Curtain
- Collection Treatment, and Discharge – Collection/Extraction
    - Extraction Wells
- Collection Treatment, and Discharge – Physical Treatment
    - Equalization
    - Dewatering
    - Sedimentation
    - Oil/Water Separation
    - Filtration
    - Reverse Osmosis
    - Air Stripping
    - Carbon Adsorption
- Collection Treatment, and Discharge – Chemical Treatment
    - Ion Exchange
    - Enhanced Oxidation
    - pH Adjustment
    - Flocculation/Precipitation
- Collection Treatment, and Discharge – Discharge
    - Beneficial Re-use/Surface Discharge
    - Direct Discharge to Surface Water
    - Subsurface Discharge
- In situ Treatment – Chemical Treatment
    - Chemical Oxidation
    - Chemical Reduction
    - Nano-Particle Zero Valent Iron
- In situ Treatment – Biological Treatment
    - Enhanced biodegradation – aerobic
    - Enhanced biodegradation – anaerobic

9.2.2 Soil Vapor and Indoor Air Remedial Technology Evaluation

In this section, potentially viable remedial technologies and process options are identified and screened according to their applicability, implementability, and relative cost to prevent vapor intrusion of soil gas contaminants into indoor air.

Identification and Screening of Soil Vapor and Indoor Air Control Technologies and Process Options

The following VOCs have been identified as potential COCs in indoor air at the Site: 1, 2-DCE, chloroform, naphthalene, and TCE. Many similar VOCs and VPH analytes were detected in sub slab soil vapor samples. Table 9-3 presents the general response actions, remedial technology types, and process options that may be applicable to mitigating soil vapor migration to indoor air.

The general response actions developed for soil gas include:

- No Action;
- Monitored Natural Attenuation;
- Limited Action;
- Barriers;
- Collection; and
- Soil Vapor Collection, Treatment, and Discharge.

Evaluation and Selection of Technologies and Process Options

Table 9-4 provides the remedial technology screening of the candidate technologies and process options that are potentially applicable. As a result of the screening evaluation, all of the passive venting and pressurization technologies and monitored natural attenuation were eliminated. The passive venting and pressurization technologies were eliminated mainly due to the fact that these types of technologies are more easily implemented in new construction than in existing buildings. Monitored natural attenuation was eliminated mainly due to the fact it is ineffective without significant reductions in contaminant concentrations in groundwater.

Technology types and process options that were retained for potential use in the remedial alternatives for soil vapor and indoor air include the following.

- Limited Action – Long-term Monitoring
  - Indoor Air, Soil Vapor and Groundwater Monitoring
- Limited Action – Institutional Controls
  - Deed restrictions, land use restrictions, town ordinances
- Barrier – Soil Vapor Barriers
  - Spray Applied Membranes
  - Sealing Vapor Entryways
- Soil Vapor Collection, Treatment, and Discharge – Active Collection/Extraction
  - Active Sub-Slab Depressurization
- Soil Vapor Collection, Treatment, and Discharge – Physical Treatment
  - Carbon Adsorption
  - Zeolite Adsorption
- Soil Vapor Collection, Treatment, and Discharge – Discharge
  - Venting

10. DEVELOPMENT OF REMEDIAL ACTION ALTERNATIVES

This section presents the rationale for the development of remedial alternatives, and a description of the assembly and screening of remedial alternatives.

10.1 RATIONALE FOR DEVELOPMENT OF REMEDIAL ACTION ALTERNATIVES

The development of remedial alternatives consists of identifying statutory, regulatory, and policy considerations; identifying considerations of human health and environmental protection; and assembling the previously identified potential response actions and technologies (Section 9) into remedial action alternatives that address Site contaminants and can achieve the RAOs.

10.1.1 Statutory, Regulatory, and Policy Considerations

Procedures identified in the National Oil and Hazardous Substances Contingency Plan ((NCP) 40 CFR 300.430(e)) and the *Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA, 1994a; EPA, 1988a) were followed during the alternatives development. The NCP encourages developing alternatives that favor treatment technologies to address principal threats, whenever practicable, and alternatives that employ engineering controls to address relatively low long-term threats. Additionally, the NCP suggests developing a range of treatment alternatives, including one or more engineering control alternatives, and the baseline no action alternative. Institutional controls can be used to supplement the engineering controls.

10.1.2 Protection of Human Health Considerations

Complete pathways exist for the volatilization of contaminants into indoor air. In addition, groundwater contaminated with TCE above MCLs is present in DW-01. C_9-C_{10} petroleum hydrocarbons are also present above MEGs in groundwater at the Site. Tables 8-2 and 8-3 identify groundwater and indoor air COCs.

Calculated risks from measured groundwater concentrations exceed a cancer risk of 1E-04 for a future residential scenario. Calculated risks from measured and modeled indoor air concentrations exceed a non-cancer HI of 1 for a future residential scenario. The remedial alternatives presented below have been developed to address the groundwater and vapor intrusion exposure pathways.

10.1.3 Protection of Environment Considerations

Contaminants have been detected in bedrock groundwater at concentrations that exceed Federal MCLs and Maine MEGs. Evaluation of the data leads to the conclusion that past release(s) at the Site and current conditions are causing contaminants to reach the bedrock groundwater beneath the Site. As a result of these release(s) the bedrock aquifer underlying the Site is being degraded.

The nearest surface water body to the Site is Longfellow Brook, located 0.42 miles south of the Site. Because no surface water has been observed during Site investigations (including during periods of heavy rain), no surface water samples have been taken. Thus, because surface water at the Site may appear only sporadically, if at all, it does not appear likely that Site contaminants are migrating to this water body.

The NCP requires that the Feasibility Study evaluate groundwater remediation alternatives that address the restoration of groundwater in the long-term, which in turn is protective of both human health and the environment.

10.2 ASSEMBLY OF ALTERNATIVES

Two types of remedial alternatives were developed to meet the identified RAOs. Groundwater (GW) alternatives were developed to address the contaminated bedrock groundwater at the Site. Vapor Intrusion (VI) alternatives were developed to address the COCs in indoor air, which are currently migrating into the AMAC facility, and could potentially migrate into future buildings at the Site. The GW and VI alternatives developed to meet the RAOs are described in the sections below.

10.2.1 Groundwater Alternatives

Five GW alternatives were developed to provide a range of options to address the contaminated bedrock groundwater. GW1 is a “No Action” alternative which is included for consideration as required by the NCP. GW2 and GW3 are protective of the current and future users of the Site, but do not directly address the bedrock groundwater contamination (Figures 10-1 and 10-2).

GW4 and GW5 directly address the bedrock groundwater contamination (Figures 10-3 and 10-4). The five GW alternatives are identified and described below.

10.2.1.1 Alternative GW1: No Action

Under Alternative GW1, no further action will be taken at the Site. Any reduction in the risk at the Site would occur through natural attenuation processes. Although this alternative does not achieve the RAOs, it is retained as a baseline alternative for comparison in accordance with the NCP and the RI/FS Guidance.

10.2.1.2 Alternative GW2: Limited Action – Continued POE Treatment of DW-01, Institutional Controls, Long-Term Monitoring, and Five-Year Reviews

This alternative includes installation of between two and four new groundwater monitoring wells to monitor possible off-site migration of groundwater towards abutting residences. The two to four new bedrock monitoring wells would be installed in the northwestern and southern portions of the Site. Groundwater monitoring will be performed annually at the property to monitor the COC concentrations, and to evaluate conditions in the environmental media. It is anticipated that annual monitoring would continue for 30 years, although it could end whenever concentrations reach PRGs. Prior to sample collection, a synoptic round of water levels will be collected. Groundwater samples will be collected from an estimated 10 existing monitoring and drinking water wells and new monitoring wells throughout the Site. Samples will be analyzed for VOCs, volatile petroleum hydrocarbons, 1-methylnaphthalene, iron, and manganese.

GW2 consists of:

- Continued POE Treatment of DW-01 – As part of this alternative, the existing point of entry (POE) activated carbon treatment system will continue to be operated, monitored, and maintained to ensure clean drinking water for users and employees of the AMAC Building.
- Institutional Controls – An Environmental Land Use Restriction will be placed on the property which requires the continued operation, maintenance, and monitoring of the DW-01 POE treatment system, and forbids the installation of new drinking water wells on the property in the future. If there is interest in limiting the extent of the Institutional Controls (ICs), subdivision of the current property may be required to

facilitate this restriction. The Maine Uniform Environmental Covenants Act will be complied with when implementing and enforcing this remedial action. The institutional controls will be coordinated with the current land owner, regulatory agencies, and appropriate local authorities, as required.

- Long-term Monitoring – This alternative includes installation of four new groundwater monitoring wells to monitor possible off-site migration of groundwater towards abutting residences. The four new bedrock monitoring wells would be installed in the northwestern and southern portions of the Site. Groundwater monitoring will be performed annually at the property to monitor the COC concentrations, and to evaluate conditions in the environmental media. It is anticipated that annual monitoring would continue for 30 years, although it could end whenever concentrations reach PRGs. Prior to sample collection, a synoptic round of water levels will be collected. Groundwater samples will be collected from an estimated 10 existing monitoring and drinking water wells and four new monitoring wells throughout the Site. Samples will be analyzed for VOCs, volatile petroleum hydrocarbons, 1-methlynaphthalene, iron, and manganese only. As part of the long-term monitoring planning process, analytical methods with greater sensitivity will be investigated to reduce analytical quantitation limits.

- Five-Year Reviews – Contaminants will remain at the Site in bedrock groundwater for an extended period of time after implementation of the alternative. Therefore, a review of Site conditions and risks will be conducted every 5 years, as required by Defense Department policy. The Five-Year Review will include evaluations of potential risks from exposure to VOCs through drinking water and/or vapor intrusion, and will make recommendations for improvements and follow-up actions.

10.2.1.3 GW3: Installation of New Drinking Water Supply Line, Institutional Controls, Long-term Monitoring, and Five-year Reviews

Alternative GW3 utilizes an existing secondary drinking water well on the property (DW-02), and institutional controls to provide protection of human health (see Figure 10-2).

Alternative GW3 consists of the following components:

- Installation of New Drinking Water Supply Line – A new drinking water supply line will be installed connecting DW-02 to the AMAC Building. According to the Preliminary Site Investigation Report, performed for the Site in June 2000, drinking water to the AMAC Building was provided through a service connection to the former Barracks Building drinking water well (DW-02). This service connection froze and was damaged and not repaired. Consequently, a new well was drilled to supply the AMAC Building (DW-01). To verify that the DW-02 well will provide sufficient yield, a 72-hour pumping test will be performed. Based on available data, a replacement line could be buried below the assumed frost line. However, given that the former supply line froze, precautions will be installed, such as additional insulation, heating cables, or similar components, to prevent freezing. The line will need to be monitored and maintained to ensure that it functions properly.

- Institutional Controls – The IC for this alternative is similar as that for GW2 with the addition that an Environmental Land Use Restriction will be placed on the property which requires the continued maintenance of the drinking water supply line from DW-02 to the AMAC Building, and forbids the installation of new drinking water wells on the property in the future.

- Long-term Monitoring – Same as GW2

- Five-year Reviews – Same as GW2

10.2.1.4 GW4: In-Situ Treatment of Bedrock Groundwater, Installation of New Drinking Water Supply Line, Institutional Controls, Long-term Monitoring, and Five-year Reviews

Alternative GW4 uses in-situ treatment of groundwater within the bedrock to restore the bedrock aquifer. Figure 10-3 depicts the proposed treatment areas.

Alternative GW4 consists of the following components:

- Bench Scale/Pilot Testing – Bench scale testing using Site groundwater samples will be performed to select the optimal reducing/oxidizing/biological agent for a field scale pilot test. The field scale pilot test will be performed to ascertain the degree to which reagents can be distributed to targeted areas within the bedrock formation. The results of these tests will then be incorporated into the remedial design. Additionally, groundwater samples collected as part of these tests should investigate methods with higher analytical sensitivity to evaluate contaminants with low risk-threshold concentrations (e.g., 1,4-dioxane and vinyl chloride).

- In-Situ Treatment – In-situ treatment will be performed on groundwater within the bedrock aquifer. Chemical oxidation was selected as the representative chemical treatment process option for pricing purposes. However, the chemical treatment approach utilized in the implementation of this alternative will be selected based on the results of the Pre-Design Investigation (PDI). It is assumed that the chemical amendments will be introduced to the source area by means of vertically drilled injection wells.

- Installation of New Drinking Water Supply Line – Same as GW3

- Institutional Controls – Same as GW3
- Long-term Monitoring – Same as GW2
- Five-year Reviews – Same as GW2

10.2.1.5 GW5: Groundwater Extraction, Treatment, and Discharge, Institutional Controls, Long-term Monitoring, and Five-year Reviews

Alternative GW5 was developed to restore the bedrock aquifer through the removal of contaminated groundwater for ex-situ treatment (see Figure 10-4). This alternative would include utilizing DW-01 to recover contaminated groundwater. The recovered groundwater would be treated and infiltrated into the ground downgradient from the Site.

Alternative GW5 consists of the following components:

- Pre-Design Investigation – Percolation tests will be performed to assess the infiltration rate of Site overburden soils. The results of this test will impact the sizing of the infiltration gallery. It is anticipated that the infiltration gallery would be upgradient from the Site. This information will be used during the remedial design to properly size an infiltration gallery for treated groundwater discharge.
- Groundwater Extraction – Contaminated bedrock groundwater will be pumped from the subsurface using the existing DW-01 supply well. A presumed pumping rate of 5 gallons per minute (gpm) was used in the cost estimate for this alternative. A specific capacity test will be performed to verify that the extraction rate is sustainable. It should be noted that in the event that the well is not sufficiently deep to achieve the 5 gpm extraction rate, the rate will be adjusted. Given the contaminated nature of the well, it is not appropriate to extend the well deeper.
- Ex-Situ Groundwater Treatment – A filtration and activated carbon treatment system (similar to the current POE treatment system for DW-01) will be utilized to treat the contaminated groundwater.
- Treated Groundwater Discharge – Because no city sewer or suitable surface water bodies are located within the vicinity of the Site, a subsurface infiltration gallery will be utilized to discharge the treated groundwater.
- Institutional Controls – Same as GW3
- Long-term Monitoring – Same as GW2

- Five-year Reviews – Same as GW2

10.2.2 Vapor Intrusion Alternatives

Four Vapor Intrusion response action alternatives were developed. VI1 is a No Action alternative, VI2 is a Limited Action alternative which includes only Institutional Controls, and VI3 and VI4 are active alternatives which address the indoor air risks posed to future residential users of the Site from contaminated soil vapors. The four VI alternatives have been developed to achieve the PRGs identified in Table 8-3.

10.2.2.1 Alternative VI1: No Action

Under Alternative VI1, no action will be taken to address the risks posed by indoor air vapor intrusion. Any reduction in the risk to residents or workers will occur through natural attenuation processes. Although this alternative does not achieve the RAOs, it is retained as a baseline alternative for comparison in accordance with the NCP and the RI/FS Guidance.

10.2.2.2 Alternative VI2: Limited Action – Institutional Controls, Long-term Monitoring, and Five-year Reviews

Alternative VI2 involves no active treatment, but provides protection of human health by preventing or controlling potential exposures to contaminated soil vapors through institutional controls.

Alternative VI2 consists of the following components:

- Institutional Controls – An Environmental Land Use Restriction will be placed on the property which restricts future residential use of any current or future Site buildings. The restrictions would include requirements to include a vapor mitigation system in future building designs constructed over the impacted areas identified in Figure 10-5. Subdivision of the current property may be required to facilitate this restriction.
- Long-term Monitoring – Annual indoor air and soil vapor monitoring will be conducted in 10 locations in and around the AMAC Building. These include the five locations that have been sampled during the RI investigations as well as up to five additional locations.

- Five-year Reviews – A review of Site conditions and risks will be conducted every 5 years, as required by CERCLA. The Five-Year Review will include evaluations of the effectiveness of institutional controls imposed at the Site.

10.2.2.3 Alternative VI3: Active Subslab Vapor Mitigation, Institutional Controls, Long-term Monitoring, and Five-year Reviews

Although no excess risk is associated with the current use of the building, without treatment, future residential users of the building would be exposed to risk above CERCLA guidelines. Alternative VI3 uses a subslab vapor mitigation system at the AMAC Building to protect potential future residential users from long term risks associated with inhalation of vapors that have been detected in the indoor air (see Figure 10-6). Horizontal vapor extraction wells will be installed beneath the AMAC Building, and connected to an active vapor mitigation system to vent contaminated soil vapor to the atmosphere.

Alternative VI3 consists of the following components:

- Pre-Design Investigation – A PDI will be performed to further assess the soil contamination in the vicinity of the AMAC Building and to evaluate the conditions of the building slab prior to design of a vapor recovery system. Test pits will be excavated adjacent to the building to inspect the AMAC foundations and footings to the extent they are visible around the perimeter of the building. In addition to observations regarding the condition and nature of the building slab and footings, soil samples will be screened and, if warranted, analyzed for VOCs. Thus, these PDIs will also investigate the possible presence of CVOC contaminated soil in areas adjacent to the AMAC Building. If high concentrations of COCs are detected in PDI samples, a limited soil excavation will be conducted in an attempt to remove source mass. This excavation is presumed to be limited (approximately 20 cubic yards).

  A PDI will also be conducted to evaluate the condition of the foundation beneath the front room of the AMAC Building. This portion of the building is the original generator building and no information is available on the nature of the original building floor. These PDIs will include cutting through the wooden floor and utilizing a flexible borescope television cameras and/or small mobile television cameras beneath the floor to investigate the geometry and condition of the building foundation slab in this area.

- Subslab Vapor Mitigation (VM) System – An active subslab VM system will be installed at the AMAC Building which will intercept contaminated soil vapors prior to entering the building. The vapors will be collected via active vacuum, within horizontal vapor extraction wells installed beneath the building, and then vented to the atmosphere above the roof line. The requirement for vapor treatment would be evaluated based on the results of the PDIs.

- Institutional Controls – An Environmental Land Use Restriction will be placed on the deed for the property to ensure the continued operation of the VM system at the AMAC Building, as well as the construction of new VM systems at any future residential buildings constructed at the Site. Subdivision of the current property may be required to facilitate this restriction.
- Long-Term Maintenance of VM System – VM system will be maintained on an as-needed basis to ensure it remains in good working condition.
- Long-term Monitoring – Same as VI2
- Five-year Reviews – Same as VI2

10.2.2.4 Alternative VI4: Vapor Barrier Installation, Institutional Controls, Long-term Monitoring, and Five-year Reviews

Alternative VI4 uses an impermeable membrane installed on top of the existing floor of the AMAC Building to prevent contaminated soil vapors from entering the building (see Figure 10-7). The barrier would then be covered with a protective wear layer to prevent direct contact with the spray applied barrier.

Alternative VI4 consists of the following components:

- Pre-Design Investigation – Same as VI3
- Vapor Barrier Installation – An impermeable membrane will be installed on top of the existing floor of the AMAC Building to prevent contaminated soil vapors from entering the building. For costing purposes, a spray-applied membrane, such as Liquid Boot® will be assumed. Installation of the membrane will require a complete demolition, removal and reconstruction of the interior flooring.
- Institutional Controls – Same as VI3
- Long-term Monitoring – Same as VI2
- Five-year Reviews – Same as VI2

10.3 SCREENING OF ALTERNATIVES

Screening of alternatives is conducted to eliminate alternatives that do not achieve protection of human health or the environment; are not technically, administratively, or economically feasible; or do not enhance the range of available alternatives. In the alternatives screening process, defined alternatives are evaluated against three broad criteria: effectiveness, implementability, and cost, in accordance with Section 4.0 of the *Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* published in October 1988 (EPA, 1988a). The screening criteria are described below:

Effectiveness – The effectiveness evaluation considers the following:

- Ability to protect human health and the environment in the short-term (i.e., during the construction and implementation period);
- Ability to protect human health and the environment in the long term (i.e., the period after remediation is complete); and
- Reduces the toxicity, mobility, or volume of contaminants through treatment.

Implementability – The implementability evaluation considers the following:

- Technical feasibility – ability to construct, reliably operate, and meet technology-specific regulations for process options until the remedial action is complete. Operation, maintenance, and monitoring of alternatives is also included; and
- Administrative feasibility – ability to obtain the necessary permits for off-site actions and the availability of treatment, storage, and disposal services (including capacity), and availability of necessary equipment and skilled workers to implement the technology.

Cost – The cost evaluation that is performed at this stage of the FS process includes a relative (i.e., low, medium, high) assessment of capital and O&M costs that would be incurred.

The five GW alternatives and four VI alternatives developed and described on the preceding pages were evaluated relative to these criteria. All of the alternatives have been retained. Although they present a range of difficulty regarding implementability, there are no technical feasibility issues with any of the proposed groundwater or vapor intrusion alternatives. There are also no administrative feasibility issues with any of the proposed alternatives.

If they are executed in conjunction with the proposed PDI’s, all of the proposed alternatives would be expected to be effective in meeting the RAOs.

The proposed alternatives present a range of costs to meet the RAOs at the Site. However, none of these alternatives can be screened out on a preliminary estimate of the alternative cost.

11. DETAILED ANALYSIS OF ALTERNATIVES

The remedial alternatives retained from Section 10 are analyzed in detail in this section. The detailed analysis of the alternatives provides information necessary to facilitate the selection of a specific remedy or combination of remedies. The detailed analysis of alternatives was conducted in accordance with the NCP (40 CFR 200.430(e)) and the *Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* published in October 1988 (EPA, 1988a).

11.1 EVALUATION CRITERIA

The NCP requires that remedial alternatives be assessed against nine evaluation criteria, which are categorized as follows.

Threshold Criteria

- **Overall Protection of Human Health and the Environment –** This criterion provides a final check to ensure that the alternative provides adequate protection of human health and the environment.

- **Compliance with ARARs –** This criterion is used to describe how each alternative will meet ARARs, or in cases where an ARAR(s) will not be met, the justification of any waiver shall be detailed.

Primary Balancing Criteria

- **Long-Term Effectiveness and Permanence –** This criterion details the evaluation of the risks remaining after the remedial alternative has been enacted and the response objectives have been achieved. The primary focus of this evaluation is the evaluation of any procedures or controls that manage risks associated with treatment residuals and/or untreated wastes. Specifically, the magnitude of residual risks and the adequacy and reliability of controls for each alternative are examined.

- **Reduction of Toxicity, Mobility, or Volume through Treatment –** This evaluation criterion addresses the statutory preference for selecting remedial alternatives that employ treatment technologies that permanently and significantly reduce the toxicity, mobility, or volume of the hazardous substances.

- **Short-Term Effectiveness –** This criterion requires an evaluation of the impacts to human health (on-site workers and community) and the environment during construction and implementation of the remedial alternatives. Sustainability aspects of the alternatives are also evaluated under this criterion.

- **Implementability –** This criterion requires an evaluation of the technical and administrative implementability of the remedial actions, as well as an evaluation of the relative availability of services and materials. The evaluation of the technical implementability generally includes short-term difficulties in construction and operation, the reliability of the technology, the relative ease of undertaking additional remedial actions, and monitoring considerations.

  Administrative implementability provides an evaluation of the administrative requirements needed to perform the remedy (such as securing rights of way, and permits). The evaluation of the relative availability of services and materials is a determination of the ease of which specialized services, materials, or equipment may be obtained.

- **Cost –** A detailed cost analysis is performed for each alternative to assess the net present worth cost to implement each alternative. The cost analyses include an estimation of the capital costs and annual operations and maintenance costs for the alternative, the development of costs that fall within a -30% to +50% estimation range, and a present worth analysis by discounting to a base year or current year using a 7% discount rate.

Modifying Criteria

- **State Acceptance –** To the extent possible, the remedial alternatives have been assembled to assure compliance with State ARARs, as applicable. Any additional concerns that the State agencies may have will be communicated during the comment period after issuance of the Proposed Plan and taken into account in the ROD.

- **Community Acceptance –** In assembling the remedial alternatives, protection of the community and anticipation of any concerns the community may have associated with the remedies have been taken into account to the extent possible. Any additional comments or suggestions the community may have will be communicated during the comment period after issuance of the Proposed Plan and taken into account in the ROD.

In conformance with the NCP, the seven criteria included in the Threshold Criteria and the Primary Balancing Criteria noted above were used to evaluate each of the retained alternatives presented in Section 10 in the detailed analysis. The last two criteria, State and community acceptance, will be addressed following the public comment period.

11.2 DETAILED ANALYSIS OF ALTERNATIVES

All of the remedial action alternatives developed in Section 9 were retained for detailed analysis. The alternatives were evaluated in regard to the two Threshold Criteria and five Primary

Balancing Criteria identified in Section 11.1. Tables 11-1 and 11-2 present the detailed analyses of the groundwater and vapor intrusion alternatives, respectively.

Additional information regarding the cost estimation and evaluation of ARARs is presented in Sections 11.3 and 11.4.

11.3 COST ESTIMATION

Estimated costs for each remedial alternative are presented on Tables 11-1 and 11-2. The detailed cost estimate assumptions and calculations are presented in Appendix E.1. The detailed cost evaluations were prepared for each alternative in accordance with the *EPA Guide to Developing and Documenting Costs Estimates During the Feasibility Study* (EPA, 2000). The guide states that cost estimates developed for an FS are for comparison purposes, only. In general, the FS stage of the remedial design may represent the 0-10% complete design, and as such, the anticipated accuracy range is -30% to +50%. As the remedial design is developed, the estimation accuracy is expected to be between -10% to +15%.

The cost estimates are prepared based on available information at the FS stage including: the quantities or extent of contamination to be addressed, prices available from standard construction information sources and vendors, and assumptions used to develop the conceptual designs for the remedial alternatives. In addition, the time needed to complete the construction, or to achieve the RAOs is based on best estimates or professional judgment. The cost analyses developed at the FS stage are for order of magnitude and comparative analysis use in the remedy selection process, and do not represent actual costs needed to implement the remedy fully. As additional information becomes available during the pre-design investigation or the remedial design phase, estimated costs will become more refined and accurate.

A present value analysis (PVA) was prepared as part of the cost analysis for each alternative to normalize long-term expenditures to a base year value. The PVA represents the amount of monies that, if set aside at the initial point in time (base year), with outflows (payments) on an as-required basis, would be sufficient to pay for the remedial action over the anticipated duration of the remedy. A discount rate of 7% was used, in accordance with EPA guidance.

In addition to capital and annual operations and maintenance costs, each alternative’s cost estimate includes the following elements:

- Scope and Bid Contingencies that account for uncertainties that could be associated with incomplete site characterization, construction delays due to weather, or unanticipated site conditions;
- Technical services, professional/specialist consulting, and engineering costs as a percentage of capital costs; and
- Administrative fees as a percentage of capital costs.

These costs have been developed based on rule of thumb percentages of total capital costs as identified in *EPA Guide to Developing and Documenting Costs Estimates during the Feasibility Study* (EPA, 2000).

11.4 IDENTIFICATION OF ARARS

Section 121(d)(2)(A) of CERCLA requires Superfund remedial actions meet Federal standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate requirements. State ARARs must be met if they are more stringent than Federal requirements and have been presented to EPA in a timely manner. Only substantive ARARs are included for evaluation; however, it is noted that administrative regulations that are applicable or relevant and appropriate will be complied with, but are not considered ARARs for the purposes of this FS.

Section 121(d)(4) of CERCLA identifies six circumstances under which ARARs may be waived.

1) The remedial action selected is only a part of a total remedial action (interim remedy) and the final remedy will attain the ARAR upon its completion.
2) Compliance with the ARAR will result in a greater risk to human health and the environment than alternative options.
3) Compliance with the ARAR is technically impracticable from an engineering perspective.
4) An alternative remedial action will attain an equivalent standard of performance through the use of another method or approach.

5) A State requirement that the State has not consistently applied (or demonstrated the intent to apply consistently) in similar circumstances.

6) For §104 Superfund-financed remedial actions, compliance with the ARAR will not provide a balance between protecting human health and the environment and the availability of Superfund money for response at other facilities.

Potential ARARs were identified for each of the remedial alternatives retained for detailed analysis. Each potential ARAR was reviewed to evaluate the applicability or relevancy and appropriateness according to the procedures identified in *Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (OSWER Directive 9355.3-01, EPA 1988), and the *CERCLA Compliance with Other Laws Manual*, *Part 1 and Part 2* (EPA, 1989c). Evaluations of each alternative's ability to comply with ARARs are presented in Tables 11-3 and 11-4.

12. COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

This section describes comparative analysis approach and presents the results of the comparative analysis of remedial alternatives that were evaluated individually in Section 11.

12.1 COMPARATIVE ANALYSIS APPROACH

The comparative analysis compares the relative performance of each alternative to the evaluation criteria specified in the NCP and described in Section 11. This comparison assists in the selection of a remedy for the Site by identifying the advantages and disadvantages of each alternative relative to the NCP evaluation criteria.

The approach to evaluating each alternative is specified in the NCP and further detailed in *Interim-Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA, October 1988). The selection of the preferred remedy must consider the major tradeoffs among the evaluation criteria. The NCP groups the evaluation criteria as described in Section 11 (Threshold Criteria, Primary Balancing Criteria, and Modifying Criteria).

12.2 COMPARATIVE ANALYSIS

The subsections below present the comparative analysis of remedial alternatives relative to each of the two Threshold and five Primary Balancing criteria. As discussed previously, the Modifying Criteria (State and community acceptance), will be addressed following the public comment period. Table 12-1 provides a summary of the comparative analysis results.

12.2.1 Overall Protection of Human Health and the Environment

12.2.1.1 Groundwater Alternatives

With the exception of GW1, all of the proposed alternatives would be protective of human health. Alternative GW1 provides the least amount of protection of human health and the environment because no actions will be taken to reduce the ongoing risks posed by groundwater contamination. GW1 will not meet the NCP threshold criterion of protection of human health and the environment.

GW2 will provide protection of human health through the continued operation of the POE system. GW3 will provide protection of human health by connecting the AMAC Building to the supply well DW-02 located outside of the former Barracks Building. For both GW2 and GW3, groundwater quality will not be restored in the near term, but will improve very gradually through source degradation/dissolution and natural attenuation of contaminants in groundwater.

GW4 and GW5 will provide protection of human health by connecting the AMAC Building to the supply well DW-02 located outside of the former Barracks Building. Under GW4, in-situ treatments will destroy CVOCs in the groundwater, which may shorten the estimated time to achieve aquifer restoration. Under GW5, groundwater extraction and treatment will remove organic and inorganic contaminants from groundwater, and will likely shorten the estimated time to achieve aquifer restoration.

12.2.1.2 Vapor Intrusion Alternatives

No excess risk is presented by current property uses so no VI alternatives are required to be protective of human health for the present use of the AMAC Building. However, the potential exists for excess risk to future residential users of the AMAC Building resulting from exposure to indoor air contamination.

Alternative VI1 provides the least amount of protection of human health for potential future residents because no actions will be taken. VI1 will not meet the NCP threshold criterion of protection of human health and the environment. No protection is offered for future occupants of buildings that may be constructed on the Site.

VI2 uses institutional controls to limit potential future exposure to intruded vapors by restricting the AMAC Building’s use to non-residential uses. VI3 and VI4 use active mechanisms and barriers to protect future users of the AMAC Building. VI2, VI3 and VI4 all will use institutional controls to provide for vapor mitigation in future buildings.

12.2.2 Compliance with ARARs

Compliance with ARARs is summarized in Tables 11-3 and 11-4. A comparative evaluation of ARARs compliance is presented below.

12.2.2.1 Groundwater Alternatives

GW1 is not consistent with the Safe Drinking Water Act. GW2 and GW3 are consistent with the Safe Drinking Water Act by providing treatment for active drinking water supplies preventing exposure to contaminated groundwater, but will not contribute significantly to the restoration of the aquifer to MCLs. GW4 and GW5 are consistent with the Safe Drinking Water Act, because they prevent exposure to contaminated groundwater, and provide a means for aquifer restoration.

All other identified ARARs are met by all of the GW alternatives.

12.2.2.2 Vapor Intrusion Alternatives

All of the VI alternatives comply with all of the identified ARARs.

12.2.3 Long-term Effectiveness and Permanence

12.2.3.1 Groundwater Alternatives

GW1 provides the least long-term effectiveness and permanence. Any reduction in risk will be a result of natural attenuation. No controls will be put in place to prevent improper use or exposure to contaminated groundwater. GW2 and GW3 will provide a reduction in risk through continued POE treatment of groundwater, and installation of a new potable water supply line, respectively. Current groundwater cancer and non-cancer risks are 1.2E-05 (for worker scenario) and HI of 0.98, respectively. Under all three of these alternatives, risks are expected to slowly decrease over time through dissolution of source materials and natural attenuation of groundwater contamination.

During implementation of GW4, rerouting the current drinking water system to supply well DW-02 will be necessary. Alternative GW5 provides a reduction of risk by providing treated drinking water. These two alternatives will provide the most long-term effectiveness and permanence for control of exposure to Site COCs; however, the in-situ treatments included in GW4 may not be as effective at mitigating manganese contamination.

12.2.3.2 Vapor Intrusion Alternatives

Exposures to soil vapor associated with current property use do not contribute to excess risks. The long-term effectiveness and permanence of the VI alternatives, as they relate to residual risk from exposure to soil vapor is primarily related to possible future residential use.

VI1 does not eliminate risk in the short or long term. VI2 eliminates risk in the long term through institutional controls requiring VI mitigation systems in future construction.

VI3 and VI4 eliminate risk in both the short and long term. VI3 uses an active subslab vapor recovery system, and VI4 uses a liquid-applied vapor barrier, to prevent exposure to contaminated soil vapors. Risk is eliminated in future use scenarios by institutional controls on future construction.

12.2.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

12.2.4.1 Groundwater Alternatives

Under GW1 and GW3, no active remediation of groundwater will take place which does not satisfy the statutory preference for treatment. However, groundwater contamination will gradually decrease over time through dissolution of source material and natural attenuation of dissolved groundwater contamination.

Alternatives GW2, GW4, and GW5 will satisfy the statutory preference for treatment. The mass, toxicity, mobility, and volume of contamination within the bedrock aquifer will be decreased through in-situ treatment under GW4, and extraction and ex-situ treatment under GW2, and GW5. Both of these treatment technologies are irreversible.

12.2.4.2 Vapor Intrusion Alternatives

Under VI1, VI2, and VI4, no active treatment of soil vapor or indoor air will be performed, which will not satisfy the statutory preference for treatment. Under VI3, soil vapor extraction and atmospheric venting will remove contaminants from the soil vapor beneath the AMAC Building, which will satisfy the statutory preference for treatment. This action will reduce the toxicity and mobility of contaminants, and will be irreversible.

12.2.5 Short-term Effectiveness

12.2.5.1 Groundwater Alternatives

GW1 does not involve any construction activities; therefore, there are no risks to the community, workers, or the environment. The continued operation of the POE treatment system under GW2, and the installation of a new potable water supply line under GW3, will pose no additional risks to the community. GW2 and GW3 will pose minimal short-term risks to workers. These risks are associated with installation of carbon filtration systems and trench excavation for the water supply line. Minimal short-term environmental impacts associated with these two alternatives include installation of new groundwater monitoring wells, and the potential for construction runoff. These risks can be minimized with proper health and safety and construction housekeeping procedures. Under all three of these alternatives, RAOs will be achieved through natural attenuation. Table 12-1 provides the estimated time to achieve RAOs for each of the alternatives. Appendix E.2 provides the details of the procedure used to estimate time to achieve RAOs.

The estimates of the time to achieve RAOs are based on a limited amount of information and a simplified source area dissolution model. As such, the time estimates should be considered to be useful to provide a relative ranking for the time estimates. The absolute values of the time estimates are subject to a large amount of uncertainty. An uncertainty analysis is also included in Appendix E.2.

GW5 poses slightly higher short-term risk to the community related to the on-site discharge of treated groundwater, as well as the off-site disposal of spent activated carbon. Short-term risks to site workers are minimal, and include risks associated with construction of the infiltration gallery and maintenance of the groundwater extraction and treatment system. Short-term risks to the environment are minimal under this alternative, and are associated with the potential for dewatering surrounding areas. Table 12-1 provides the estimated time to achieve RAOs for each of the alternatives. Appendix E.2 provides the details of the procedure used to estimate time to achieve RAOs.

GW4 poses the highest short-term risk to the community, site workers, and the environment. These risks are associated with the on-site storage of chemicals, pressurized injection of reactive chemicals, and altering the chemistry of the bedrock aquifer. Chlorinated solvent contamination in a bedrock aquifer has historically been difficult to treat using existing treatment methods. Additionally, this alternative relies on the ability of the reagent contacting the contaminant mass for a sufficient duration to allow for treatment to occur. A fractured bedrock matrix significantly complicates effective implementation of in-site reagents, because targeting individual fractures or fracture sets for treatment may only contact a small percentage of the overall contaminant mass. Additionally, the possible presence of a source material within the bedrock matrix itself (i.e., contamination that has diffused into the bedrock matrix contamination), further complicates implementation and effectiveness of this remedy. Additionally, certain in-situ reagents may not address the presence of manganese in the aquifer. Table 12-1 provides the estimated time to achieve RAOs for each of the alternatives. Appendix E.2 provides the details of the procedure used to estimate time to achieve RAOs.

The above estimates are based on the assumption that contamination within bedrock fractures is accessible, and treatment reagents will be able to reach contaminants.

The overall effectiveness of the groundwater treatment alternative is impacted by the ongoing leaching of source material that may be above the water table. If contaminated material is identified during PDIs removal of this source material would be expected to increase the short-term effectiveness of all of the groundwater treatment alternatives.

12.2.5.2 Vapor Intrusion Alternatives

VI1 and VI2 do not involve any construction activities; therefore, there are no risks to the community, workers, or the environment associated with these alternatives. GW3 and GW4 involve standard construction techniques, and pose little to no short-term risk to the community, site workers, or the environment. Although it is not a design objective of the system, venting soils that would take place as part of VI3 may act to remove contamination from the subsurface more quickly and may reduce time to achieve RAOs in the soil vapor.

12.2.6 Implementability

12.2.6.1 Groundwater Alternatives

With no proposed actions, GW1 is the easiest to implement when compared with the other alternatives. GW2 will be slightly more difficult to implement than GW1. It will involve the installation of new groundwater monitoring wells, as well as the implementation of institutional controls. These actions are easily implementable. GW3 will also be easily implementable, but will require the additional construction of a new potable water supply line from DW-02 to the AMAC Building.

GW4 will be more difficult to implement than GW3. This alternative will involve the installation of approximately five bedrock injection wells, as well as the injection of treatment reagents into the bedrock aquifer. Chlorinated solvent contamination in a bedrock aquifer has historically been difficult to treat using existing treatment methods. Effectively targeting individual bedrock fractures or fracture sets for treatment is difficult to implement. Typically, very high injection pressures are required to displace the fracture water to provide sufficient contact with the contamination. Additionally, USACE and MEDEP are aware of the concerns associated with injecting in-situ reagents into an active drinking water aquifer. Bench and pilot-scale testing will be tailored to attempt to address this concern.

GW5 is likely to be the most difficult alternative to implement. Installation of an upgraded treatment system using approximately the same floorspace, and installing an upgraded well pump will be easily implementable. However, the nearest surface water body is too far from the Site to discharge treated groundwater, so an on-site subsurface infiltration system is proposed. Based on preliminary calculations, this gallery will be approximately one acre in size, and will require significant excavation and piping. The shallow bedrock, the site topography, and the in-place soil materials are not conducive to draining even relatively small volume of continuous water flow.

12.2.6.2 Vapor Intrusion Alternatives

With no proposed actions, VI1 is the easiest to implement when compared with the other alternatives. VI2 involves institutional controls, and is therefore slightly more difficult to implement than VI1.

VI3 is more difficult to implement than VI2. This alternative involves horizontal drilling beneath the AMAC Building and installation of a vapor extraction system. VI4 will be the most difficult alternative to implement, because it will require the disruption of activities within the AMAC Building for a period of approximately three months. It will be necessary to completely strip the interior of the building so that the membrane can be sprayed across the entire floor. A wear layer will be installed above the floor and the interior will then be re-constructed throughout the entire building.

12.2.7 Cost

Detailed breakdowns of capital costs, operations and maintenance costs, and present value analyses for each alternative are provided in Appendix E.1 and summarized in Tables 11-1 and 11-2. Total present value costs for each alternative are also presented on Table 12-1.

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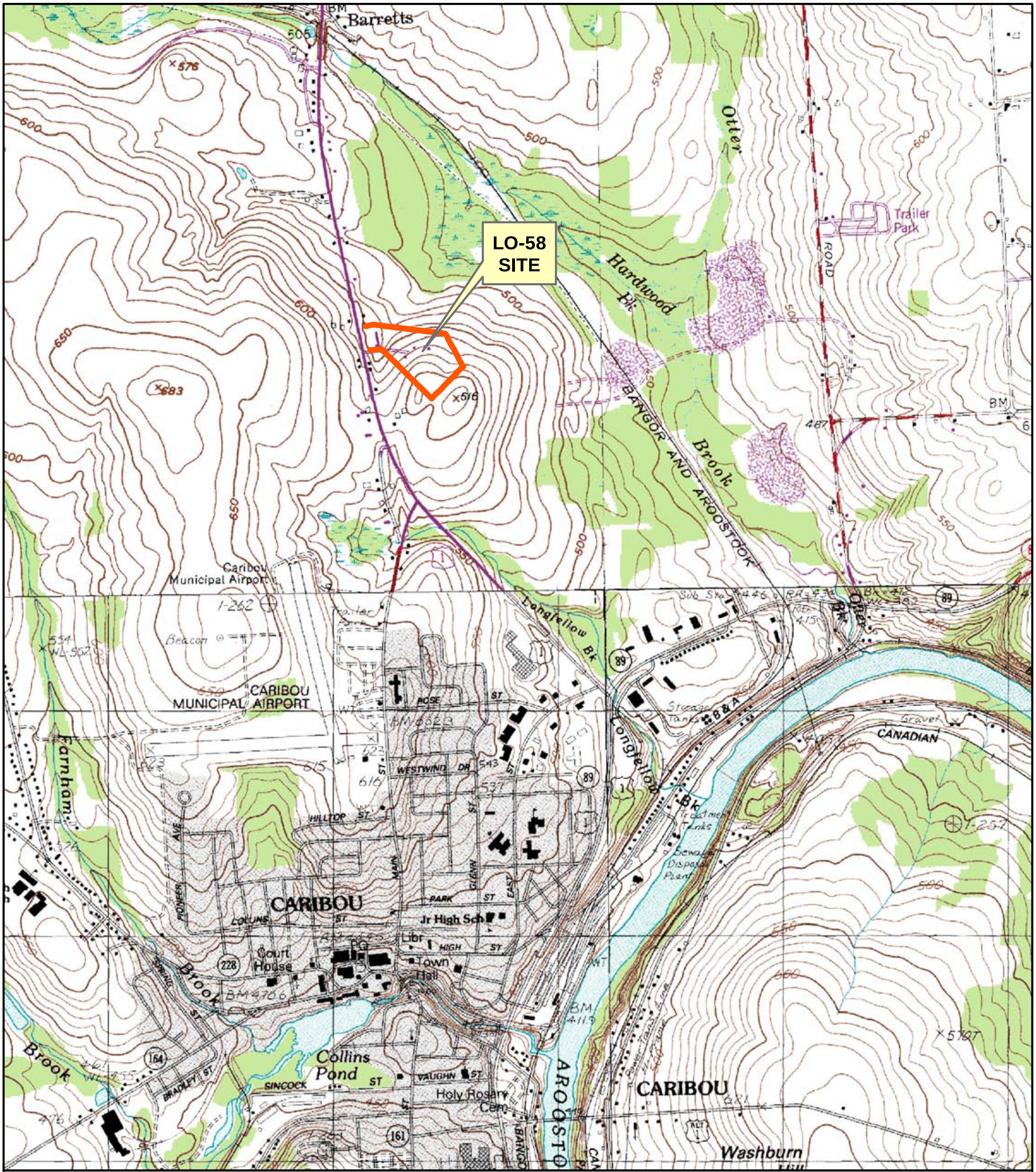
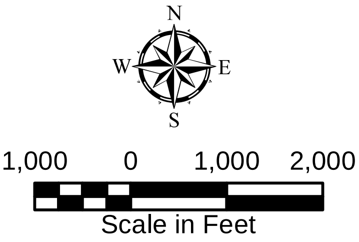
FIGURES





Source: U.S. Geological Survey (USGS) 7.5 Min. Series, Caribou, Goodwin, Fort Fairfield NW, and New Sweden 1:24,000 scale quadrangles,

Department of the Army
New England District
Corps of Engineers

FIGURE 1-1
SITE LOCUS MAP

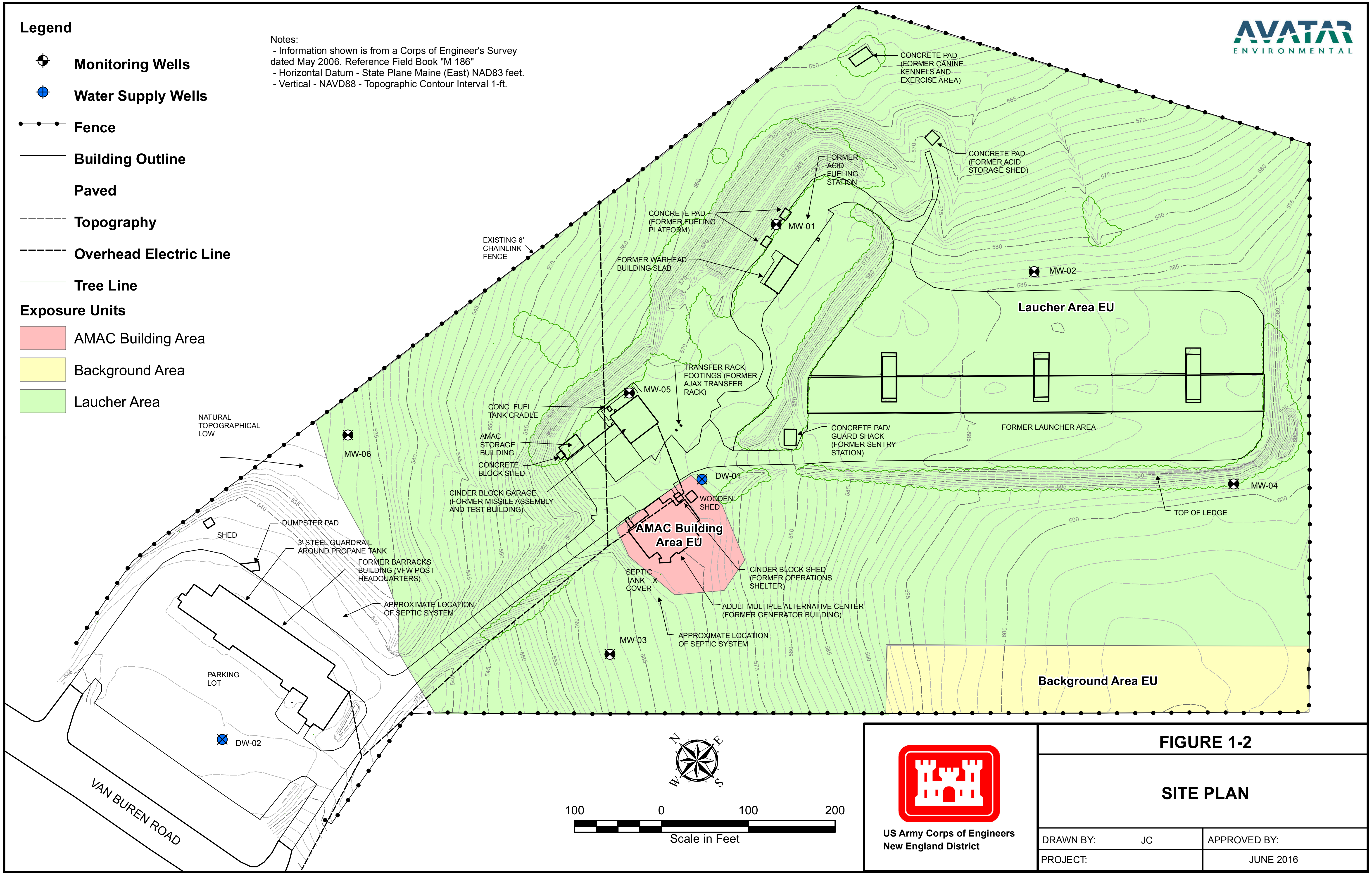
Legend

- Monitoring Wells
- Water Supply Wells
- Fence
- Building Outline
- Paved
- Topography
- Overhead Electric Line
- Tree Line

Exposure Units

- 🟥 AMAC Building Area
- 🟨 Background Area
- 🟩 Laucher Area

Notes:
- Information shown is from a Corps of Engineer's Survey dated May 2006. Reference Field Book "M 186"
- Horizontal Datum - State Plane Maine (East) NAD83 feet.
- Vertical - NAVD88 - Topographic Contour Interval 1-ft.



AVATAR ENVIRONMENTAL

US Army Corps of Engineers
New England District

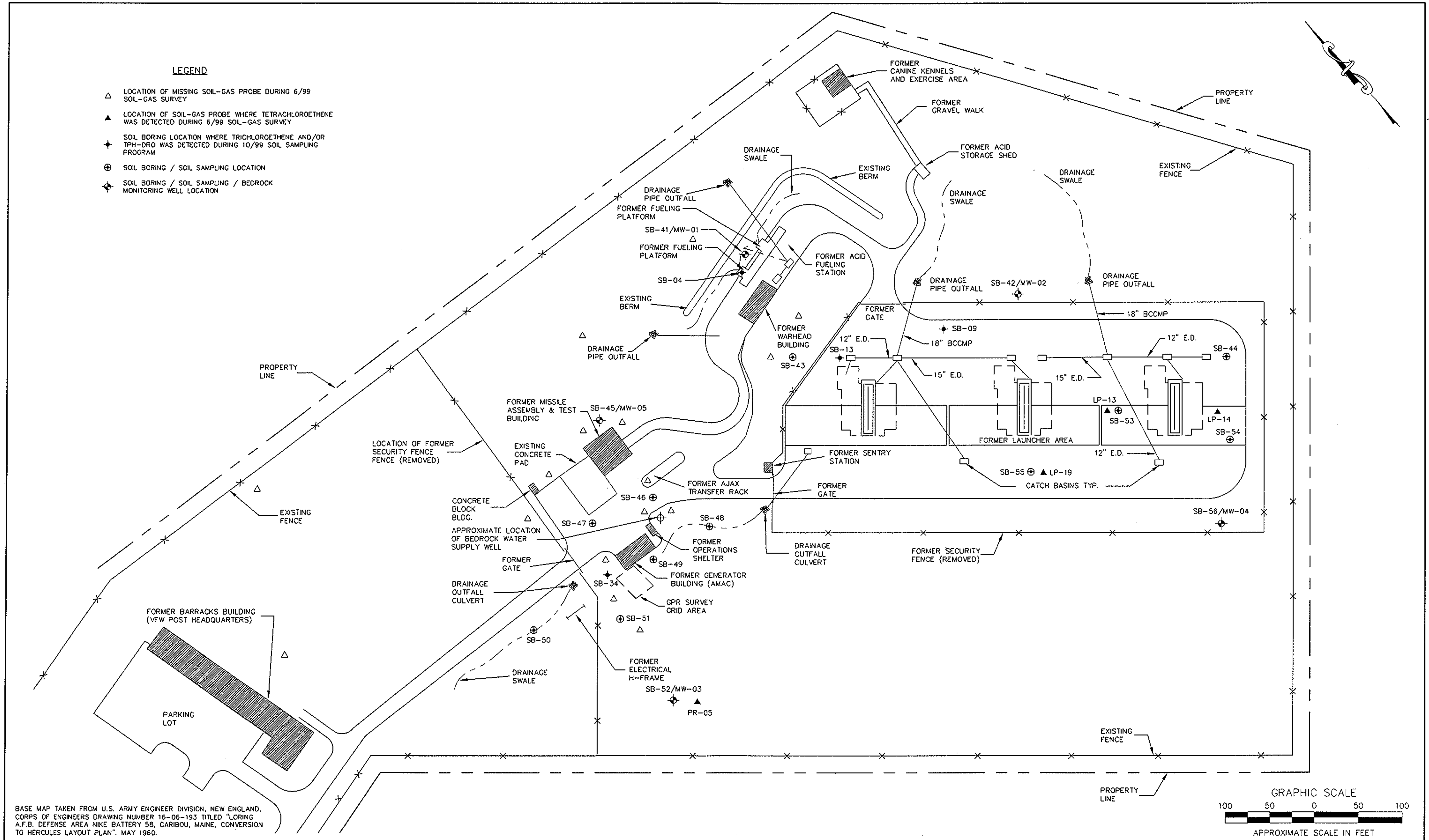
FIGURE 1-2

SITE PLAN

DRAWN BY: JC	APPROVED BY:
PROJECT:	JUNE 2016

M:\Design\DWG\ACOE\MEFUDS\HISTORICAL REPORT\FIG 4-2.dwg, Model, 11/13/2007 9:09:24 AM, GIRARDEB, 1:2

FILE NAME:



BASE MAP TAKEN FROM U.S. ARMY ENGINEER DIVISION, NEW ENGLAND, CORPS OF ENGINEERS DRAWING NUMBER 16-06-193 TITLED "LORING A.F.B. DEFENSE AREA NIKE BATTERY 58, CARIBOU, MAINE, CONVERSION TO HERCULES LAYOUT PLAN". MAY 1960.

NO.	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION

HISTORICAL REPORT
FIVE MAINE DERP-FUDS
FORMER NIKE LO-58 LAUNCH SITE
CARIBOU, MAINE

WESTON
MANAGERS DESIGNERS/CONSULTANTS
MANCHESTER NEW HAMPSHIRE

CHECKED	DATE	CLIENT APPROVALS	DATE
DES. ENG.			
PROJ. ENG.			
PROJ. MGR.			
APPROVED			
APPROVED		ISSUED FOR	DATE

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT
CORPS OF ENGINEERS
CONCORD, MASSACHUSETTS

HISTORIC SITE PLAN

DRAWN	DATE	FIGURE NO.	REV. NO.
BEG	NOV 2007	1-3	
SCALE	W.O. NO.	SHT. ____ OF ____	
AS SHOWN	10971-218-001		

LEGEND	
SYMBOL	DESCRIPTION
⌖ MW–05	WELL LOCATION
● DW–1	WATER SUPPLY WELLS
▲ LP–09	SOIL VAPOR SAMPLE LOCATION FROM JUNE 1999 ROUND
✦ SB–15	SOIL BORING LOCATION FROM OCTOBER 1999 ROUND
✦ SB–43	SOIL BORING LOCATION FROM OCTOBER 2000 ROUND
△	LOST SOIL VAPOR SAMPLE LOCATION FROM JUNE 1999 ROUND
⊕	SANITARY SEWER MANHOLE
●	UTILITY POLE
–○–	FENCE
▣	CATCH BASIN
—550—	MAJOR CONTOUR
— — —	OVERHEAD ELECTRIC LINE
︵︵︵	TREE LINE
▨	CHLORINATED SOLVENT SOIL SOURCE AREA
▨	FUEL–RELATED SOIL SOURCE AREA

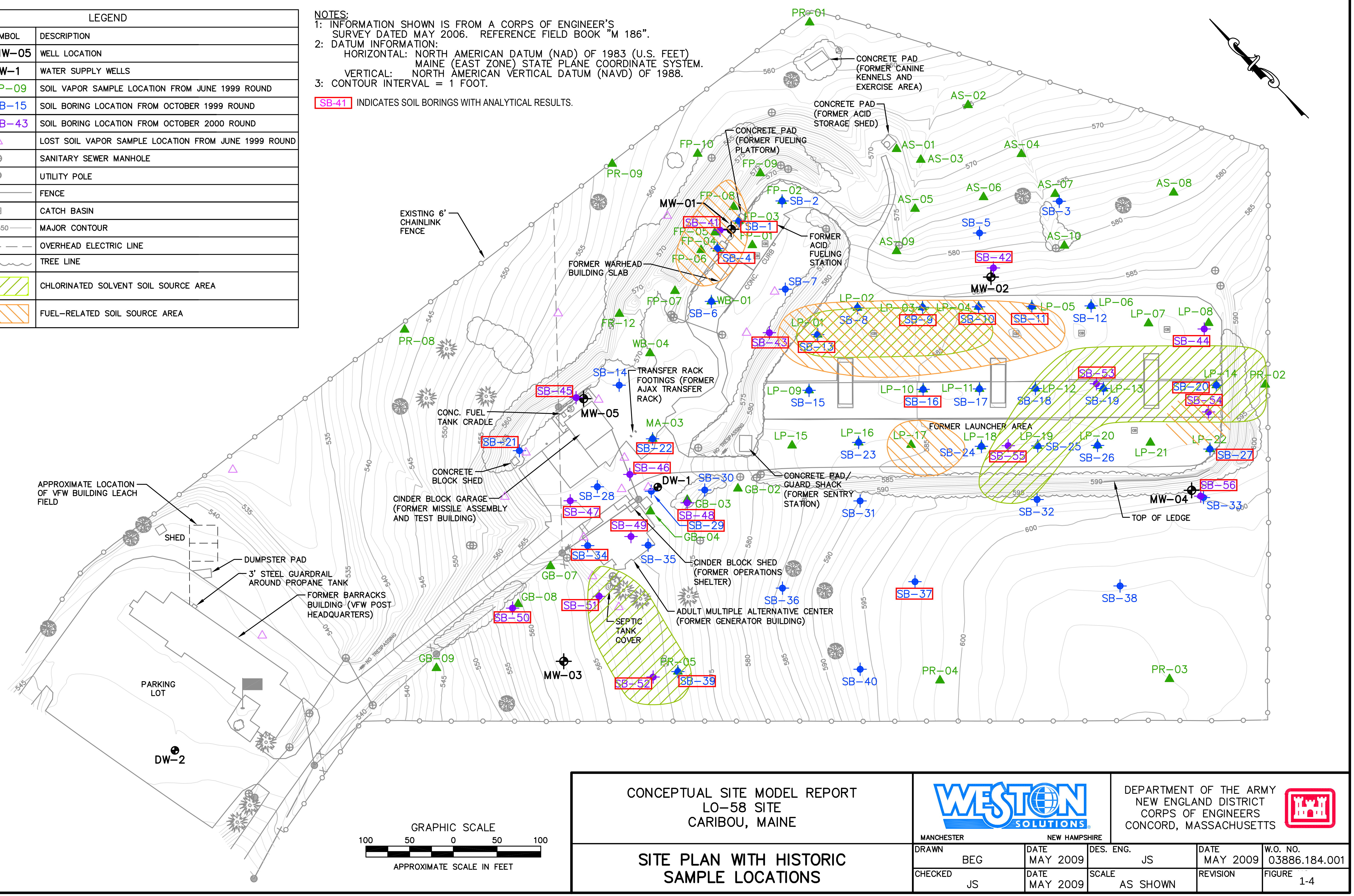
NOTES:

1: INFORMATION SHOWN IS FROM A CORPS OF ENGINEER'S SURVEY DATED MAY 2006. REFERENCE FIELD BOOK "M 186".

2: DATUM INFORMATION:
HORIZONTAL: NORTH AMERICAN DATUM (NAD) OF 1983 (U.S. FEET) MAINE (EAST ZONE) STATE PLANE COORDINATE SYSTEM.
VERTICAL: NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.

3: CONTOUR INTERVAL = 1 FOOT.

SB–41 INDICATES SOIL BORINGS WITH ANALYTICAL RESULTS.



GRAPHIC SCALE
100 50 0 50 100
APPROXIMATE SCALE IN FEET

CONCEPTUAL SITE MODEL REPORT
LO–58 SITE
CARIBOU, MAINE

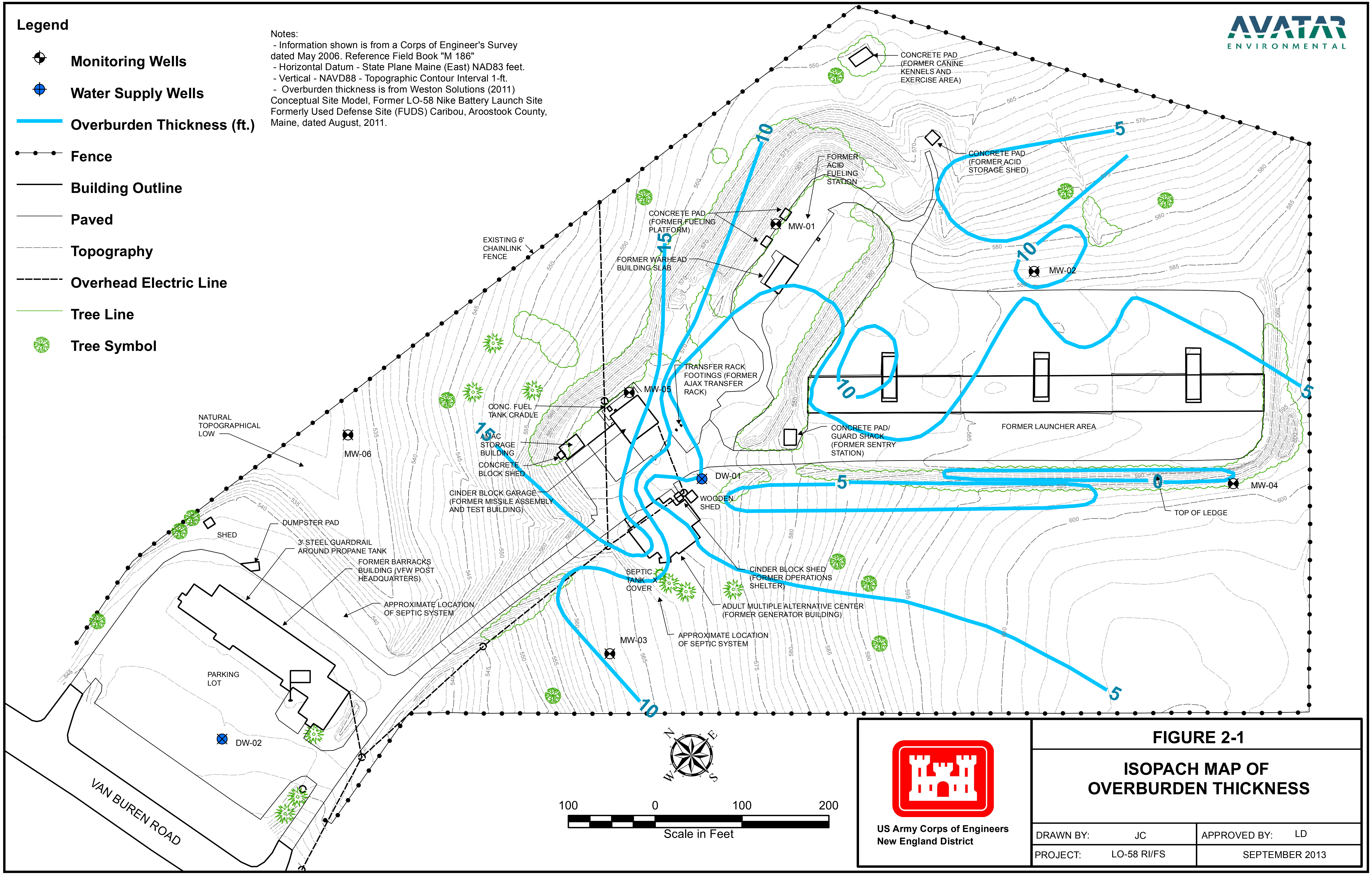
WESTON SOLUTIONS
MANCHESTER NEW HAMPSHIRE

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT
CORPS OF ENGINEERS
CONCORD, MASSACHUSETTS

SITE PLAN WITH HISTORIC SAMPLE LOCATIONS

DRAWN	DATE	DES. ENG.	DATE	W.O. NO.
BEG	MAY 2009	JS	MAY 2009	03886.184.001
CHECKED	DATE	SCALE	REVISION	FIGURE
JS	MAY 2009	AS SHOWN		1-4

M:\Design\DWG\ACOE\MEFUDS\5FUDS\2009\LO–58 2009\CSM 2009\FIG 2–1.dwg, Layout1, 2/18/2010 3:07:57 PM, GIRARDEB, 1:1



Legend

Monitoring Wells

Water Supply Wells

Overburden Thickness (ft.)

Fence

Building Outline

Paved

Topography

Overhead Electric Line

Tree Line

Tree Symbol

Notes:
- Information shown is from a Corps of Engineer's Survey dated May 2006. Reference Field Book "M 186"
- Horizontal Datum - State Plane Maine (East) NAD83 feet.
- Vertical - NAVD88 - Topographic Contour Interval 1-ft.
- Overburden thickness is from Weston Solutions (2011) Conceptual Site Model, Former LO-58 Nike Battery Launch Site Formerly Used Defense Site (FUDS) Caribou, Aroostook County, Maine, dated August, 2011.

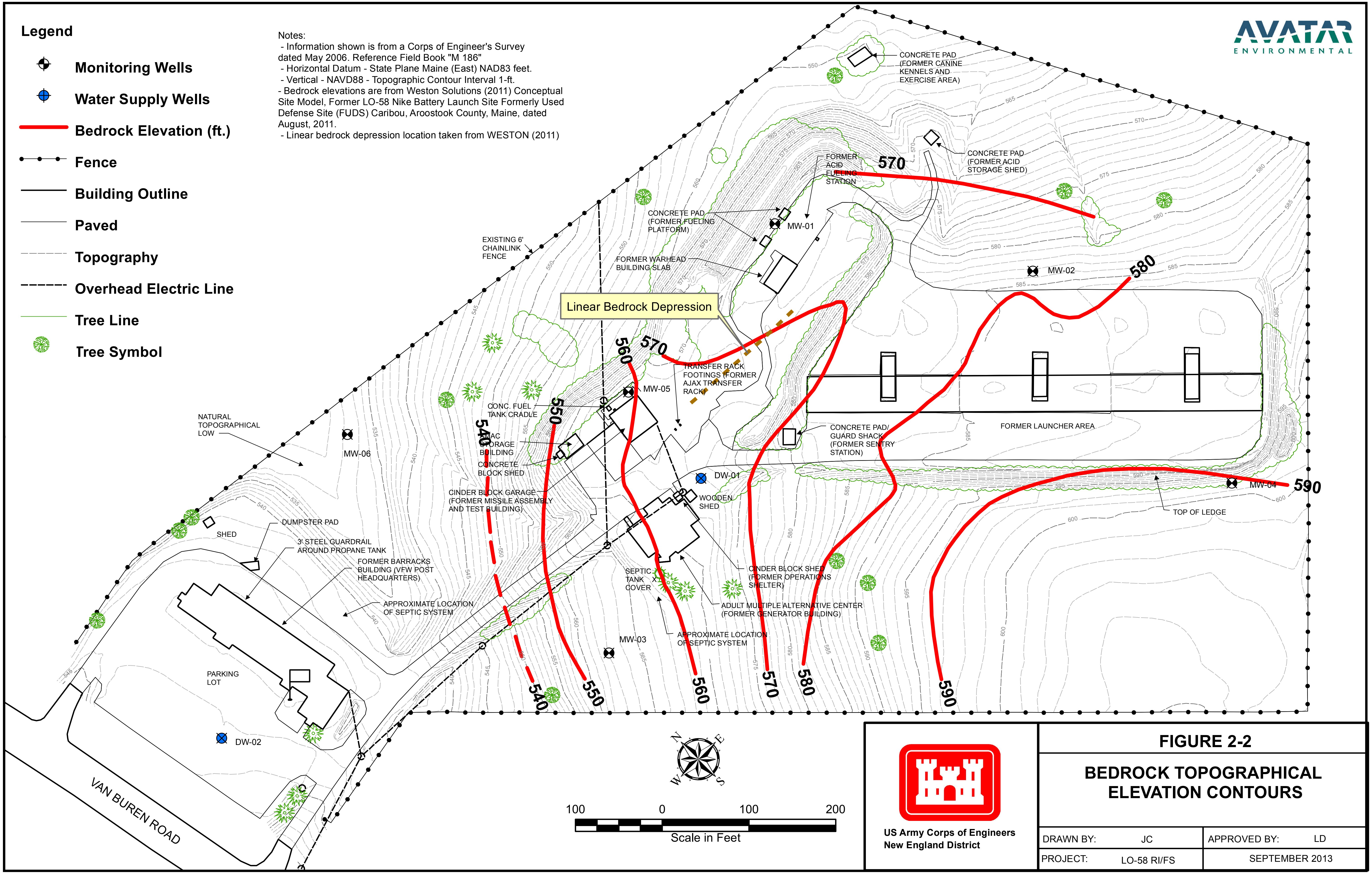
AVATAR
ENVIRONMENTAL

US Army Corps of Engineers
New England District

FIGURE 2-1

ISOPACH MAP OF OVERBURDEN THICKNESS

DRAWN BY:	JC	APPROVED BY:	LD
PROJECT:	LO-58 RI/FS	SEPTEMBER 2013	



Notes:

- Information shown is from a Corps of Engineer's Survey dated May 2006. Reference Field Book "M 186"
- Horizontal Datum - State Plane Maine (East) NAD83 feet.
- Vertical - NAVD88 - Topographic Contour Interval 1-ft.
- Bedrock elevations are from Weston Solutions (2011) Conceptual Site Model, Former LO-58 Nike Battery Launch Site Formerly Used Defense Site (FUDS) Caribou, Aroostook County, Maine, dated August, 2011.
- Linear bedrock depression location taken from WESTON (2011)

US Army Corps of Engineers
New England District

FIGURE 2-2

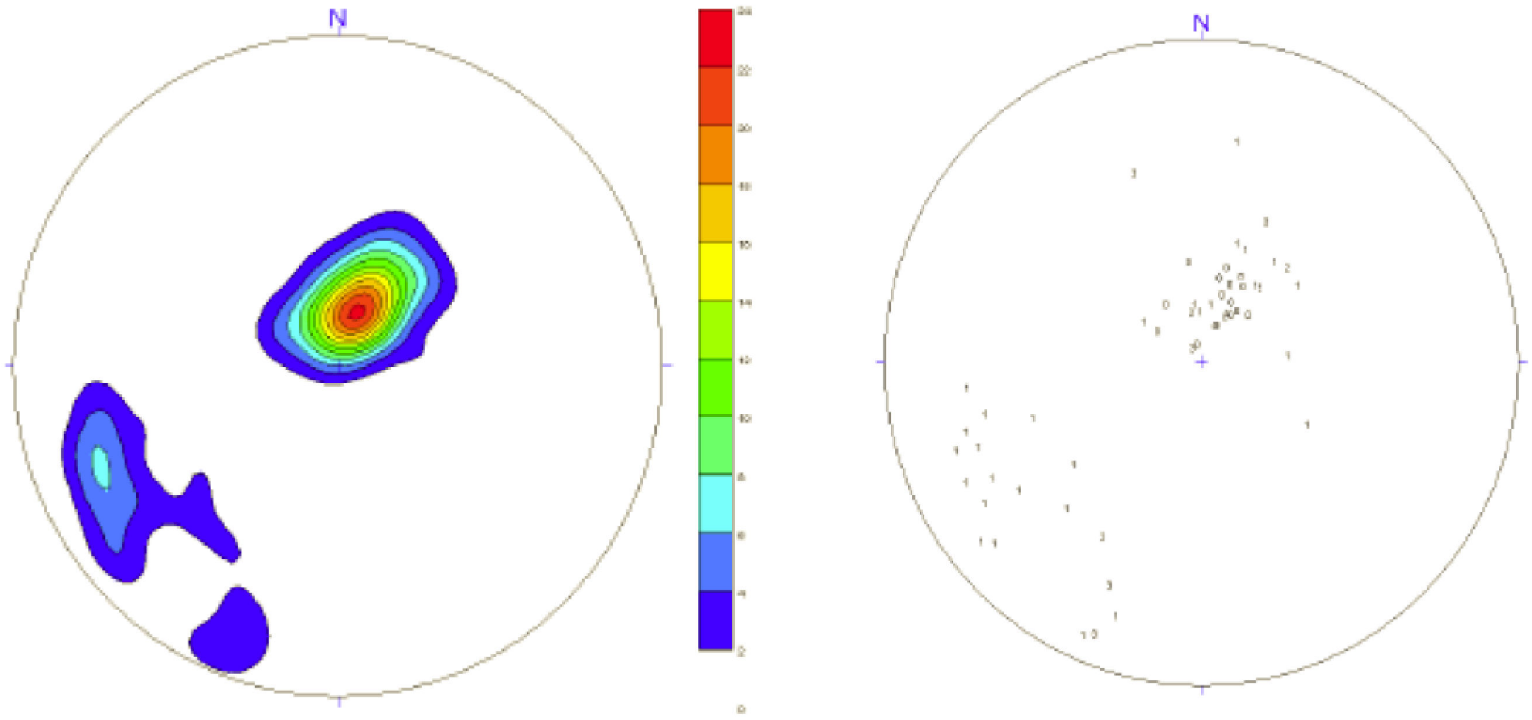
BEDROCK TOPOGRAPHICAL ELEVATION CONTOURS

DRAWN BY:	JC	APPROVED BY:	LD
PROJECT:	LO-58 RI/FS	SEPTEMBER 2013	

AVATAR
ENVIRONMENTAL

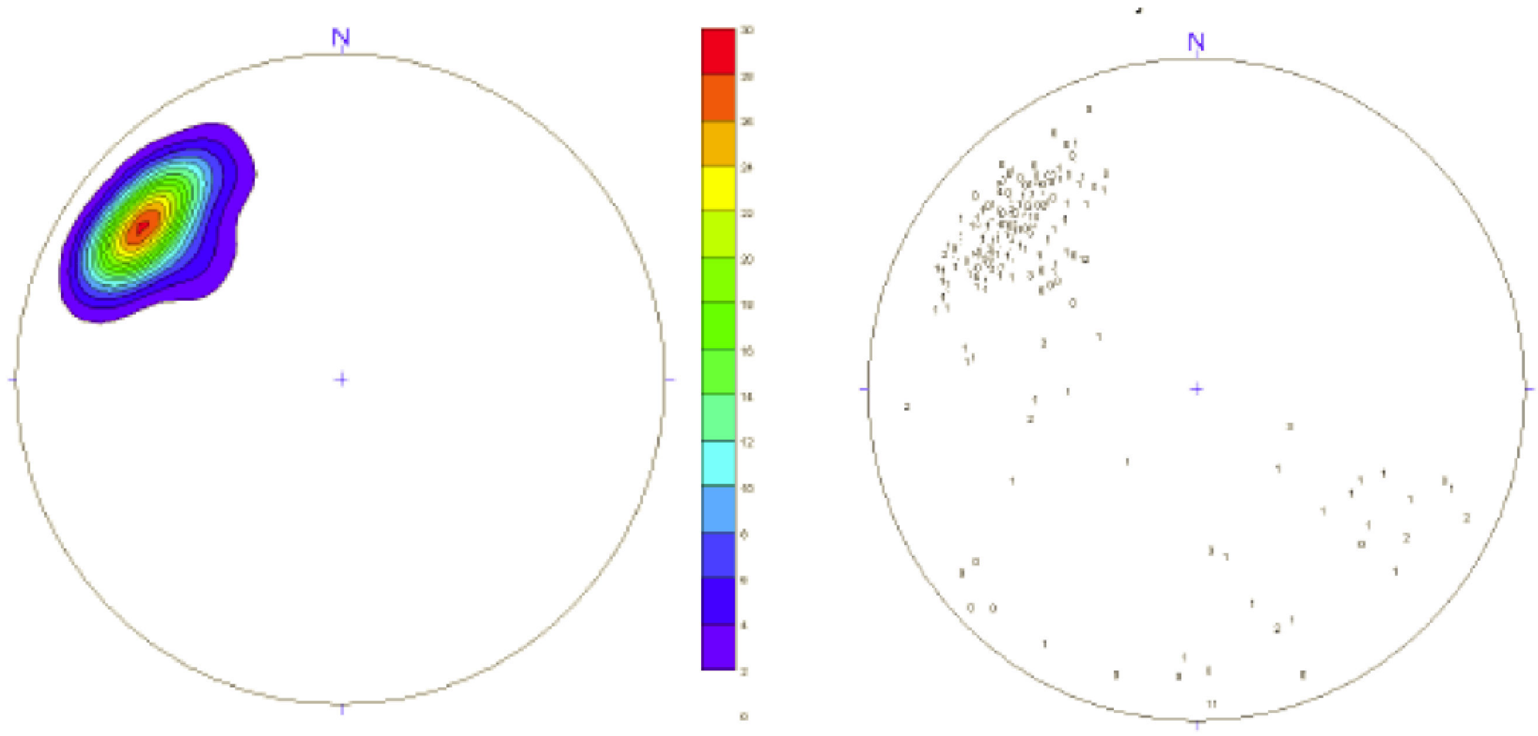
Drinking Water Well DW-1

Schmidt Projection with Contours | Schmidt Projection with Feature Ranks



Drinking Water Well DW-2

Schmidt Projection with Contours | Schmidt Projection with Feature Ranks



From HydroPhysics^{TM} and Geophysical Logging Results, 2009.

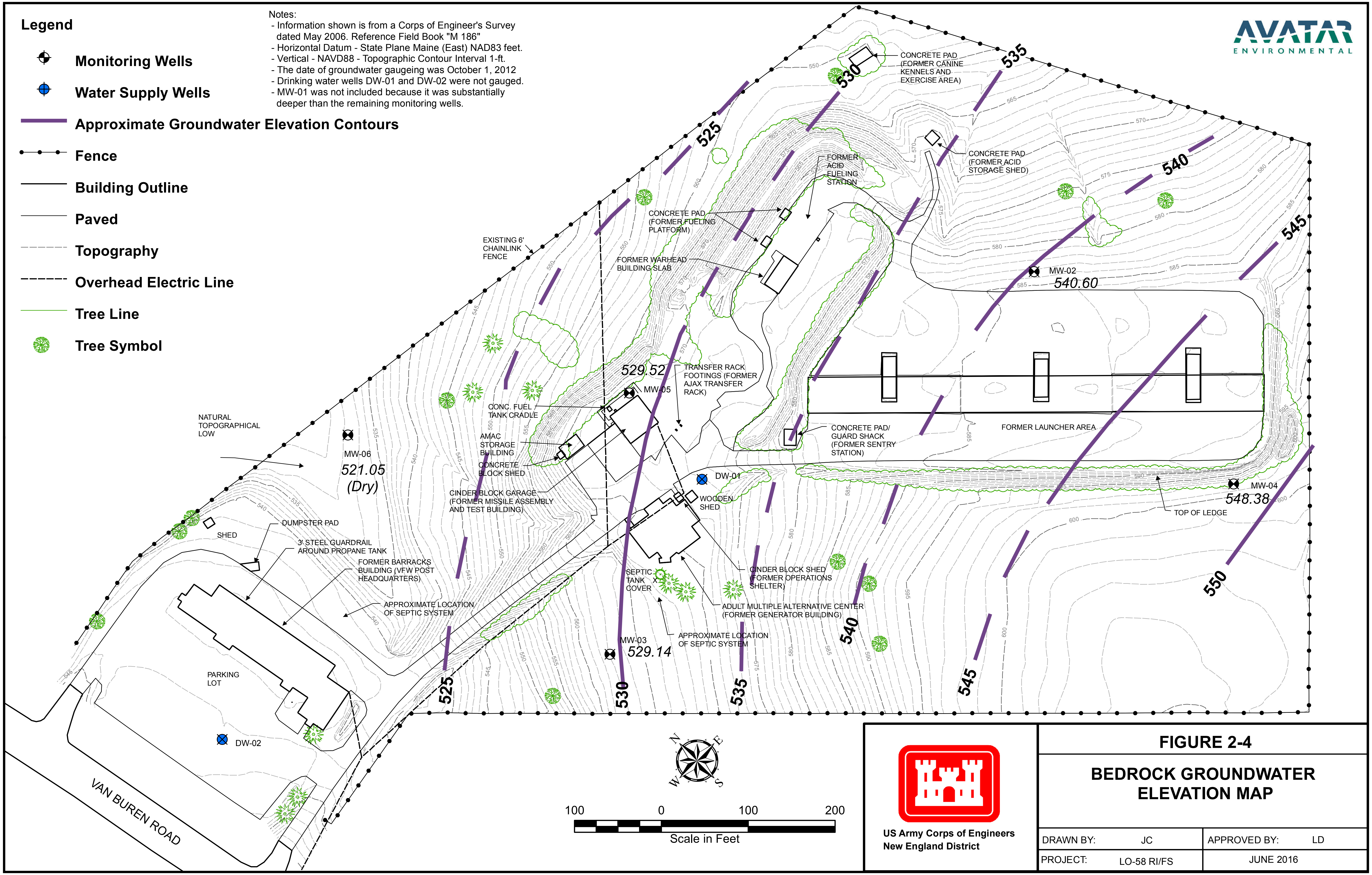
Notes:
-From FINAL CONCEPTUAL SITE MODEL REPORT, August 2011, WESTON SOLUTIONS, INC.

US Army Corps of Engineers
New England District

FIGURE 2-3

STEREONET PLOT OF BEDDING PLANES AND MEASURED JOINTS

DRAWN BY: JC
APPROVED BY: LD
PROJECT: Former LO-58 Site RI/FS
MAY 2013



Notes:
- Information shown is from a Corps of Engineer's Survey dated May 2006. Reference Field Book "M 186"
- Horizontal Datum - State Plane Maine (East) NAD83 feet.
- Vertical - NAVD88 - Topographic Contour Interval 1-ft.
- The date of groundwater gaugeing was October 1, 2012
- Drinking water wells DW-01 and DW-02 were not gauged.
- MW-01 was not included because it was substantially deeper than the remaining monitoring wells.

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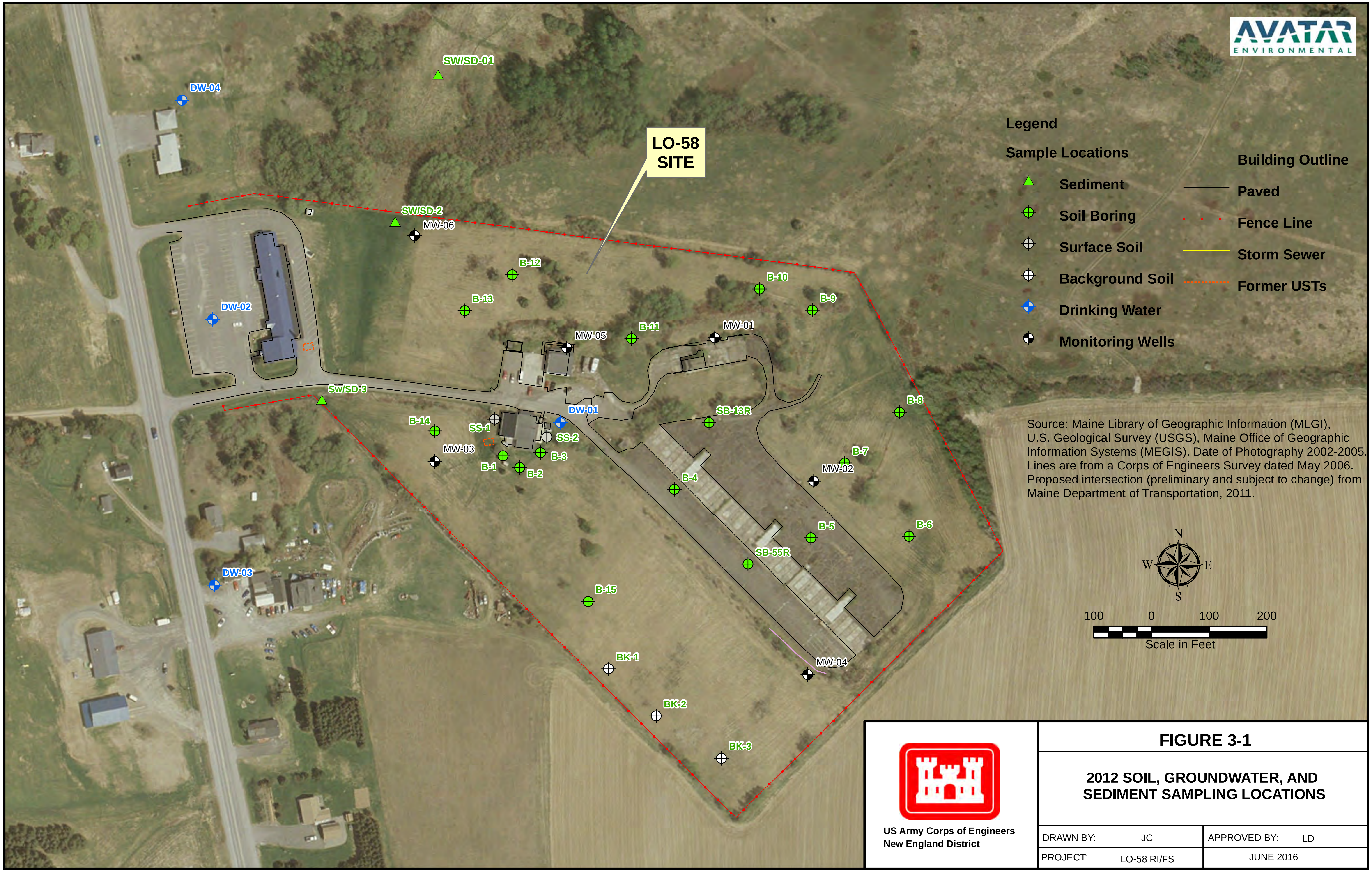
New England District

FIGURE 2-4

BEDROCK GROUNDWATER ELEVATION MAP

DRAWN BY:	JC	APPROVED BY:	LD
PROJECT:	LO-58 RI/FS	JUNE 2016	



Source: Maine Library of Geographic Information (MLGI), U.S. Geological Survey (USGS), Maine Office of Geographic Information Systems (MEGIS). Date of Photography 2002-2005. Lines are from a Corps of Engineers Survey dated May 2006. Proposed intersection (preliminary and subject to change) from Maine Department of Transportation, 2011.

US Army Corps of Engineers
New England District

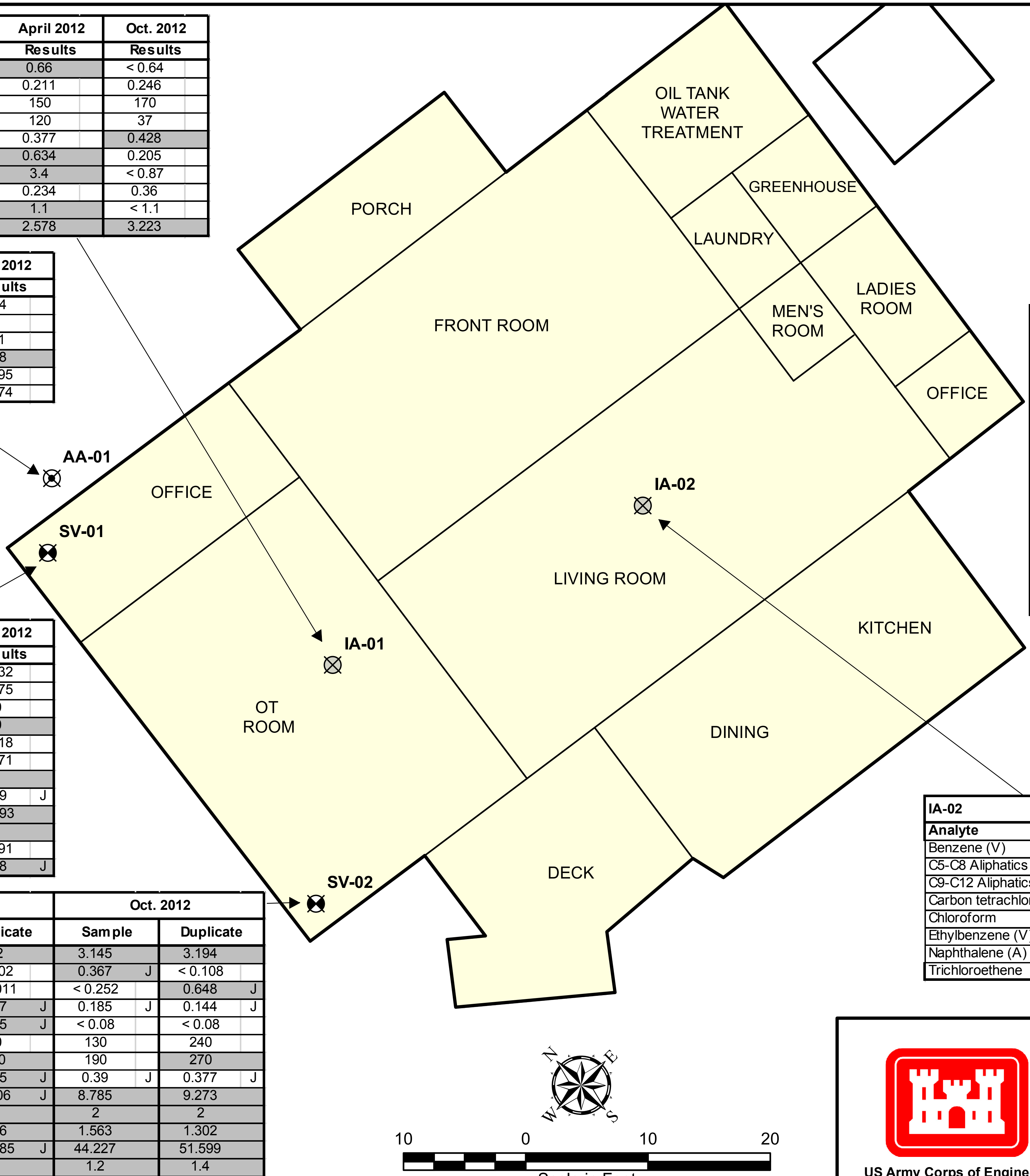
FIGURE 3-1

2012 SOIL, GROUNDWATER, AND SEDIMENT SAMPLING LOCATIONS

DRAWN BY:	JC	APPROVED BY:	LD
PROJECT:	LO-58 RI/FS		JUNE 2016

IA-01	April 2012	Oct. 2012
Analyte	Results	Results
Benzene (A)	0.66	< 0.64
Benzene (V)	0.211	0.246
C5-C8 Aliphatics (adjusted)	150	170
C9-C12 Aliphatics (adjusted)	120	37
Carbon tetrachloride	0.377	0.428
Chloroform	0.634	0.205
Ethylbenzene (A)	3.4	< 0.87
Ethylbenzene (V)	0.234	0.36
Naphthalene (A)	1.1	< 1.1
Trichloroethene	2.578	3.223

AA-01	April 2012	Oct. 2012
Analyte	Results	Results
Benzene (V)	0.211	0.144
C5-C8 Aliphatics (adjusted)	< 32	13
C9-C12 Aliphatics (adjusted)	18	< 7.1
Carbon tetrachloride	0.446	0.528
Chloroform	0.054	< 0.195
Ethylbenzene (V)	0.065	< 0.174



Legend

AMAC Building

Air Sample Locations

- Sub-Slab Vapor Sample Location
- Indoor Air Sample Location
- Ambient Air Sample Location

Analyte	Screening Toxicity Value (µg/m³)			
	Residential		Industrial	
1,2,4-Trimethylbenzene	0.73	n	3.1	n
1,4-Dichlorobenzene	0.26	c	1.1	c
1,4-Dioxane	0.56	c	2.5	c
Benzene	0.36	c	1.6	c
Bromodichloromethane	0.076	c	0.33	c
C5-C8 Aliphatics (adjusted)	630		2600	
C9-C12 Aliphatics (adjusted)	210		880	
Carbon tetrachloride	0.47	c	2	c
Chloroform	0.12	c	0.53	c
Ethylbenzene	1.1	c	4.9	c
Isopropyl alcohol	21	n	88	n
Naphthalene	0.083	c	0.36	c
Trichloroethene	0.21	n	0.88	n

Notes:
- Shaded concentrations exceed the applicable screening values
- This Plan was developed from a Supplemental Sample Locations Plan by WESTON Solutions, Dated May 2009 along with site observations by Nobis Engineering, Inc.
- Locations as site features depicted here on are approximate and given ofr illustrative purposes only.

(A) - Air Petroleum Hydrocarbon Analytical Result.
(V) - TO-15 Analytical Result.

SV-01	April 2012	Oct. 2012
Analyte	Results	Results
1,2,4-Trimethylbenzene	1.622	< 1.032
Benzene (V)	0.262 J	< 0.575
C5-C8 Aliphatics (adjusted)	740	560
C9-C12 Aliphatics (adjusted)	430	390
Carbon tetrachloride	0.44 J	< 0.818
Chloroform	0.537 J	< 1.171
Ethylbenzene (A)	3.5	1.5
Ethylbenzene (V)	1.129	1.259 J
Isopropyl alcohol	737.122 J	761.693
Naphthalene (A)	1.1	1.7
Naphthalene (V)	0.524 J	< 1.991
Trichloroethene	1.397	2.578 J

SV-02	April 2012		Oct. 2012	
Analyte	Sample	Duplicate	Sample	Duplicate
1,2,4-Trimethylbenzene	2.261	1.72	3.145	3.194
1,4-Dichlorobenzene	< 1.202	< 1.202	0.367 J	< 0.108
1,4-Dioxane	< 18.011	< 18.011	< 0.252	0.648 J
Benzene (V)	0.447 J	0.447 J	0.185 J	0.144 J
Bromodichloromethane	0.556 J	0.455 J	< 0.08	< 0.08
C5-C8 Aliphatics (adjusted)	700 B	550	130	240
C9-C12 Aliphatics (adjusted)	920	1100	190	270
Carbon tetrachloride	0.547 J	0.535 J	0.39 J	0.377 J
Chloroform	63.448 J	48.806 J	8.785	9.273
Ethylbenzene (A)	3.8	3.8	2	2
Ethylbenzene (V)	1.693 J	1.346	1.563	1.302
Isopropyl alcohol	636.839 J	515.985 J	44.227	51.599
Naphthalene (A)	1.3	1.2	1.2	1.4
Naphthalene (V)	0.681 J	< 2.62	0.472 J	0.524 J
Trichloroethene	6.983 J	4.996 J	6.446	6.983

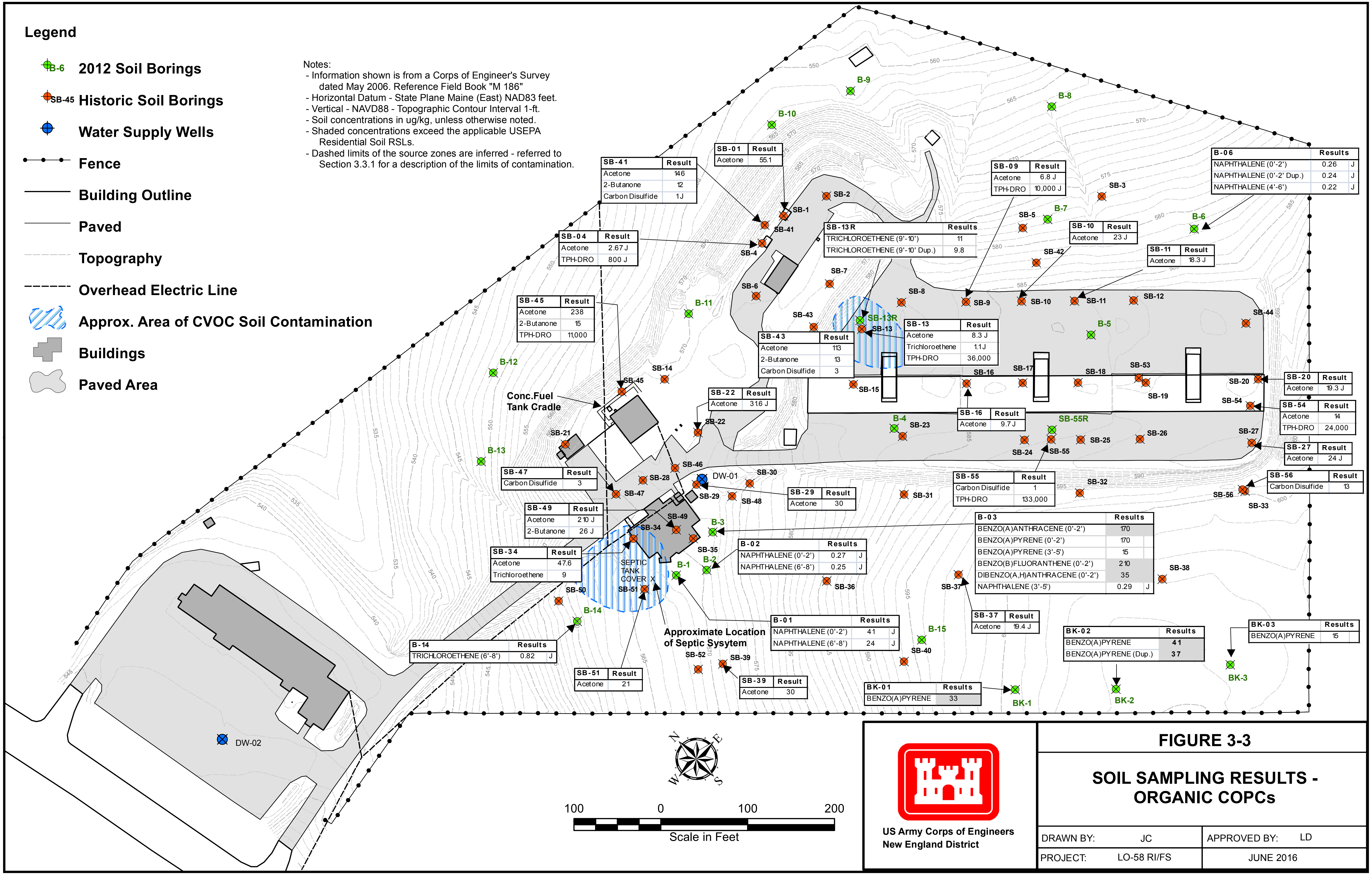
IA-02	April 2012		Oct. 2012	
Analyte	Sample	Duplicate	Sample	Duplicate
Benzene (V)	0.249	0.227	0.255	0.236
C5-C8 Aliphatics (adjusted)	200	190	190	200
C9-C12 Aliphatics (adjusted)	130	110	75	98
Carbon tetrachloride	0.44	0.384	0.434	0.421
Chloroform	1.318 J	0.732 J	0.205	0.21
Ethylbenzene (V)	0.256	0.286	0.347	0.339
Naphthalene (A)	< 1.1	< 1.1	1.4	1.5
Trichloroethene	3.975	3.33	3.223	3.492

US Army Corps of Engineers
New England District

FIGURE 3-2

2012 AIR SAMPLING RESULTS

DRAWN BY:	JC	APPROVED BY:	LD
PROJECT:	LO-58 RI/FS		JUNE 2016



Legend

- ⊗ B-6 **2012 Soil Borings**
- ⊗ SB-45 **Historic Soil Borings**
- ⊕ **Water Supply Wells**
- •—•—• **Fence**
- **Building Outline**
- **Paved**
- **Topography**
- - - - - **Overhead Electric Line**
- ▨ **Approx. Area of CVOC Soil Contamination**
- ■ **Buildings**
- ▩ **Paved Area**

Notes:
- Information shown is from a Corps of Engineer's Survey dated May 2006. Reference Field Book "M 186"
- Horizontal Datum - State Plane Maine (East) NAD83 feet.
- Vertical - NAVD88 - Topographic Contour Interval 1-ft.
- Soil concentrations in ug/kg, unless otherwise noted.
- Shaded concentrations exceed the applicable USEPA Residential Soil RSLs.
- Dashed limits of the source zones are inferred - referred to Section 3.3.1 for a description of the limits of contamination.

SB-01	Result
Acetone	55.1

SB-41	Result
Acetone	146
2-Butanone	12
Carbon Disulfide	1 J

SB-04	Result
Acetone	2.67 J
TPH-DRO	800 J

SB-45	Result
Acetone	238
2-Butanone	15
TPH-DRO	11,000

SB-13R	Results
TRICHLOROETHENE (9'-10')	11
TRICHLOROETHENE (9'-10' Dup.)	9.8

SB-09	Result
Acetone	6.8 J
TPH-DRO	10,000 J

SB-10	Result
Acetone	23 J

SB-11	Result
Acetone	18.3 J

B-06	Results	
NAPHTHALENE (0'-2')	0.26	J
NAPHTHALENE (0'-2' Dup.)	0.24	J
NAPHTHALENE (4'-6')	0.22	J

SB-43	Result
Acetone	113
2-Butanone	13
Carbon Disulfide	3

SB-13	Result
Acetone	8.3 J
Trichloroethene	1.1 J
TPH-DRO	36,000

SB-22	Result
Acetone	31.6 J

SB-16	Result
Acetone	9.7 J

SB-20	Result
Acetone	19.3 J

SB-54	Result
Acetone	14
TPH-DRO	24,000

SB-27	Result
Acetone	24 J

SB-47	Result
Carbon Disulfide	3

SB-29	Result
Acetone	30

SB-55	Result
Carbon Disulfide	1
TPH-DRO	133,000

SB-56	Result
Carbon Disulfide	13

SB-49	Result
Acetone	210 J
2-Butanone	26 J

B-03	Results	
BENZO(A)ANTHRACENE (0'-2')	170	
BENZO(A)PYRENE (0'-2')	170	
BENZO(A)PYRENE (3'-5')	15	
BENZO(B)FLUORANTHENE (0'-2')	210	
DIBENZO(A,H)ANTHRACENE (0'-2')	35	
NAPHTHALENE (3'-5')	0.29	J

SB-34	Result
Acetone	47.6
Trichloroethene	9

B-02	Results	
NAPHTHALENE (0'-2')	0.27	J
NAPHTHALENE (6'-8')	0.25	J

SB-37	Result
Acetone	19.4 J

B-01	Results	
NAPHTHALENE (0'-2')	41	J
NAPHTHALENE (6'-8')	24	J

BK-02	Results
BENZO(A)PYRENE	41
BENZO(A)PYRENE (Dup.)	37

BK-03	Results
BENZO(A)PYRENE	15

B-14	Results	
TRICHLOROETHENE (6'-8')	0.82	J

SB-51	Result
Acetone	21

SB-39	Result
Acetone	30

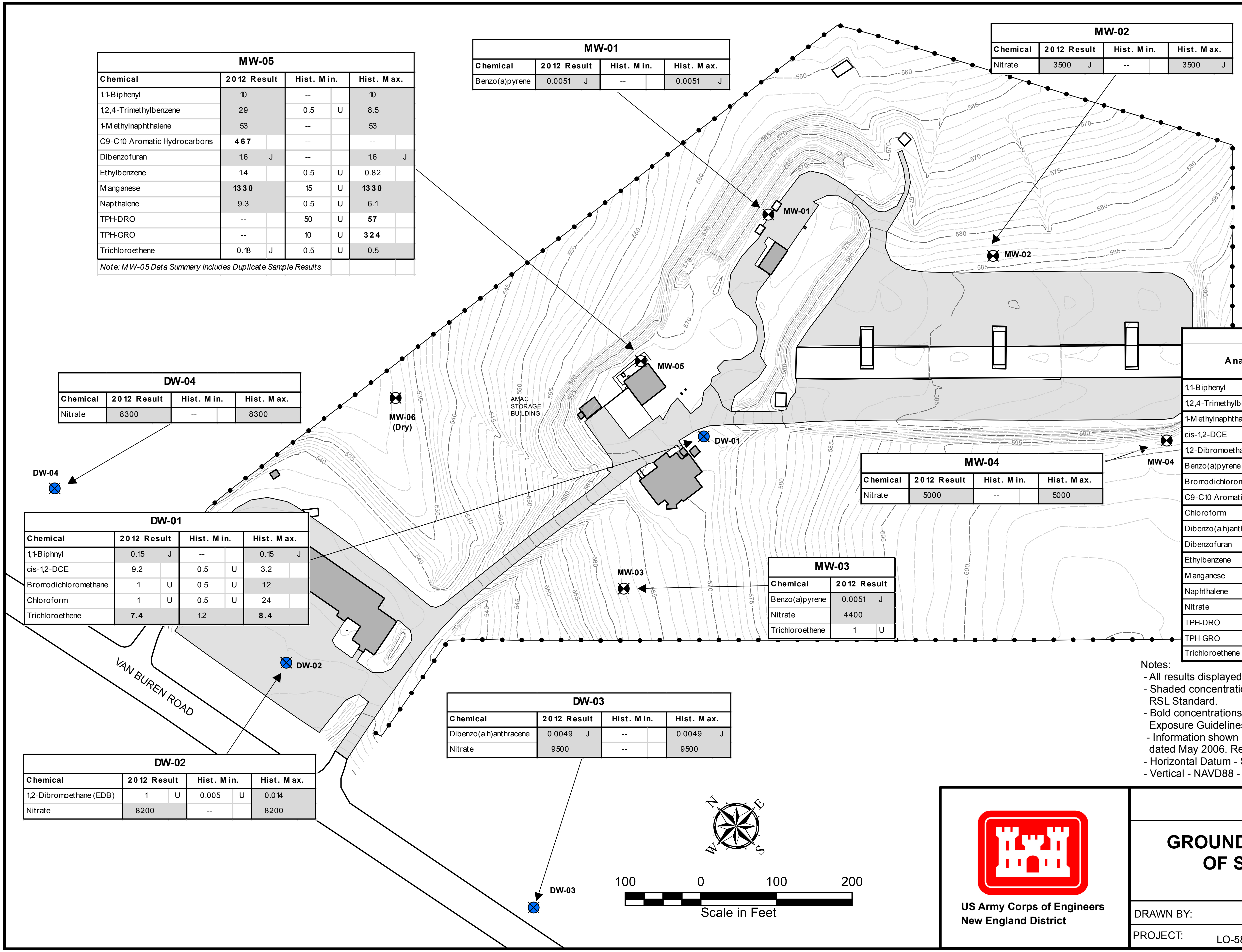
BK-01	Results
BENZO(A)PYRENE	33

US Army Corps of Engineers
New England District

FIGURE 3-3

SOIL SAMPLING RESULTS - ORGANIC COPCs

DRAWN BY:	JC	APPROVED BY:	LD
PROJECT:	LO-58 RI/FS		JUNE 2016



MW-05

Chemical	2012 Result		Hist. Min.		Hist. Max.	
1,1-Biphenyl	10		--		10	
1,2,4-Trimethylbenzene	29		0.5	U	8.5	
1-Methylnaphthalene	53		--		53	
C9-C10 Aromatic Hydrocarbons	**467**		--		--	
Dibenzofuran	1.6	J	--		1.6	J
Ethylbenzene	1.4		0.5	U	0.82	
Manganese	**1330**		15	U	**1330**	
Napthalene	9.3		0.5	U	6.1	
TPH-DRO	--		50	U	**57**	
TPH-GRO	--		10	U	**324**	
Trichloroethene	0.18	J	0.5	U	0.5	

Note: MW-05 Data Summary Includes Duplicate Sample Results

MW-01

Chemical	2012 Result		Hist. Min.		Hist. Max.	
Benzo(a)pyrene	0.0051	J	--		0.0051	J

MW-02

Chemical	2012 Result		Hist. Min.		Hist. Max.	
Nitrate	3500	J	--		3500	J

DW-04

Chemical	2012 Result		Hist. Min.		Hist. Max.	
Nitrate	8300		--		8300	

DW-01

Chemical	2012 Result		Hist. Min.		Hist. Max.	
1,1-Biphnyl	0.15	J	--		0.15	J
cis-1,2-DCE	9.2		0.5	U	3.2	
Bromodichloromethane	1	U	0.5	U	1.2	
Chloroform	1	U	0.5	U	24	
Trichloroethene	**7.4**		1.2		**8.4**	

MW-04

Chemical	2012 Result		Hist. Min.		Hist. Max.	
Nitrate	5000		--		5000	

MW-03

Chemical	2012 Result	
Benzo(a)pyrene	0.0051	J
Nitrate	4400	
Trichloroethene	1	U

DW-03

Chemical	2012 Result		Hist. Min.		Hist. Max.	
Dibenzo(a,h)anthracene	0.0049	J	--		0.0049	J
Nitrate	9500		--		9500	

DW-02

Chemical	2012 Result		Hist. Min.		Hist. Max.	
1,2-Dibromoethane (EDB)	1	U	0.005	U	0.014	
Nitrate	8200		--		8200	

Analyte	Screening Toxicity Value (µg/L)		
	MCL	Maine MEG	EPA Tapwater RSL
1,1-Biphenyl		400	0.083
1,2,4-Trimethylbenzene			1.5
1-Methylnaphthalene			1.1
cis-1,2-DCE		10	3.6
1,2-Dibromoethane		0.2	0.0075
Benzo(a)pyrene	0.2	0.05	0.0034
Bromodichloromethane	80	5.6	0.13
C9-C10 Aromatic Hydrocarbons		200	
Chloroform		70	0.22
Dibenzo(a,h)anthracene		0.05	0.0034
Dibenzofuran			0.79
Ethylbenzene	700	30	1.5
Manganese		500	43
Naphthalene		10	0.17
Nitrate	10000	10000	3200
TPH-DRO		50	
TPH-GRO		50	
Trichloroethene		4	0.28

Notes:
- All results displayed in ug/L, unless otherwise noted.
- Shaded concentrations exceed the USEPA Residential Tapwater RSL Standard.
- Bold concentrations exceed the Maine Maximum Exposure Guidelines.
- Information shown is from a Corps of Engineer's Survey dated May 2006. Reference Field Book "M 186"
- Horizontal Datum - State Plane Maine (East) NAD83 feet.
- Vertical - NAVD88 - Topographic Contour Interval 1-ft.

US Army Corps of Engineers
New England District

FIGURE 3-4

GROUNDWATER EXCEEDENCES OF SCEENING CRITERIA

DRAWN BY:	JC	APPROVED BY:	LD
PROJECT:	LO-58 RI/FS	JUNE 2016	

Figure 3-5
DW-01 TCE Concentration (ug/L)

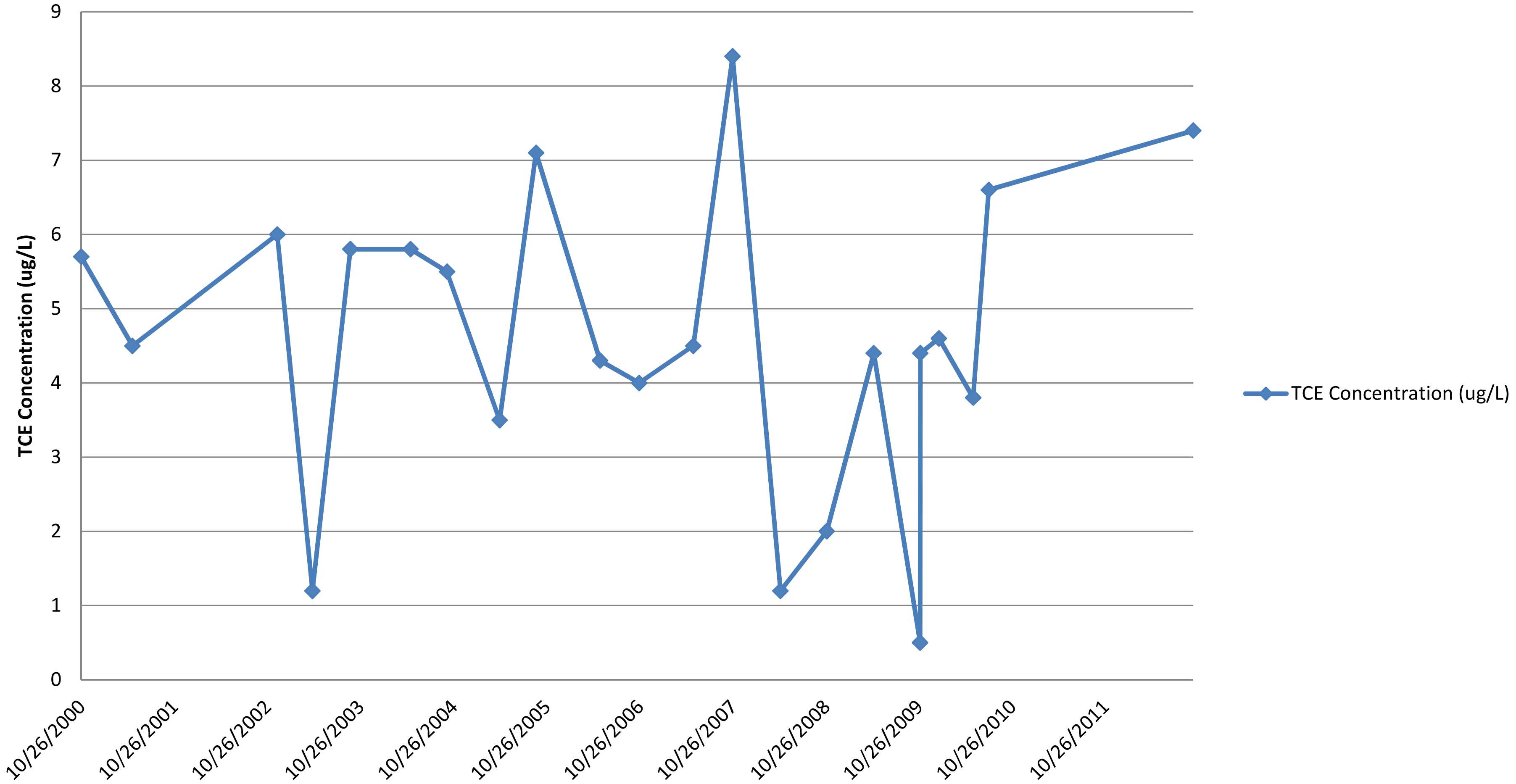
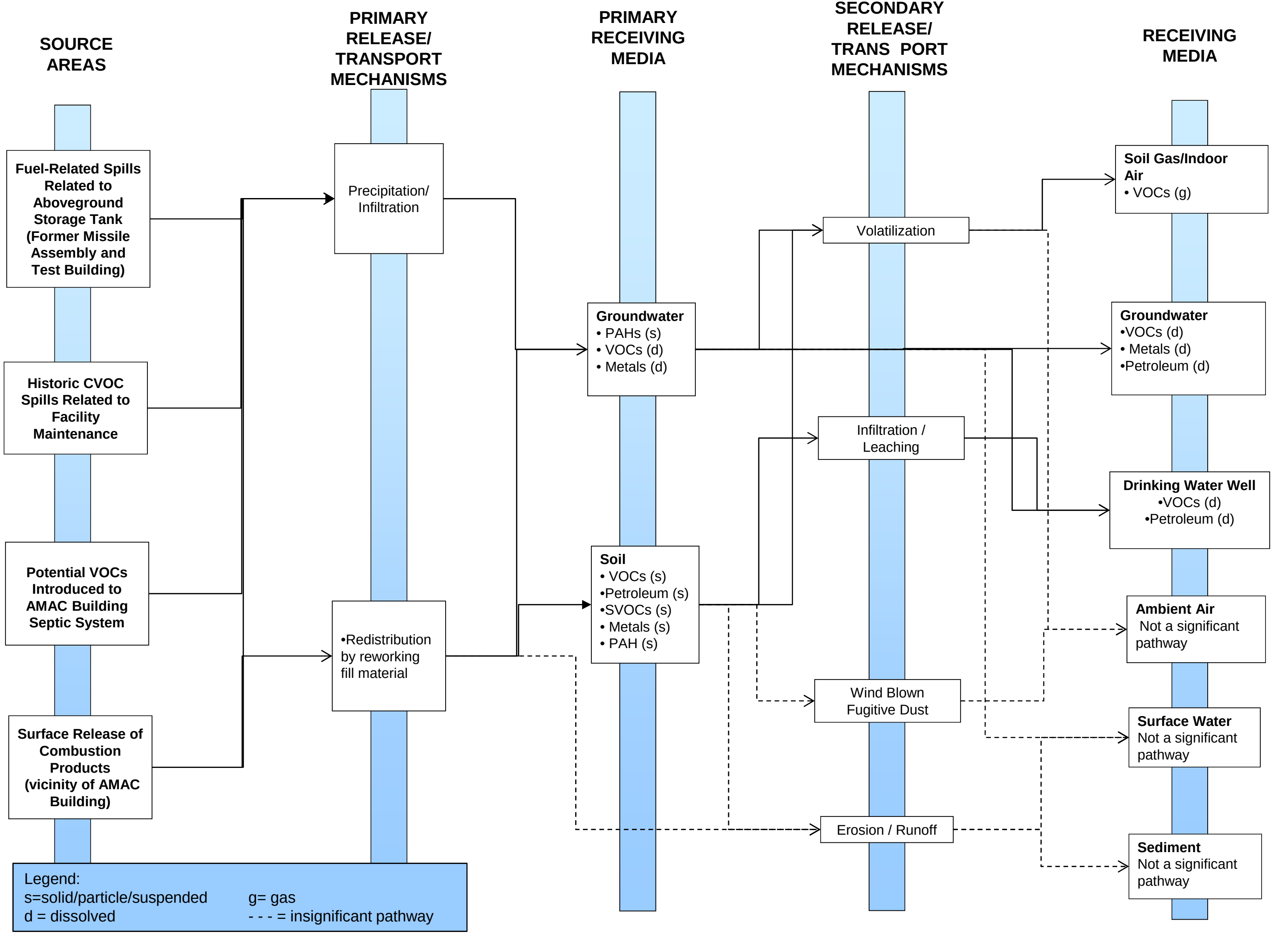


Figure 4-1
Fate and Transport Conceptual Site Model
Former LO-58 Nike Launcher Site, Caribou, ME

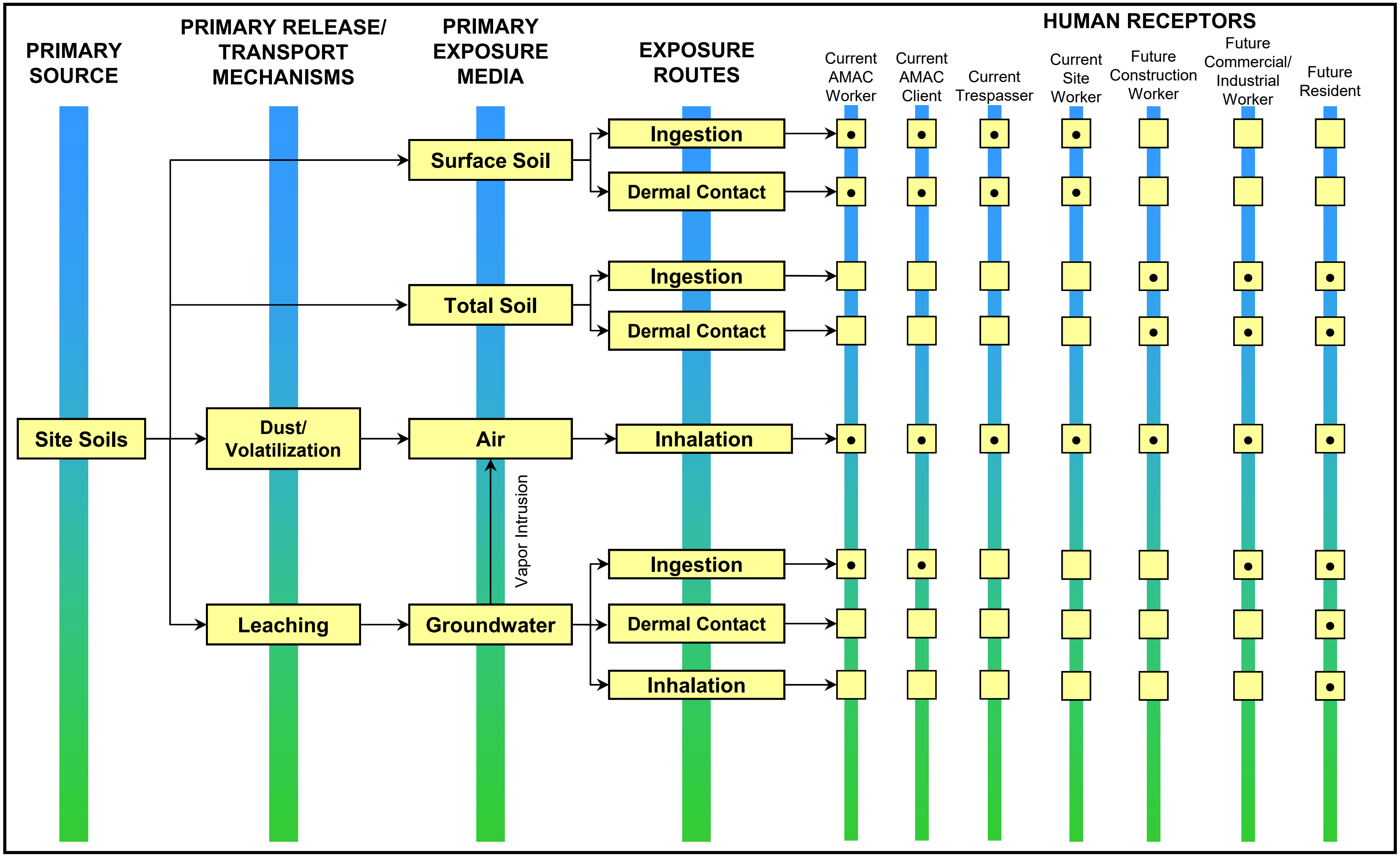


FATE AND TRANSPORT SCREENING SUMMARY

	Soil	Groundwater	Air	Dust	Surface Water	Sediment
VOCs	✓	✓	✓			
Petroleum	✓	✓	✓			
SVOCs						
Metals	✓	✓				
PAHs	✓					
Pesticides						

Note:

✓ Indicates a transport pathway of interest based on results of Method 1 Risk Assessment in Draft RI/FS.



PRIMARY EXPOSURE MEDIA	EXPOSURE ROUTES	Current AMAC Worker	Current AMAC Client	Current Trespasser	Current Site Worker	Future Construction Worker	Future Commercial/ Industrial Worker	Future Resident
Surface Soil	Ingestion	●	●	●	●	☐	☐	☐
	Dermal Contact	●	●	●	●	☐	☐	☐
Total Soil	Ingestion	☐	☐	☐	☐	●	●	●
	Dermal Contact	☐	☐	☐	☐	●	●	●
Air	Inhalation	●	●	●	●	●	●	●
Groundwater	Ingestion	●	●	☐	☐	☐	●	●
	Dermal Contact	☐	☐	☐	☐	☐	☐	●
	Inhalation	☐	☐	☐	☐	☐	☐	●

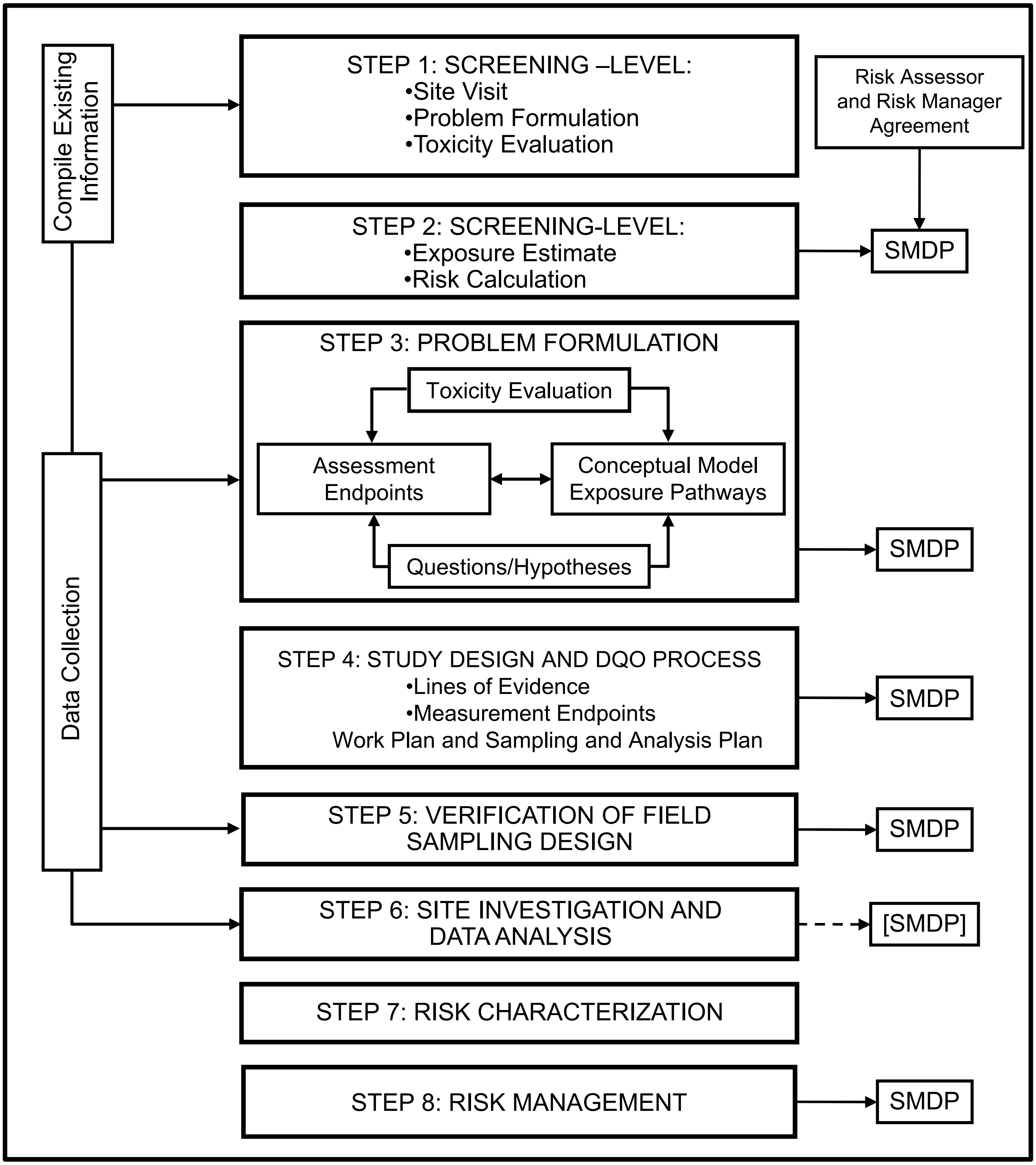
LEGEND:

● = complete exposure pathway.

☐ = incomplete exposure pathway.

Figure 5-1

CONCEPTUAL SITE MODEL
HUMAN HEALTH RISK
ASSESSMENT
LO 58 SITE
Caribou, Maine



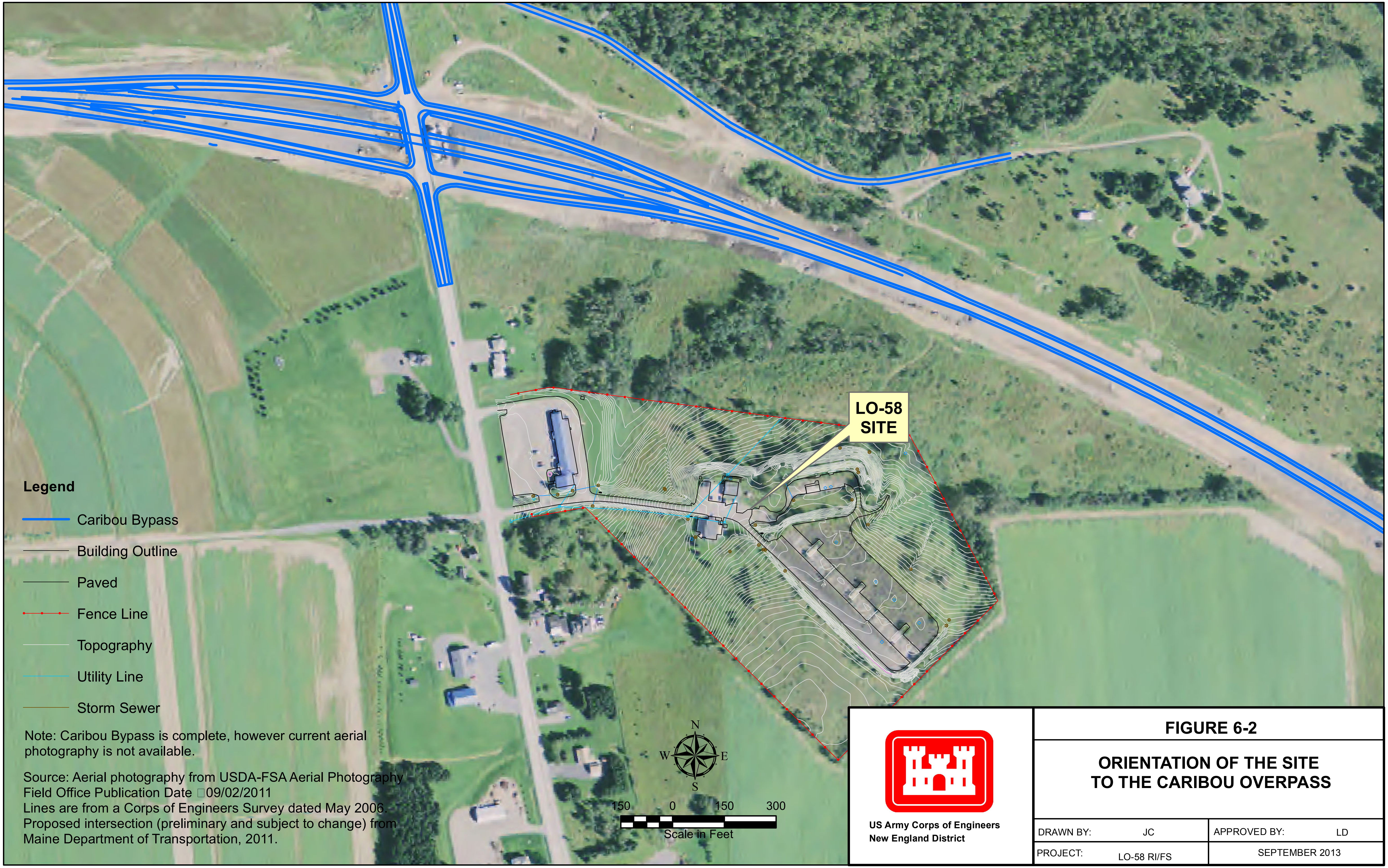
Legend:
SMDP - Scientific/management decision point
[SMDP] - only if change to the sampling and analysis plan is necessary

Source: EPA (U.S. Environmental Protection Agency), Environmental Response Team. 1997. *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments.* Interim Final. EPA 540-R-97-006.

LO 58 SITE
Caribou, Maine

FIGURE 6-1

GENERIC EIGHT-STEP ECOLOGICAL RISK ASSESSMENT PROCESS FOR SUPERFUND



Legend

- Caribou Bypass
- Building Outline
- Paved
- Fence Line
- Topography
- Utility Line
- Storm Sewer

Note: Caribou Bypass is complete, however current aerial photography is not available.

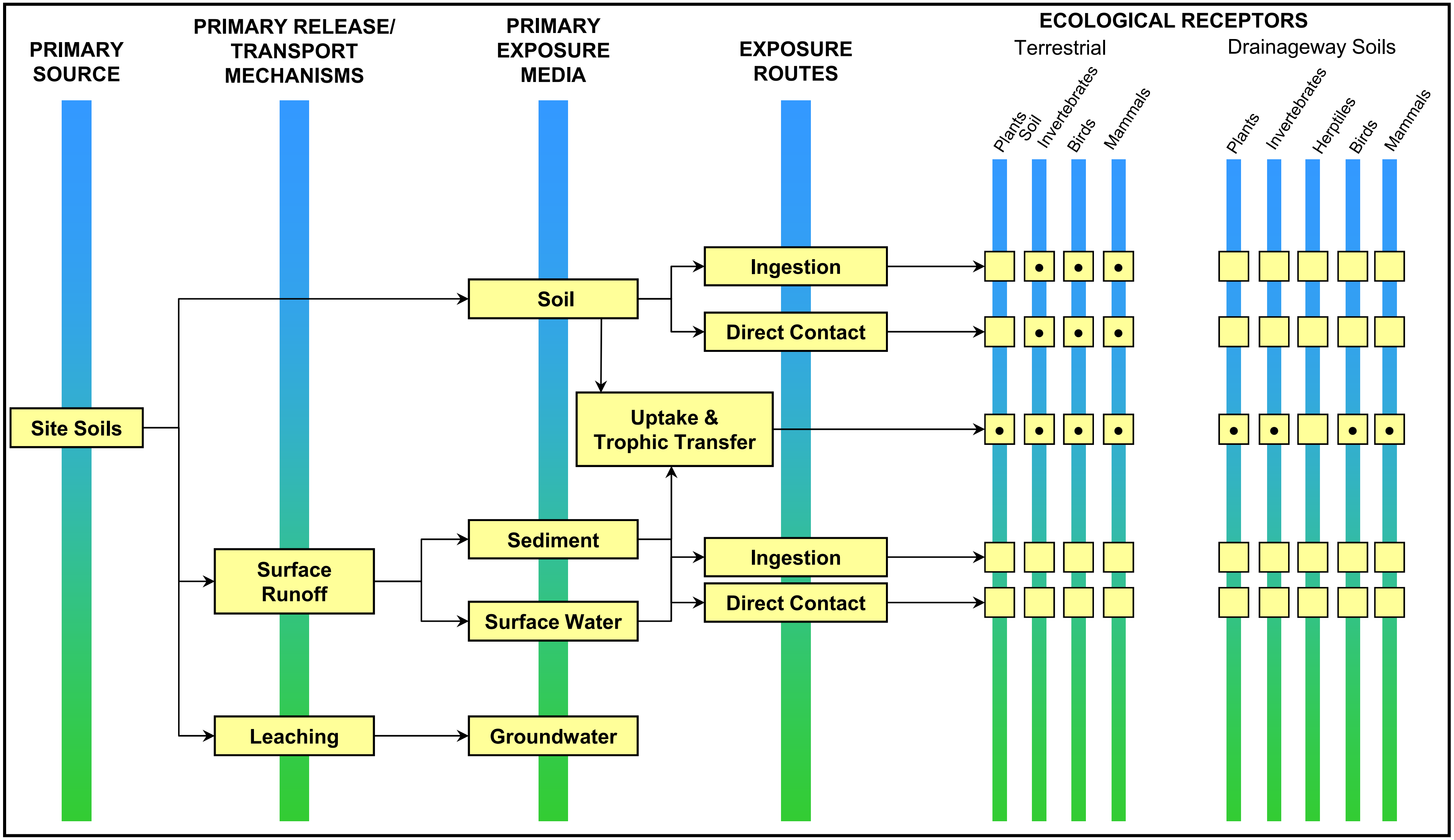
Source: Aerial photography from USDA-FSA Aerial Photography Field Office Publication Date 09/02/2011
Lines are from a Corps of Engineers Survey dated May 2006.
Proposed intersection (preliminary and subject to change) from Maine Department of Transportation, 2011.

US Army Corps of Engineers
New England District

FIGURE 6-2

ORIENTATION OF THE SITE TO THE CARIBOU OVERPASS

DRAWN BY:	JC	APPROVED BY:	LD
PROJECT:	LO-58 RI/FS		SEPTEMBER 2013



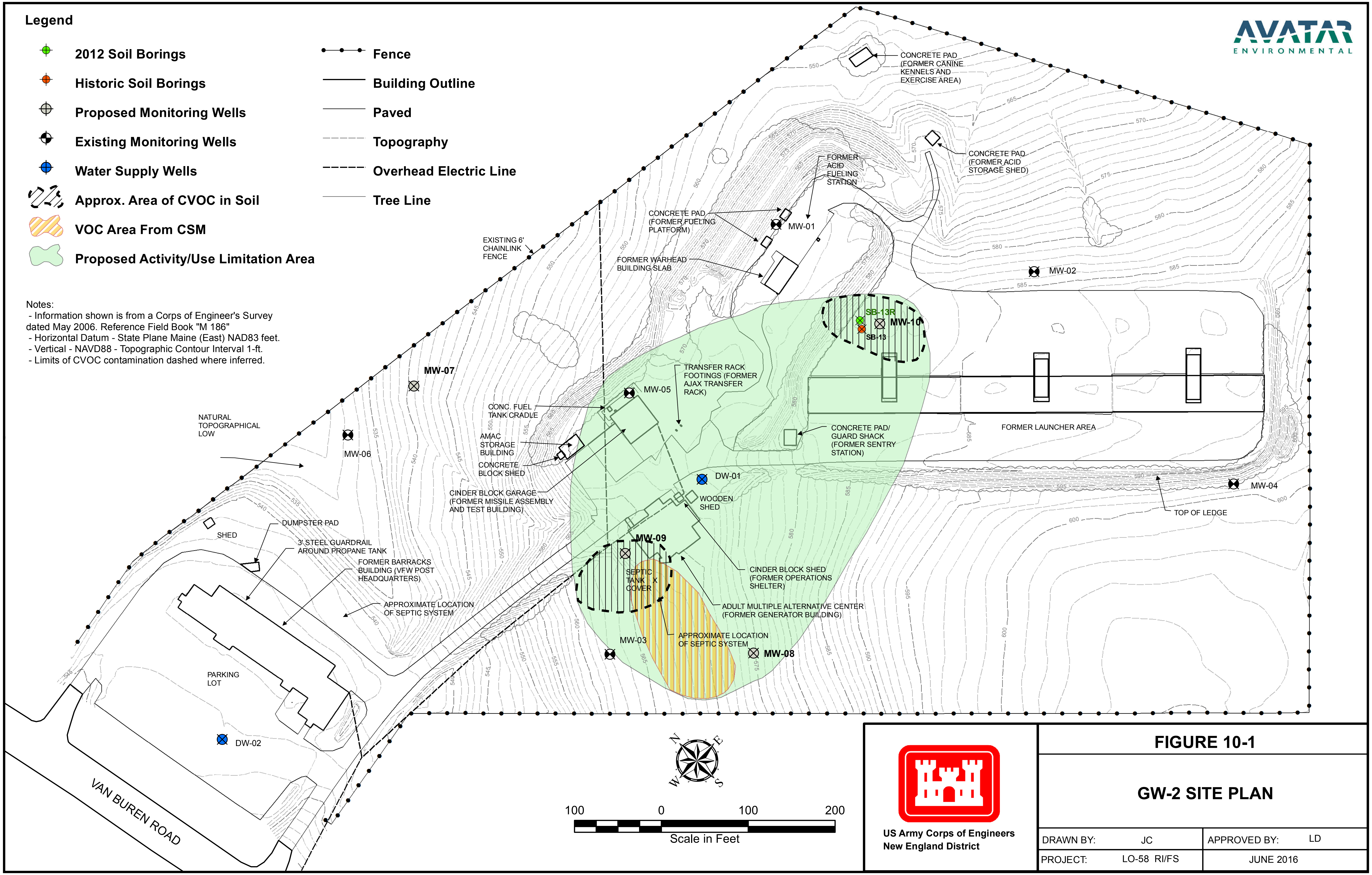
LEGEND:

⊡ = complete exposure pathway.

☐ = incomplete exposure pathway.

Figure 6-3

CONCEPTUAL SITE MODEL
ECOLOGICAL RISK ASSESSMENT
LO-58 SITE
Caribou, Maine



Legend

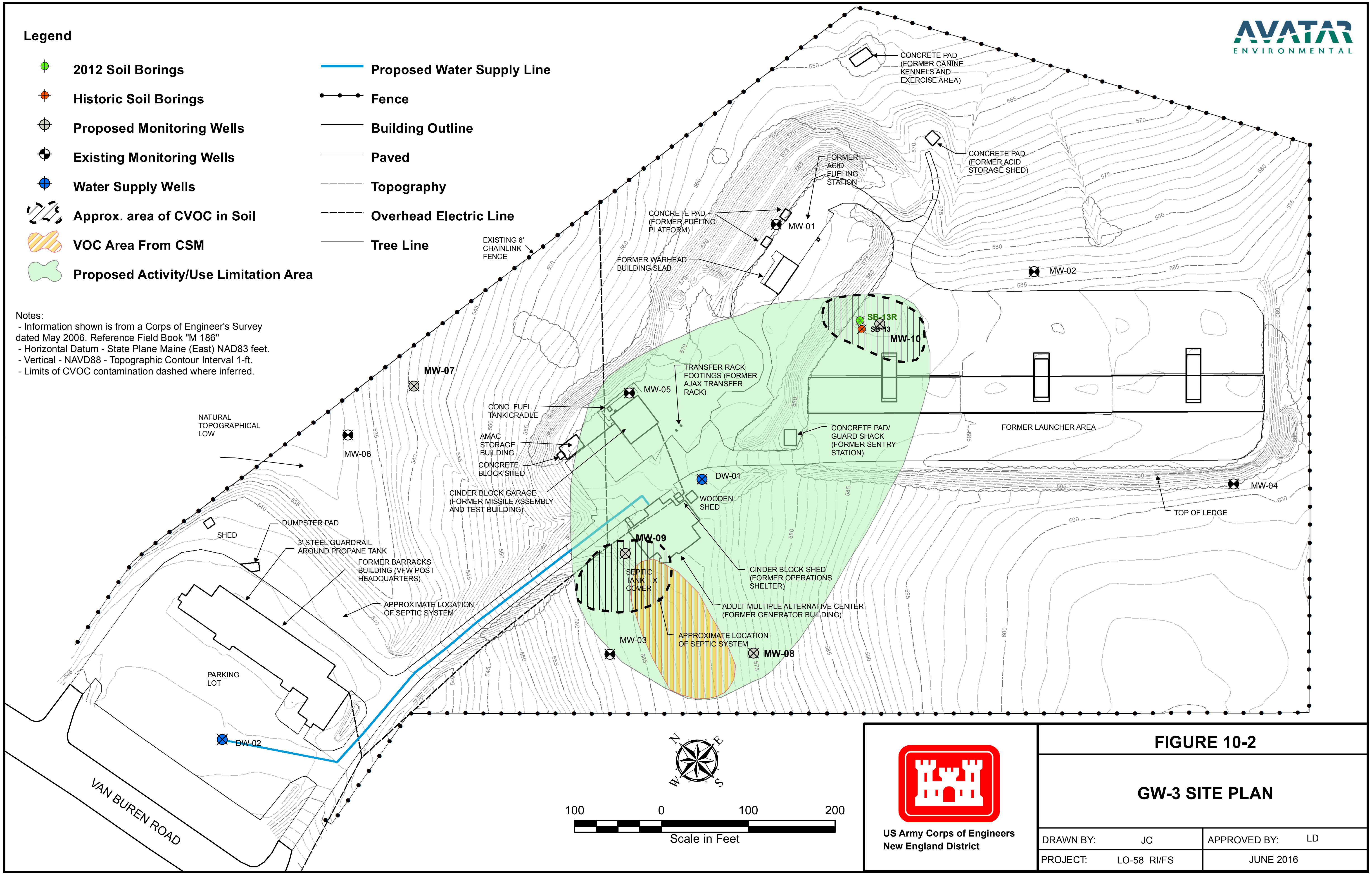
⊕	2012 Soil Borings
⊕	Historic Soil Borings
⊕	Proposed Monitoring Wells
⊕	Existing Monitoring Wells
●	Water Supply Wells
▨	Approx. Area of CVOC in Soil
▨	VOC Area From CSM
🟩	Proposed Activity/Use Limitation Area
- • - • -	Fence
——	Building Outline
——	Paved
- - - -	Topography
— — —	Overhead Electric Line
——	Tree Line

Notes:
- Information shown is from a Corps of Engineer's Survey dated May 2006. Reference Field Book "M 186"
- Horizontal Datum - State Plane Maine (East) NAD83 feet.
- Vertical - NAVD88 - Topographic Contour Interval 1-ft.
- Limits of CVOC contamination dashed where inferred.

FIGURE 10-1

GW-2 SITE PLAN

DRAWN BY:	JC	APPROVED BY:	LD
PROJECT:	LO-58 RI/FS		JUNE 2016



Legend

2012 Soil Borings	Proposed Water Supply Line
Historic Soil Borings	Fence
Proposed Monitoring Wells	Building Outline
Existing Monitoring Wells	Paved
Water Supply Wells	Topography
Approx. area of CVOC in Soil	Overhead Electric Line
VOC Area From CSM	Tree Line
Proposed Activity/Use Limitation Area	

Notes:
- Information shown is from a Corps of Engineer's Survey dated May 2006. Reference Field Book "M 186"
- Horizontal Datum - State Plane Maine (East) NAD83 feet.
- Vertical - NAVD88 - Topographic Contour Interval 1-ft.
- Limits of CVOC contamination dashed where inferred.

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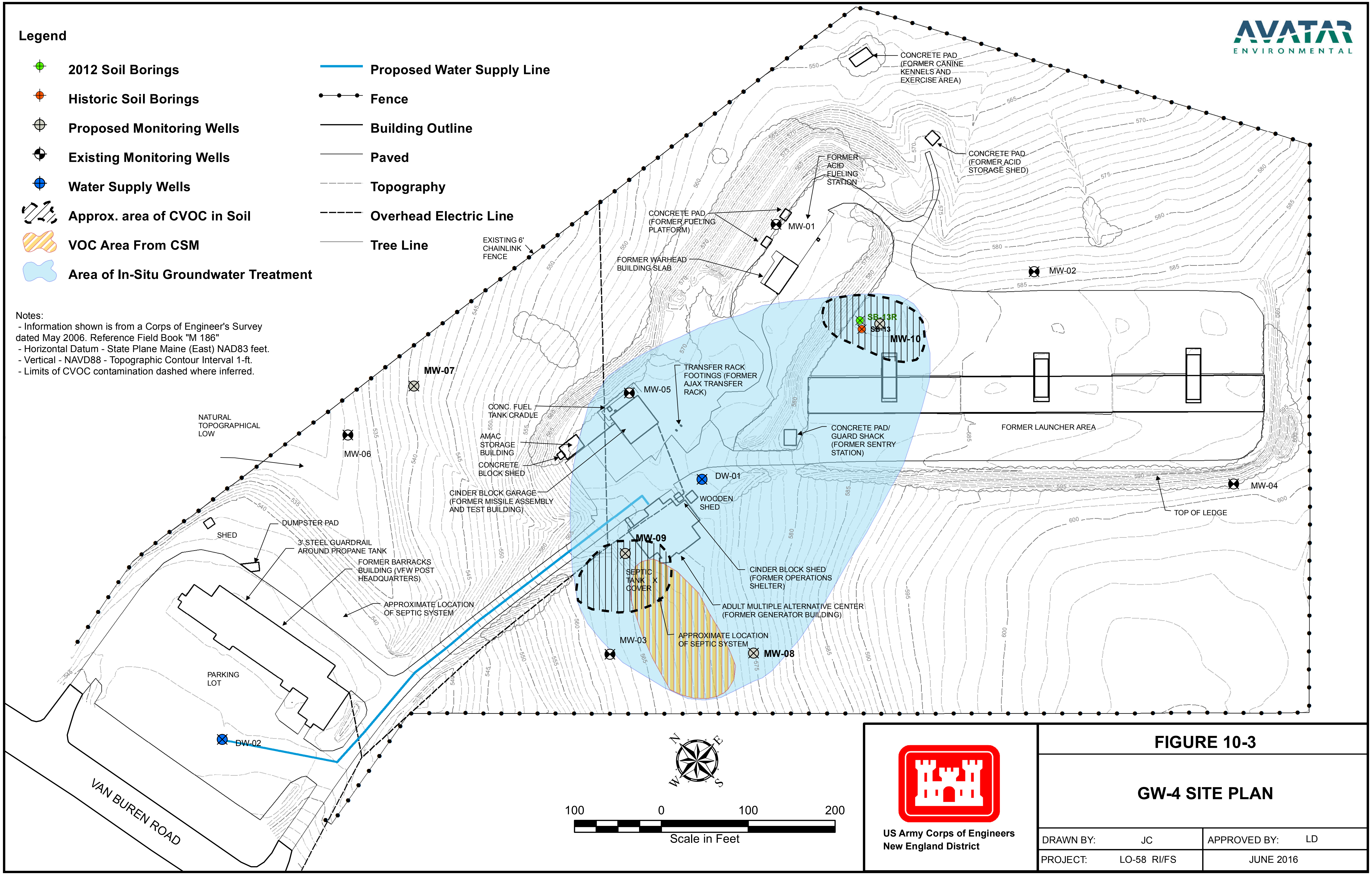
FIGURE 10-2

GW-3 SITE PLAN

DRAWN BY:	JC	APPROVED BY:	LD
PROJECT:	LO-58 RI/FS		JUNE 2016



Legend

- 🟢 2012 Soil Borings
- 🟠 Historic Soil Borings
- ⊕ Proposed Monitoring Wells
- ⊕ Existing Monitoring Wells
- 🔵 Water Supply Wells
- ▨ Approx. area of CVOC in Soil
- ▨ VOC Area From CSM
- Area of In-Situ Groundwater Treatment
- Proposed Water Supply Line
- Fence
- Building Outline
- Paved
- Topography
- Overhead Electric Line
- Tree Line

Notes:
- Information shown is from a Corps of Engineer's Survey dated May 2006. Reference Field Book "M 186"
- Horizontal Datum - State Plane Maine (East) NAD83 feet.
- Vertical - NAVD88 - Topographic Contour Interval 1-ft.
- Limits of CVOC contamination dashed where inferred.

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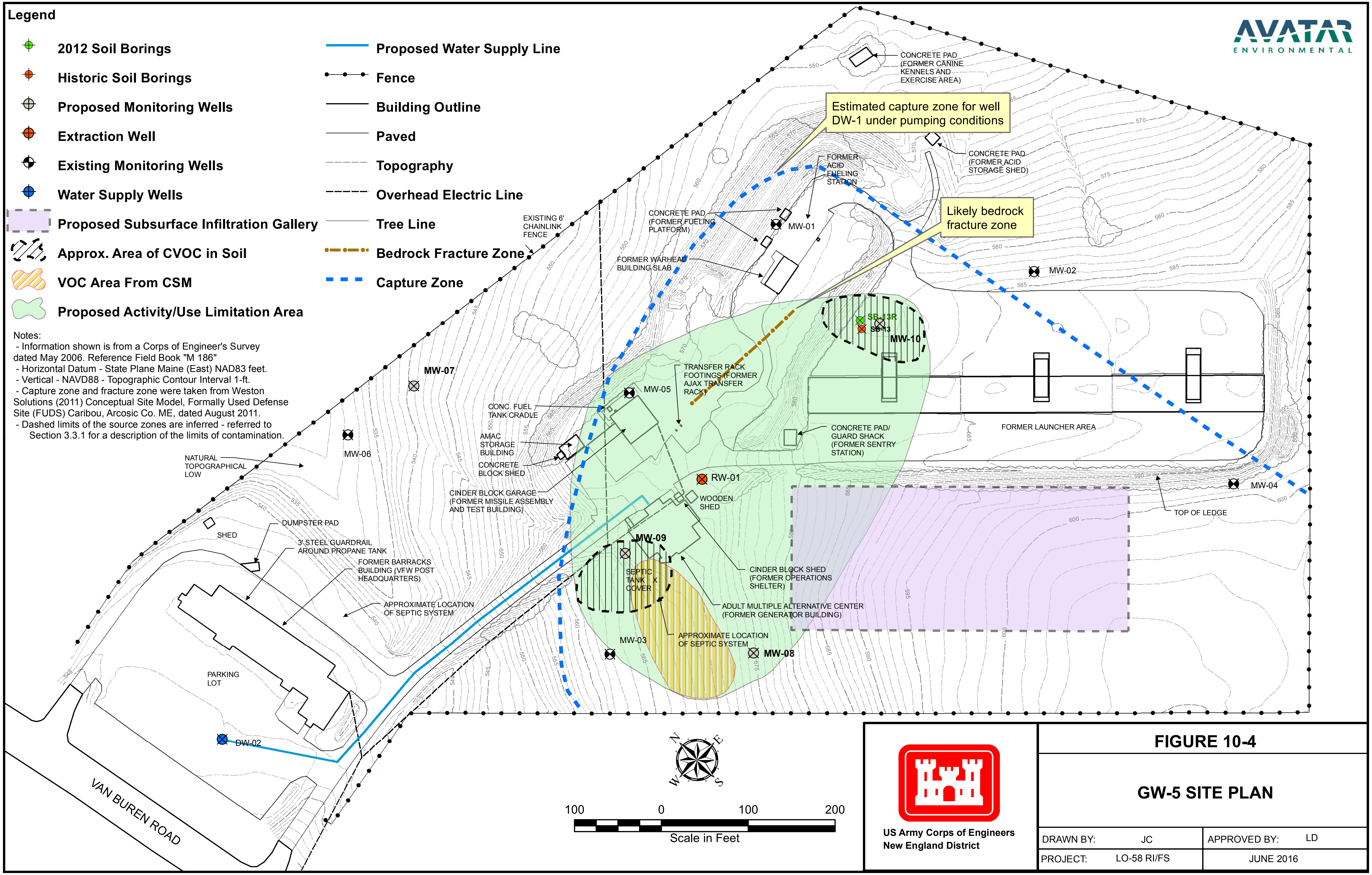
FIGURE 10-3

GW-4 SITE PLAN

DRAWN BY:	JC	APPROVED BY:	LD
PROJECT:	LO-58 RI/FS		JUNE 2016



Notes:
- Information shown is from a Corps of Engineer's Survey dated May 2006. Reference Field Book "M 186"
- Horizontal Datum - State Plane Maine (East) NAD83 feet.
- Vertical - NAVD88 - Topographic Contour Interval 1-ft.
- Capture zone and fracture zone were taken from Weston Solutions (2011) Conceptual Site Model, Formally Used Defense Site (FUDS) Caribou, Arcosic Co. ME, dated August 2011.
- Dashed limits of the source zones are inferred - referred to Section 3.3.1 for a description of the limits of contamination.

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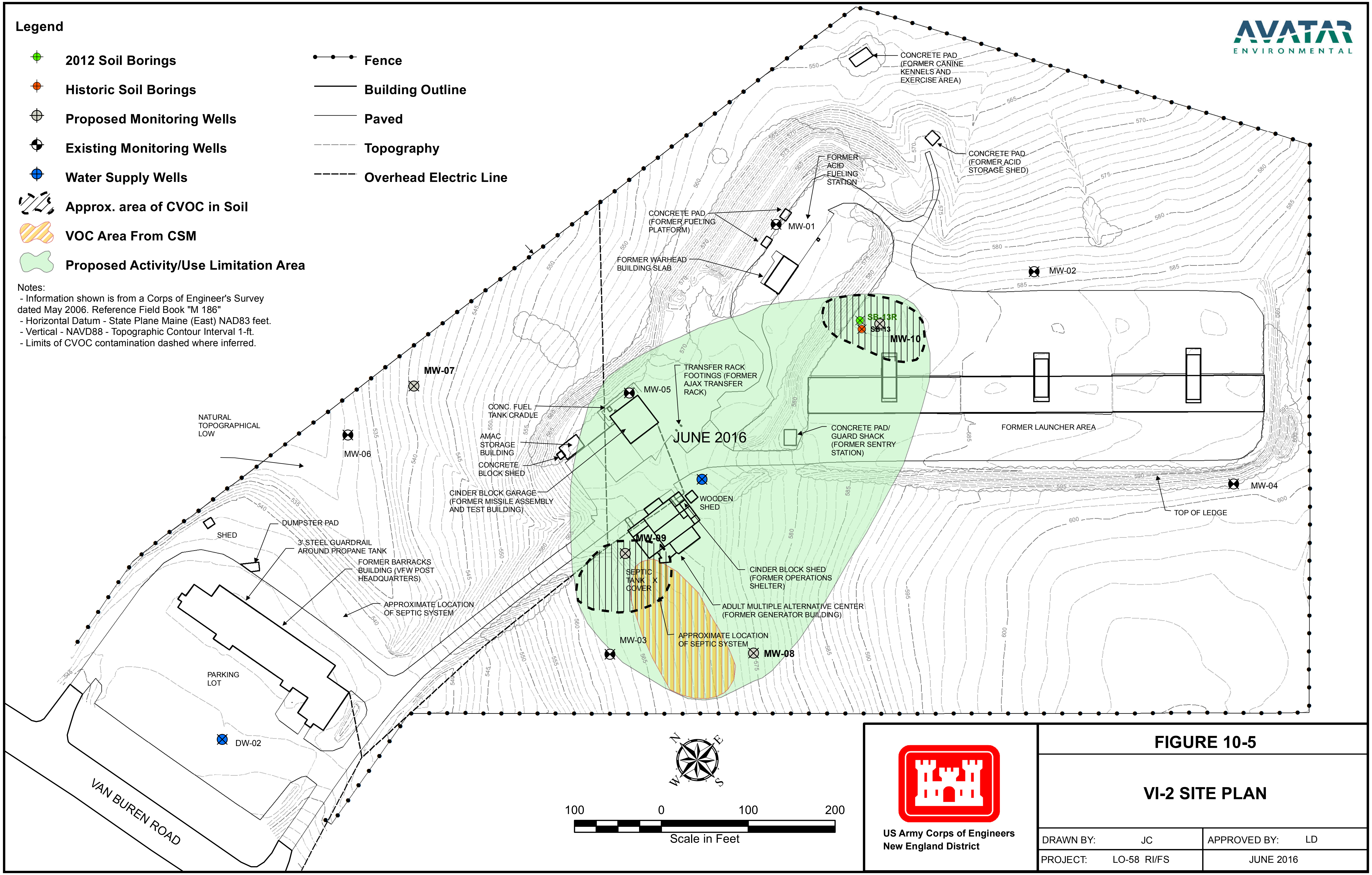
FIGURE 10-4

GW-5 SITE PLAN

DRAWN BY: JC
APPROVED BY: LD
PROJECT: LO-58 RI/FS
JUNE 2016



Legend

- 🟢 **2012 Soil Borings**
- 🟠 **Historic Soil Borings**
- ⊕ **Proposed Monitoring Wells**
- ⊗ **Existing Monitoring Wells**
- 🔵 **Water Supply Wells**
- ▨ **Approx. area of CVOC in Soil**
- 🟨 **VOC Area From CSM**
- 🟩 **Proposed Activity/Use Limitation Area**
- •—•—• **Fence**
- ━━ **Building Outline**
- —— **Paved**
- - - - **Topography**
- ━ ━ ━ **Overhead Electric Line**

Notes:
- Information shown is from a Corps of Engineer's Survey dated May 2006. Reference Field Book "M 186"
- Horizontal Datum - State Plane Maine (East) NAD83 feet.
- Vertical - NAVD88 - Topographic Contour Interval 1-ft.
- Limits of CVOC contamination dashed where inferred.

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FIGURE 10-5

VI-2 SITE PLAN

DRAWN BY:	JC	APPROVED BY:	LD
PROJECT:	LO-58 RI/FS	JUNE 2016	

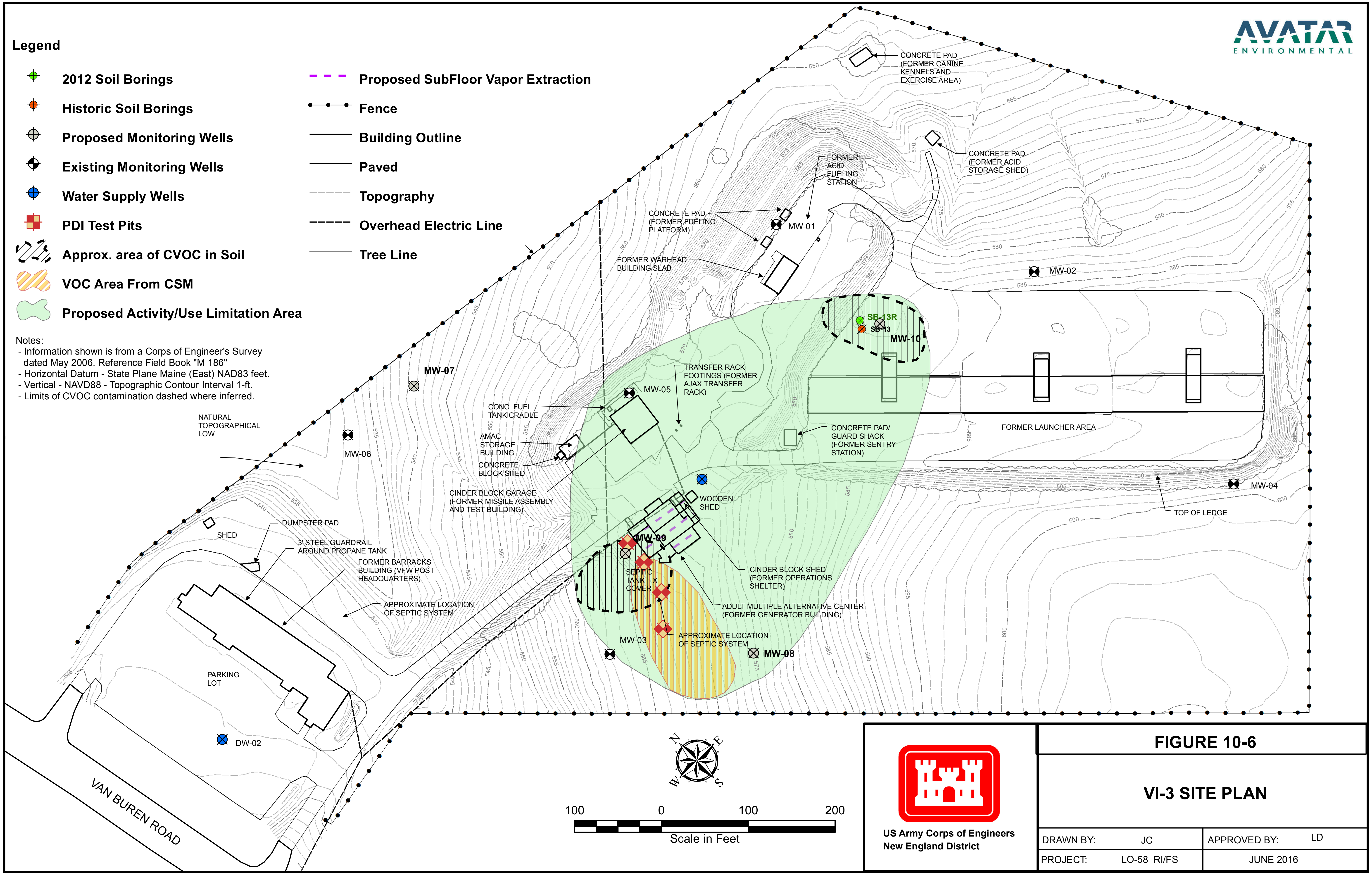

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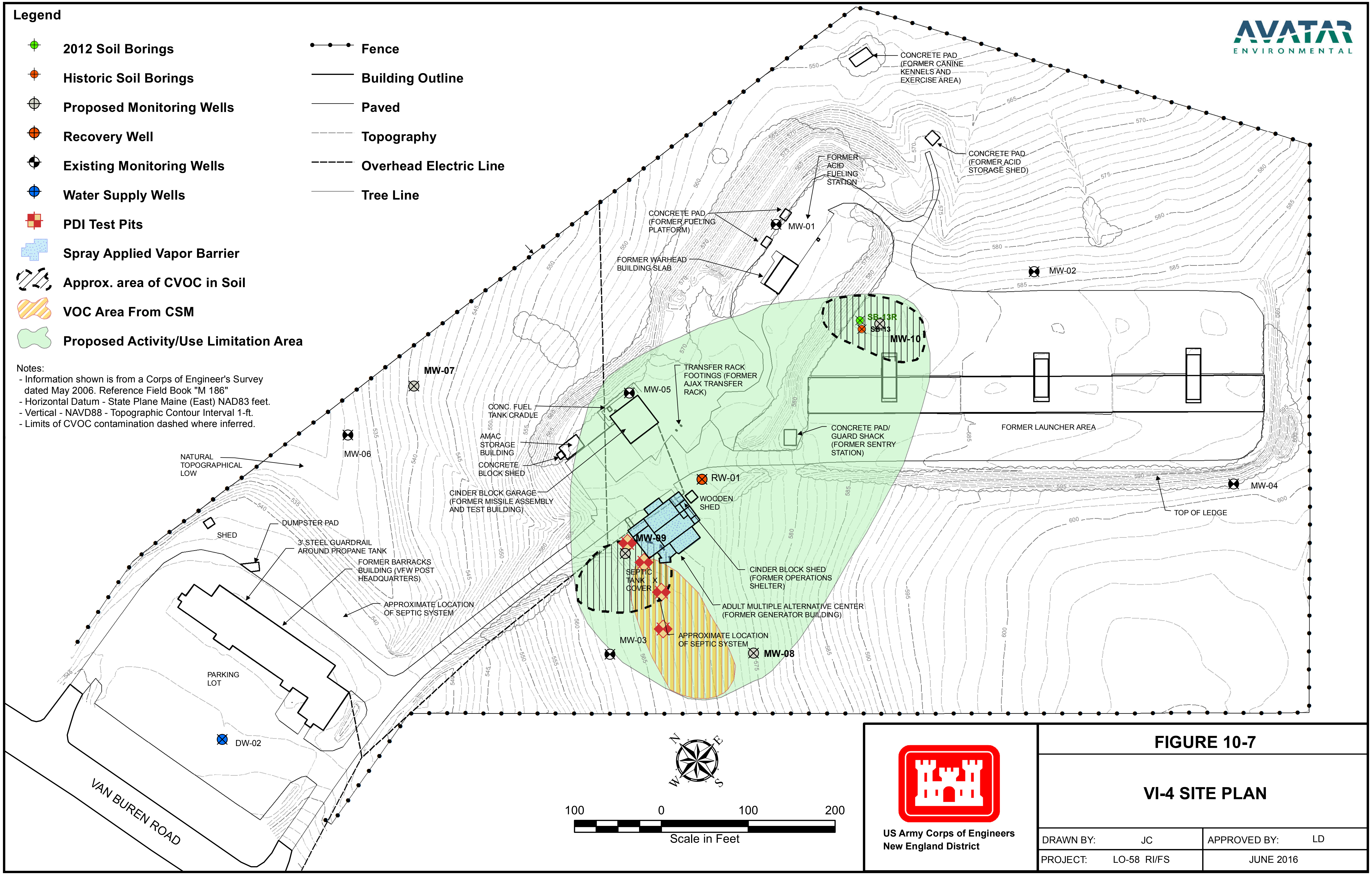
FIGURE 10-6

VI-3 SITE PLAN

DRAWN BY:	JC	APPROVED BY:	LD
PROJECT:	LO-58 RI/FS		JUNE 2016



Notes:
- Information shown is from a Corps of Engineer's Survey dated May 2006. Reference Field Book "M 186"
- Horizontal Datum - State Plane Maine (East) NAD83 feet.
- Vertical - NAVD88 - Topographic Contour Interval 1-ft.
- Limits of CVOC contamination dashed where inferred.

US Army Corps of Engineers
New England District

FIGURE 10-7

VI-4 SITE PLAN

DRAWN BY:	JC	APPROVED BY:	LD
PROJECT:	LO-58 RI/FS		JUNE 2016

TABLES

EXECUTIVE SUMMARY

TABLES

Table ES-1
Comparative Analysis of Alternatives Summary
LO-58
Caribou, Maine

	Protection of Human Health & Environment	Compliance with ARARs	Long-Term Effectiveness & Permanence	Reduction of Toxicity, Mobility, & Volume Through Treatment	Short-Term Effectiveness	Implementability	Total Present Value Cost	Time to Achieve Residential PRGs/RAOs (Cancer Risk = 10^{-5})
Groundwater Alternatives								
GW1 - No Action [Groundwater]	☒	☒	☒	☒	☒	☑	$0	90 yrs
GW2 - Continued POE System Operation, Institutional Controls, LTM	☑	○	○	○	☑	☑	$481,782	90 yrs
GW3 - Shut Down POE System; Reroute Drinking Water Supply Line, Institutional Controls, LTM	☑	○	☑	☒	☑	☑	$482,500	90 yrs
GW4 - In-Situ Treatment; Install Drinking Water Supply Line, Institutional Controls, LTM	☑	☑	☑	☑	☑	○	$1,320,429	2 yrs
GW-05 - Groundwater Extraction, Treatment, Discharge, Install Drinking Water Supply Line, Institutional Controls, LTM	☑	☑	☑	☑	☑	☑	$518,107	52 yrs
Vapor Intrusion Alternatives								
VI1 - No Action [Vapor Intrusion]	☒	☑	☒	☒	☒	☑	$0	>300 yrs
VI2 - Institutional Controls	☑	☑	☑	☒	☑	☑	$274,055	>300 yrs
VI3 - Vapor Removal and Treatment, Institutional Controls	☑	☑	☑	☑	☑	☑	$363,367	Immediately upon completion of installation
VI4 - Vapor Barrier, Institutional Controls	☑	☑	☑	☒	☑	☑	$480,169	Immediately upon completion of installation

Legend

☒	Does not meet criterion
○	Partially meets criterion
☑	Meets criterion
○*	Meets criterion when paired with VI2

SECTION 2

TABLES

Table 2-1
Monitoring Well Summary and Groundwater Elevation
LO-58
Caribou, Maine

Well ID	MW-01	MW-02	MW-03	MW-04	MW-05	MW-06	DW-1	DW-2
Ground Elevation (ft amsl)	577.3	587.6	567.5	603.4	575.9	535.5	571	546.5
Protective/Steel Casing Elevation (ft amsl)	578.96	590.13	571.07	605.84	575.88	538.3	573	539.5
Top of Inner Casing Elevation (ft amsl)	578.79	589.36	570.63	605.45	575.72	538.14	na	na
Casing Stickup, construction log (ft)	1.66	2.53	3.57	2.44	-0.02	2.8	na	na
Casing Stickup, measured (ft)	1.66	2.53	3.57	2.44	-0.02	2.8	2.4	-6
Well Total Depth, construction log (ft bmp)	142	62	47	82	82	15	na	na
Well Total Depth, measured (ft bmp)	143.1	61.6	47.85	82.7	77.8	17.1	58.1	284
Casing Diameter (inches)	2	2	2	2	2	2	6	6
Screened Interval Elevation (ft amsl)	435.69 to 445.69	527.76 to 537.76	521.78 to 531.78	522.75 to 532.75	497.92 to 507.92	524.14 to 529.14	514.9 to 563	524.5 to 255.5
Casing Bottom Elevation (ft amsl)	435.69	527.76	521.78	522.75	497.92	523.14	514.9	255.5
Depth to Water (ft bmp)	49.91	48.76	41.49	57.07	46.2	DRY	NM	NM
Groundwater Elevation (ft amsl)	528.88	540.6	529.14	548.38	529.52	--	--	--

Notes:

1. Monitoring wells MW-01 through MW-05 and drinking water wells DW-01 and DW-02 were surveyed in May 2001 by Blackstone Land Surveying of Caribou, Maine.
2. Monitoring well MW-06 was surveyed in October 2012 by Titcomb Associates of Bath, Maine.
3. Elevations for well DW-1 and DW-2 are approximate, and not the result of a precise survey.
4. The synoptic round of groundwater measurements was obtained on October 1, 2012.
5. NM = Not Measured
6. ft bmp = feet below measuring point
7. ft amsl = feet above mean sea level

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SECTION 3

TABLES

Table 3-1
Soil Sampling Laboratory Results - 2012 Sampling Event Summary
LO-58
Caribou, Maine
Page 1 of 12

	Maine Remedial Action Guidelines for Soil		Sample ID	LO58-SB01-0002	LO58-SB01-0608	LO58-SB02-0002	LO58-SB02-0608	LO58-SB03-0002	LO58-SB03-0305	LO58-SB04-0002
			Sample Description	Soil Bore	Soil Bore	Soil Bore	Soil Bore	Soil Bore	Soil Bore	Soil Bore
			Sample Date	10/1/2012	10/1/2012	10/1/2012	10/1/2012	10/1/2012	10/1/2012	10/1/2012
			Sample Depth	0'-2'	6'-8'	0'-2'	6'-8'	0'-2'	3'-5'	0'-2'
		Screening Toxicity Value								
Analyte	**Residential**	**Residential$^{(a)}$**	**Ecological$^{(b)}$**							
MADEP EPH - µg/kg										
C11-C22 Aromatic Hydrocarbons	750,000	NBA	NBA	15300 J	30600 U	29300 U	33400 U	38300 U	27900 U	29300 U
C19-C36 Aliphatic Hydrocarbons	10,000,000	NBA	NBA	28800 U	30600 U	29300 U	33400 U	38300 U	27900 U	29300 U
MADEP VPH - µg/kg										
C9-C10 Aromatic Hydrocarbons	750000	NBA	NBA	522 U	681 U	522 U	749 U	966 U	547 U	546 U
Metals (SW6010) - mg/kg										
Aluminum	170,000	7700 n	600	**15700** J	**15900** J	**15900** J	**29900** J	**25600** J	**15300** J	**13900**
Antimony	68	3.1 n	0.27	R	R	R	R	R	R	**0.52** J
Arsenic	1.4	0.68 c	18	**6.2**	**4.4**	**4.8**	**6.6**	**8.5**	**3.9**	**7.3** J
Barium	10,000	1500 n	330	44	37.8	59.9	104	62.6 J	33.3	34.5
Beryllium	340	16 n	21	0.61	0.77	1	1.4 J	1.4 J	0.79	0.93
Cadmium	11	7.1 n	0.36	0.065 J	0.83 UJ	0.073 J	2.5 UJ	2.3 UJ	0.84 UJ	0.1 J
Calcium	--	NBA	NBA	9360 J	43600 J	907 J	6610 J	5140 J	48000 J	3150
Chromium^{8}	510	0.3 c	26	**32**	**35.6**	**35.8**	**61.4**	**56.3**	**33.3**	**28.8**
Cobalt	51	2.3 n	13	**10.3** J	**13.2** J	**10.9** J	**21** J	**19.6** J	**13.8** J	**13.4**
Copper	2,400	310 n	28	26.6 J	17.6 J	23.3 J	**32.7** J	**34** J	15.6 J	23.7 J
Iron	120,000	5500 n	200	**31000** J	**27800** J	**31500** J	**36400** J	**49300** J	**28400** J	**32200** J
Lead	340	400	11	**16.1** J	**14.1** J	**13.9** J	**17.1** J	**23.3** J	**14.5** J	**19.4**
Magnesium	--	NBA	NBA	8980 J	11600 J	10700 J	17500 J	16600 J	13000 J	8800
Manganese	4,100	180 n	220	**487** J	**413** J	**486** J	**593** J	**654** J	**412** J	**640**
Nickel	510	150 n	38	**38.4**	**49.1**	**51.6**	**86.4**	**84.6**	**50**	**52.1**
Potassium	--	NBA	NBA	924 J	986 J	924 J	1780 J	1310 J	950 J	672
Selenium	850	39 n	0.52	**0.85** J	5.8 UJ	**1.2** J	17.2 UJ	16.2 UJ	5.9 UJ	2.4 U
Silver	850	39 n	4.2	0.71 UJ	4.4 UJ	0.88 UJ	4.8 UJ	4.7 UJ	0.78 UJ	0.68 U
Sodium	--	NBA	NBA	35.4 J	34 J	27.9 J	43.1 J	44.6 J	30.4 J	26.3 J
Thallium	--	0.078 n	0.21	1.9 UJ	**0.46** J	1.9 U	2.5 UJ	2.3 UJ	2.1 UJ	**0.49** J
Vanadium	1,200	39 n	7.8	**22.2**	**16.6**	**20.1**	**22.4**	**29.2**	**16.4**	**16.4**
Zinc	10,000	2300 n	46	**54.8**	**51.8**	**53.8**	**85.6**	**91.9**	**52.1**	**60.3**
Mercury	51	1.1 n	0.000051	**0.048** J	**0.013** J	**0.065** J	0.044 UJ	**0.025** J	0.036 UJ	**0.093**
PCBs (SW8082) - µg/kg										
PCB-1260	2,400	240 c	NBA	15 J	20 U	20 U	22 U	23 U	19 U	20 U
VOCs (SW8260) - µg/kg										
1,2-Dichlorobenzene	5,100,000	180,000 n	2,960	4.7 U	20 U	5.4 UJ	6.3 UJ	6.7 U	5.2 U	5.3 UJ
1,4-Dichlorobenzene	2,600,000	2,600 c	20,000	1.1 J	3.9 J	0.72 J	0.76 J	1.1 J	1.1 J	5.3 UJ
2-Butanone	10,000,000	2,700,000 n	89,600	4.7 U	20 U	5.4 UJ	6.3 UJ	33	5.2 U	15
4-Isopropyltoluene	--	NBA	NBA	0.17 J	20 U	5.4 UJ	6.3 UJ	6.7 U	5.2 U	5.3 UJ
4-Methyl-2-pentanone	10,000,000	3,300,000 n	443,000	2 J	20 U	5.4 UJ	6.3 UJ	6.7 U	5.2 U	5.3 U
Acetone	10,000,000	6,100,000 n	2,500	210 J	47	140 J	49 J	300	20	120
Carbon disulfide	10,000,000	77,000 n	94	1.4 J	20 U	5.4 UJ	1 J	0.58 J	5.1 J	5.3 UJ

Table 3-1
Soil Sampling Laboratory Results - 2012 Sampling Event Summary
LO-58
Caribou, Maine

	Maine Remedial Action Guidelines for Soil	Sample ID		LO58-SB01-0002	LO58-SB01-0608	LO58-SB02-0002	LO58-SB02-0608	LO58-SB03-0002	LO58-SB03-0305	LO58-SB04-0002
		Sample Description		Soil Bore	Soil Bore	Soil Bore	Soil Bore	Soil Bore	Soil Bore	Soil Bore
		Sample Date		10/1/2012	10/1/2012	10/1/2012	10/1/2012	10/1/2012	10/1/2012	10/1/2012
		Sample Depth		0'-2'	6'-8'	0'-2'	6'-8'	0'-2'	3'-5'	0'-2'
		Screening Toxicity Value								
Analyte	**Residential**	**Residential(a)**	**Ecological(b)**							
VOCs (SW8270) Continued - µg/kg										
Methyl acetate	--	7,800,000 n	NBA	9.7 J	20 U	5.1 J	4.9 J	42	5.2 U	6.6 J
Methyl iodide	--	NBA	NBA	4.7 U	20 U	5.4 UJ	6.3 UJ	6.7 U	5.2 U	5.3 U
n-Butylbenzene	--	390,000 n	NBA	0.44 UJ	1.4 U	0.44 UJ	0.4 UJ	6.7 U	0.34 U	5.3 UJ
o-Xylene	10,000,000	65,000 n	NBA	4.7 U	20 U	5.4 UJ	6.3 UJ	6.7 U	5.2 U	5.3 UJ
Toluene	10,000,000	490,000 n	200,000	0.25 J	20 U	5.4 UJ	6.3 UJ	6.7 U	5.2 U	5.3 U
Trichloroethene	85,000	410 n	12,400	4.7 U	20 U	5.4 UJ	6.3 UJ	6.7 U	5.2 U	5.3 UJ
Xylenes, Total	10,000,000	58,000 n	10,000	4.7 U	20 U	5.4 UJ	6.3 UJ	6.7 U	5.2 U	5.3 U
SVOCs (SW8270) - µg/kg										
1-Methylnaphthalene	--	18,000 c	NBA	0.29 J	0.8 U	0.79 U	0.9 U	9 U	0.26 J	0.77 U
1-Methylphenanthrene	--	NBA	NBA	2.4	0.8 U	0.79 U	0.9 U	30	5.2	0.77 U
1,1'-Biphenyl	8,500,000	4,700 n	NBA	0.75 U	0.8 U	0.79 U	0.9 U	9 U	0.76 U	0.77 U
1,2-Dichlorobenzene	5,100,000	180,000 n	2,960	4.7 U	20 U	5.4 UJ	6.3 UJ	6.7 U	5.2 U	5.3 UJ
1,4-Dichlorobenzene	2,600,000	2,600 c	20,000	1.1 J	3.9 J	0.72 J	0.76 J	1.1 J	1.1 J	5.3 UJ
2-Methylnaphthalene	500,000	24,000 n	3,240	0.42 J	0.8 U	0.79 U	0.9 U	9 U	0.26 J	0.21 J
2,3,5-Trimethylnaphthalene	--	NBA	NBA	0.75 U	0.8 U	0.79 U	0.9 U	9 U	0.76 U	0.77 U
2,6-Dimethylnaphthalene	--	NBA	NBA	0.27 J	0.8 U	0.79 U	0.9 U	9 U	0.76 U	0.77 U
Acenaphthene	7,500,000	360,000 n	20,000	1.4	0.8 U	0.79 U	0.9 U	6.4 J	0.48 J	0.77 U
Acenaphthylene	7,500,000	360,000 n	682,000	0.81	0.8 U	0.79 U	0.9 U	8.5 J	0.93	0.77 U
Anthracene	10,000,000	1,800,000 n	1,480,000	3.3	0.8 U	0.79 U	0.9 U	26	1.8	0.77 U
Benzo[a]anthracene	2,600	160 c	5,210	14	0.8 U	0.79 U	0.9 U	**170**	15	0.44 J
Benzo[a]pyrene	260	16 c	1,520	13	0.8 U	0.79 U	0.9 U	**170**	15	0.36 J
Benzo[b]fluoranthene	2,600	160 c	59,800	16	0.37 J	0.22 J	0.26 J	**210**	17	1.2 J
Benzo[e]pyrene	--	NBA	NBA	11	0.8 U	0.79 U	0.9 U	130	13	0.83 J
Benzo[g,h,i]perylene	3,700,000	3,800 c	119,000	5.4	0.8 U	0.79 U	0.9 U	71	7.1	0.4 J
Benzo[k]fluoranthene	26,000	1,600 c	148,000	12	0.8 U	0.79 U	0.9 U	160	17	0.63 J
Bis(2-ethylhexyl) phthalate	770,000	39,000 c	925	29 J	27 J	390 U	32 J	32 J	32 J	380 U
Butyl benzyl phthalate	5,700,000	290,000 c	239	370 U	390 U	390 U	440 U	440 U	380 U	380 U
Chrysene	260,000	16,000 c	4,730	14	0.8 U	0.79 U	0.9 U	180	17	0.78 J
Dibenz(a,h)anthracene	260	16 c	18,400	2.7	0.8 U	0.79 U	0.9 U	**35**	2.9	0.77 U
Dibenzothiophene	--	78,000 n	NBA	0.82	0.8 U	0.79 U	0.9 U	6.9 J	0.8	0.77 U
Fluoranthene	5,000,000	240,000 n	122,000	26	0.8 U	0.79 U	0.9 U	350	30	0.81 J
Fluorene	5,000,000	240,000 n	30,000	1.4	0.8 U	0.79 U	0.9 U	6.7 J	0.81	0.77 U
Indeno[1,2,3-cd]pyrene	2,600	160 c	109,000	8.6	0.8 U	0.79 U	0.9 U	100	10	0.39 J
Naphthalene	2,500,000	3,800 c	99	0.41 J	0.24 J	0.27 J	0.25 J	9 U	0.29 J	0.77 U
Perylene	--	NBA	NBA	3.7	0.8 U	0.79 U	0.9 U	43	3.8	0.77 U
Phenanthrene	3,700,000	1,800,000 n	45,700	13	0.27 J	0.79 U	0.9 U	120	12	0.62 J
Pyrene	3,700,000	180,000 n	78,500	21	0.8 U	0.79 U	0.9 U	310	27	0.95 J

Table 3-1
Soil Sampling Laboratory Results - 2012 Sampling Event Summary
LO-58
Caribou, Maine

	Maine Remedial Action Guidelines for Soil			Sample ID	LO58-SB04-0608	LO58-SB-DUP-01	LO58-SB05-0002	LO58-SB05-0305	LO58-SB06-0002	LO58-SB-DUP-02	LO58-SB06-0406
				Sample Description	Soil Bore	DUP OF SB04-0608	Soil Bore	Soil Bore	Soil Bore	DUP OF SB06-0002	Soil Bore
				Sample Date	10/1/2012	10/1/2012	10/1/2012	10/1/2012	10/2/2012	10/2/2012	10/2/2012
				Sample Depth	6'-8'	6'-8'	0'-2'	3'-5'	0'-2'	0'-2'	4'-6'
		Screening Toxicity Value									
Analyte	**Residential**	**Residential(a)**		**Ecological(b)**							
MADEP EPH - µg/kg											
C11-C22 Aromatic Hydrocarbons	750,000	NBA		NBA	31000 U	30200 U	27300 U	30800 U	30000 U	30300 U	30000 U
C19-C36 Aliphatic Hydrocarbons	10,000,000	NBA		NBA	31000 U	30200 U	27300 U	30800 U	30000 U	19900 J	--
MADEP VPH - µg/kg											
C9-C10 Aromatic Hydrocarbons	750000	NBA		NBA	586 U	645 U	486 U	661 U	612 U	616 U	627 U
Metals (SW6010) - mg/kg											
Aluminum	170,000	7700	n	600	**14800**	**13900**	**15500**	**16700**	**13000** J	**15900** J	**11900** J
Antimony	68	3.1	n	0.27	**0.58** J	0.45 U	**0.35** J	**0.51** J	R	R	R
Arsenic	1.4	0.68	c	18	**5.2** J	**4.6** J	**8** J	**6.7** J	**6.7**	**9.3**	**4.6**
Barium	10,000	1500	n	330	25.3	25.4	40.5	75.1	43.4	52.8	46.4
Beryllium	340	16	n	21	0.85	0.83	0.6	0.88	0.87	0.85	0.77
Cadmium	11	7.1	n	0.36	0.087 J	0.095 J	0.12 J	0.11 J	0.12 J	0.12 J	0.4 UJ
Calcium	--	NBA		NBA	4620 J	20900 J	5950	16900	1600 J	8600 J	156000 J
Chromium[8]	510	0.3	c	26	**37.2**	**31.5**	**29.1**	**32.3**	**28**	**31**	**24.2**
Cobalt	51	2.3	n	13	**16.9**	**16**	**11.3**	**13.5**	**9.1** J	**11.3** J	**9.2** J
Copper	2,400	310	n	28	23.6 J	21.7 J	21.9 J	25.4 J	**39.6** J	**50.7** J	19.2 J
Iron	120,000	5500	n	200	**34300** J	**32700** J	**31900** J	**31400** J	**29000** J	**33900** J	**27100** J
Lead	340	400		11	**53.9**	**33.2**	**16.6**	**19.1**	**12.9** J	**17.2** J	**15.6** J
Magnesium	--	NBA		NBA	10400	9610	8960	9890	7700 J	8190 J	8710 J
Manganese	4,100	180	n	220	**494**	**469**	**669**	**897**	**474** J	**584** J	**353** J
Nickel	510	150	n	38	**69.6**	**64.6**	**39.5**	**48.5**	**41.4**	**42.9**	**43.4**
Potassium	--	NBA		NBA	756	771	746	785	886 J	1050 J	1120 J
Selenium	850	39	n	0.52	2.4 U	2.4 U	2.4 U	2.5 U	**0.86** J	**1.4** J	2.8 UJ
Silver	850	39	n	4.2	0.67 U	0.69 U	0.68 U	0.71 U	4.6 UJ	0.77 UJ	0.68 UJ
Sodium	--	NBA		NBA	29.9 J	30.5 J	35.5 J	31.5 J	22.7 J	29.9 J	44.3 J
Thallium	--	0.078	n	0.21	1.7 U	1.7 U	1.7 U	**0.6** J	1.9 UJ	2.3 UJ	2 UJ
Vanadium	1,200	39	n	7.8	**18.4**	**16.9**	**24.6**	**20**	**18.1**	**23.7**	**14.1**
Zinc	10,000	2300	n	46	**69.7**	**64.6**	**56.4**	**56.1**	**57.3**	**66.4**	**51.9**
Mercury	51	1.1	n	0.000051	**0.014** J	**0.009** J	**0.051**	**0.054**	**0.11** J	**0.12** J	**0.079** J
PCBs (SW8082) - µg/kg											
PCB-1260	2,400	240	c	NBA	19 U	19 U	19 U	20 U	23 U	22 U	19 U
VOCs (SW8260) - µg/kg											
1,2-Dichlorobenzene	5,100,000	180,000	n	2,960	5.2 UJ	6.3 UJ	5.4 U	6 U	6.4 U	6.9 U	7.4 U
1,4-Dichlorobenzene	2,600,000	2,600	c	20,000	5.2 U	6.3 UJ	5.4 U	2.1 J	0.89 J	6.9 U	0.89 J
2-Butanone	10,000,000	2,700,000	n	89,600	29	6.3 U	8.8	6 U	12	27	7.4 U
4-Isopropyltoluene	--	NBA		NBA	5.2 U	6.3 UJ	5.4 U	6 U	6.4 U	6.9 U	7.4 U
4-Methyl-2-pentanone	10,000,000	3,300,000	n	443,000	5.2 U	6.3 U	5.4 U	6 U	5.4 J	6.9 U	7.4 U
Acetone	10,000,000	6,100,000	n	2,500	160 J	75 J	74	50	320 J	590 J	130
Carbon disulfide	10,000,000	77,000	n	94	5.2 U	0.47 J	5.4 U	17	14	6.9 U	8.8

Table 3-1
Soil Sampling Laboratory Results - 2012 Sampling Event Summary
LO-58
Caribou, Maine

	Maine Remedial Action Guidelines for Soil	Sample ID Sample Description Sample Date Sample Depth			LO58-SB04-0608 Soil Bore 10/1/2012 6'-8'	LO58-SB-DUP-01 DUP OF SB04-0608 10/1/2012 6'-8'	LO58-SB05-0002 Soil Bore 10/1/2012 0'-2'	LO58-SB05-0305 Soil Bore 10/1/2012 3'-5'	LO58-SB06-0002 Soil Bore 10/2/2012 0'-2'	LO58-SB-DUP-02 DUP OF SB06-0002 10/2/2012 0'-2'	LO58-SB06-0406 Soil Bore 10/2/2012 4'-6'
		Screening Toxicity Value									
Analyte	**Residential**	**Residential(a)**		**Ecological(b)**							
VOCs (SW8270) Continued - µg/kg											
Methyl acetate	--	7,800,000	n	NBA	5.2 U	4.7 J	19 J	6 U	6.4 U	30	7.4 U
Methyl iodide	--	NBA		NBA	5.2 U	6.3 U	5.4 U	6 U	6.4 U	6.9 U	7.4 U
n-Butylbenzene	--	390,000	n	NBA	5.2 U	0.63 UJ	5.4 U	6 U	6.4 U	6.9 U	7.4 U
o-Xylene	10,000,000	65,000	n	NBA	5.2 U	0.63 UJ	5.4 U	6 U	6.4 U	6.9 U	7.4 U
Toluene	10,000,000	490,000	n	200,000	5.2 U	0.63 U	5.4 U	6 U	6.4 U	6.9 U	7.4 U
Trichloroethene	85,000	410	n	12,400	5.2 U	0.63 UJ	5.4 U	6 U	6.4 U	6.9 U	7.4 U
Xylenes, Total	10,000,000	58,000	n	10,000	5.2 U	0.63 U	5.4 U	6 U	6.4 U	6.9 U	7.4 U
SVOCs (SW8270) - µg/kg											
1-Methylnaphthalene	--	18,000	c	NBA	0.74 U	0.76 U	0.19 J	0.37 J	0.91 U	0.87 U	0.71 U
1-Methylphenanthrene	--	NBA		NBA	0.2 J	0.76 U	0.64 J	0.28 J	0.85 J	1.4	0.25 J
1,1'-Biphenyl	8,500,000	4,700	n	NBA	0.74 U	0.76 U	0.74 U	0.25 J	0.91 U	0.87 U	0.71 U
1,2-Dichlorobenzene	5,100,000	180,000	n	2,960	5.2 U	6.3 UJ	5.4 U	6 U	6.4 U	6.9 U	7.4 U
1,4-Dichlorobenzene	2,600,000	2,600	c	20,000	5.2 U	6.3 UJ	5.4 U	2.1 J	0.89 J	6.9 U	0.89 J
2-Methylnaphthalene	500,000	24,000	n	3,240	0.23 J	0.21 J	0.34 J	0.54 J	0.91 U	0.87 U	0.71 U
2,3,5-Trimethylnaphthalene	--	NBA		NBA	0.74 U	0.76 U	0.74 U	0.82 U	0.91 U	0.87 U	0.71 U
2,6-Dimethylnaphthalene	--	NBA		NBA	0.74 U	0.76 U	0.19 J	0.23 J	0.91 U	0.87 U	0.71 U
Acenaphthene	7,500,000	360,000	n	20,000	0.74 U	0.76 U	0.25 J	0.82 U	0.91 U	0.87 U	0.71 U
Acenaphthylene	7,500,000	360,000	n	682,000	0.74 U	0.76 U	0.74 U	0.37 J	0.43 J	0.59 J	0.71 U
Anthracene	10,000,000	1,800,000	n	1,480,000	0.23 J	0.76 U	0.83	0.28 J	0.91 U	0.28 J	0.71 U
Benzo[a]anthracene	2,600	160	c	5,210	2	0.53 J	6.2	1.1	2.3	3.5	0.6 J
Benzo[a]pyrene	260	16	c	1,520	2.1	0.56 J	5.4	1.2	2.5	3.9	0.66 J
Benzo[b]fluoranthene	2,600	160	c	59,800	3.6	1.5	7.1	2.3	4.5	6.3	1.1
Benzo[e]pyrene	--	NBA		NBA	5.2 J	1.4 J	5.1	1.4	2.8	4	0.93
Benzo[g,h,i]perylene	3,700,000	3,800	c	119,000	1.3	0.51 J	2.1	0.67 J	1.1	1.7	0.52 J
Benzo[k]fluoranthene	26,000	1,600	c	148,000	2.1	0.57 J	4.9	1.4	3.2	4.5	0.75
Bis(2-ethylhexyl) phthalate	770,000	39,000	c	925	370 U	370 U	360 U	400 U	35 J	31 J	350 U
Butyl benzyl phthalate	5,700,000	290,000	c	239	370 U	370 U	360 U	400 U	450 U	430 U	350 U
Chrysene	260,000	16,000	c	4,730	3 J	0.87 J	5.9	1.6	3.5	5.3	0.95
Dibenz(a,h)anthracene	260	16	c	18,400	0.44 J	0.76 U	0.96	0.31 J	0.42 J	0.83 J	0.71 U
Dibenzothiophene	--	78,000	n	NBA	0.19 J	0.76 U	0.21 J	0.82 U	0.91 U	0.31 J	0.71 U
Fluoranthene	5,000,000	240,000	n	122,000	4.8 J	1.1 J	7.8	2.2	6.3	9.2	1.7
Fluorene	5,000,000	240,000	n	30,000	0.24 J	0.76 U	0.28 J	0.31 J	0.23 J	0.29 J	0.71 U
Indeno[1,2,3-cd]pyrene	2,600	160	c	109,000	0.99	0.39 J	2.4	0.95	1.8	2.9	0.5 J
Naphthalene	2,500,000	3,800	c	99	0.74 U	0.76 U	0.74 U	0.82 U	0.26 J	0.24 J	0.22 J
Perylene	--	NBA		NBA	1.2	0.27 J	1.7	0.35 J	0.53 J	0.82 J	0.71 U
Phenanthrene	3,700,000	1,800,000	n	45,700	2.2	0.6 J	3.1	1.1	2.8	4.1	0.87
Pyrene	3,700,000	180,000	n	78,500	4.1 J	1.1 J	7.6	2	4.7	7.3	1.5

Table 3-1

Soil Sampling Laboratory Results - 2012 Sampling Event Summary

LO-58

Caribou, Maine

	Maine Remedial Action Guidelines for Soil			Sample ID	LO58-SB07-0002	LO58-SB07-0911	LO58-SB08-0001	LO58-SB08-0608	LO58-SB09-0002	LO58-SB09-0406	LO58-SB10-0002
				Sample Description	Soil Bore	Soil Bore	Soil Bore	Soil Bore	Soil Bore	Soil Bore	Soil Bore
				Sample Date	10/2/2012	10/2/2012	10/2/2012	10/2/2012	10/2/2012	10/2/2012	10/2/2012
				Sample Depth	0'-2'	9'-11'	0'-1'	6'-8'	0'-2'	4'-6'	0'-2'
		Screening Toxicity Value									
Analyte	**Residential**	**Residential$^{(a)}$**		**Ecological$^{(b)}$**							
MADEP EPH - µg/kg											
C11-C22 Aromatic Hydrocarbons	750,000	NBA		NBA	29400 U	36000 U	32600 U	29400 U	29000 U	28300 U	32100 U
C19-C36 Aliphatic Hydrocarbons	10,000,000	NBA		NBA	29400 U	36000 U	32600 U	29400 U	29000 U	28300 U	32100 U
MADEP VPH - µg/kg											
C9-C10 Aromatic Hydrocarbons	750000	NBA		NBA	593 U	861 U	666 U	701 U	540 U	554 U	694 U
Metals (SW6010) - mg/kg											
Aluminum	170,000	7700	n	600	**14900** J	**19500** J	**18100** J	**16500** J	**13500** J	**20600** J	**18100** J
Antimony	68	3.1	n	0.27	R	R	R	R	R	R	**0.49** J
Arsenic	1.4	0.68	c	18	**5.7**	**6.5**	**9**	**3**	**5.9**	**6.3**	**7.6** J
Barium	10,000	1500	n	330	40.3	35.3 J	65.2	36.6	42.7	52.9 J	32.5
Beryllium	340	16	n	21	0.65	0.85 J	0.69	0.73	0.66	1.4 J	0.62
Cadmium	11	7.1	n	0.36	0.069 J	2.1 UJ	**0.43** J	0.41 UJ	0.33 UJ	1.8 UJ	0.11 J
Calcium	--	NBA		NBA	9570 J	8150 J	5530 J	81400 J	827 J	4840 J	698 J
Chromium^{8}	510	0.3	c	26	**28.2**	**53.5**	**34.4**	**40.1**	**29.1**	**35.5**	**32.9** J
Cobalt	51	2.3	n	13	**9.7** J	**18.9** J	**10** J	**10.4** J	**11.6** J	**15.2** J	**12.9**
Copper	2,400	310	n	28	21.9 J	26.2 J	**40.9** J	16 J	18.7 J	24.2 J	24
Iron	120,000	5500	n	200	**30200** J	**38100** J	**36500** J	**29400** J	**30600** J	**35800** J	**31000** J
Lead	340	400		11	**17.5** J	**19.3** J	**34.2** J	**13.3** J	**15.3** J	**20.9** J	**17.3** J
Magnesium	--	NBA		NBA	8950 J	14200 J	7410 J	13400 J	8420 J	13400 J	8060 J
Manganese	4,100	180	n	220	**464** J	**462** J	**607** J	**327** J	**682** J	**779** J	**565** J
Nickel	510	150	n	38	**38.7**	**82.9**	**43.2**	**56.6**	37.7	**61.3**	**42.2**
Potassium	--	NBA		NBA	1050 J	1040 J	1210 J	1060 J	828 J	1320 J	704 J
Selenium	850	39	n	0.52	2.7 UJ	14.9 UJ	**1.1** J	**0.78** J	**1** J	12.5 UJ	**1.7** J
Silver	850	39	n	4.2	0.69 UJ	3.9 UJ	0.88 UJ	1.4 UJ	0.7 UJ	3.3 UJ	0.77 U
Sodium	--	NBA		NBA	31.6 J	2130 U	37.8 J	45.6 J	31.5 J	41.5 J	29.8 J
Thallium	--	0.078	n	0.21	2 UJ	2.1 UJ	2.2 UJ	2.1 UJ	1.6 UJ	**0.44** J	1.9 U
Vanadium	1,200	39	n	7.8	**20.3**	**21.9**	**29.1**	**19.6**	**20.5**	**19.7**	**24.2**
Zinc	10,000	2300	n	46	**55.7**	**73.1**	**79.6**	**53.9**	**51.6**	**65.3**	**54.5**
Mercury	51	1.1	n	0.000051	**0.067** J	**0.018** J	**0.35** J	0.034 UJ	**0.027** J	**0.041** J	**0.037**
PCBs (SW8082) - µg/kg											
PCB-1260	2,400	240	c	NBA	20 U	21 U	5.3 J	19 U	19 U	18 U	18 U
VOCs (SW8260) - µg/kg											
1,2-Dichlorobenzene	5,100,000	180,000	n	2,960	6.1 U	5.4 U	6.5 U	0.43 J	5.3 U	5.3 U	5.6 UJ
1,4-Dichlorobenzene	2,600,000	2,600	c	20,000	6.1 U	0.63 J	6.5 U	1.3 UJ	1.1 U	0.93 U	5.6 UJ
2-Butanone	10,000,000	2,700,000	n	89,600	10 J	9.7	18	5.3 U	6	5.3 U	7.5
4-Isopropyltoluene	--	NBA		NBA	6.1 U	5.4 U	6.5 U	5.3 U	5.3 U	5.3 U	5.6 U
4-Methyl-2-pentanone	10,000,000	3,300,000	n	443,000	6.1 U	5.4 U	6.5 U	5.3 U	5.3 U	5.3 U	5.6 U
Acetone	10,000,000	6,100,000	n	2,500	170 J	320	340	68 J	180	45	180 J
Carbon disulfide	10,000,000	77,000	n	94	18 J	1 J	6.5 U	2.6 J	5.3 U	2 J	5.6 U

Table 3-1
Soil Sampling Laboratory Results - 2012 Sampling Event Summary
LO-58
Caribou, Maine
Page 6 of 12

	Maine Remedial Action Guidelines for Soil	Sample ID Sample Description Sample Date Sample Depth		LO58-SB07-0002 Soil Bore 10/2/2012 0'-2'	LO58-SB07-0911 Soil Bore 10/2/2012 9'-11'	LO58-SB08-0001 Soil Bore 10/2/2012 0'-1'	LO58-SB08-0608 Soil Bore 10/2/2012 6'-8'	LO58-SB09-0002 Soil Bore 10/2/2012 0'-2'	LO58-SB09-0406 Soil Bore 10/2/2012 4'-6'	LO58-SB10-0002 Soil Bore 10/2/2012 0'-2'
		Screening Toxicity Value								
Analyte	**Residential**	**Residential(a)**	**Ecological(b)**							
VOCs (SW8270) Continued - µg/kg										
Methyl acetate	--	7,800,000 n	NBA	6.1 U	9.5	20	5.3 U	3.7 J	5.3 U	3.6 J
Methyl iodide	--	NBA	NBA	6.1 U	0.81 J	2 J	0.72 J	5.3 U	5.3 U	5.6 U
n-Butylbenzene	--	390,000 n	NBA	6.1 U	5.4 U	0.4 J	0.62 J	0.48 J	0.51 J	5.6 UJ
o-Xylene	10,000,000	65,000 n	NBA	6.1 U	5.4 U	6.5 U	5.3 U	5.3 U	5.3 U	0.099 J
Toluene	10,000,000	490,000 n	200,000	6.1 U	5.4 U	6.5 U	5.3 U	5.3 U	5.3 U	5.6 U
Trichloroethene	85,000	410 n	12,400	6.1 U	5.4 U	6.5 U	5.3 U	5.3 U	5.3 U	5.6 U
Xylenes, Total	10,000,000	58,000 n	10,000	6.1 U	5.4 U	6.5 U	5.3 U	5.3 U	5.3 U	0.099 J
SVOCs (SW8270) - µg/kg										
1-Methylnaphthalene	--	18,000 c	NBA	0.83 U	0.82 U	0.57 J	0.75 U	0.75 U	0.71 U	0.72 U
1-Methylphenanthrene	--	NBA	NBA	1.8	1	4.5	0.75 U	0.75 U	0.71 U	0.72 U
1,1'-Biphenyl	8,500,000	4,700 n	NBA	0.83 U	0.82 U	1.2 U	0.75 U	0.75 U	0.71 U	0.72 U
1,2-Dichlorobenzene	5,100,000	180,000 n	2,960	6.1 U	5.4 U	6.5 U	0.43 J	5.3 U	5.3 U	5.6 UJ
1,4-Dichlorobenzene	2,600,000	2,600 c	20,000	6.1 U	0.63 J	6.5 U	1.3 UJ	1.1 U	0.93 U	5.6 UJ
2-Methylnaphthalene	500,000	24,000 n	3,240	0.31 J	0.29 J	0.73 J	0.75 U	0.75 U	0.71 U	0.72 U
2,3,5-Trimethylnaphthalene	--	NBA	NBA	0.83 U	0.82 U	0.54 J	0.75 U	0.75 U	0.71 U	0.72 U
2,6-Dimethylnaphthalene	--	NBA	NBA	0.21 J	0.82 U	0.51 J	0.75 U	0.75 U	0.71 U	0.72 U
Acenaphthene	7,500,000	360,000 n	20,000	0.83 U	0.82 U	1 J	0.75 U	0.75 U	0.71 U	0.72 U
Acenaphthylene	7,500,000	360,000 n	682,000	0.34 J	0.35 J	1.2	0.75 U	0.75 U	0.71 U	0.72 U
Anthracene	10,000,000	1,800,000 n	1,480,000	0.49 J	0.82 U	2	0.75 U	0.75 U	0.71 U	0.72 U
Benzo[a]anthracene	2,600	160 c	5,210	5	2	18	0.75 U	0.2 J	0.71 U	0.43 J
Benzo[a]pyrene	260	16 c	1,520	5.4	2	**22**	0.75 U	0.19 J	0.71 U	0.41 J
Benzo[b]fluoranthene	2,600	160 c	59,800	6.5	3.7	26	0.37 J	0.36 J	0.3 J	0.82
Benzo[e]pyrene	--	NBA	NBA	5.4	2.5	21	0.75 U	0.24 J	0.71 U	0.79
Benzo[g,h,i]perylene	3,700,000	3,800 c	119,000	3.2	1.5	9.1	0.75 U	0.75 U	0.71 U	0.37 J
Benzo[k]fluoranthene	26,000	1,600 c	148,000	5.1	2.3	25	0.75 U	0.19 J	0.71 U	0.56 J
Bis(2-ethylhexyl) phthalate	770,000	39,000 c	925	36 J	44 J	33 J	370 U	25 J	350 U	360 U
Butyl benzyl phthalate	5,700,000	290,000 c	239	410 U	410 U	420 U	370 U	370 U	350 U	360 U
Chrysene	260,000	16,000 c	4,730	6.3	3.1	23	0.75 U	0.29 J	0.71 U	0.72
Dibenz(a,h)anthracene	260	16 c	18,400	1.5	0.58 J	4.4	0.75 U	0.75 U	0.71 U	0.72 U
Dibenzothiophene	--	78,000 n	NBA	0.28 J	0.22 J	1.2	0.75 U	0.75 U	0.71 U	0.72 U
Fluoranthene	5,000,000	240,000 n	122,000	12	4.7	44	0.75 U	0.53 J	0.33 J	1.2
Fluorene	5,000,000	240,000 n	30,000	0.31 J	0.24 J	1.3	0.75 U	0.75 U	0.71 U	0.72 U
Indeno[1,2,3-cd]pyrene	2,600	160 c	109,000	4.6	2	14	0.75 U	0.19 J	0.71 U	0.52 J
Naphthalene	2,500,000	3,800 c	99	0.29 UJ	0.23 UJ	0.58 UJ	0.75 U	0.75 U	0.71 U	0.72 U
Perylene	--	NBA	NBA	1.4	0.48 J	4.7	0.75 U	0.75 U	0.71 U	0.72 U
Phenanthrene	3,700,000	1,800,000 n	45,700	4.6	2.5	20	0.21 J	0.28 J	0.31 J	0.64 J
Pyrene	3,700,000	180,000 n	78,500	9.3	4.3	36	0.75 U	0.37 J	0.26 J	0.92

Table 3-1
Soil Sampling Laboratory Results - 2012 Sampling Event Summary
LO-58
Caribou, Maine

	Maine Remedial Action Guidelines for Soil	**Sample ID Sample Description Sample Date Sample Depth**			**LO58-SB10-0507 Soil Bore 10/2/2012 5'-7'**	**LO58-SB11-0001 Soil Bore 10/2/2012 0'-1'**	**LO58-SB11-0810 Soil Bore 10/2/2012 8'-10'**	**LO58-SB12-0001 Soil Bore 10/3/2012 0'-1'**	**LO58-SB12-0810 Soil Bore 10/3/2012 8'-10'**	**LO58-SB13-0002 Soil Bore 10/3/2012 0'-2'**	**LO58-SB13-0810 Soil Bore 10/3/2012 8'-10'**
		Screening Toxicity Value									
Analyte	**Residential**	**Residential$^{(a)}$**		**Ecological$^{(b)}$**							
MADEP EPH - µg/kg											
C11-C22 Aromatic Hydrocarbons	750,000	NBA		NBA	30500 U	28700 U	29600 U	27700 U	28500 U	31500 U	32500 U
C19-C36 Aliphatic Hydrocarbons	10,000,000	NBA		NBA	30500 U	28700 U	29600 U	27700 U	28500 U	31500 U	32500 U
MADEP VPH - µg/kg											
C9-C10 Aromatic Hydrocarbons	750000	NBA		NBA	679 U	658 U	563 U	549 U	593 U	393 J	702 U
Metals (SW6010) - mg/kg											
Aluminum	170,000	7700	n	600	**13800** J	**19000** J	**17500** J	**15800** J	**11800** J	**16400** J	**18800** J
Antimony	68	3.1	n	0.27	4.9 UJ	4.6 UJ	10.1 UJ	**0.39** J	**0.45** J	4.6 UJ	9.3 UJ
Arsenic	1.4	0.68	c	18	**6** J	**9.4** J	**3.9** J	**7.1** J	**7.1** J	**7** J	**4.1** J
Barium	10,000	1500	n	330	37.4	51.9	45.9	39.5	37.7	29.2	49.7 J
Beryllium	340	16	n	21	0.81	0.77	1	0.63	0.57	0.5	1.3 J
Cadmium	11	7.1	n	0.36	0.09 J	0.12 J	0.84 U	0.13 J	0.089 J	0.12 J	0.77 U
Calcium	--	NBA		NBA	75100 J	1960 J	38200 J	732 J	2020 J	797 J	8300 J
Chromium^{8}	510	0.3	c	26	**31.9** J	**34.9** J	**39.6** J	**28.9** J	**25.2** J	**28.6** J	**33.6** J
Cobalt	51	2.3	n	13	**11.5**	**13.9**	**13.4**	**13.3**	**11.7**	**12.4**	**14.5**
Copper	2,400	310	n	28	21.8	**49.5**	19.7	**44.4**	23.5	26	21.8
Iron	120,000	5500	n	200	**25800** J	**33500** J	**31400** J	**30100** J	**28500** J	**29300** J	**31500** J
Lead	340	400		11	**16.9** J	**21.1** J	**19.2** J	**21.1** J	**18.2** J	**17.3** J	**16.9** J
Magnesium	--	NBA		NBA	8710 J	8130 J	12700 J	7410 J	6230 J	8220 J	13000 J
Manganese	4,100	180	n	220	**469** J	**616** J	**487** J	**780** J	**584** J	**566** J	**463** J
Nickel	510	150	n	38	**47**	**48.4**	**58.4**	36.1	35.2	**39**	**55.4**
Potassium	--	NBA		NBA	882 J	900 J	894 J	703 J	839 J	611 J	1090 J
Selenium	850	39	n	0.52	**1.3** J	**2.3** J	5.9 UJ	**2** J	**1.8** J	**2.2** J	5.4 UJ
Silver	850	39	n	4.2	0.82 U	0.76 U	1.7 U	0.71 U	0.77 U	0.77 U	1.5 U
Sodium	--	NBA		NBA	35.2 J	33.3 J	28.8 J	26.7 J	37 J	29.3 J	36 J
Thallium	--	0.078	n	0.21	2.1 U	1.9 U	2.1 U	1.8 U	1.9 U	1.9 U	1.9 U
Vanadium	1,200	39	n	7.8	**16.8**	**25.9**	**18.7**	**24.1**	**20.3**	**27.5**	**17.8**
Zinc	10,000	2300	n	46	**46.9**	**66.7**	**54.5**	**57.7**	**57.7**	**50.9**	**62.3**
Mercury	51	1.1	n	0.000051	**0.053**	**0.098**	**0.017** J	**0.043**	**0.042**	**0.034** J	**0.052**
PCBs (SW8082) - µg/kg											
PCB-1260	2,400	240	c	NBA	20 U	20 U	20 U	20 U	18 U	20 U	20 U
VOCs (SW8260) - µg/kg											
1,2-Dichlorobenzene	5,100,000	180,000	n	2,960	6.6 UJ	6.1 UJ	6.5 UJ	5.8 UJ	5.7 UJ	5.5 UJ	7.4 UJ
1,4-Dichlorobenzene	2,600,000	2,600	c	20,000	6.6 UJ	6.1 UJ	6.5 UJ	5.8 UJ	5.7 UJ	5.5 UJ	7.4 UJ
2-Butanone	10,000,000	2,700,000	n	89,600	11	7.6	19	5.8 U	5.7 U	8.4	16
4-Isopropyltoluene	--	NBA		NBA	6.6 U	6.1 U	6.5 U	5.8 U	5.7 U	5.5 U	7.4 U
4-Methyl-2-pentanone	10,000,000	3,300,000	n	443,000	6.6 U	3.2 J	4.8 J	5.3 J	5.7 U	5.5 U	7.4 U
Acetone	10,000,000	6,100,000	n	2,500	110 J	220 J	380 J	170 J	45 J	220 J	230 J
Carbon disulfide	10,000,000	77,000	n	94	1.7 J	0.88 J	0.81 J	5.8 U	5.7 U	5.5 U	7.4 U

Table 3-1
Soil Sampling Laboratory Results - 2012 Sampling Event Summary
LO-58
Caribou, Maine

	Maine Remedial Action Guidelines for Soil	Sample ID Sample Description Sample Date Sample Depth			LO58-SB10-0507 Soil Bore 10/2/2012 5'-7'	LO58-SB11-0001 Soil Bore 10/2/2012 0'-1'	LO58-SB11-0810 Soil Bore 10/2/2012 8'-10'	LO58-SB12-0001 Soil Bore 10/3/2012 0'-1'	LO58-SB12-0810 Soil Bore 10/3/2012 8'-10'	LO58-SB13-0002 Soil Bore 10/3/2012 0'-2'	LO58-SB13-0810 Soil Bore 10/3/2012 8'-10'
		Screening Toxicity Value									
Analyte	**Residential**	**Residential$^{(a)}$**		**Ecological$^{(b)}$**							
VOCs (SW8270) Continued - µg/kg											
Methyl acetate	--	7,800,000	n	NBA	1.7 J	16 J	22 J	15 J	5.7 U	9.6 J	2.7 J
Methyl iodide	--	NBA		NBA	6.6 U	6.1 U	1.5 J	5.8 U	5.7 U	5.5 U	7.4 U
n-Butylbenzene	--	390,000	n	NBA	0.45 J	0.58 J	0.64 J	5.8 UJ	5.7 UJ	5.5 UJ	0.75 J
o-Xylene	10,000,000	65,000	n	NBA	6.6 UJ	6.1 UJ	6.5 UJ	5.8 UJ	5.7 UJ	5.5 UJ	7.4 UJ
Toluene	10,000,000	490,000	n	200,000	6.6 U	6.1 U	0.3 J	5.8 U	5.7 U	5.5 U	7.4 U
Trichloroethene	85,000	410	n	12,400	6.6 U	6.1 U	6.5 U	5.8 U	5.7 U	5.5 U	7.4 U
Xylenes, Total	10,000,000	58,000	n	10,000	6.6 UJ	6.1 UJ	6.5 UJ	5.8 UJ	5.7 UJ	5.5 UJ	7.4 UJ
SVOCs (SW8270) - µg/kg											
1-Methylnaphthalene	--	18,000	c	NBA	0.75 U	0.25 J	0.79 U	0.21 J	0.73 U	0.27 J	0.82 U
1-Methylphenanthrene	--	NBA		NBA	0.75 U	4.6	0.79 U	1.4	0.73 U	2.2	0.82 U
1,1'-Biphenyl	8,500,000	4,700	n	NBA	0.75 U	0.79 U	0.79 U	0.76 U	0.73 U	0.74 U	0.82 U
1,2-Dichlorobenzene	5,100,000	180,000	n	2,960	6.6 UJ	6.1 UJ	6.5 UJ	5.8 UJ	5.7 UJ	5.5 UJ	7.4 UJ
1,4-Dichlorobenzene	2,600,000	2,600	c	20,000	6.6 UJ	6.1 UJ	6.5 UJ	5.8 UJ	5.7 UJ	5.5 UJ	7.4 UJ
2-Methylnaphthalene	500,000	24,000	n	3,240	0.75 U	0.37 J	0.79 U	0.22 J	0.73 U	0.3 J	0.82 U
2,3,5-Trimethylnaphthalene	--	NBA		NBA	0.75 U	0.79 U	0.79 U	0.76 U	0.73 U	0.74 U	0.82 U
2,6-Dimethylnaphthalene	--	NBA		NBA	0.75 U	0.2 J	0.79 U	0.76 U	0.73 U	0.74 U	0.82 U
Acenaphthene	7,500,000	360,000	n	20,000	0.75 U	0.79 U	0.79 U	0.76 U	0.73 U	0.74 U	0.82 U
Acenaphthylene	7,500,000	360,000	n	682,000	0.75 U	0.51 J	0.79 U	0.44 J	0.73 U	0.67 J	0.82 U
Anthracene	10,000,000	1,800,000	n	1,480,000	0.75 U	0.36 J	0.79 U	0.3 J	0.73 U	0.41 J	0.82 U
Benzo[a]anthracene	2,600	160	c	5,210	0.75 U	3.6	0.79 U	3.4	0.73 U	4.7	0.82 U
Benzo[a]pyrene	260	16	c	1,520	0.75 U	4.1	0.79 U	3.4	0.73 U	5.6	0.82 U
Benzo[b]fluoranthene	2,600	160	c	59,800	0.32 J	5.3	0.34 J	6.7	0.71 J	9.1	0.54 J
Benzo[e]pyrene	--	NBA		NBA	0.75 U	4.4	0.79 U	4.2	0.34 J	5.4	0.82 U
Benzo[g,h,i]perylene	3,700,000	3,800	c	119,000	0.75 UJ	2.6 J	0.79 UJ	1.6 J	0.73 UJ	2.2 J	0.82 UJ
Benzo[k]fluoranthene	26,000	1,600	c	148,000	0.75 U	4.4	0.79 U	4.5	0.73 U	6.2	0.82 U
Bis(2-ethylhexyl) phthalate	770,000	39,000	c	925	370 J B	390 U	390 U	370 U	--	370 U	--
Butyl benzyl phthalate	5,700,000	290,000	c	239	370 U	390 U	390 U	370 U	--	370 U	--
Chrysene	260,000	16,000	c	4,730	0.75 U	5.5	0.79 U	4.8	0.47 J	6.6	0.82 U
Dibenz(a,h)anthracene	260	16	c	18,400	0.75 U	1	0.79 U	0.76	0.73 U	1.1	0.82 U
Dibenzothiophene	--	78,000	n	NBA	0.75 U	0.3 J	0.79 U	0.26 J	0.73 U	0.34 J	0.82 U
Fluoranthene	5,000,000	240,000	n	122,000	0.75 U	9.5	0.79 U	8.5	0.73 U	11	0.82 U
Fluorene	5,000,000	240,000	n	30,000	0.75 U	0.37 J	0.79 U	0.28 J	0.73 U	0.38 J	0.82 U
Indeno[1,2,3-cd]pyrene	2,600	160	c	109,000	0.75 U	3.9	0.79 U	2.7	0.73 U	3.7	0.82 U
Naphthalene	2,500,000	3,800	c	99	0.75 U	0.79 U	0.79 U	0.76 U	0.73 U	0.74 U	0.82 U
Perylene	--	NBA		NBA	0.75 U	1	0.79 U	0.82	0.73 U	1.2	0.82 U
Phenanthrene	3,700,000	1,800,000	n	45,700	0.75 U	4.4	0.79 U	4	0.6 J	5.5	0.29 J
Pyrene	3,700,000	180,000	n	78,500	0.75 U	7.2	0.79 U	7.1	0.21 J	10	0.82 U

Table 3-1
Soil Sampling Laboratory Results - 2012 Sampling Event Summary
LO-58
Caribou, Maine

	Maine Remedial Action Guidelines for Soil			Sample ID	LO58-SB13R-0910	LO58-SB-DUP-03	LO58-SB14-0001	LO58-SB14-0608	LO58-SB15-0001	LO58-SB15-0406	LO58-SB55R-0004
				Sample Description	Soil Bore	DUP OF SB13R-0910	Soil Bore	Soil Bore	Soil Bore	Soil Bore	Soil Bore
				Sample Date	10/3/2012	10/3/2012	10/1/2012	10/1/2012	10/1/2012	10/1/2012	10/3/2012
				Sample Depth	9'-10'	9'-10'	0'-1'	6'-8'	0'-1'	4'-6'	0'-4'
		Screening Toxicity Value									
Analyte	**Residential**	**Residential$^{(a)}$**		**Ecological$^{(b)}$**							
MADEP EPH - µg/kg											
C11-C22 Aromatic Hydrocarbons	750,000	NBA		NBA	33000 U	32300 U	30800 U	27600 U	30800 U	30100 U	27300 U
C19-C36 Aliphatic Hydrocarbons	10,000,000	NBA		NBA	--	32300 U	57900	22000 J	30800 U	30100 U	27300 U
MADEP VPH - µg/kg											
C9-C10 Aromatic Hydrocarbons	750000	NBA		NBA	702 U	656 U	755 U	582 U	765 U	737 U	518 U
Metals (SW6010) - mg/kg											
Aluminum	170,000	7700	n	600	**13400** J	**17200** J	**18100**	**13900**	**18000**	**13700**	**8670** J
Antimony	68	3.1	n	0.27	29.8 UJ	9.9 UJ	**0.61** J	**0.5** J	**0.6** J	4.5 UJ	3.7 UJ
Arsenic	1.4	0.68	c	18	**6.5** J	**5.3** J	**7.7** J	**9.7** J	**11.1** J	**7.5** J	**3.9** J
Barium	10,000	1500	n	330	36.2 J	52.7 J	30.6	40.6	37.2	40.2	28.9
Beryllium	340	16	n	21	0.92 J	1.2 J	0.51	0.52	0.52	0.97	0.43
Cadmium	11	7.1	n	0.36	2.5 U	0.13 J	0.12 J	0.11 J	0.14 J	0.13 J	0.057 J
Calcium	--	NBA		NBA	3130 J	12300 J	702	5050	571	817	123000 J
Chromium^{8}	510	0.3	c	26	**39.9** J	**34.7** J	**28.8**	**27.5**	**30.2** J	**25**	**18.3** J
Cobalt	51	2.3	n	13	**16.4** J	**15**	**12.3**	**11.2**	**13.5**	**12.3**	**7.2**
Copper	2,400	310	n	28	16.6	19.3	**39.1** J	21.5 J	**41.8** J	19.4 J	14.8
Iron	120,000	5500	n	200	**30400** J	**34100** J	**28400** J	**29600** J	**32100** J	**28600** J	**17800** J
Lead	340	400		11	**15.3** J	**23.3** J	**15.5**	**17.1**	**16**	**18.9**	**11.3** J
Magnesium	--	NBA		NBA	9540 J	12200 J	6790	7440	7220	7750	6030 J
Manganese	4,100	180	n	220	**518** J	**561** J	**549**	**513**	**615**	**564**	**364** J
Nickel	510	150	n	38	**64.2**	**58.1**	34.6	36.3	35.9	**42.9**	28.2
Potassium	--	NBA		NBA	800 J	997 J	643	828	662	729	566 J
Selenium	850	39	n	0.52	17.4 UJ	5.8 UJ	2.9 U	2.1 U	2.6 U	2.6 U	**0.88** J
Silver	850	39	n	4.2	2 U	1.7 U	0.82 U	0.59 U	0.73 U	0.75 U	0.61 U
Sodium	--	NBA		NBA	22.5 J	2070 U	36.5 J	42.1 J	29.5 J	25.8 J	32.7 J
Thallium	--	0.078	n	0.21	2.5 U	2.1 U	2 U	**0.24** J	1.8 U	1.9 U	1.5 U
Vanadium	1,200	39	n	7.8	**15.6**	**16.9**	**22.2**	**22.1**	**25.9** J	**14.4**	**11.1**
Zinc	10,000	2300	n	46	**60.3**	**57**	**50**	**56.5**	**61.1**	**50.8**	38.2
Mercury	51	1.1	n	0.000051	**0.0041** J	**0.015** J	**0.085**	**0.1**	**0.029** J	**0.097**	0.033 U
PCBs (SW8082) - µg/kg											
PCB-1260	2,400	240	c	NBA	22 U	23 U	20 U	18 U	19 U	20 U	18 U
VOCs (SW8260) - µg/kg											
1,2-Dichlorobenzene	5,100,000	180,000	n	2,960	7.5 UJ	6.4 UJ	7.8 U	4 U	5.6 UJ	6.4 UJ	5.2 UJ
1,4-Dichlorobenzene	2,600,000	2,600	c	20,000	7.5 UJ	6.4 UJ	3.6 J	0.99 J	5.6 UJ	6.4 UJ	5.2 UJ
2-Butanone	10,000,000	2,700,000	n	89,600	12	12	9.1	4 U	16	23	5.2 U
4-Isopropyltoluene	--	NBA		NBA	7.5 U	6.4 U	0.33 J	4 U	5.6 UJ	6.4 UJ	5.2 U
4-Methyl-2-pentanone	10,000,000	3,300,000	n	443,000	7.5 U	6.4 U	7.8 U	4 U	5.6 U	6.4 U	5.2 U
Acetone	10,000,000	6,100,000	n	2,500	190 J	230 J	340	21	270	340	65 J
Carbon disulfide	10,000,000	77,000	n	94	0.9 J	0.93 J	7.8 U	4 U	5.6 UJ	6.4 UJ	5.2 U

Table 3-1
Soil Sampling Laboratory Results - 2012 Sampling Event Summary
LO-58
Caribou, Maine
Page 10 of 12

	Maine Remedial Action Guidelines for Soil		Sample ID	LO58-SB13R-0910	LO58-SB-DUP-03	LO58-SB14-0001	LO58-SB14-0608	LO58-SB15-0001	LO58-SB15-0406	LO58-SB55R-0004
			Sample Description	Soil Bore	DUP OF SB13R-0910	Soil Bore	Soil Bore	Soil Bore	Soil Bore	Soil Bore
			Sample Date	10/3/2012	10/3/2012	10/1/2012	10/1/2012	10/1/2012	10/1/2012	10/3/2012
			Sample Depth	9'-10'	9'-10'	0'-1'	6'-8'	0'-1'	4'-6'	0'-4'
		Screening Toxicity Value								
Analyte	Residential	Residential$^{(a)}$	Ecological$^{(b)}$							
VOCs (SW8270) Continued - µg/kg										
Methyl acetate	--	7,800,000 n	NBA	11 J	13 J	7.8 U	4 U	35 J	22 J	3.5 J
Methyl iodide	--	NBA	NBA	7.5 U	6.4 U	1.1 J	4 U	1.9 J	3 J	5.2 U
n-Butylbenzene	--	390,000 n	NBA	7.5 UJ	6.4 UJ	7.8 U	4 U	5.6 UJ	6.4 UJ	5.2 UJ
o-Xylene	10,000,000	65,000 n	NBA	7.5 UJ	6.4 UJ	7.8 U	4 U	5.6 UJ	6.4 UJ	5.2 UJ
Toluene	10,000,000	490,000 n	200,000	7.5 U	6.4 U	7.8 U	4 U	5.6 U	6.4 U	5.2 U
Trichloroethene	85,000	410 n	12,400	11	9.8	7.8 U	0.82 J	5.6 UJ	6.4 UJ	5.2 U
Xylenes, Total	10,000,000	58,000 n	10,000	7.5 UJ	6.4 UJ	7.8 U	4 U	5.6 U	6.4 U	5.2 UJ
SVOCs (SW8270) - µg/kg										
1-Methylnaphthalene	--	18,000 c	NBA	0.86 U	0.85 U	0.26 J	0.72 U	0.33 J	0.8 U	0.72 U
1-Methylphenanthrene	--	NBA	NBA	0.86 U	0.85 U	2.4	0.72 U	3.3	0.8 U	0.26 J
1,1'-Biphenyl	8,500,000	4,700 n	NBA	0.86 U	0.85 U	0.8 U	0.72 U	0.78 U	0.8 U	0.72 U
1,2-Dichlorobenzene	5,100,000	180,000 n	2,960	7.5 UJ	6.4 UJ	7.8 U	4 U	5.6 UJ	6.4 UJ	5.2 UJ
1,4-Dichlorobenzene	2,600,000	2,600 c	20,000	7.5 UJ	6.4 UJ	3.6 J	0.99 J	5.6 UJ	6.4 UJ	5.2 UJ
2-Methylnaphthalene	500,000	24,000 n	3,240	0.86 U	0.85 U	0.25 J	0.72 U	0.35 J	0.2 J	0.25 J
2,3,5-Trimethylnaphthalene	--	NBA	NBA	0.86 U	0.85 U	0.8 U	0.72 U	0.78 U	0.8 U	0.72 U
2,6-Dimethylnaphthalene	--	NBA	NBA	0.86 U	0.85 U	0.8 U	0.72 U	0.78 U	0.8 U	0.2 J
Acenaphthene	7,500,000	360,000 n	20,000	0.86 U	0.85 U	0.8 U	0.72 U	0.23 J	0.8 U	0.72 U
Acenaphthylene	7,500,000	360,000 n	682,000	0.86 U	0.85 U	0.77 J	0.72 U	1.3	0.8 U	0.72 U
Anthracene	10,000,000	1,800,000 n	1,480,000	0.86 U	0.85 U	0.4 J	0.72 U	0.71 J	0.8 U	0.26 J
Benzo[a]anthracene	2,600	160 c	5,210	0.86 U	0.85 U	4.2	0.72 U	8.7	0.8 U	1.4
Benzo[a]pyrene	260	16 c	1,520	0.86 U	0.85 U	4.7 J	0.72 UJ	9.3 J	0.8 UJ	1.1
Benzo[b]fluoranthene	2,600	160 c	59,800	0.53 J	0.64 J	6.9 J	0.36 J	17 J	0.41 J	1.8
Benzo[e]pyrene	--	NBA	NBA	0.24 J	0.36 J	4.6 J	0.72 UJ	11 J	0.24 J	1.3
Benzo[g,h,i]perylene	3,700,000	3,800 c	119,000	0.23 J	0.85 UJ	2.5 J	0.72 UJ	4.2 J	0.8 UJ	0.57 J
Benzo[k]fluoranthene	26,000	1,600 c	148,000	0.86 U	0.85 U	4.5 J	0.72 UJ	11 J	0.8 UJ	1.1
Bis(2-ethylhexyl) phthalate	770,000	39,000 c	925	420 U	--	390 U	25 J	390 U	390 U	350 U
Butyl benzyl phthalate	5,700,000	290,000 c	239	420 U	--	390 U	360 U	390 U	390 U	350 U
Chrysene	260,000	16,000 c	4,730	0.86 U	0.22 J	5.9 J	0.22 J	12 J	0.8 UJ	1.5
Dibenz(a,h)anthracene	260	16 c	18,400	0.86 U	0.85 U	1.3	0.72 U	2.2	0.8 U	0.25 J
Dibenzothiophene	--	78,000 n	NBA	0.86 U	0.85 U	0.33 J	0.72 U	0.59 J	0.8 U	0.72 U
Fluoranthene	5,000,000	240,000 n	122,000	0.86 U	0.85 U	10 J	0.72 U	22 J	0.8 UJ	2.2
Fluorene	5,000,000	240,000 n	30,000	0.86 U	0.85 U	0.43 J	0.72 U	0.48 J	0.8 U	0.72 U
Indeno[1,2,3-cd]pyrene	2,600	160 c	109,000	0.86 U	0.85 U	4 J	0.72 U	7.4 J	0.8 UJ	0.63 J
Naphthalene	2,500,000	3,800 c	99	0.86 U	0.85 U	0.8 U	0.72 U	0.78 U	0.8 U	0.72 U
Perylene	--	NBA	NBA	0.86 U	0.85 U	1	0.72 U	2	0.8 U	0.35 J
Phenanthrene	3,700,000	1,800,000 n	45,700	0.86 U	0.3 J	5.2 J	0.33 J	9.3 J	0.28 J	1.4
Pyrene	3,700,000	180,000 n	78,500	0.86 U	0.23 J	9.4 J	0.72 UJ	18 J	0.22 J	2.3

Table 3-1
Soil Sampling Laboratory Results - 2012 Sampling Event Summary
LO-58
Caribou, Maine

	Maine Remedial Action Guidelines for Soil	Sample ID Sample Description Sample Date Sample Depth Screening Toxicity Value		LO58-SS02-100212 Surface Soil 10/1/2012 0'-1'	LO58-SB-TB01 Trip Blank 10/1/2012	LO58-SB-TB02 Trip Blank 10/1/2012	LO58-BK01-0001 Background 10/2/2012 0'-1'	LO58-BK02-0001 Background 10/2/2012 0'-1'	LO58-BK-DUP-01 DUP OF BK02-0001 10/2/2012 0'-1'	LO58-BK03-0001 Background 10/2/2012 0'-1'
Analyte	**Residential**	**Residential$^{(a)}$**	**Ecological$^{(b)}$**							
MADEP EPH - µg/kg										
C11-C22 Aromatic Hydrocarbons	750,000	NBA	NBA	--	--	--	34500 U	36100 U	35700 U	32500 U
C19-C36 Aliphatic Hydrocarbons	10,000,000	NBA	NBA	--	--	--	34500 U	36100 U	35700 U	32500 U
MADEP VPH - µg/kg										
C9-C10 Aromatic Hydrocarbons	750000	NBA	NBA	--	--	--	784 U	919 U	1000 U	761 U
Metals (SW6010) - mg/kg										
Aluminum	170,000	7700 n	600	--	--	--	**17500** J	**16400** J	**15000** J	**17700** J
Antimony	68	3.1 n	0.27	--	--	--	**0.59** J	**0.55** J	**0.55** J	**1.1** J
Arsenic	1.4	0.68 c	18	--	--	--	**14.8** J	**14** J	**14.6** J	**22.4** J
Barium	10,000	1500 n	330	--	--	--	57.7	63.2	57.2	65
Beryllium	340	16 n	21	--	--	--	0.42 J	0.38 J	0.37 J	0.45
Cadmium	11	7.1 n	0.36	--	--	--	0.3 J	0.23 J	**0.37** J	0.21 J
Calcium	--	NBA	NBA	--	--	--	1040 J	1060 J	930 J	732 J
Chromium^{8}	510	0.3 c	26	--	--	--	**37.6** J	**40.3** J	**26** J	**31.8** J
Cobalt	51	2.3 n	13	--	--	--	**11.8**	**9.1**	**13.9**	**11.4**
Copper	2,400	310 n	28	--	--	--	**75.3**	**79.8**	**72.1**	**119**
Iron	120,000	5500 n	200	--	--	--	**28800** J	**27700** J	**29200** J	**33100** J
Lead	340	400	11	--	--	--	**31.4** J	**22.9** J	**36.3** J	**22.9** J
Magnesium	--	NBA	NBA	--	--	--	4800 J	4480 J	4060 J	5000 J
Manganese	4,100	180 n	220	--	--	--	**1390** J	**655** J	**1610** J	**920** J
Nickel	510	150 n	38	--	--	--	26.4	25.5	22	29.3
Potassium	--	NBA	NBA	--	--	--	959 J	915 J	980 J	964 J
Selenium	850	39 n	0.52	--	--	--	**1.6** J	**2.1** J	**1.7** J	**2** J
Silver	850	39 n	4.2	--	--	--	1 U	0.96 U	0.12 J	0.79 U
Sodium	--	NBA	NBA	--	--	--	25 J	25.2 J	25 J	25.6 J
Thallium	--	0.078 n	0.21	--	--	--	2.6 U	2.4 U	2.1 U	2 U
Vanadium	1,200	39 n	7.8	--	--	--	**35.4**	**30.9**	**37.6**	**32**
Zinc	10,000	2300 n	46	--	--	--	**76.5**	**72**	**64.4**	**76.6**
Mercury	51	1.1 n	0.000051	--	--	--	**0.014** J	**0.18**	**0.19**	**0.13**
PCBs (SW8082) - µg/kg										
PCB-1260	2,400	240 c	NBA	49	--	--	22 U	24 U	23 U	21 U
VOCs (SW8260) - µg/kg										
1,2-Dichlorobenzene	5,100,000	180,000 n	2,960	--	1 U	1 U	7.3 UJ	8.6 UJ	8.7 UJ	5.8 UJ
1,4-Dichlorobenzene	2,600,000	2,600 c	20,000	--	1 U	1 U	7.3 UJ	8.6 UJ	8.7 UJ	5.8 UJ
2-Butanone	10,000,000	2,700,000 n	89,600	--	5 U	5 U	40	35	44	23
4-Isopropyltoluene	--	NBA	NBA	--	1 U	1 U	3.4 J	8.6 U	8.7 U	5.8 U
4-Methyl-2-pentanone	10,000,000	3,300,000 n	443,000	--	5 U	5 U	20	26	21	5.8 U
Acetone	10,000,000	6,100,000 n	2,500	--	5 U	5 U	570 J	640 J	570 J	380 J
Carbon disulfide	10,000,000	77,000 n	94	--	1 U	1 U	7.3 U	8.6 U	8.7 U	5.8 U

Table 3-1
Soil Sampling Laboratory Results - 2012 Sampling Event Summary
LO-58
Caribou, Maine

	Maine Remedial Action Guidelines for Soil	Sample ID Sample Description Sample Date Sample Depth		LO58-SS02-100212 Surface Soil 10/1/2012 0'-1'	LO58-SB-TB01 Trip Blank 10/1/2012	LO58-SB-TB02 Trip Blank 10/1/2012	LO58-BK01-0001 Background 10/2/2012 0'-1'	LO58-BK02-0001 Background 10/2/2012 0'-1'	LO58-BK-DUP-01 DUP OF BK02-0001 10/2/2012 0'-1'	LO58-BK03-0001 Background 10/2/2012 0'-1'
		Screening Toxicity Value								
Analyte	**Residential**	**Residential$^{(a)}$**	**Ecological$^{(b)}$**							
VOCs (SW8270) Continued - µg/kg										
Methyl acetate	--	7,800,000 n	NBA	--	1 UJ	1 UJ	180 J	1300 J	290 J	52 J
Methyl iodide	--	NBA	NBA	--	1 U	1 U	1.5 J	1.1 J	1.7 J	2.4 J
n-Butylbenzene	--	390,000 n	NBA	--	1 U	1 U	0.66 J	0.77 J	8.7 UJ	5.8 UJ
o-Xylene	10,000,000	65,000 n	NBA	--	1 U	1 U	7.3 UJ	8.6 UJ	8.7 UJ	5.8 UJ
Toluene	10,000,000	490,000 n	200,000	--	1 U	1 U	0.45 J	0.19 J	8.7 U	5.8 U
Trichloroethene	85,000	410 n	12,400	--	1 U	1 U	7.3 U	8.6 U	8.7 U	5.8 U
Xylenes, Total	10,000,000	58,000 n	10,000	--	1 U	1 U	7.3 UJ	8.6 UJ	8.7 UJ	5.8 UJ
SVOCs (SW8270) - µg/kg										
1-Methylnaphthalene	--	18,000 c	NBA	--	--	--	0.82 J	1 J	0.63 J	0.67 J
1-Methylphenanthrene	--	NBA	NBA	--	--	--	13	18	14	6.1
1,1'-Biphenyl	8,500,000	4,700 n	NBA	--	--	--	1.8 U	3 U	2.2 U	1.2 U
1,2-Dichlorobenzene	5,100,000	180,000 n	2,960	--	--	--	7.3 UJ	8.6 UJ	8.7 UJ	5.8 UJ
1,4-Dichlorobenzene	2,600,000	2,600 c	20,000	--	--	--	7.3 UJ	8.6 UJ	8.7 UJ	5.8 UJ
2-Methylnaphthalene	500,000	24,000 n	3,240	--	--	--	0.77 J	0.89 J	0.58 J	0.57 J
2,3,5-Trimethylnaphthalene	--	NBA	NBA	--	--	--	1.2 J	1.3 J	0.87 J	0.74 J
2,6-Dimethylnaphthalene	--	NBA	NBA	--	--	--	0.55 J	3 U	2.2 U	0.44 J
Acenaphthene	7,500,000	360,000 n	20,000	--	--	--	1 J	1.2 J	1.1 J	0.44 J
Acenaphthylene	7,500,000	360,000 n	682,000	--	--	--	3.6	3.2	2.8	2.6
Anthracene	10,000,000	1,800,000 n	1,480,000	--	--	--	2.7	3.1	2.6	1.4
Benzo[a]anthracene	2,600	160 c	5,210	--	--	--	31	31	31	18
Benzo[a]pyrene	260	16 c	1,520	--	--	--	**33**	**41**	**37**	15
Benzo[b]fluoranthene	2,600	160 c	59,800	--	--	--	49	59	51	30
Benzo[e]pyrene	--	NBA	NBA	--	--	--	31	37	31	18
Benzo[g,h,i]perylene	3,700,000	3,800 c	119,000	--	--	--	16 J	19 J	14 J	8.6 J
Benzo[k]fluoranthene	26,000	1,600 c	148,000	--	--	--	33	41	36	20
Bis(2-ethylhexyl) phthalate	770,000	39,000 c	925	--	--	--	430 U	--	--	420 U
Butyl benzyl phthalate	5,700,000	290,000 c	239	--	--	--	45 J	--	--	420 U
Chrysene	260,000	16,000 c	4,730	--	--	--	42	41	41	26
Dibenz(a,h)anthracene	260	16 c	18,400	--	--	--	6.8	8.1	7.1	3.7
Dibenzothiophene	--	78,000 n	NBA	--	--	--	2.1	2.7 J	2 J	1.5
Fluoranthene	5,000,000	240,000 n	122,000	--	--	--	81	96	76	45
Fluorene	5,000,000	240,000 n	30,000	--	--	--	1.8	2.1 J	1.6 J	1.3
Indeno[1,2,3-cd]pyrene	2,600	160 c	109,000	--	--	--	24	29	23	14
Naphthalene	2,500,000	3,800 c	99	--	--	--	1.8 U	3 U	2.2 U	1.2 U
Perylene	--	NBA	NBA	--	--	--	7.8	9.8	8.4	3.8
Phenanthrene	3,700,000	1,800,000 n	45,700	--	--	--	35	44	33	23
Pyrene	3,700,000	180,000 n	78,500	--	--	--	68	75	62	39

Table 3-2
Summary of Detected Analytical Data in Air
LO-58
Caribou, Maine
Page 1 of 4

Sample ID					LO58-AA01-042212		LO58-BK01-100712		LO58-IA01-042212		LO58-IA01-100712		LO58-IA02-042212		LO58-IA-Dup-01		LO58-IA02-100712	
Sample Description					Ambient Air		Ambient Air		Indoor Air #1		Indoor Air #1		Indoor Air #2		Indoor Air #2 Dup		Indoor Air #2	
Sample Date					4/21/2012		10/6/2012		4/21/2012		10/6/2012		4/21/2012		4/21/2012		10/6/2012	
Analyte	Screening Toxicity Value (μg/m^3)																	
	Residential[a]		Industrial[b]															
Air Petroleum Hydrocarbons (MADEP-APH) - μg/m3																		
Benzene	0.36	c	1.6	c	0.64	U	0.64	U	**0.66**		0.64	U	0.64	U	0.64	U	0.64	U
C5-C8 Aliphatics (adjusted)	630		2600		32	U	13		150		170		200		190		190	
C9-C10 Aromatics	52		220		5	U	5	U	6.1	J	5	U	24	J	6	J	5	U
C9-C12 Aliphatics (adjusted)	210		880		18		7.1	U	120		37		130		110		75	
Ethylbenzene	1.1	c	4.9	c	0.87	U	0.87	U	**3.4**		0.87	U	0.87	U	0.87	U	0.87	U
m-Xylene & p-Xylene	10	n	44	n	0.87	U	0.87	U	2.2		0.87	U	0.87	UJ	1.3	J	0.87	U
Methyl tert-butyl ether	11	c	47	c	0.72	U	0.72	U	4.4		0.72	U	0.72	U	0.72	U	0.72	U
Naphthalene	0.083	c	0.36	c	1.1	U	1.1	U	**1.1**		1.1	U	1.1	U	1.1	U	**1.4**	
o-Xylene	10	n	44	n	0.87	U	0.87	U	2.3		0.87	U	0.87	UJ	2.1	J	0.87	U
Toluene	520	n	2200	n	0.75	U	0.75	U	3.4		2.7		3.1		3.3		2.7	
VOCs (TO15) - μg/m3																		
1,1,1-Trichloroethane	520	n	2200	n	0.055	U	0.218	U	0.06		0.218	U	0.082	U	0.082	U	0.218	U
1,2-Dichloroethane	0.11	c	0.47	c	0.081	U	0.324	U	0.105		0.324	U	0.121	U	0.121	U	0.324	U
1,2,4-Trimethylbenzene	0.73	n	3.1	n	--		--		--		--		--		--		--	
1,3-Dichlorobenzene	NBA		NBA		--		--		--		--		--		--		--	
1,3,5-Trimethylbenzene	NBA		NBA		0.098	U	0.393	U	0.098	U	0.393	U	0.147	U	0.147	U	0.393	U
1,4-Dichlorobenzene	0.26	c	1.1	c	--		--		--		--		--		--		--	
1,4-Dioxane	0.56	c	2.5	c	--		--		--		--		--		--		--	
2,2,4-Trimethylpentane	NBA		NBA		0.061		0.187	U	0.047	U	0.187	U	0.084		0.079		0.187	U
4-Ethyltoluene	NBA		NBA		0.049	U	0.197	U	0.084	J	0.197	U	0.074	U	0.088	J	0.197	U
4-Isopropyltoluene	NBA		NBA		--		--		--		--		--		--		--	
Acetone	3200	n	14000	n	--		--		--		--		--		--		--	
Benzene	0.36	c	1.6	c	0.211		0.144		0.211		0.246		0.249		0.227		0.255	
Bromodichloromethane	0.076	c	0.33	c	0.067	U	0.268	U	0.067	U	0.268	U	0.1	U	0.1	U	0.268	U
Carbon disulfide	73	n	310	n	--		--		--		--		--		--		--	
Carbon tetrachloride	0.47	c	2	c	0.446		**0.528**		0.377		0.428		0.44		0.384		0.434	
Chloroform	0.12	c	0.53	c	0.054		0.195	U	**0.634**		**0.205**		**1.318**	J	**0.732**	J	**0.205**	
Chloromethane	9.4	n	39	n	--		--		--		--		--		--		--	
Cumene	42	n	180	n	--		--		--		--		--		--		--	
Cyclohexane	630	n	2600	n	0.034	U	0.138	U	0.055		0.138	U	0.096		0.072		0.138	U
Dichlorodifluoromethane	10	n	44	n	2.175		3.905		2.126		3.806		2.472		2.126		3.757	
Ethylbenzene	1.1	c	4.9	c	0.065		0.174	U	0.234		0.36		0.256		0.286		0.347	
Freon 22	5200	n	22000	n	--		--		--		--		--		--		--	
Freon TF	3100	n	13000	n	--		--		--		--		--		--		--	
Isopropyl alcohol	21	n	88	n	--		--		--		--		--		--		--	
m,p-Xylene	10	n	44	n	0.1		0.347	U	0.694		0.955		0.694		0.738		0.911	
Methyl Butyl Ketone	3.1	n	13	n	--		--		--		--		--		--		--	
Methyl Ethyl Ketone	520	n	2200	n	--		--		--		--		--		--		--	
methyl isobutyl ketone	310	n	1300	n	--		--		--		--		--		--		--	
Methyl methacrylate	73	n	310	n	--		--		--		--		--		--		--	
Methyl tert-butyl ether	11	c	47	c	0.036	U	0.144	U	0.036	U	0.144	U	0.054	U	0.054	U	0.144	U
Methylene Chloride	63	n	260	n	0.347	U	1.389	U	0.417		3.125		0.833		0.521	U	3.299	
n-Butane	NBA		NBA		--		--		--		--		--		--		--	

Table 3-2
Summary of Detected Analytical Data in Air
LO-58
Caribou, Maine
Page 2 of 4

Sample ID Sample Description Sample Date					LO58-AA01-042212 Ambient Air 4/21/2012		LO58-BK01-100712 Ambient Air 10/6/2012		LO58-IA01-042212 Indoor Air #1 4/21/2012		LO58-IA01-100712 Indoor Air #1 10/6/2012		LO58-IA02-042212 Indoor Air #2 4/21/2012		LO58-IA-Dup-01 Indoor Air #2 Dup 4/21/2012		LO58-IA02-100712 Indoor Air #2 10/6/2012	
Analyte	Screening Toxicity Value (µg/m^3)																	
	Residential[a]		Industrial[b]															
VOCs (TO15) - µg/m3, Continued																		
n-Butylbenzene	NBA		NBA		--		--		--		--		--		--		--	
n-Heptane	NBA		NBA		0.119		0.164	U	1.229		1.024		1.598		1.434		0.86	
n-Hexane	73	n	310	n	0.141		0.282	U	0.201		0.321		0.271		0.247		0.289	
n-Propylbenzene	100	n	440	n	--		--		--		--		--		--		--	
Naphthalene	0.083	c	0.36	c	--		--		--		--		--		--		--	
o-Xylene	10	n	44	n	0.043	U	0.174	U	0.304		0.477		0.286		0.326		0.352	
Styrene	100	n	440	n	--		--		--		--		--		--		--	
tert-Butyl alcohol	NBA		NBA		--		--		--		--		--		--		--	
Tetrachloroethene	4.2	n	18	n	0.068	U	0.271	U	0.068	U	2.78		0.4	J	0.102	UJ	2.644	
Tetrahydrofuran	210	n	880	n	--		--		--		--		--		--		--	
Toluene	520	n	2200	n	0.241		0.192		1.281		1.846		1.394		1.318		1.733	
Trichloroethene	0.21	n	0.88	n	0.054	U	0.215	U	**2.578**		**3.223**		**3.975**		**3.33**		**3.223**	
Trichlorofluoromethane	NBA		NBA		1.067		1.573		5.616		12.917		7.301		6.178		12.355	
Xylene (total)	10	n	44	n	0.13		0.174	U	0.998		1.432		0.955		1.085		1.302	
Xylene, o-	10	n	44	n	--		1.7		--		--		--		--		--	

[a] Regional Screening Level (RSL) Residential Air Table (May, 2016).

[b] Regional Screening Level (RSL) Industrial Air Table (May, 2016).

NBA = No benchmark available.

c = Cancer based, target risk equals 1E-06.

n = Noncancer based, target hazard quotient equals 0.1.

µg/m3 = Micrograms per cubic meter.

Bold values indicate exceedance of residential RSL.

Highlighted values indicate exceedance of industrial RSL.

U = Analyte was not detected as is reported < LOQ.

J = The reported result is an estimated value.

Table 3-2
Summary of Detected Analytical Data in Air
LO-58
Caribou, Maine
Page 3 of 4

Sample ID					LO58-IA-Dup-01		LO58-SV01-042212		LO58-SV01-100712		LO58-SV02-042212		LO58-SV-Dup-01		LO58-SV02-100712		LO58-SV-Dup-01	
Sample Description					Indoor Air #2 Dup		Sub-Slab #1		Sub-Slab #1		Sub-Slab #2		Sub-Slab #2 Dup		Sub-Slab #2		Sub-Slab #2 Dup	
Sample Date					10/6/2012		4/21/2012		10/6/2012		4/21/2012		4/21/2012		10/6/2012		10/6/2012	
Analyte	Screening Toxicity Value (µg/m^3)																	
	Residential[a]		Industrial[b]															
Air Petroleum Hydrocarbons (MADEP-APH) - µg/m3																		
Benzene	0.36	c	1.6	c	0.64	U	0.64	U	0.64	U	0.64	U	0.64	U	0.64	U	0.64	U
C5-C8 Aliphatics (adjusted)	630		2600		200		**740**		560		**700**	B	550		130		240	
C9-C10 Aromatics	52		220		5	U	37		24		37		51		24		25	
C9-C12 Aliphatics (adjusted)	210		880		98		**430**		**390**		**920**		**1100**		190		**270**	
Ethylbenzene	1.1	c	4.9	c	0.87	U	**3.5**		**1.5**		**3.8**		**3.8**		**2**		**2**	
m-Xylene & p-Xylene	10	n	44	n	0.87	U	5.7		5		8.7		7.8		5.9		5.5	
Methyl tert-butyl ether	11	c	47	c	0.72	U	0.72	U	0.72	U	4.7		4.6		0.72	U	0.72	U
Naphthalene	0.083	c	0.36	c	**1.5**		**1.1**		**1.7**		**1.3**		**1.2**		**1.2**		**1.4**	
o-Xylene	10	n	44	n	0.87	U	3.1		2.4		4.2		3.8		2.7		2.7	
Toluene	520	n	2200	n	3		5.1		2.9		6.4	J	8.5	J	2.1		2.6	
VOCs (TO15) - µg/m3																		
1,1,1-Trichloroethane	520	n	2200	n	0.218	U	1.091	U	1.091	U	0.218	J	1.091	U	0.245	J	0.251	J
1,2-Dichloroethane	0.11	c	0.47	c	0.324	U	0.809	U	0.728	U	0.809	U	0.809	U	0.073	U	0.073	U
1,2,4-Trimethylbenzene	0.73	n	3.1	n	--		**1.622**		1.032	U	**2.261**		**1.72**		**3.145**		**3.194**	
1,3-Dichlorobenzene	NBA		NBA		--		0.529	J	1.142	U	0.781	J	0.511	J	1.863		2.524	
1,3,5-Trimethylbenzene	NBA		NBA		0.393	U	0.442	J	0.934	U	0.541	J	0.477	J	0.835	J	0.786	J
1,4-Dichlorobenzene	0.26	c	1.1	c	--		1.202	U	1.082	U	1.202	U	1.202	U	**0.367**	J	0.108	U
1,4-Dioxane	0.56	c	2.5	c	--		18.011	U	2.522	U	18.011	U	18.011	U	0.252	U	**0.648**	J
2,2,4-Trimethylpentane	NBA		NBA		0.187	U	0.934	U	0.7	U	0.934	U	0.233	J	0.07	U	0.07	U
4-Ethyltoluene	NBA		NBA		0.197	U	0.423	J	0.737	U	0.477	J	0.413	J	0.884	J	0.934	J
4-Isopropyltoluene	NBA		NBA		--		0.477	J	1.097	U	0.532	J	0.433	J	1.536		0.538	J
Acetone	3200	n	14000	n	--		26.119		94.98	J	26.119		26.119		16.384		26.119	
Benzene	0.36	c	1.6	c	0.236		0.262	J	0.575	U	**0.447**	J	**0.447**	J	0.185	J	0.144	J
Bromodichloromethane	0.076	c	0.33	c	0.268	U	1.34	U	0.804	U	**0.556**	J	**0.455**	J	0.08	U	0.08	U
Carbon disulfide	73	n	310	n	--		0.373	J	2.863	J	0.809	J	0.685	J	29.257		2.739	J
Carbon tetrachloride	0.47	c	2	c	0.421		0.44	J	0.818	U	**0.547**	J	**0.535**	J	0.39	J	0.377	J
Chloroform	0.12	c	0.53	c	**0.21**		**0.537**	J	1.171	U	**63.448**	J	**48.806**	J	**8.785**		**9.273**	
Chloromethane	9.4	n	39	n	--		1.032		0.702	U	1.032	U	0.475	J	0.227	J	0.268	J
Cumene	42	n	180	n	--		0.983	U	0.541	U	0.541	J	0.457	J	0.835	J	0.162	J
Cyclohexane	630	n	2600	n	0.138	U	0.688	U	0.654	U	0.688	U	0.378	J	0.237	J	0.065	U
Dichlorodifluoromethane	10	n	44	n	3.757		2.323	J	4.548	J	2.966		2.916		3.262		2.818	
Ethylbenzene	1.1	c	4.9	c	0.339		**1.129**		**1.259**	J	**1.693**	J	**1.346**		**1.563**		**1.302**	
Freon 22	5200	n	22000	n	--		0.742	J	0.813	U	0.848	J	0.813	J	0.813	J	0.778	J
Freon TF	3100	n	13000	n	--		0.393	J	1.532	U	0.498	J	0.536	J	0.621	J	0.598	J
Isopropyl alcohol	21	n	88	n	--		**737.122**	J	**761.693**		**636.839**	J	**515.985**	J	**44.227**		**51.599**	
m,p-Xylene	10	n	44	n	0.911		3.863		3.429	J	6.076		5.208		4.774		3.95	
Methyl Butyl Ketone	3.1	n	13	n	--		2.047	U	1.638	U	2.047	U	2.047	U	0.278	J	0.86	J
Methyl Ethyl Ketone	520	n	2200	n	--		3.833		0.737	U	3.538		3.243		2.123		4.127	
methyl isobutyl ketone	310	n	1300	n	--		2.047	U	1.392	U	2.047	U	2.047	U	0.737	J	1.024	J
Methyl methacrylate	73	n	310	n	--		2.047	U	0.655	U	2.047	U	2.047	U	0.372	J	0.45	J
Methyl tert-butyl ether	11	c	47	c	0.144	U	0.721	U	0.541	U	1.261		1.081		0.054	U	0.054	U
Methylene Chloride	63	n	260	n	2.778		0.556	J	2.396	UJ	0.382	J	3.819		0.972	UJ	0.799	UJ
n-Butane	NBA		NBA		--		1.188	U	0.523	U	1.188	U	0.927	J	1.354		0.052	U

Table 3-2
Summary of Detected Analytical Data in Air
LO-58
Caribou, Maine
Page 4 of 4

Sample ID Sample Description Sample Date					LO58-IA-Dup-01 Indoor Air #2 Dup 10/6/2012		LO58-SV01-042212 Sub-Slab #1 4/21/2012		LO58-SV01-100712 Sub-Slab #1 10/6/2012		LO58-SV02-042212 Sub-Slab #2 4/21/2012		LO58-SV-Dup-01 Sub-Slab #2 Dup 4/21/2012		LO58-SV02-100712 Sub-Slab #2 10/6/2012		LO58-SV-Dup-01 Sub-Slab #2 Dup 10/6/2012	
Analyte	Screening Toxicity Value (µg/m³)																	
	Residential[a]		Industrial[b]															
VOCs (TO15) - µg/m3, Continued																		
n-Butylbenzene	NBA		NBA		--		1.097	U	1.207	U	1.097	U	1.097	J	0.384	J	0.433	J
n-Heptane	NBA		NBA		0.819		1.434		0.696	U	0.901	J	2.335	J	0.266	J	0.274	J
n-Hexane	73	n	310	n	0.282	U	0.236	J	0.705	U	0.349	J	0.493	J	0.222	J	0.229	J
n-Propylbenzene	100	n	440	n	--		0.29	J	0.639	U	0.418	J	0.251	J	0.541	J	0.59	J
Naphthalene	0.083	c	0.36	c	--		**0.524**	J	1.991	U	**0.681**	J	2.62	U	**0.472**	J	**0.524**	J
o-Xylene	10	n	44	n	0.386		1.432		1.302	J	3.342		2.648		1.953		1.649	
Styrene	100	n	440	n	--		0.426	J	0.468	U	0.596	J	0.511	J	0.396	J	1.277	J
tert-Butyl alcohol	NBA		NBA		--		1.091	J	1.242	U	12.151	U	12.151	U	0.261	J	0.758	J
Tetrachloroethene	4.2	n	18	n	2.644		1.356	U	1.017	U	1.356	U	0.231	J	1.695		2.102	
Tetrahydrofuran	210	n	880	n	--		0.973	J	0.855	U	14.74	U	14.74	U	0.501	J	1.297	J
Toluene	520	n	2200	n	1.657		4.144		3.051	J	5.65	J	7.534	J	1.883		1.883	
Trichloroethene	0.21	n	0.88	n	**3.492**		**1.397**		**2.578**	J	**6.983**	J	**4.996**	J	**6.446**		**6.983**	
Trichlorofluoromethane	NBA		NBA		12.355		7.863		106.706		15.725		14.04		30.327		32.012	
Xylene (total)	10	n	44	n	1.302		5.209		4.775	J	9.549		7.813		6.511		5.643	
Xylene, o-	10	n	44	n	--		1.5		1.3	J	3.3		2.6		2		1.7	

[a] Regional Screening Level (RSL) Residential Air Table (May, 2016).
[b] Regional Screening Level (RSL) Industrial Air Table (May, 2016).
NBA = No benchmark available.
c = Cancer based, target risk equals 1E-06.
n = Noncancer based, target hazard quotient equals 0.1.
µg/m3 = Micrograms per cubic meter.
Bold values indicate exceedance of residential RSL.
Highlighted values indicate exceedance of industrial RSL.
U = Analyte was not detected as is reported < LOQ.
J = The reported result is an estimated value.

Table 3-3
Groundwater Sampling Laboratory Results - 2012 Sampling Event Summary
LO-58
Caribou, Maine
Page 1 of 6

			Sample ID	LO58-MW01-100512	LO58-MW02-100312	LO58-MW03-100312	LO58-MW04-100412	LO58-MW05-100812	LO58-MW-DUP-01
			Sample Description	Monitoring Well	Monitoring Well	Monitoring Well	Monitoring Well	Monitoring Well	DUP of MW05
			Sample Date	10/5/2012	10/3/2012	10/3/2012	10/4/2012	10/8/2012	10/8/2012
Analyte	**Maximum Exposure Guideline**	**EPA or State MCL**	**Screening Toxicity Value(a)**						
VPH (MADEP VPH) - µg/L									
C5-C8 Aliphatics Hydrocarbons	300	--	NBA	50 U	50 U	50 U	50 U	28 J	26 J
C9-C10 Aromatic Hydrocarbons	200	--	NBA	10 U	10 U	10 U	10 U	467	464
C9-C12 Aliphatic Hydrocarbons	700	--	NBA	50 U	50 U	50 U	50 U	261	260
Metals (SW6010) - µg/L									
Aluminum	7000	--	2000 n	836	200 U	255	200 U	139 J	200 U
Barium	1000	2000	380 n	42 J	46.5 J	38.5 J	51.2 J	74.4 J	75.6 J
Cadmium	1	5	0.92 n	5 U	5 U	5 U	5 U	**1** J	5 U
Calcium	--	--	NBA	66400 J	75700 J	74100 J	80200 J	106000 J	107000 J
Chromium	20	100	0.035 c	**1.5** J	10 U	10 U	10 U	10 U	10 U
Cobalt	10	--	0.6 n	50 U	50 U	50 U	50 U	**4.8** J	**5.2** J
Iron	5000	--	1400 n	901	200 U	215	200 U	1040	950
Magnesium	--	--	NBA	8000	7530	7640	7080	14000	14200
Manganese	500	--	43 n	16.4	15 U	15 U	15 U	**1290**	**1330**
Nickel	20	--	39 n	40 U	40 U	40 U	40 U	40 U	3.1 J
Potassium	--	--	NBA	879 J	1220 J	933 J	1330 J	749 J	691 J
Sodium	20000	--	NBA	2750 J	6760	7430	8070	5930	5840
Vanadium	200	--	8.6 n	1.5 J	50 U	50 U	50 U	50 U	50 U
Zinc	2000	--	600 n	19.1 J	20 U	20 U	20 U	26.1	23.2
Mercury	--	2	0.063 n	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
VOCs (SW8260) - µg/L									
1,2,4-Trimethylbenzene	--	--	1.5 n	1 U	1 U	1 U	1 U	**28**	**29**
1,3,5-Trimethylbenzene	--	--	12 n	1 U	1 U	1 U	1 U	1.2	1.2
4-Isopropyltoluene	70	--	NBA	1 U	1 U	1 U	1 U	3.9	4.2
Acetone	6000	--	1400 n	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	30	700	1.5 c	1 U	1 U	1 U	1 U	1.4	1.3
Isopropylbenzene	--	--	45 n	1 U	1 U	1 U	1 U	4.3	4.4
m&p-Xylene	--	10000	19 n	1 U	1 U	1 U	1 U	0.44 J	0.45 J
Methylene Chloride	40	5	11 n	1 U	1 U	1 U	1 U	1 U	1 U
Naphthalene	10	--	0.17 c	1 U	1 U	1 U	1 U	**12**	**12**
n-Propylbenzene	--	--	66 n	1 U	1 U	1 U	1 U	4.5	4.6
o-Xylene	--	10000	19 n	1 U	1 U	1 U	1 U	0.21 J	0.22 J
sec-Butylbenzene	--	--	200 n	1 U	1 U	1 U	1 U	5.7	5.8
tert-Butylbenzene	--	--	69 n	1 U	1 U	1 U	1 U	2.5	2.7

Table 3-3
Groundwater Sampling Laboratory Results - 2012 Sampling Event Summary
LO-58
Caribou, Maine

			Sample ID	LO58-MW01-100512	LO58-MW02-100312	LO58-MW03-100312	LO58-MW04-100412	LO58-MW05-100812	LO58-MW-DUP-01
			Sample Description	Monitoring Well	Monitoring Well	Monitoring Well	Monitoring Well	Monitoring Well	DUP of MW05
			Sample Date	10/5/2012	10/3/2012	10/3/2012	10/4/2012	10/8/2012	10/8/2012
Analyte	**Maximum Exposure Guideline**	**EPA or State MCL**	**Screening Toxicity Value[(a)]**						
VOCs (SW8260) - µg/L, Continued									
Trichloroethene	4	5	0.28 n	1 U	1 U	1 U	1 U	0.18 J	1 U
Xylenes, Total	1000	10000	19 n	1 U	1 U	1 U	1 U	0.65 J	0.67 J
SVOCs (SW8270) - µg/L									
1,1'-Biphenyl	400	--	0.083 n	0.019 UJ	0.019 UJ	0.019 U	0.019 UJ	**10**	**7.8**
1-Methylnaphthalene	--	--	1.1 c	0.0038 J	0.019 UJ	0.019 U	0.019 UJ	**53**	**41**
2,3,5-Trimethylnaphthalene	--	--	NBA	0.019 U	0.019 U	0.019 U	0.019 U	4 J	2.9 J
2,6-Dimethylnaphthalene	--	--	NBA	0.019 U	0.019 U	0.019 U	0.019 U	22	17
2-Methylnaphthalene	30	--	3.6 n	0.0038 J	0.019 UJ	0.019 U	0.019 UJ	1 J	0.79 J
Acenaphthene	400	--	53 n	0.0028 J	0.019 UJ	0.019 U	0.019 UJ	1.6	1.2 J
Acenaphthylene	--	--	53 n	0.0018 J	0.019 UJ	0.019 U	0.019 UJ	1.3 U	1.3 U
Anthracene	2000	--	180 n	0.0026 J	0.0056 J	0.019 U	0.019 UJ	1.3 U	1.3 U
Benzo[a]anthracene	0.5	--	0.012 c	0.0065 J	0.0052 J	**0.017** J	0.019 UJ	1.3 U	1.3 U
Benzo[a]pyrene	0.05	0.2	0.0034 c	**0.0051** J	0.019 UJ	**0.018** J	0.019 UJ	1.3 U	1.3 U
Benzo[b]fluoranthene	0.5	--	0.034 c	0.0051 J	0.019 UJ	0.019	0.019 UJ	1.3 U	1.3 U
Benzo[e]pyrene	--	--	NBA	0.0054 J	0.019 UJ	0.012 J	0.019 UJ	1.3 U	1.3 U
Benzo[g,h,i]perylene	--	--	0.17 c	0.019 UJ	0.019 UJ	0.012 J	0.019 UJ	1.3 U	1.3 U
Benzo[k]fluoranthene	5	--	0.34 c	0.019 UJ	0.019 UJ	0.02	0.019 UJ	1.3 U	1.3 U
Chrysene	50	--	3.4 c	0.0057 J	0.019 UJ	0.018 J	0.019 UJ	1.3 U	1.3 U
Dibenz(a,h)anthracene	0.05	--	0.0034 c	0.019 UJ	0.019 UJ	**0.0076** J	0.019 UJ	1.3 U	1.3 U
Dibenzofuran	--	--	0.79 n	9.5 U	9.4 U	9.4 U	9.4 U	**1.6** J	**1.6** J
Dibenzothiophene	--	--	6.5 n	0.019 U	0.019 U	0.019 U	0.019 U	0.59 J	0.43 J
Fluoranthene	300	--	80 n	0.0088 J	0.014 J	0.014 J	0.019 UJ	1.3 U	1.3 U
Fluorene	300	--	29 n	0.0031 J	0.019 UJ	0.019 U	0.019 UJ	2	1.6
Indeno[1,2,3-cd]pyrene	0.5	--	0.034 c	0.019 UJ	0.019 UJ	0.016 J	0.019 UJ	1.3 U	1.3 U
Naphthalene	10	--	0.17 c	0.0065 J	0.019 UJ	0.019 U	0.019 UJ	**9.3**	**7.3**
Perylene	--	--	NBA	0.019 UJ	0.019 UJ	0.0051 J	0.019 UJ	1.3 U	1.3 U
Phenanthrene	--	--	180 n	0.0068 J	0.0069 J	0.019 U	0.019 UJ	0.56 J	0.44 J
Pyrene	200	--	12 n	0.0078 J	0.014 J	0.012 J	0.019 UJ	1.3 U	1.3 U

Table 3-3
Groundwater Sampling Laboratory Results - 2012 Sampling Event Summary
LO-58
Caribou, Maine

			Sample ID	LO58-MW01-100512	LO58-MW02-100312	LO58-MW03-100312	LO58-MW04-100412	LO58-MW05-100812	LO58-MW-DUP-01
			Sample Description	Monitoring Well	Monitoring Well	Monitoring Well	Monitoring Well	Monitoring Well	DUP of MW05
			Sample Date	10/5/2012	10/3/2012	10/3/2012	10/4/2012	10/8/2012	10/8/2012
Analyte	**Maximum Exposure Guideline**	**EPA or State MCL**	**Screening Toxicity Value$^{(a)}$**						
Miscellaneous									
Nitrate as N (SW9056) - mg/L	10	10	3.2 n	1.6	**3.5** J	**4.4**	5 U	0.5 U	0.5 U
Nitrite as N (SW9056) - mg/L	1	1	0.2 n	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dimethylhydrazine - µg/L	--	--	0.0004 n	10 U	10 UJ	10 U	10 U	10 U	10 U
Hydrazine - µg/L	--	--	0.0011 c	5 U	5 UJ	5 U	5 U	5 U	5 U
Monomethyl Hydrazine - µg/L	--	--	0.0042 n	10 U	10 UJ	10 U	10 U	10 U	10 U

1. Maximum Exposure Guidelines and EPA or State MCL Standards were obtained from Maine CDC Maximum Exposure Guidelines (MEGs) for Drinking Water, October 19, 2012 and and Maine Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances (February 2016).
2. Highlighted values indicate exceedance of MEG.
3. Bold values indicate exceedance of EPA or State MCL.
4. µg/L = Micrograms per liter
5. mg/L = milligrams per liter

[a] Regional Screening Level (RSL) Residential Groundwater (May, 2016).
NBA = No benchmark available.
c = Cancer based, target risk equals 1E-06.
n = Noncancer based, target hazard quotient equals 0.1.
U = Analyte was not detected as is reported < LOQ.
J = The reported result is an estimated value.

Table 3-3
Groundwater Sampling Laboratory Results - 2012 Sampling Event Summary
LO-58
Caribou, Maine

				Sample ID	LO58-MW-TB01	LO58-MW-TB02
				Sample Description	Trip Blank	Trip Blank
				Sample Date	10/1/2012	10/7/2012
Analyte	Maximum Exposure Guideline	EPA or State MCL	Screening Toxicity Value(a)			
VPH (MADEP VPH) - µg/L						
C5-C8 Aliphatics Hydrocarbons	300	--	NBA		-	-
C9-C10 Aromatic Hydrocarbons	200	--	NBA		-	-
C9-C12 Aliphatic Hydrocarbons	700	--	NBA		-	-
Metals (SW6010) - µg/L						
Aluminum	7000	--	2000	n	-	-
Barium	1000	2000	380	n	-	-
Cadmium	1	5	0.92	n	-	-
Calcium	--	--	NBA		-	-
Chromium	20	100	0.035	c	-	-
Cobalt	10	--	0.6	n	-	-
Iron	5000	--	1400	n	-	-
Magnesium	--	--	NBA		-	-
Manganese	500	--	43	n	-	-
Nickel	20	--	39	n	-	-
Potassium	--	--	NBA		-	-
Sodium	20000	--	NBA		-	-
Vanadium	200	--	8.6	n	-	-
Zinc	2000	--	600	n	-	-
Mercury	--	2	0.063	n	-	-
VOCs (SW8260) - µg/L						
1,2,4-Trimethylbenzene	--	--	1.5	n	1 U	1 U
1,3,5-Trimethylbenzene	--	--	12	n	1 U	1 U
4-Isopropyltoluene	70	--	NBA		1 U	1 U
Acetone	6000	--	1400	n	5 U	1.9 J
Ethylbenzene	30	700	1.5	c	1 U	1 U
Isopropylbenzene	--	--	45	n	1 U	1 U
m&p-Xylene	--	10000	19	n	1 U	1 U
Methylene Chloride	40	5	11	n	1 U	1 U
Naphthalene	10	--	0.17	c	1 U	1 U
n-Propylbenzene	--	--	66	n	1 U	1 U
o-Xylene	--	10000	19	n	1 U	1 U
sec-Butylbenzene	--	--	200	n	1 U	1 U
tert-Butylbenzene	--	--	69	n	1 U	1 U

Table 3-3
Groundwater Sampling Laboratory Results - 2012 Sampling Event Summary
LO-58
Caribou, Maine

			Sample ID		LO58-MW-TB01	LO58-MW-TB02
			Sample Description		Trip Blank	Trip Blank
			Sample Date		10/1/2012	10/7/2012
Analyte	**Maximum Exposure Guideline**	**EPA or State MCL**	**Screening Toxicity Value$^{(a)}$**			
VOCs (SW8260) - µg/L, Continued						
Trichloroethene	4	5	0.28	n	1 U	1 U
Xylenes, Total	1000	10000	19	n	1 U	1 U
SVOCs (SW8270) - µg/L						
1,1'-Biphenyl	400	--	0.083	n	-	-
1-Methylnaphthalene	--	--	1.1	c	-	-
2,3,5-Trimethylnaphthalene	--	--	NBA		-	-
2,6-Dimethylnaphthalene	--	--	NBA		-	-
2-Methylnaphthalene	30	--	3.6	n	-	-
Acenaphthene	400	--	53	n	-	-
Acenaphthylene	--	--	53	n	-	-
Anthracene	2000	--	180	n	-	-
Benzo[a]anthracene	0.5	--	0.012	c	-	-
Benzo[a]pyrene	0.05	0.2	0.0034	c	-	-
Benzo[b]fluoranthene	0.5	--	0.034	c	-	-
Benzo[e]pyrene	--	--	NBA		-	-
Benzo[g,h,i]perylene	--	--	0.17	c	-	-
Benzo[k]fluoranthene	5	--	0.34	c	-	-
Chrysene	50	--	3.4	c	-	-
Dibenz(a,h)anthracene	0.05	--	0.0034	c	-	-
Dibenzofuran	--	--	0.79	n	-	-
Dibenzothiophene	--	--	6.5	n	-	-
Fluoranthene	300	--	80	n	-	-
Fluorene	300	--	29	n	-	-
Indeno[1,2,3-cd]pyrene	0.5	--	0.034	c	-	-
Naphthalene	10	--	0.17	c	-	-
Perylene	--	--	NBA		-	-
Phenanthrene	--	--	180	n	-	-
Pyrene	200	--	12	n	-	-

Table 3-3
Groundwater Sampling Laboratory Results - 2012 Sampling Event Summary
LO-58
Caribou, Maine
Page 6 of 6

			Sample ID		**LO58-MW-TB01**	**LO58-MW-TB02**
			Sample Description		**Trip Blank**	**Trip Blank**
			Sample Date		**10/1/2012**	**10/7/2012**
Analyte	**Maximum Exposure Guideline**	**EPA or State MCL**	**Screening Toxicity Value$^{(a)}$**			
Miscellaneous						
Nitrate as N (SW9056) - mg/L	10	10	3.2	n	-	-
Nitrite as N (SW9056) - mg/L	1	1	0.2	n	-	-
1,1-Dimethylhydrazine - µg/L	--	--	0.0004	n	-	-
Hydrazine - µg/L	--	--	0.0011	c	-	-
Monomethyl Hydrazine - µg/L	--	--	0.0042	n	-	-

1. Maximum Exposure Guidelines and EPA or State MCL Standards were obtained from Maine CDC Maximum Exposure Guidelines (MEGs) for Drinking Water, October 19, 2012 and and Maine Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances (February 2016).
2. Highlighted values indicate exceedance of MEG.
3. Bold values indicate exceedance of EPA or State MCL.
4. µg/L = Micrograms per liter
5. mg/L = milligrams per liter

^{a}Regional Screening Level (RSL) Residential Groundwater (May, 2016).
NBA = No benchmark available.
c = Cancer based, target risk equals 1E-06.
n = Noncancer based, target hazard quotient equals 0.1.
U = Analyte was not detected as is reported < LOQ.
J = The reported result is an estimated value.

Table 3-4
Drinking Water Sampling Summary
LO-58
Caribou, Maine
Page 1 of 2

			Sample ID		**LO58-DW01-100512**		**LO58-DUP-01**		**LO58-DW02-100512**		**LO58-DW03-100312**		**LO58-DW04-100812**		**LO58-DW-TB01**		**LO58-DW-TB02**	
			Sample Description		**Drinking Water**		**DUP OF DW01**		**Drinking Water**		**Drinking Water**		**Drinking Water**		**Trip Blank**		**Trip Blank**	
			Sample Date		**10/4/2012**		**10/4/2012**		**10/4/2012**		**10/2/2012**		**10/7/2012**		**10/6/2012**		**10/6/2012**	
Analyte	**Maximum Exposure Guideline**	**EPA or State MCL**	**Screening Toxicity Value[a]**															
MADEP VPH - µg/L																		
C9-C10 Aromatic Hydrocarbons	200	--	NBA		15		14		10	U	10	U	10	U	-		-	
Metals (SW6010) - µg/L																		
Aluminum	7000	--	2000	n	992		784		200	U	200	U	200	U	-		-	
Barium	1000	2000	380	n	51.3	J	50.6	J	53	J	43.5	J	40.9	J	-		-	
Calcium	--	--	NBA		93200		93000	J	92600	J	79800	J	77800	J	-		-	
Chromium	20	100	0.035	c	**2.4**	J	**2.1**	J	10	U	10	U	**1.2**	J	-		-	
Copper	500	1300	80	n	62.3	J	45.6	J	45		11.9	J	27.9		-		-	
Iron	5000	--	1400	n	1280		965		200	U	200	U	200	U	-		-	
Lead	10	15	15		11.5		12.6		10	U	10	U	10	U	-		-	
Magnesium	--	--	NBA		7090		7120		10100		12900		12900		-		-	
Manganese	500	--	43	n	**67**	J	42.6	J	15	U	15	U	15	U	-		-	
Nickel	20	--	39	n	2.6	J	3	J	40	U	40	U	40	U	-		-	
Potassium	--	--	NBA		1370	J	1320	J	2130	J	676	J	1210	J	-		-	
Sodium	20000	--	NBA		12100		12300		23700		5790		8100		-		-	
Vanadium	200	--	8.6	n	1.6	J	1.6	J	50	U	50	U	50	U	-		-	
Zinc	2000	--	600	n	37.9		46.7		10	J	39.7		13.9	J	-		-	
Mercury	--	2	0.063	n	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	-		-	
VOCs (SW8260) - µg/L																		
1,2-Dichloroethene, Total	10	--	NBA		8.6		9.2		1	U	1	U	1	U	1	U	1	U
Acetone	6000	--	1400	n	5	U	1	J	5	U	5	U	5	U	1.7	J	1.9	J
cis-1,2-Dichloroethene	10	70	3.6	n	**8.6**		**9.2**		1	U	1	U	1	U	1	U	1	U
Methylene Chloride	40	5	11	n	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Naphthalene	10	--	0.17	c	**0.32**	J	**0.4**	J	1	U	1	U	1	U	1	U	1	U
sec-Butylbenzene	--	--	200	n	0.49	J	0.51	J	1	U	1	U	1	U	1	U	1	U
Trichloroethene	4	5	0.28	n	**7.1**		**7.4**		1	U	1	U	1	U	1	U	1	U
SVOCs (SW8270) - µg/L																		
1-Methylnaphthalene	--	--	1.1	c	0.37		0.31		0.019	U	0.019	U	0.012	J	-		-	
1,1'-Biphenyl	400	--	0.083	n	**0.15**	J	**0.099**	J	0.019	U	0.019	U	0.05		-		-	
2-Methylnaphthalene	30	--	3.6	n	0.017	J	0.014	J	0.019	U	0.019	U	0.019	U	-		-	
2,3,5-Trimethylnaphthalene	--	--	NBA		0.06		0.051		0.019	U	0.019	U	0.019	U	-		-	
2,6-Dimethylnaphthalene	--	--	NBA		0.11	J	0.08	J	0.019	U	0.019	U	0.019	U	-		-	
Acenaphthene	400	--	53	n	0.13		0.12		0.019	U	0.019	U	0.019	U	-		-	
Benzo[g,h,i]perylene	--	--	0.17	c	0.019	U	0.019	U	0.019	U	0.0054	J	0.019	U	-		-	
Dibenz(a,h)anthracene	0.05	--	0.0034	c	0.019	U	0.019	U	0.019	U	**0.0049**	J	0.019	U	-		-	
Dibenzothiophene	--	--	6.5	n	0.044		0.037		0.019	U	0.019	U	0.019	U	-		-	
Fluorene	300	--	29	n	0.17		0.15		0.019	U	0.019	U	0.019	U	-		-	
Indeno[1,2,3-cd]pyrene	0.5	--	0.034	c	0.019	U	0.019	U	0.019	U	0.0066	J	0.019	U	-		-	
Naphthalene	10	--	0.17	c	0.045		0.042		0.019	U	0.019	U	0.0067	J	-		-	
Phenanthrene	--	--	180	n	0.02		0.015	J	0.019	U	0.019	U	0.019	U	-		-	

Table 3-4
Drinking Water Sampling Summary
LO-58
Caribou, Maine
Page 2 of 2

			Sample ID	LO58-DW01-100512	LO58-DUP-01	LO58-DW02-100512	LO58-DW03-100312	LO58-DW04-100812	LO58-DW-TB01	LO58-DW-TB02
			Sample Description	Drinking Water	DUP OF DW01	Drinking Water	Drinking Water	Drinking Water	Trip Blank	Trip Blank
			Sample Date	10/4/2012	10/4/2012	10/4/2012	10/2/2012	10/7/2012	10/6/2012	10/6/2012
Analyte	Maximum Exposure Guideline	EPA or State MCL	Screening Toxicity Value[a]							
Miscellaneous										
Nitrate as N (SW9056 - mg/L)	10	10	3.2 n	1.5	1.5	**8.2**	**9.5**	**8.3**	-	-
Nitrite as N (SW9056 - mg/L)	1	1	0.2 n	0.11 J	0.095 J	0.5 U	0.5 U	0.5 U	-	-
1,1-Dimethylhydrazine (µg/L)	--	--	0.0004 n	10 U	10 U	10 U	10 U	10 U	-	-
Hydrazine (µg/L)	--	--	0.0011 c	5 U	5 U	5 U	5 U	5 U	-	-
Monomethyl Hydrazine (µg/L)	--	--	0.0042 n	10 U	10 U	10 U	10 U	10 U	-	-

1. Maximum Exposure Guidelines and EPA or State MCL Standards were obtained from Maine CDC Maximum Exposure Guidelines (MEGs) for Drinking Water, October 19, 2012 and Maine Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances (February 2016).
2. Highlighted values indicate exceedance of MEG.
3. Bold values indicate exceedance of EPA or State MCL or RSL.

[a] Regional Screening Level (RSL) Residential Tapwater Table (May, 2016)
µg/L = Micrograms per liter.
c = Cancer based, target risk equals 1E-06.
J = The reported result is an estimated value.
mg/L = Milligrams per liter.
n = Noncancer based, target hazard quotient equals 0.1.
NBA = No benchmark available.
U = Analyte was not detected as is reported < LOQ.

Table 3-5
Summary of Detected Compounds in Swale Soils
LO-58
Caribou, Maine
Page 1 of 2

		Sample ID	LO58-SD01-042112		LO58-SD02-042112		LO58-SD-DUP-01		LO58-SD03-042112		LO58-SD01-100712		LO58-SD02-100712		LO58-SD03-100712	
		Sample Description	SD01		SD02		DUP OF SD02		SD03		SD01		SD02		SD03	
		Sample Date	4/20/2012		4/20/2012		4/20/2012		4/20/2012		10/6/2012		10/6/2012		10/6/2012	
Analyte	Units	Screening Toxicity Value Ecological[a]														
Percent Solids	%	-	58.1		59.6		59.5		68.9		58.1		59.6		68.9	
Total Organic Carbon	mg/kg	NBA	64700		57900		60600		32800		-		-		-	
Metals (SW6010) - mg/kg																
Aluminum	mg/kg	5	22200		21100		21400		17300		-		-		-	
Arsenic	mg/kg	0.25	18.7		24		23.8		16.8		-		-		-	
Barium	mg/kg	5	100		85.1		83.9		68.4		-		-		-	
Beryllium	mg/kg	0.1	0.77	J	0.61	J	0.62		0.57		-		-		-	
Cadmium	mg/kg	32	0.37	J	0.5	J	0.53	J	0.46	J	-		-		-	
Calcium	mg/kg	NBA	6480	J	4800	J	4800	J	7610	J	-		-		-	
Chromium	mg/kg	0.018	33.5	J	31.6	J	31.6	J	29.6	J	-		-		-	
Cobalt	mg/kg	13	9	J	9.1	J	9.4	J	10.7	J	-		-		-	
Copper	mg/kg	70	66.9		71.4		73.1		47.4		-		-		-	
Iron	mg/kg	200	30100		30200		30700		31500		-		-		-	
Lead	mg/kg	120	22.8		28.9		30.1		29.2		-		-		-	
Magnesium	mg/kg	NBA	5590	J	6100	J	6350	J	7450	J	-		-		-	
Manganese	mg/kg	220	898	J	512	J	514	J	697	J	-		-		-	
Nickel	mg/kg	38	32	J	32	J	32.9	J	34.9	J	-		-		-	
Potassium	mg/kg	NBA	1190	J	1240	J	1100	J	844	J	-		-		-	
Selenium	mg/kg	0.52	9.8	U	4.9	U	4.2	U	1.3	J	-		-		-	
Sodium	mg/kg	NBA	103	J	99	J	96.3	J	120	J	-		-		-	
Vanadium	mg/kg	2	28.7		30.1		29.5		27.6		-		-		-	
Zinc	mg/kg	120	117		123		125		132		-		-		-	
Mercury	mg/kg	0.349	0.31		0.22		0.23		0.15		-		-		-	
PCBs (SW8082) - µg/kg																
PCB-1260	µg/kg	2510	29	U	20	J	20	J	36		-		-		-	
VOCs (SW8260) - µg/kg																
2-Butanone	µg/kg	42.4	9.6	U	9.2	U	9	U	8.4	U	41	J	33	J	35	J
2-Hexanone	µg/kg	58.2	9.6	U	9.2	U	9	U	8.4	U	97		11	U	5.8	U
4-Isopropyltoluene	µg/kg	NBA	9.6	U	9.2	U	9	U	8.4	U	0.78	J	0.35	J	2.3	J
4-Methyl-2-pentanone	µg/kg	25.1	9.6	U	9.2	U	9	U	8.4	U	12	UJ	6.5	J	6.6	J
Acetone	µg/kg	9.9	15	J	7.3	J	16	J	17	J	530	J	410	J	390	J
Bromobenzene	µg/kg	NBA	9.6	U	9.2	U	9	U	8.4	U	12	U	11	U	5.8	U
Carbon disulfide	µg/kg	0.851	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ	12	U	11	U	0.88	J
Chloroform	µg/kg	121	9.6	UJ	9.2	UJ	0.96	J	0.96	J	12	U	11	U	5.8	U
Methyl acetate	µg/kg	NBA	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ	12		180		110	
Methyl iodide	µg/kg	NBA	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ	4.5	J	3	J	2.1	J
n-Butylbenzene	µg/kg	NBA	0.43	J	9.2	UJ	9	UJ	8.4	UJ	12	U	11	U	5.8	U
Naphthalene	µg/kg	480	0.98	UJ	0.65	UJ	9	UJ	0.75	UJ	12	UJ	11	UJ	5.8	UJ
Styrene	µg/kg	559	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ	2.2	J	11	U	5.8	U
Toluene	µg/kg	670	9.6	U	9.2	U	9	U	8.4	U	0.84	J	0.63	J	2.4	J

Table 3-5
Summary of Detected Compounds in Swale Soils
LO-58
Caribou, Maine
Page 2 of 2

		Sample ID	LO58-SD01-042112		LO58-SD02-042112		LO58-SD-DUP-01		LO58-SD03-042112		LO58-SD01-100712	LO58-SD02-100712	LO58-SD03-100712
		Sample Description	SD01		SD02		DUP OF SD02		SD03		SD01	SD02	SD03
		Sample Date	4/20/2012		4/20/2012		4/20/2012		4/20/2012		10/6/2012	10/6/2012	10/6/2012
Analyte	Units	Screening Toxicity Value Ecological[a]											
SVOCs (SW8270) - µg/kg													
1-Methylnaphthalene	µg/kg	130	3.4	J	4	J	3.8	J	9.6	J	-	-	-
1-Methylphenanthrene	µg/kg	NBA	33		42		40		120		-	-	-
1,1'-Biphenyl	µg/kg	NBA	9.7	U	11	U	3.3	J	24	U	-	-	-
2-Methylnaphthalene	µg/kg	176	3.4	J	4.5	J	4.6	J	11	J	-	-	-
2-Methylphenol	µg/kg	55.4	560	UJ	560	UJ	550	UJ	490	UJ	-	-	-
2,3,5-Trimethylnaphthalene	µg/kg	NBA	3.1	J	3.8	J	2.9	J	12	J	-	-	-
2,6-Dimethylnaphthalene	µg/kg	NBA	9.7	U	2.8	J	11	U	9.3	J	-	-	-
3,3'-Dichlorobenzidine	µg/kg	127		R		R		R		R	-	-	-
4-Chloroaniline	µg/kg	146		R		R		R		R	-	-	-
Acenaphthene	µg/kg	620	9.7	U	5.3	J	5	J	12	J	-	-	-
Acenaphthylene	µg/kg	57.2	19	J	16	J	22	J	26	J	-	-	-
Aniline	µg/kg	NBA		R		R		R		R	-	-	-
Anthracene	µg/kg	57.2	9.4	J	13	J	13	J	52	J	-	-	-
Benzidine	µg/kg	1.7		R		R		R		R	-	-	-
Benzo[a]anthracene	µg/kg	1200	150		220		200		570		-	-	-
Benzo[a]pyrene	µg/kg	1200	170		240		210		490		-	-	-
Benzo[b]fluoranthene	µg/kg	1200	270		390		330		760		-	-	-
Benzo[e]pyrene	µg/kg	NBA	140		200		170		390		-	-	-
Benzo[g,h,i]perylene	µg/kg	170	160		170		150		340		-	-	-
Benzo[k]fluoranthene	µg/kg	1200	85		120		100		250		-	-	-
Bis(2-ethylhexyl) phthalate	µg/kg	180	560	U	560	U	52	J	88	J	-	-	-
Butyl benzyl phthalate	µg/kg	11000	560	U	560	U	550	U	40	J	-	-	-
Carbazole	µg/kg	NBA	560	U	560	U	550	U	35	J	-	-	-
Chrysene	µg/kg	1200	250	J	330	J	320	J	1100	J	-	-	-
Di-n-octyl phthalate	µg/kg	40600	560	U	560	U	550	U	88	J	-	-	-
Dibenz(a,h)anthracene	µg/kg	1200	44		46		45		100		-	-	-
Dibenzothiophene	µg/kg	NBA	7.6	J	9.5	J	8.8	J	30	J	-	-	-
Fluoranthene	µg/kg	2900	300		410		360		970		-	-	-
Fluorene	µg/kg	30000	7.7	J	9.5	J	9	J	29	J	-	-	-
Indeno[1,2,3-cd]pyrene	µg/kg	1200	140		150		140		310		-	-	-
Isophorone	µg/kg	432	560	U	560	U	550	U	490	U	-	-	-
Naphthalene	µg/kg	480	3.9	J	4.8	J	5.1	J	8.8	J	-	-	-
Perylene	µg/kg	NBA	39		59		50		130		-	-	-
Phenanthrene	µg/kg	850	130		170		150		500		-	-	-
Pyrene	µg/kg	195	290		440		410		1100		-	-	-

[a] From various sources as presented in Table 6-4.
NBA = No benchmark available.
µg/kg= micrograms per kilogram
mg/kg=milligram per kilogram
Shaded values exceed screening benchmark

Table 3-6
Summary of Attenuation Factors Between Indoor Air and Soil Vapor at AMAC Building
Former LO-58 Nike Battery Launch Site
Caribou, Maine

	Indoor Air #1 4/22/2012	Sub-Slab #2 4/22/2012 Average of Duplicates	Indoor Air to Subslab Vapor Attenuation Factor	Indoor Air #1 10/7/2012	Sub-Slab #2 10/7/2012 Average of Duplicates	Indoor Air to Subslab Vapor Attenuation Factor
Air Petroleum Hydrocarbons (MADEP-APH) - µg/m3						
C9-C10 Aromatics	6.1	44	0.14	5 U	24.5	0.20
Ethylbenzene	3.4	3.8	0.89	0.87 U	2	0.44
Naphthalene	1.1	1.25	0.88	1.1 U	1.3	0.85
VOCs (TO15) - µg/m3						
1,1,1-Trichloroethane	0.06	0.66 J	0.09	0.22 U	0.25 J	0.88
Chloroform	0.634	56.1	0.01	0.2	9.0	0.02
Trichloroethene	2.6	6	0.43	3.2	6.7	0.48

Attenuation Factor = Indoor Air Concentration/Subslab Vapor Concentration

Detection Limit was used to calculate dilution factor when compound was not detected in the indoor air.

J = Estimated Value

U= Not Detected at Indicated Detection Limit

µg/m3 = Micrograms per cubic meter.

Table 3-7
Summary of Attenuation Factors Between Indoor Air and Groundwater at AMAC Building
LO-58
Caribou, Maine

	Indoor Air #1 4/22/2012		DW-1 10/5/2012 Average of Duplicates (µg/l)	Henrys Law Coefficient (dimensionless)	Estimated Soil Vapor Concentration Above Groundwater Surface air (µg/m^3)	Indoor Air to Groundwater Attenuation Factor
Petroleum Hydrocarbons						
C9-C10 Aromatics	5	U	14	0.33	4620	0.0011
VOCs						
Trichloroethene	3.2		7.25	0.45	3269	0.0010

Groundwater Attenuation Factor =Indoor Air Concentration/EstimatedSoil Vapor Concentration Above Groundwater Surface

Soil Vapor Concentration Above Groundwater Surface Estimate using Dimensionless Henry's Law Coefficient*Groundwater Concentration*10^3 as follows:

$C_{SV} = K_{H'} * C_{GW} * 1000$ where:

C_{SV} = Soil vapor concentration
$K_{H'}$ = Dimensionless Henry's Law Constant
C_{GW} = Groundwater Concentration

$K_{H'} = K_H/RK$ where:

K_H = Henry's Law Constant (atm-m^3/mol)
R = Ideal gas constant
K = Temperature (Kelvin)

Henry's Law Coefficient for C9-C10 Aromatics from Mass DEP *Final Guidance for Characterizing Risk by Petroleum Contaminated Sites* , 10/31/02

Detection Limit was used to calculate dilution factor when compound was not detected in the indoor air.

U= Not Detected at Indicated Detection Limit

µg/m^3 = Micrograms per cubic meter.
µg/l = Micrograms per liter.

SECTION 4

TABLES

Table 4-1

Selection of COCs for Groundwater
Former LO-58 NIKE Battery Launch Site
Caribou, Maine

	ARAR	To Be Considered		Groundwater Maximum Chemical Concentrations (µg/L)		
Potential Contaminant of Concern	**Federal MCL (µg/L)**	**EPA Regional Screening Level for Tap Water (2) (µg/L)**	**Maine MEG (1) (µg/L)**		**Frequency Above Screening Value (3)**	**Selection as COC? (Yes or No?)**
VOCs						
Trichloroethene	5	2.8	4	7.4	1/9	Yes; Concentration exceeds ARAR; Excess risk established in risk assessment
SVOCs						
Benzo(a)pyrene	0.2	0.034	0.05	0.018	0/9	No; Concentrations less than ARAR; Concentrations less than Maine MEG TBC
1,1-Biphenyl	NL	0.83	400	10	3/9	No; Concentrations less than Maine MEG TBC.
1-Methlynaphthalene	NL	11	NL	53	2/9	Yes; No ARAR available and excess risk established in the risk assessment
Dibenzo(a,h)anthracene	NL	0.034	0.05	0.0076	2/9	No; Concentrations less than Maine MEG TBC.
Petroleum Compounds						
C9-C10 Aromatic Hydrocarbons	NL	NL	200	467	1/9	Yes; Concentration exceeds Maine MEG TBC
INORGANICS						
Cadmium	5	9.2	1	1	1/9	No; Concentrations less than ARAR; No excess risk established in risk assessment
Chromium	100	0.35	20	2.4	3/9	No; Concentrations less than ARAR, and concentrations are within the range of regional background
Lead	15 (treatment technique)	NL	10	12.6	1/9	No; Concentrations less than ARAR; No excess risk established in risk assessment
Manganese	NL	434	500	1,330	1/9	Yes; Excess risk established in the risk assessment

Notes:

(1) Maine Groundwater Remedial Action Guidelines - February 2016 (residential groundwater)

(2) EPA Regional Screening Level for Tap Water, May 2016 for a 1E-05 excess risk and HI=1.0.

(3) Frequency above MCL, in the absense of MCLs, frequency above RSL or Maine Maximum Exposure Guideline.

MCL – Maximum Contaminant Level

NL – Not applicable, or no criteria available

Analytical data summarized above are from the October 2012 groundwater and drinking water sample collection.

Table 4-2
Selection of COCs for Indoor Air
Former LO-58 NIKE Battery Launch Site
Caribou, Maine

	To Be Considered			Ambient Air Chemical Concentrations	Indoor Air Chemical Concentrations		
Potential Contaminant of Concern	EPA Regional Screening Level for Residential Indoor Air (2) ($\mu g/m^3$)	EPA Regional Screening Level for Industrial Indoor Air (2) ($\mu g/m^3$)	Maine Residential Chronic Indoor Air Target Concentrations for Multi-Contaminant Sites ($\mu g/m^3$) (1)	Maximum Conc. (µg/m3)	Maximum Conc. ($\mu g/m^3$)	Frequency Above Screening Value (3)	Selection as COC? (Yes or No?)
VOCs							
1,2-Dichloroethane	0.11	0.47	0.094	<0.081	0.11	1/4	Yes; Concentrations above screening values and ambient air concentrations
Benzene	0.36	1.6	0.31	0.21	0.26	0/4	No; No concentrations above screening values
Carbon Tetrachloride	0.47	2	0.41	0.53	0.44	4/4	No; No concentrations above ambient air concentrations
Chloroform	0.12	0.53	0.11	0.052	1.3	4/4	Yes; Concentrations above screening values and ambient air concentrations
Ethylbenzene	1.1	4.9	0.97	0.067	0.36	0/4	No; No concentrations above screening values
Naphthalene	0.083	0.36	0.07	<1.1	1.5	2/4	Yes; Concentrations above screening values and ambient air concentrations
Trichloroethene	0.21	0.88	0.21	<0.21	4	4/4	Yes; Concentrations above screening values and ambient air concentrations
APHs							
C5-C8 Aliphatics (adjusted)	Not available	Not available	630	<32	200	0/4	No; Although sub-slab soil vapor concentrations exceeded Maine Indoor Air RAGs, no concentrations in indoor air were detected above Maine Indoor Air RAGs
C9-C12 Aliphatics (adjusted)	Not available	Not available	210	18	130	0/4	No; Although sub-slab soil vapor concentrations exceeded Maine Indoor Air RAGs, no concentrations in indoor air were detected above Maine Indoor Air RAGs

Notes:

(1) Maine Remedial Action Guidelines for Indoor Air Exposure Pathway - February 2016 multiplied by 0.1 to simulate multi-contaminant sites

(2) EPA Regional Screening Level for Residential Indoor Air and Industrial Indoor Air from May 2016.

(3) Frequency above the lowest presented screening value.

Analytical data summarized above are from the 2012 indoor air sample collection.

TABLE 4-3
COPC Characteristics
Former LO-58 Nike Battery Launch Site
Caribou, Maine

Compound	Media	Formula	Formula Weight	Specific Density	Vapor Pressure	Henrys Law Coefficient	Water Solubility	Log K_{OC}	Log K_{OW}	Ionization Potential
			g/mol	-	mm	atm·m^3/mol	mg/L	-	-	eV
VOCs										
C9-C10 Aromatics*	GW, Air	--	120	--	2.2	0.0075	51	3.25	--	--
Napthalene	Air	$C_{10}H_8$	128.18	1.1535	53.4	0.0006345	28	2.62	3.34	8.19
1,2 Dichloroethane	Air	$C_2H_4Cl_2$	98.96	1.235	70	0.000978	8.7x10^6	1.52	1.48	11.4
Chloroform	Air	$CHCl_3$	119.38	1.49	157	0.0053	8110	1.64	1.94	11.42
Trichloroethene	Soil GW, AIr	C_2HCl_3	131.39	1.46	56	0.0099	1090	1.98	2.72	9.71

Note: values based on atmospheric pressure and 20°C; multiple values were averaged.

From: J. H. Montgomery and Welkom, L. M. Groundwater Chemicals Desk Reference. 2nd Edition. Lewis Publisher, Inc., Chelsea, MI, 1996.

*C9-C10 Aromatic Hydrocarbon characteristics were taken from *Characterizing Risks Posed by Petroleum Contaminated Sites,* Mass Department of Environmental Protection, WSC-02-411, October 31, 2002.

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SECTION 5

TABLES

Table 5-1
Occurrence, Distribution, and Selection of Contaminants of Potential Concern - Surface Soil
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Surface soil

Exposure Point	CAS Number	Contaminant	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (N/C) (2)	Potential ARAR/TBC Value (3)	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
AMAC	106467	1,4-Dichlorobenzene	0.00072	0.0011	mg/kg	LO58-SB01-0002	3/3	NA	0.0011	ND	2.6 c	2600	ME RAGS	NO	BSL
Building Area	90120	1-Methylnaphthalene	0.00029	0.00029	mg/kg	LO58-SB01-0002	1/3	0.00079 - 0.009	0.00029	0.0010	18 c	NBA	---	NO	BSL
	832699	1-Methylphenanthrene	0.0024	0.03	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.03	0.018	NBA	NBA	---	NO	NBA
	581420	2,6-Dimethylnaphthalene	0.00027	0.00027	mg/kg	LO58-SB01-0002	1/3	0.00079 - 0.0090	0.00027	0.00055	NBA	NBA	---	NO	NBA
	78933	2-Butanone	0.033	0.033	mg/kg	LO58-SB03-0002	1/3	0.0047 - 0.0054	0.033	0.044	2700 n	10000	ME RAGS	NO	BSL
	91576	2-Methylnaphthalene	0.00042	0.00042	mg/kg	LO58-SB01-0002	1/3	0.00079 - 0.0090	0.00042	0.00089	24 n	500	ME RAGS	NO	BSL
	99876	4-Isopropyltoluene	0.00017	0.00017	mg/kg	LO58-SB01-0002	1/3	0.0054 - 0.0067	0.00017	0.0034	NBA	NBA	---	NO	NBA
	108101	4-Methyl-2-pentanone	0.002	0.002	mg/kg	LO58-SB01-0002	1/3	0.0054 - 0.0067	0.002	0.026	3300 n	10000	ME RAGS	NO	BSL
	83329	Acenaphthene	0.0014	0.0064	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.0064	0.0012	360 n	7500	ME RAGS	NO	BSL
	208968	Acenaphthylene	0.00081	0.0085	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.0085	0.0036	360 n	7500	ME RAGS	NO	BSL
	67641	Acetone	0.14	0.30	mg/kg	LO58-SB03-0002	3/3	NA	0.30	0.64	6100 n	10000	ME RAGS	NO	BSL
	120127	Anthracene	0.0033	0.026	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.026	0.0031	1800 n	10000	ME RAGS	NO	BSL
	56553	Benzo(a)anthracene	0.014	0.17	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.17	0.031	0.16 c	2.6	ME RAGS	YES	ASL
	50328	Benzo(a)pyrene	0.013	0.17	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.17	0.041	0.016 c	0.26	ME RAGS	YES	ASL
	205992	Benzo(b)fluoranthene	0.00022	0.21	mg/kg	LO58-SB03-0002	3/3	NA	0.21	0.059	0.16 c	2.6	ME RAGS	YES	ASL
	192972	Benzo(e)pyrene	0.011	0.13	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.13	0.037	NBA	NBA	---	NO	NBA
	191242	Benzo(g,h,i)perylene	0.0054	0.071	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.071	0.019	3.8 c	3700	ME RAGS	NO	BSL
	207089	Benzo(k)fluoranthene	0.012	0.16	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.16	0.041	1.6 c	26	ME RAGS	NO	BSL
	117817	Bis(2-ethylhexyl)phthalate	0.029	0.032	mg/kg	LO58-SB03-0002	2/3	0.39 - 0.39	0.032	ND	39 c	770	ME RAGS	NO	BSL
	75150	Carbon disulfide	0.00058	0.0014	mg/kg	LO58-SB01-0002	2/3	0.0054 - 0.0054	0.0014	ND	77 n	10000	ME RAGS	NO	BSL
	218019	Chrysene	0.014	0.18	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.18	0.042	16 c	260	ME RAGS	NO	BSL
	53703	Dibenzo(a,h)anthracene	0.0027	0.035	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.035	0.0081	0.016 c	0.26	ME RAGS	YES	ASL
	132650	Dibenzothiophene	0.00082	0.0069	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.0069	0.0027	78 n	NBA	---	NO	BSL
	206440	Fluoranthene	0.026	0.35	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.35	0.096	240 n	5000	ME RAGS	NO	BSL
	86737	Fluorene	0.0014	0.0067	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.0067	0.0021	240 n	5000	ME RAGS	NO	BSL
	193395	Indeno(1,2,3-cd)pyrene	0.0086	0.10	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.1	0.029	0.16 c	2.6	ME RAGS	NO	BSL
	79209	Methyl acetate	0.0051	0.042	mg/kg	LO58-SB03-0002	3/3	NA	0.042	1.3	7800 n	NBA	---	NO	BSL
	91203	Naphthalene	0.00027	0.00041	mg/kg	LO58-SB01-0002	2/3	0.0090 - 0.0090	0.00041	ND	3.8 c	2500	ME RAGS	NO	BSL
	198550	Perylene	0.0037	0.043	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.043	0.0098	NBA	NBA	---	NO	NBA
	85018	Phenanthrene	0.013	0.12	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.12	0.044	1800 n	3700	ME RAGS	NO	BSL
	129000	Pyrene	0.021	0.31	mg/kg	LO58-SB03-0002	2/3	0.00079 - 0.00079	0.31	0.075	180 n	3700	ME RAGS	NO	BSL
	108883	Toluene	0.00025	0.00025	mg/kg	LO58-SB01-0002	1/3	0.0054 - 0.0067	0.00025	0.00045	490 n	10000	ME RAGS	NO	BSL
	11096825	Aroclor 1260	0.015	0.049	mg/kg	LO58-SS02-100212	2/5	0.019 - 0.023	0.049	ND	0.24 c	2.4	ME RAGS	NO	BSL
	---	C11-C22 Aromatic Hydrocarbons	15.3	15.3	mg/kg	LO58-SB01-0002	1/3	29.3 - 38.3	15.3	ND	750 (4)	750	ME RAGS	NO	BSL
	7429905	Aluminum	15700	25600	mg/Kg	LO58-SB03-0002	3/3	NA	25600	17700	7700 n	170000	ME RAGS	YES	ASL
	7440382	Arsenic	4.8	8.5	mg/Kg	LO58-SB03-0002	3/3	NA	8.5	22.4	0.68 c	1.4	ME RAGS	YES	ASL
	7440393	Barium	44	62.6	mg/Kg	LO58-SB03-0002	3/3	NA	62.6	65.0	1500 n	10000	ME RAGS	NO	BSL
	7440417	Beryllium	0.61	1.4	mg/Kg	LO58-SB03-0002	3/3	NA	1.4	0.45	16 n	340	ME RAGS	NO	BSL
	7440439	Cadmium	0.065	0.073	mg/Kg	LO58-SB02-0002	2/3	2.3 - 2.3	0.073	0.37	7.1 n	11	ME RAGS	NO	BSL
	7440702	Calcium	907	9360	mg/Kg	LO58-SB01-0002	3/3	NA	9360	1060	NUT	NBA	---	NO	See text
	7440473	Chromium	32	56.3	mg/Kg	LO58-SB03-0002	3/3	NA	56.3	40.3	0.30 c	510	ME RAGS	YES	ASL

Table 5-1
Occurrence, Distribution, and Selection of Contaminants of Potential Concern - Surface Soil
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Surface soil

Exposure Point	CAS Number	Contaminant	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (N/C) (2)		Potential ARAR/TBC Value (3)	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
AMAC	7440484	Cobalt	10.3	19.6	mg/Kg	LO58-SB03-0002	3/3	NA	19.6	13.9	2.3	n	51	ME RAGS	YES	ASL
Building Area	7440508	Copper	23.3	34	mg/Kg	LO58-SB03-0002	3/3	NA	34	119	310	n	2400	ME RAGS	NO	BSL
(cont'd)	7439896	Iron	31000	49300	mg/Kg	LO58-SB03-0002	3/3	NA	49300	33100	5500	n	120000	ME RAGS	YES	ASL
	7439921	Lead	13.9	23.3	mg/Kg	LO58-SB03-0002	3/3	NA	23.3	36.3	400		340	ME RAGS	NO	BSL
	7439954	Magnesium	8980	16600	mg/Kg	LO58-SB03-0002	3/3	NA	16600	5000	NUT		NBA	---	NO	See text
	7439965	Manganese	486	654	mg/Kg	LO58-SB03-0002	3/3	NA	654	1610	180	n	4100	ME RAGS	YES	ASL
	7439976	Mercury	0.025	0.065	mg/Kg	LO58-SB02-0002	3/3	NA	0.065	0.19	1.1	n	51	ME RAGS	NO	BSL
	7440020	Nickel	38.4	84.6	mg/Kg	LO58-SB03-0002	3/3	NA	84.6	29.3	150	n	510	ME RAGS	NO	BSL
	7440097	Potassium	924	1310	mg/Kg	LO58-SB03-0002	3/3	NA	1310	980	NUT		NBA	---	NO	See text
	7782492	Selenium	0.85	1.2	mg/Kg	LO58-SB02-0002	2/3	16.2 - 16.2	1.2	2.1	39	n	850	ME RAGS	NO	BSL
	7440235	Sodium	27.9	44.6	mg/Kg	LO58-SB03-0002	3/3	NA	44.6	25.6	NUT		NBA	---	NO	See text
	7440622	Vanadium	20.1	29.2	mg/Kg	LO58-SB03-0002	3/3	NA	29.2	37.6	39	n	1200	ME RAGS	NO	BSL
	7440666	Zinc	53.8	91.9	mg/Kg	LO58-SB03-0002	3/3	NA	91.9	76.6	2300	n	10000	ME RAGS	NO	BSL
Launcher	106467	1,4-Dichlorobenzene	0.00089	0.0036	mg/kg	LO58-SB14-0001	2/12	0.0053 - 0.0065	0.0036	ND	2.6	c	2600	ME RAGS	NO	BSL
Area	90120	1-Methylnaphthalene	0.00019	0.00057	mg/kg	LO58-SB08-0001	7/12	0.00072 - 0.00091	0.00057	0.0010	18	c	NBA	---	NO	BSL
	832699	1-Methylphenanthrene	0.00064	0.0046	mg/kg	LO58-SB11-0001	9/12	0.00072 - 0.00077	0.0046	0.018	NBA		NBA	---	NO	NBA
	2245387	2,3,5-Trimethylnaphthalene	0.00054	0.00054	mg/kg	LO58-SB08-0001	1/12	0.00072 - 0.00091	0.00054	0.0013	NBA		NBA	---	NO	NBA
	581420	2,6-Dimethylnaphthalene	0.00019	0.00051	mg/kg	LO58-SB08-0001	4/12	0.00072 - 0.00091	0.00051	0.00055	NBA		NBA	---	NO	NBA
	78933	2-Butanone	0.0060	0.027	mg/kg	LO58-SB-DUP-02	11/12	0.0058 - 0.0058	0.027	0.044	2700	n	10000	ME RAGS	NO	BSL
	91576	2-Methylnaphthalene	0.00021	0.00073	mg/kg	LO58-SB08-0001	9/12	0.00072 - 0.00091	0.00073	0.00089	24	n	500	ME RAGS	NO	BSL
	99876	4-Isopropyltoluene	0.00033	0.00033	mg/kg	LO58-SB14-0001	1/12	0.0053 - 0.0069	0.00033	0.0034	NBA		NBA	---	NO	NBA
	108101	4-Methyl-2-pentanone	0.0032	0.0054	mg/kg	LO58-SB06-0002	3/12	0.0053 - 0.0078	0.0054	0.026	3300	n	10000	ME RAGS	NO	BSL
	83329	Acenaphthene	0.00023	0.0010	mg/kg	LO58-SB08-0001	3/12	0.00072 - 0.00091	0.0010	0.0012	360	n	7500	ME RAGS	NO	BSL
	208968	Acenaphthylene	0.00034	0.0013	mg/kg	LO58-SB15-0001	8/12	0.00072 - 0.00077	0.0013	0.0036	360	n	7500	ME RAGS	NO	BSL
	67641	Acetone	0.074	0.59	mg/kg	LO58-SB-DUP-02	12/12	NA	0.59	0.64	6100	n	10000	ME RAGS	NO	BSL
	120127	Anthracene	0.00028	0.0020	mg/kg	LO58-SB08-0001	9/12	0.00072 - 0.00091	0.002	0.0031	1800	n	10000	ME RAGS	NO	BSL
	56553	Benzo(a)anthracene	0.00020	0.018	mg/kg	LO58-SB08-0001	12/12	NA	0.018	0.031	0.16	c	2.6	ME RAGS	NO	BSL
	50328	Benzo(a)pyrene	0.00019	0.022	mg/kg	LO58-SB08-0001	12/12	NA	0.022	0.041	0.016	c	0.26	ME RAGS	YES	ASL
	205992	Benzo(b)fluoranthene	0.00036	0.026	mg/kg	LO58-SB08-0001	12/12	NA	0.026	0.059	0.16	c	2.6	ME RAGS	NO	BSL
	192972	Benzo(e)pyrene	0.00024	0.021	mg/kg	LO58-SB08-0001	12/12	NA	0.021	0.037	NBA		NBA	---	NO	NBA
	191242	Benzo(g,h,i)perylene	0.00037	0.0091	mg/kg	LO58-SB08-0001	11/12	0.00075 - 0.00075	0.0091	0.019	3.8	c	3700	ME RAGS	NO	BSL
	207089	Benzo(k)fluoranthene	0.00019	0.025	mg/kg	LO58-SB08-0001	12/12	NA	0.025	0.041	1.6	c	26	ME RAGS	NO	BSL
	117817	Bis(2-ethylhexyl)phthalate	0.025	0.036	mg/kg	LO58-SB07-0002	4/12	0.36 - 0.39	0.036	ND	39	c	770	ME RAGS	NO	BSL
	75150	Carbon disulfide	0.00088	0.018	mg/kg	LO58-SB07-0002	3/12	0.0053 - 0.0078	0.018	ND	77	n	10000	ME RAGS	NO	BSL
	218019	Chrysene	0.00029	0.023	mg/kg	LO58-SB08-0001	12/12	NA	0.023	0.042	16	c	260	ME RAGS	NO	BSL
	53703	Dibenzo(a,h)anthracene	0.00042	0.0044	mg/kg	LO58-SB08-0001	9/12	0.00072 - 0.00077	0.0044	0.0081	0.016	c	0.26	ME RAGS	NO	BSL
	132650	Dibenzothiophene	0.00021	0.0012	mg/kg	LO58-SB08-0001	9/12	0.00072 - 0.00091	0.0012	0.0027	78	n	NBA	---	NO	BSL
	206440	Fluoranthene	0.00053	0.044	mg/kg	LO58-SB08-0001	12/12	NA	0.044	0.096	240	n	5000	ME RAGS	NO	BSL
	86737	Fluorene	0.00023	0.0013	mg/kg	LO58-SB08-0001	9/12	0.00072 - 0.00077	0.0013	0.0021	240	n	5000	ME RAGS	NO	BSL
	193395	Indeno(1,2,3-cd)pyrene	0.00019	0.014	mg/kg	LO58-SB08-0001	12/12	NA	0.014	0.029	0.16	c	2.6	ME RAGS	NO	BSL
	74884	Iodomethane	0.0011	0.0020	mg/kg	LO58-SB08-0001	3/12	0.0053 - 0.0069	0.002	0.0024	NBA		NBA	---	NO	NBA
	79209	Methyl acetate	0.0036	0.035	mg/kg	LO58-SB15-0001	10/12	0.0061 - 0.0078	0.035	1.3	7800	n	NBA	---	NO	BSL
	91203	Naphthalene	0.00024	0.00058	mg/kg	LO58-SB08-0001	3/12	0.00072 - 0.00080	0.00058	ND	3.8	c	2500	ME RAGS	NO	BSL
	104518	n-Butylbenzene	0.00040	0.00058	mg/kg	LO58-SB11-0001	3/12	0.0053 - 0.0078	0.00058	0.00077	390	n	NBA	---	NO	BSL
	95476	o-Xylene	0.000099	0.000099	mg/kg	LO58-SB10-0002	1/12	0.0053 - 0.0078	0.000099	ND	65	n	10000	ME RAGS	NO	BSL
	106434	p-Chlorotoluene	0.00056	0.00056	mg/kg	LO58-SB09-0002	1/12	0.0053 - 0.0078	0.00056	ND	160	n	NBA	---	NO	BSL
	198550	Perylene	0.00053	0.0047	mg/kg	LO58-SB08-0001	9/12	0.00072 - 0.00077	0.0047	0.0098	NBA		NBA	---	NO	NBA

Table 5-1
Occurrence, Distribution, and Selection of Contaminants of Potential Concern - Surface Soil
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Surface soil

Exposure Point	CAS Number	Contaminant	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (N/C) (2)	Potential ARAR/TBC Value (3)	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Launcher Area (cont'd)	85018	Phenanthrene	0.00028	0.020	mg/kg	LO58-SB08-0001	12/12	NA	0.02	0.044	1800 n	3700	ME RAGS	NO	BSL
	129000	Pyrene	0.00037	0.036	mg/kg	LO58-SB08-0001	12/12	NA	0.036	0.075	180 n	3700	ME RAGS	NO	BSL
	1330207	Xylene (Total)	0.000099	0.000099	mg/kg	LO58-SB10-0002	1/12	0.0053 - 0.0078	0.000099	ND	58 n	10000	ME RAGS	NO	BSL
	11096825	Aroclor 1260	0.0053	0.0053	mg/kg	LO58-SB08-0001	1/12	0.018 - 0.023	0.0053	ND	0.24 c	2.4	ME RAGS	NO	BSL
	---	C19-C36 Aliphatic Hydrocarbons	19.9	57.9	mg/kg	LO58-SB14-0001	2/12	27.3 - 32.6	57.9	ND	10000 (4)	10000	ME RAGS	NO	BSL
	---	C9-C10 Aromatic Hydrocarbons	0.39	0.39	mg/kg	LO58-SB13-0002	1/12	0.486 - 0.765	0.393	ND	750 (4)	750	ME RAGS	NO	BSL
	7429905	Aluminum	13000	19000	mg/Kg	LO58-SB11-0001	12/12	NA	19000	17700	7700 n	170000	ME RAGS	YES	ASL
	7440360	Antimony	0.35	0.61	mg/Kg	LO58-SB14-0001	6/8	4.6 - 4.6	0.61	1.1	3.1 n	68	ME RAGS	NO	BSL
	7440382	Arsenic	5.7	11.1	mg/Kg	LO58-SB15-0001	12/12	NA	11.1	22.4	0.68 c	1.4	ME RAGS	YES	ASL
	7440393	Barium	29.2	65.2	mg/Kg	LO58-SB08-0001	12/12	NA	65.2	65	1500 n	10000	ME RAGS	NO	BSL
	7440417	Beryllium	0.50	0.93	mg/Kg	LO58-SB04-0002	12/12	NA	0.93	0.45	16 n	340	ME RAGS	NO	BSL
	7440439	Cadmium	0.069	0.43	mg/Kg	LO58-SB08-0001	11/12	0.33 - 0.33	0.43	0.37	7.1 n	11	ME RAGS	NO	BSL
	7440702	Calcium	571	9570	mg/Kg	LO58-SB07-0002	12/12	NA	9570	1060	NUT	NBA	---	NO	See text
	7440473	Chromium	28	34.9	mg/Kg	LO58-SB11-0001	12/12	NA	34.9	40.3	0.3 c	510	ME RAGS	YES	ASL
	7440484	Cobalt	9.1	13.9	mg/Kg	LO58-SB11-0001	12/12	NA	13.9	13.9	2.3 n	51	ME RAGS	YES	ASL
	7440508	Copper	18.7	50.7	mg/Kg	LO58-SB-DUP-02	12/12	NA	50.7	119	310 n	2400	ME RAGS	NO	BSL
	7439896	Iron	28400	36500	mg/Kg	LO58-SB08-0001	12/12	NA	36500	33100	5500 n	120000	ME RAGS	YES	ASL
	7439921	Lead	12.9	34.2	mg/Kg	LO58-SB08-0001	12/12	NA	34.2	36.3	400	340	ME RAGS	NO	BSL
	7439954	Magnesium	6790	8960	mg/Kg	LO58-SB05-0002	12/12	NA	8960	5000	NUT	NBA	---	NO	See text
	7439965	Manganese	464	780	mg/Kg	LO58-SB12-0001	12/12	NA	780	1610	180 n	4100	ME RAGS	YES	ASL
	7439976	Mercury	0.027	0.35	mg/Kg	LO58-SB08-0001	12/12	NA	0.35	0.19	1.1 n	51	ME RAGS	NO	BSL
	7440020	Nickel	34.6	52.1	mg/Kg	LO58-SB04-0002	12/12	NA	52.1	29.3	150 n	510	ME RAGS	NO	BSL
	7440097	Potassium	611	1210	mg/Kg	LO58-SB08-0001	12/12	NA	1210	980	NUT	NBA	---	NO	See text
	7782492	Selenium	0.86	2.3	mg/Kg	LO58-SB11-0001	7/12	2.4 - 2.9	2.3	2.1	39 n	850	ME RAGS	NO	BSL
	7440235	Sodium	22.7	37.8	mg/Kg	LO58-SB08-0001	12/12	NA	37.8	25.6	NUT	NBA	---	NO	See text
	7440280	Thallium	0.49	0.49	mg/Kg	LO58-SB04-0002	1/12	1.6 - 2.3	0.49	ND	0.078 n	NBA	---	YES	ASL
	7440622	Vanadium	16.4	29.1	mg/Kg	LO58-SB08-0001	12/12	NA	29.1	37.6	39 n	1200	ME RAGS	NO	BSL
	7440666	Zinc	50	79.6	mg/Kg	LO58-SB08-0001	12/12	NA	79.6	76.6	2300 n	10000	ME RAGS	NO	BSL

Notes/sources:

(1) Maximum detected concentration used for screening.

(2) Risk-based residential soil concentrations obtained from the Regional Screening Level (RSL) Table (May, 2016).

Surrogate screening values used:

- Acenaphthene value used for acenaphthylene.
- Naphthene value used for benzo(g,h,i)perylene.
- Anthracene value used for phenanthrene.
- Hexavalent chromium used for chromium.

(3) Maine Remedial Action Guidelines for Residential Soil (ME RAGS)(MEDEP, 2016).

Surrogate screening values used:

- Hexavalent chromium used for chromium.
- PCBs value used for Aroclor 1260.

(4) In the absence of an EPA residential soil RSL, the ME RAG value was used.

(5) Due to a lack of available toxicity criteria, Aromatic and Aliphatic Hydrocarbons were not carried through the risk assessment process.

ASL = above screening level.
BSL = below screening level.
c = cancer based screening value set at a target risk of 1E-06.
NA = not available.
NBA = no benchmark available.
n = noncancer based screening value set at a target hazard quotient of 0.1.
NUT = essential nutrient.
mg/kg = milligrams per kilogram.

Table 5-2
Occurrence, Distribution, and Selection of Contaminants of Potential Concern - Total Soil
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Total soil

Exposure Point	CAS Number	Contaminant	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (N/C) (2)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Entire Site	71556	1,1,1-Trichloroethane	0.00082	0.00082	mg/kg	LO58-SB03-0305	1/32	0.0040 - 0.020	0.00082	ND	810 n	10000	ME RAGS	NO	BSL
	92524	1,1-Biphenyl	0.00025	0.00025	mg/kg	LO58-SB05-0305	1/32	0.00071 - 0.0090	0.00025	ND	4.7 n	8500	ME RAGS	NO	BSL
	95501	1,2-Dichlorobenzene	0.00043	0.00043	mg/kg	LO58-SB08-0608	1/32	0.0040 - 0.020	0.00043	ND	180 n	5100	ME RAGS	NO	BSL
	106467	1,4-Dichlorobenzene	0.00063	0.0039	mg/kg	LO58-SB01-0608	12/32	0.0052 - 0.0075	0.0039	ND	2.6 c	2600	ME RAGS	NO	BSL
	90120	1-Methylnaphthalene	0.00019	0.00057	mg/kg	LO58-SB08-0001	10/32	0.00071 - 0.0090	0.00057	0.0010	18 c	NBA	---	NO	BSL
	832699	1-Methylphenanthrene	0.00020	0.030	mg/kg	LO58-SB03-0002	17/32	0.00071 - 0.00090	0.030	0.018	NBA	NBA	---	NO	NBA
	2245387	2,3,5-Trimethylnaphthalene	0.00054	0.00054	mg/kg	LO58-SB08-0001	1/32	0.00071 - 0.0090	0.00054	0.0013	NBA	NBA	---	NO	NBA
	581420	2,6-Dimethylnaphthalene	0.00019	0.00051	mg/kg	LO58-SB08-0001	7/32	0.00071 - 0.0090	0.00051	0.00055	NBA	NBA	---	NO	NBA
	78933	2-Butanone	0.0060	0.033	mg/kg	LO58-SB03-0002	19/32	0.0040 - 0.020	0.033	0.044	2700 n	10000	ME RAGS	NO	BSL
	91576	2-Methylnaphthalene	0.00020	0.00073	mg/kg	LO58-SB08-0001	16/32	0.00071 - 0.0090	0.00073	0.00089	24 n	500	ME RAGS	NO	BSL
	99876	4-Isopropyltoluene	0.00017	0.00033	mg/kg	LO58-SB14-0001	2/32	0.0040 - 0.020	0.00033	0.0034	NBA	NBA	---	NO	NBA
	108101	4-Methyl-2-pentanone	0.0020	0.0054	mg/kg	LO58-SB06-0002	5/32	0.0040 - 0.020	0.0054	0.026	3300 n	10000	ME RAGS	NO	BSL
	83329	Acenaphthene	0.00023	0.0064	mg/kg	LO58-SB03-0002	6/32	0.00071 - 0.00091	0.0064	0.0012	360 n	7500	ME RAGS	NO	BSL
	208968	Acenaphthylene	0.00034	0.0085	mg/kg	LO58-SB03-0002	13/32	0.00071 - 0.00090	0.0085	0.0036	360 n	7500	ME RAGS	NO	BSL
	67641	Acetone	0.020	0.59	mg/kg	LO58-SB-DUP-02	32/32	NA	0.59	0.64	6100 n	10000	ME RAGS	NO	BSL
	120127	Anthracene	0.00023	0.026	mg/kg	LO58-SB03-0002	15/32	0.00071 - 0.00091	0.026	0.0031	1800 n	10000	ME RAGS	NO	BSL
	56553	Benzo(a)anthracene	0.00020	0.17	mg/kg	LO58-SB03-0002	20/32	0.00071 - 0.00090	0.17	0.031	0.16 c	2.6	ME RAGS	YES	ASL
	50328	Benzo(a)pyrene	0.00019	0.17	mg/kg	LO58-SB03-0002	20/32	0.00071 - 0.00090	0.17	0.041	0.016 c	0.26	ME RAGS	YES	ASL
	205992	Benzo(b)fluoranthene	0.00022	0.21	mg/kg	LO58-SB03-0002	32/32	NA	0.21	0.059	0.16 c	2.6	ME RAGS	YES	ASL
	192972	Benzo(e)pyrene	0.00024	0.13	mg/kg	LO58-SB03-0002	23/32	0.00071 - 0.00090	0.13	0.037	NBA	NBA	---	NO	NBA
	191242	Benzo(g,h,i)perylene	0.00023	0.071	mg/kg	LO58-SB03-0002	20/32	0.00071 - 0.00090	0.071	0.019	3.8 c	3700	ME RAGS	NO	BSL
	207089	Benzo(k)fluoranthene	0.00019	0.16	mg/kg	LO58-SB03-0002	20/32	0.00071 - 0.00090	0.16	0.041	1.6 c	26	ME RAGS	NO	BSL
	117817	Bis(2-ethylhexyl)phthalate	0.025	0.044	mg/kg	LO58-SB07-0911	11/32	0.35 - 0.42	0.044	ND	39 c	770	ME RAGS	NO	BSL
	75150	Carbon disulfide	0.00047	0.018	mg/kg	LO58-SB07-0002	16/32	0.0040 - 0.020	0.018	ND	77 n	10000	ME RAGS	NO	BSL
	218019	Chrysene	0.00022	0.18	mg/kg	LO58-SB03-0002	23/32	0.00071 - 0.00090	0.18	0.042	16 c	260	ME RAGS	NO	BSL
	53703	Dibenzo(a,h)anthracene	0.00025	0.035	mg/kg	LO58-SB03-0002	16/32	0.00071 - 0.00090	0.035	0.0081	0.016 c	0.26	ME RAGS	YES	ASL
	132650	Dibenzothiophene	0.00019	0.0069	mg/kg	LO58-SB03-0002	14/32	0.00071 - 0.00091	0.0069	0.0027	78 n	NBA	---	NO	BSL
	206440	Fluoranthene	0.00033	0.35	mg/kg	LO58-SB03-0002	21/32	0.00072 - 0.39000	0.35	0.096	240 n	5000	ME RAGS	NO	BSL
	86737	Fluorene	0.00023	0.0067	mg/kg	LO58-SB03-0002	15/32	0.00071 - 0.00090	0.0067	0.0021	240 n	5000	ME RAGS	NO	BSL
	193395	Indeno(1,2,3-cd)pyrene	0.00019	0.10	mg/kg	LO58-SB03-0002	20/32	0.00071 - 0.00090	0.10	0.029	0.16 c	2.6	ME RAGS	NO	BSL
	74884	Iodomethane	0.00072	0.003	mg/kg	LO58-SB15-0406	7/32	0.0040 - 0.020	0.003	0.0024	NBA	NBA	---	NO	NBA
	79209	Methyl acetate	0.0017	0.042	mg/kg	LO58-SB03-0002	22/32	0.0040 - 0.020	0.042	1.3	7800 n	NBA	---	NO	BSL
	91203	Naphthalene	0.00022	0.00058	mg/kg	LO58-SB08-0001	10/32	0.00071 - 0.0090	0.00058	ND	3.8 c	2500	ME RAGS	NO	BSL
	104518	n-Butylbenzene	0.00040	0.00075	mg/kg	LO58-SB13-0810	8/32	0.004 - 0.02	0.00075	0.00077	390 n	NBA	---	NO	BSL
	95476	o-Xylene	0.000099	0.000099	mg/kg	LO58-SB10-0002	1/32	0.0040 - 0.020	0.000099	ND	65 n	10000	ME RAGS	NO	BSL
	106434	p-Chlorotoluene	0.00056	0.00056	mg/kg	LO58-SB09-0002	1/32	0.0040 - 0.020	0.00056	ND	160 n	NBA	---	NO	BSL
	198550	Perylene	0.00027	0.043	mg/kg	LO58-SB03-0002	16/32	0.00071 - 0.00090	0.043	0.0098	NBA	NBA	---	NO	NBA
	85018	Phenanthrene	0.00021	0.12	mg/kg	LO58-SB03-0002	28/32	0.00075 - 0.00090	0.12	0.044	1800 n	3700	ME RAGS	NO	BSL
	129000	Pyrene	0.00021	0.31	mg/kg	LO58-SB03-0002	23/32	0.00072 - 0.39000	0.31	0.075	180 n	3700	ME RAGS	NO	BSL
	108883	Toluene	0.00025	0.00030	mg/kg	LO58-SB11-0810	2/32	0.0040 - 0.020	0.0003	0.00045	490 n	10000	ME RAGS	NO	BSL
	79016	Trichloroethene	0.00082	0.011	mg/kg	LO58-SB13R-0910	2/32	0.0047 - 0.020	0.011	ND	0.41 n	85	ME RAGS	NO	BSL
	1330207	Xylene (Total)	0.000099	0.000099	mg/kg	LO58-SB10-0002	1/32	0.0040 - 0.020	0.000099	ND	58 n	10000	ME RAGS	NO	BSL
	11096825	Aroclor 1260	0.0053	0.049	mg/kg	LO58-SS02-100212	3/34	0.018 - 0.023	0.049	ND	0.24 c	2.4	ME RAGS	NO	BSL
	---	C19-C36 Aliphatic Hydrocarbons	19.9	57.9	mg/kg	LO58-SB14-0001	3/32	27.3 - 38.3	57.9	ND	10000 (4)	10000	ME RAGS	NO	BSL
	---	C9-C10 Aromatic Hydrocarbons	0.39	0.39	mg/kg	LO58-SB13-0002	1/32	0.49 - 0.97	0.39	ND	750 (4)	750	ME RAGS	NO	BSL
	---	C11-C22 Aromatic Hydrocarbons	15.3	15.3	mg/kg	LO58-SB01-0002	1/32	27.3 - 38.3	15.3	ND	750 (4)	750	ME RAGS	NO	BSL
	7429905	Aluminum	8670	29900	mg/Kg	LO58-SB02-0608	32/32	NA	29900	17700	7700 n	170000	ME RAGS	YES	ASL

Table 5-2
Occurrence, Distribution, and Selection of Contaminants of Potential Concern - Total Soil
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Total soil

Exposure Point	CAS Number	Contaminant	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (N/C) (2)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Entire Site	7440360	Antimony	0.35	0.61	mg/Kg	LO58-SB14-0001	10/18	3.7 - 29.8	0.61	1.1	3.1 n	68	ME RAGS	NO	BSL
(cont'd)	7440382	Arsenic	3.0	11.1	mg/Kg	LO58-SB15-0001	32/32	NA	11.1	22.4	0.68 c	1.4	ME RAGS	YES	ASL
	7440393	Barium	25.3	104	mg/Kg	LO58-SB02-0608	32/32	NA	104	65	1500 n	10000	ME RAGS	NO	BSL
	7440417	Beryllium	0.43	1.4	mg/Kg	LO58-SB02-0608	32/32	NA	1.4	0.45	16 n	340	ME RAGS	NO	BSL
	7440439	Cadmium	0.057	0.43	mg/Kg	LO58-SB08-0001	21/32	0.33 - 2.5	0.43	0.37	7.1 n	11	ME RAGS	NO	BSL
	7440702	Calcium	571	156000	mg/Kg	LO58-SB06-0406	32/32	NA	156000	1060	NUT	NBA	---	NO	See text
	7440473	Chromium	18.3	61.4	mg/Kg	LO58-SB02-0608	32/32	NA	61.4	40.3	0.3 c	510	ME RAGS	YES	ASL
	7440484	Cobalt	7.2	21	mg/Kg	LO58-SB02-0608	32/32	NA	21	13.9	2.3 n	51	ME RAGS	YES	ASL
	7440508	Copper	14.8	50.7	mg/Kg	LO58-SB-DUP-02	32/32	NA	50.7	119	310 n	2400	ME RAGS	NO	BSL
	7439896	Iron	17800	49300	mg/Kg	LO58-SB03-0002	32/32	NA	49300	33100	5500 n	120000	ME RAGS	YES	ASL
	7439921	Lead	11.3	53.9	mg/Kg	LO58-SB04-0608	32/32	NA	53.9	36.3	400	340	ME RAGS	NO	BSL
	7439954	Magnesium	6030	17500	mg/Kg	LO58-SB02-0608	32/32	NA	17500	5000	NUT	NBA	---	NO	See text
	7439965	Manganese	327	897	mg/Kg	LO58-SB05-0305	32/32	NA	897	1610	180 n	4100	ME RAGS	YES	ASL
	7439976	Mercury	0.0041	0.35	mg/Kg	LO58-SB08-0001	28/32	0.033 - 0.044	0.35	0.19	1.1 n	51	ME RAGS	NO	BSL
	7440020	Nickel	28.2	86.4	mg/Kg	LO58-SB02-0608	32/32	NA	86.4	29.3	150 n	510	ME RAGS	NO	BSL
	7440097	Potassium	566	1780	mg/Kg	LO58-SB02-0608	32/32	NA	1780	980	NUT	NBA	---	NO	See text
	7782492	Selenium	0.78	2.3	mg/Kg	LO58-SB11-0001	13/32	2.1 - 17.4	2.3	2.1	39 n	850	ME RAGS	NO	BSL
	7440235	Sodium	22.5	45.6	mg/Kg	LO58-SB08-0608	31/32	2070 - 2130	45.6	25.6	NUT	NBA	---	NO	See text
	7440280	Thallium	0.24	0.60	mg/Kg	LO58-SB05-0305	5/32	1.5 - 2.5	0.60	ND	0.078 n	NBA	---	YES	ASL
	7440622	Vanadium	11.1	29.2	mg/Kg	LO58-SB03-0002	32/32	NA	29.2	37.6	39 n	1200	ME RAGS	NO	BSL
	7440666	Zinc	38.2	91.9	mg/Kg	LO58-SB03-0002	32/32	NA	91.9	76.6	2300 n	10000	ME RAGS	NO	BSL

Notes/sources:

(1) Maximum detected concentration used for screening.

(2) Risk-based residential soil concentrations obtained from the Regional Screening Level (RSL) Table (May, 2016).

Surrogate screening values used:

- Acenaphthene value used for acenaphthylene.
- Naphthene value used for benzo(g,h,i)perylene.
- Anthracene value used for phenanthrene.
- Hexavalent chromium used for chromium.

(3) Maine Remedial Action Guidelines for Residential Soil (ME RAGS)(MEDEP, 2016).

Surrogate screening values used:

- Hexavalent chromium used for chromium.
- PCBs value used for Aroclor 1260.

(4) In the absence of an EPA residential soil RSL, the ME RAG value was used.

(5) Due to a lack of available toxicity criteria, Aromatic and Aliphatic Hydrocarbons were not carried through the risk assessment process.

ASL = above screening level.
BSL = below screening level.
c = cancer based screening value set at a target risk of 1E-06.
NA = not available.
NBA = no benchmark available.
n = noncancer based screening value set at a target hazard quotient of 0.1.
NUT = essential nutrient.
mg/kg = milligrams per kilogram.

Table 5-3

Comparison of Maximum Essential Nutrient Concentrations to Recommended Dietary Allowances/Adequate Intakes
LO-58 Site, Caribou, Maine

Essential Nutrient	AMAC Building Area Maximum Detected Concentration (mg/kg)	Launcher Area Maximum Detected Concentration (mg/kg)	Maximum Daily Intake - Soil [a] (mg/day)	Range of RDA/AI [b] (mg/day)	Result of Comparison
Calcium	9360	9570	1.9	200 - 1300	Eliminate
Magnesium	16600	8960	3.3	30 - 420	Eliminate
Potassium	1310	1210	0.26	400 - 5100	Eliminate
Sodium	44.6	37.8	0.0089	120 - 1500	Eliminate

Notes:

[a] Estimated based on a 200 mg/day soil ingestion rate (200 mg/day = 0.0002 kg/day).

[b] Sources: Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, *Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride* (The National Academies Press, 1997) and *Dietary Reference Intakes for Water, Potassium, Sodium, Chloride, and Sulfate* (The National Academies Press, 2005).

AI = Adequate intake

RDA = Recommended dietary allowance

Table 5-4
Surface Soil Background Comparisons
LO-58 Site, Caribou, Maine

	Site Background	Regional Background[b]	AMAC Building Area	AMAC Building Area Exceedances ?		Launcher Area	Launcher Area Exceedances ?	
Contaminant	Range of Detected Concentrations (mg/kg)	UPL (mg/kg)	Range of Detected Concentrations (mg/kg)	AMAC Area Maximum Exceeds Site-Specific Background Maximum	AMAC Area Maximum Exceeds Regional Background UPL	Range of Detected Concentrations (mg/kg)	Launcher Area Maximum Exceeds Site-Specific Background Maximum	Launcher Area Maximum Exceeds Regional Background UPL
Aluminum	15000 - 17700	NA	15700 - 25600	Y	---	13000 - 19000	Y	---
Antimony	0.55 - 1.1	0.71	ND	---	---	0.35 - 0.61	N	N
Arsenic	14 - 22.4	16	4.8 - 8.5	N	N	5.7 - 11.1	N	N
Barium	57.2 - 65	470	44 - 62.6	N	N	29.2 - 65.2	N	N
Beryllium	0.37 - 0.45	2.4	0.61 - 1.4	Y	N	0.50 - 0.93	Y	N
Cadmium	0.21 - 0.37	0.26	0.065 - 0.073	N	N	0.069 - 0.43	Y	Y
Chromium	26 - 40.3	79	32 - 56.3	Y	N	28 - 34.9	N	N
Cobalt	9.1 - 13.9	15	10.3 - 19.6	Y	Y	9.1 - 13.9	N	N
Copper	72.1 - 119	23	23.3 - 34	N	Y	18.7 - 50.7	N	Y
Iron	27700 - 33100	NA	31000 - 49300	Y	---	28400 - 36500	Y	---
Lead	22.9 - 36.3	32	13.9 - 23.3	N	N	12.9 - 34.2	N	Y
Manganese	655 - 1610	840	486 - 654	N	N	464 - 780	N	N
Mercury	0.014 - 0.19	0.123	0.025 - 0.065	N	N	0.027 - 0.35	Y	Y
Nickel	22 - 29.3	39	38.4 - 84.6	Y	Y	34.6 - 52.1	Y	Y
Selenium	1.6 - 2.1	0.61	0.85 - 1.2	N	Y	0.86 - 2.3	Y	Y
Thallium	ND	0.6	ND	---	---	0.49 - 0.49	---	N
Vanadium	30.9 - 37.6	100	20.1 - 29.2	N	N	16.4 - 29.1	N	N
Zinc	64.4 - 76.6	100	53.8 - 91.9	Y	N	50 - 79.6	Y	N

[a] Regional background upper prediction limits obtained from *Summary Report for Evaluation of Concentrations of Polycyclic Aromatic Hydrocarbons (PAHs) and Metals in Background Soils in Maine* (AMEC, 2012) and *Proposed Revisions the the Maine Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances (MEDEP, 2013).*

mg/kg = milligrams per kilogram.

UPL = Upper Prediction limit.

Table 5-5
Occurrence, Distribution, and Selection of Contaminants of Potential Concern - Groundwater
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Contaminant	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (N/C) (2)		Potential ARAR/TBC Value (3)	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
AMAC Building Area	71556	1,1,1-Trichloroethane	0.12	0.12	µg/L	DW-01_PR_021412	1/13	0.5 - 1.0	0.12	NA	800	n	10000	ME MEGs	NO	BSL
	92524	1,1-Biphenyl	0.099	0.15	µg/L	LO58-DW01-100512	1/1	NA	0.15	NA	0.083	n	400	ME MEGs	YES	ASL
	540590	1,2-Dichloroethene	8.6	9.2	µg/L	LO58-DW-DUP-01	1/1	NA	9.2	NA	NBA		10	ME MEGs	NO	NBA
	90120	1-Methylnaphthalene	0.31	0.37	µg/L	LO58-DW01-100512	1/1	NA	0.37	NA	1.1	c	NBA	---	NO	BSL
	2245387	2,3,5-Trimethylnaphthalene	0.051	0.06	µg/L	LO58-DW01-100512	1/1	NA	0.060	NA	NBA		NBA	---	NO	NBA
	581420	2,6-Dimethylnaphthalene	0.08	0.11	µg/L	LO58-DW01-100512	1/1	NA	0.11	NA	NBA		NBA	---	NO	NBA
	91576	2-Methylnaphthalene	0.014	0.017	µg/L	LO58-DW01-100512	1/1	NA	0.017	NA	3.6	n	30	ME MEGs	NO	BSL
	83329	Acenaphthene	0.12	0.13	µg/L	LO58-DW01-100512	1/1	NA	0.13	NA	53	n	400	ME MEGs	NO	BSL
	---	Aromatic Hydrocarbons, C9-C10	14	15	µg/L	LO58-DW01-100512	1/7	0.05 - 0.05	15	NA	200	(4)	200	ME MEGs	NO	BSL
	156592	cis-1,2-Dichloroethene	0.18	9.2	µg/L	LO58-DW-DUP-01	13/13	NA	9.2	NA	3.6	n	10	ME MEGs	YES	ASL
	74873	Chloromethane	0.37	0.63	µg/L	DW-01_PR_083011_Dup	1/13	0.5 - 1	0.63	NA	19	n	20	ME MEGs	NO	BSL
	132650	Dibenzothiophene	0.037	0.044	µg/L	LO58-DW01-100512	1/1	NA	0.044	NA	6.5	n	NBA	---	NO	BSL
	---	DRO	50	50	µg/L	DW-01_PR_052610	2/2	NA	50	NA	NBA		NBA	---	NO	NBA
	86737	Fluorene	0.15	0.17	µg/L	LO58-DW01-100512	1/1	NA	0.17	NA	29	n	300	ME MEGs	NO	BSL
	---	GRO	10	10	µg/L	DW-01_PR_052610	2/2	NA	10	NA	NBA		NBA	---	NO	NBA
	91203	Naphthalene	0.042	0.045	µg/L	LO58-DW01-100512	1/13	0.5 - 0.5	0.045	NA	0.17	c	10	ME MEGs	NO	BSL
	85018	Phenanthrene	0.015	0.020	µg/L	LO58-DW01-100512	1/1	NA	0.020	NA	180	n	NBA	---	NO	BSL
	135988	sec-Butylbenzene	0.14	0.51	µg/L	LO58-DW-DUP-01	2/13	0.5 - 0.5	0.51	NA	200	n	NBA	---	NO	BSL
	79016	Trichloroethene	2	7.4	µg/L	LO58-DW-DUP-01	13/13	NA	7.4	NA	0.28	n	4.0	ME MEGs	YES	ASL
	7429905	Aluminum	784	992	µg/L	LO58-DW01-100512	1/1	NA	992	NA	2000	n	7000	ME MEGs	NO	BSL
	7440393	Barium	50.6	51.3	µg/L	LO58-DW01-100512	1/1	NA	51	NA	380	n	1000	ME MEGs	NO	BSL
	7440702	Calcium	93000	93200	µg/L	LO58-DW01-100512	1/1	NA	93200	NA	NUT		NBA	---	NO	See text
	7440473	Chromium	2.1	2.4	µg/L	LO58-DW01-100512	1/1	NA	2.4	NA	0.035	c	20	ME MEGs	YES	ASL
	7440508	Copper	45.6	62.3	µg/L	LO58-DW01-100512	1/1	NA	62.3	NA	80	n	500	ME MEGs	NO	BSL
	7439896	Iron	965	1280	µg/L	LO58-DW01-100512	1/1	NA	1280	NA	1400	n	5000	ME MEGs	NO	BSL
	7439921	Lead	11.5	12.6	µg/L	LO58-DW-DUP-01	1/1	NA	12.6	NA	15		10	ME MEGs	NO	BSL
	7439954	Magnesium	7090	7120	µg/L	LO58-DW-DUP-01	1/1	NA	7120	NA	NUT		NBA	---	NO	See text
	7439965	Manganese	42.6	67	µg/L	LO58-DW01-100512	1/1	NA	67	NA	43	n	500	ME MEGs	YES	ASL
	7440020	Nickel	2.6	3.0	µg/L	LO58-DW-DUP-01	1/1	NA	3.0	NA	39	n	20	ME MEGs	NO	BSL
	14797558	Nitrate	1500	1500	µg/L	LO58-DW01-100512	1/1	NA	1500	NA	3200	n	10000	ME MEGs	NO	BSL
	14797650	Nitrite	95	110	µg/L	LO58-DW01-100512	1/1	NA	110	NA	200	n	1000	ME MEGs	NO	BSL
	7440097	Potassium	1320	1370	µg/L	LO58-DW01-100512	1/1	NA	1370	NA	NUT		NBA	---	NO	See text
	7440235	Sodium	12100	12300	µg/L	LO58-DW-DUP-01	1/1	NA	12300	NA	NUT		20000	ME MEGs	NO	See text
	7440622	Vanadium	1.6	1.6	µg/L	LO58-DW01-100512	1/1	NA	1.6	NA	8.6	n	200	ME MEGs	NO	BSL
	7440666	Zinc	37.9	46.7	µg/L	LO58-DW-DUP-01	1/1	NA	46.7	NA	600	n	2000	ME MEGs	NO	BSL
Entire Site	71556	1,1,1-Trichloroethane	0.12	0.12	µg/L	DW-01_PR_021412	1/36	0.5 - 1	0.12	NA	800	n	10000	ME MEGs	NO	BSL
	92524	1,1-Biphenyl	0.099	10	µg/L	LO58-MW05-100812	2/6	0.019 - 0.019	10	NA	0.083	n	400	ME MEGs	YES	ASL
	95636	1,2,4-Trimethylbenzene	0.12	29	µg/L	LO58-MW-DUP-01	5/36	0.5 - 1.0	29	NA	1.5	n	NBA	---	YES	ASL
	540590	1,2-Dichloroethene	8.6	9.2	µg/L	LO58-DW-DUP-01	1/6	1.0 - 1.0	9.2	NA	NBA		10	ME MEGs	NO	NBA
	108678	1,3,5-Trimethylbenzene	1.2	1.2	µg/L	LO58-MW05-100812	1/36	0.5 - 1.0	1.2	NA	12	n	NBA	---	NO	BSL
	90120	1-Methylnaphthalene	0.0038	53	µg/L	LO58-MW05-100812	3/6	0.019 - 0.019	53	NA	1.1	c	NBA	---	YES	ASL
	2245387	2,3,5-Trimethylnaphthalene	0.051	4.0	µg/L	LO58-MW05-100812	2/6	0.019 - 0.019	4.0	NA	NBA		NBA	---	NO	NBA
	581420	2,6-Dimethylnaphthalene	0.08	22	µg/L	LO58-MW05-100812	2/6	0.019 - 0.019	22	NA	NBA		NBA	---	NO	NBA
	91576	2-Methylnaphthalene	0.0038	1.0	µg/L	LO58-MW05-100812	3/6	0.019 - 0.019	1.0	NA	3.6	n	30	ME MEGs	NO	BSL
	99876	4-Isopropyltoluene	0.27	4.2	µg/L	LO58-MW-DUP-01	3/36	0.5 - 1.0	4.2	NA	NBA		70	ME MEGs	NO	NBA
	83329	Acenaphthene	0.0028	1.6	µg/L	LO58-MW05-100812	3/6	0.019 - 0.019	1.6	NA	53	n	400	ME MEGs	NO	BSL

Table 5-5
Occurrence, Distribution, and Selection of Contaminants of Potential Concern - Groundwater
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Contaminant	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (N/C) (2)	Potential ARAR/TBC Value (3)	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Entire Site	208968	Acenaphthylene	0.0018	0.0018	µg/L	LO58-MW01-100512	1/6	0.019 - 1.3	0.0018	NA	53 n	NBA	---	NO	BSL
(cont'd)	---	Aliphatic Hydrocarbons, C5-C8	26	28	µg/L	LO58-MW05-100812	1/20	0.05 - 50	28.00	NA	300 (4)	300	ME MEGs	NO	BSL
	---	Aliphatic Hydrocarbons, C9-C12	0.059	261	µg/L	LO58-MW05-100812	4/20	0.05 - 50	261.00	NA	700 (4)	700	ME MEGs	NO	BSL
	120127	Anthracene	0.0026	0.0056	µg/L	LO58-MW02-100312	2/6	0.019 - 1.3	0.0056	NA	180 n	2000	ME MEGs	NO	BSL
	---	Aromatic Hydrocarbons, C9-C10	0.050	467	µg/L	LO58-MW05-100812	3/20	0.05 - 10	467	NA	200 (4)	200	ME MEGs	NO	See Footnote (5)
	---	Aromatic Hydrocarbons, C11-C22	215	215	µg/L	LO58-MW05-100812	1/20	0.10 - 150	215	NA	200 (4)	200	ME MEGs	NO	See Footnote (5)
	56553	Benzo(a)anthracene	0.0052	0.017	µg/L	LO58-MW03-100312	3/6	0.019 - 1.3	0.017	NA	0.012 c	0.50	ME MEGs	YES	ASL
	50328	Benzo(a)pyrene	0.0051	0.018	µg/L	LO58-MW03-100312	2/6	0.019 - 1.3	0.018	NA	0.0034 c	0.050	ME MEGs	YES	ASL
	205992	Benzo(b)fluoranthene	0.0051	0.019	µg/L	LO58-MW03-100312	2/6	0.019 - 1.3	0.019	NA	0.034 c	0.50	ME MEGs	NO	BSL
	192972	Benzo(e)pyrene	0.0054	0.012	µg/L	LO58-MW03-100312	2/6	0.019 - 1.3	0.012	NA	NBA	NBA	---	NO	NBA
	191242	Benzo(g,h,i)perylene	0.012	0.012	µg/L	LO58-MW03-100312	1/6	0.019 - 1.3	0.012	NA	0.17 c	NBA	---	NO	BSL
	207089	Benzo(k)fluoranthene	0.020	0.02	µg/L	LO58-MW03-100312	1/6	0.019 - 1.3	0.020	NA	0.34 c	5.0	ME MEGs	NO	BSL
	74873	Chloromethane	0.37	0.63	µg/L	DW-01_PR_083011_Dup	1/36	0.5 - 1	0.63	NA	19 n	20	ME MEGs	NO	BSL
	218019	Chrysene	0.0057	0.018	µg/L	LO58-MW03-100312	2/6	0.019 - 1.3	0.018	NA	3.4 c	50	ME MEGs	NO	BSL
	156592	cis-1,2-Dichloroethene	0.18	9.2	µg/L	LO58-DW-DUP-01	13/36	0.5 - 1.0	9.2	NA	3.6 n	10	ME MEGs	YES	ASL
	53703	Dibenzo(a,h)anthracene	0.0076	0.0076	µg/L	LO58-MW03-100312	1/6	0.019 - 1.3	0.0076	NA	0.0034 c	0.050	ME MEGs	YES	ASL
	132649	Dibenzofuran	1.6	1.6	µg/L	LO58-MW05-100812	1/6	9.4 - 9.5	1.6	NA	0.79 n	NBA	---	YES	ASL
	132650	Dibenzothiophene	0.037	0.59	µg/L	LO58-MW05-100812	2/6	0.019 - 0.019	0.59	NA	6.5 n	NBA	---	NO	BSL
	---	DRO	50	70	µg/L	MW-05_103109_Dup	12/12	NA	70	NA	NBA	NBA	---	NO	NBA
	100414	Ethyl benzene	1.3	1.4	µg/L	LO58-MW05-100812	1/36	0.5 - 1.0	1.4	NA	1.5 c	30.0	ME MEGs	NO	BSL
	206440	Fluoranthene	0.0088	0.014	µg/L	LO58-MW02-100312	3/6	0.019 - 1.3	0.014	NA	80 n	300	ME MEGs	NO	BSL
	86737	Fluorene	0.0031	2.0	µg/L	LO58-MW05-100812	3/6	0.019 - 0.019	2.0	NA	29 n	300	ME MEGs	NO	BSL
	---	GRO	10	32	µg/L	MW-05_050109	12/12	NA	32	NA	NBA	NBA	---	NO	NBA
	193395	Indeno(1,2,3-cd)pyrene	0.016	0.016	µg/L	LO58-MW03-100312	1/6	0.019 - 1.3	0.016	NA	0.034 c	0.50	ME MEGs	NO	BSL
	98828	Isopropylbenzene	0.16	4.4	µg/L	LO58-MW-DUP-01	3/36	0.5 - 1.0	4.4	NA	45 n	NBA	---	NO	BSL
	179601231	m,p-Xylene	0.3	0.45	µg/L	LO58-MW-DUP-01	3/36	0.5 - 1.0	0.45	NA	19 n	NBA	---	NO	BSL
	91203	Naphthalene	0.0065	9.3	µg/L	LO58-MW05-100812	3/36	0.019 - 0.5	9.3	NA	0.17 c	10	ME MEGs	YES	ASL
	103651	n-Propylbenzene	0.2	4.6	µg/L	LO58-MW-DUP-01	3/36	0.5 - 1.0	4.6	NA	66 n	NBA	---	NO	BSL
	95476	o-Xylene	0.21	0.22	µg/L	LO58-MW-DUP-01	1/36	0.5 - 1.0	0.22	NA	19 n	NBA	---	NO	BSL
	198550	Perylene	0.0051	0.0051	µg/L	LO58-MW03-100312	1/6	0.019 - 1.3	0.0051	NA	NBA	NBA	---	NO	NBA
	85018	Phenanthrene	0.0068	0.56	µg/L	LO58-MW05-100812	4/6	0.019 - 0.019	0.56	NA	180 n	NBA	---	NO	BSL
	129000	Pyrene	0.0078	0.014	µg/L	LO58-MW02-100312	3/6	0.019 - 1.3	0.014	NA	12 n	200	ME MEGs	NO	BSL
	135988	sec-Butylbenzene	0.14	5.8	µg/L	LO58-MW-DUP-01	11/36	0.5 - 1.0	5.8	NA	200 n	NBA	---	NO	BSL
	98066	tert-Butylbenzene	0.46	2.7	µg/L	LO58-MW-DUP-01	4/36	0.5 - 1.0	2.7	NA	69 n	NBA	---	NO	BSL
	108883	Toluene	0.3	0.4	µg/L	MW-05_102908	2/36	0.5 - 1.0	0.4	NA	110 n	600	ME MEGs	NO	BSL
	79016	Trichloroethene	0.18	7.4	µg/L	LO58-DW-DUP-01	26/36	0.5 - 1.0	7.4	NA	0.28 n	4	ME MEGs	YES	ASL
	1330207	Xylene (Total)	0.65	0.67	µg/L	LO58-MW-DUP-01	1/6	1.0 - 1.0	0.67	NA	19 n	1000	ME MEGs	NO	BSL
	7429905	Aluminum	139	992	µg/L	LO58-DW01-100512	4/6	200 - 200	992	NA	2000 n	7000	ME MEGs	NO	BSL
	7440393	Barium	38.5	75.6	µg/L	LO58-MW-DUP-01	6/6	NA	75.6	NA	380 n	1000	ME MEGs	NO	BSL
	7440439	Cadmium	1.0	1.0	µg/L	LO58-MW05-100812	1/6	5.0 - 5.0	1.0	NA	0.92 n	1	ME MEGs	YES	ASL
	7440702	Calcium	66400	107000	µg/L	LO58-MW-DUP-01	6/6	NA	107000	NA	NUT	NBA	---	NO	See text
	7440473	Chromium	1.5	2.4	µg/L	LO58-DW01-100512	2/6	10 - 10	2.4	NA	0.035 c	20	ME MEGs	YES	ASL
	7440484	Cobalt	4.8	5.2	µg/L	LO58-MW-DUP-01	1/6	50 - 50	5.2	NA	0.6 n	10	ME MEGs	YES	ASL
	7440508	Copper	45.6	62.3	µg/L	LO58-DW01-100512	1/6	25 - 25	62.3	NA	80 n	500	ME MEGs	NO	BSL
	7439896	Iron	901	1280	µg/L	LO58-DW01-100512	3/6	200 - 200	1280	NA	1400 n	5000	ME MEGs	NO	BSL
	7439921	Lead	11.5	12.6	µg/L	LO58-DW-DUP-01	1/6	10 - 10	12.6	NA	15	10	ME MEGs	NO	BSL

Table 5-5
Occurrence, Distribution, and Selection of Contaminants of Potential Concern - Groundwater
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Contaminant	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (N/C) (2)	Potential ARAR/TBC Value (3)	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Entire Site	7439954	Magnesium	7080	14200	µg/L	LO58-MW-DUP-01	6/6	NA	14200	NA	NUT	NBA	---	NO	See text
(cont'd)	7439965	Manganese	16.4	1330	µg/L	LO58-MW-DUP-01	3/6	15 - 15	1330	NA	43 n	500	ME MEGs	YES	ASL
	7440020	Nickel	2.6	3.1	µg/L	LO58-MW-DUP-01	2/6	40 - 40	3.1	NA	39 n	20	ME MEGs	NO	BSL
	14797558	Nitrate	1500	5000	µg/L	LO58-MW04-100312	5/6	500 - 500	5000	NA	3200 n	10000	ME MEGs	YES	ASL
	14797650	Nitrite	95	110	µg/L	LO58-DW01-100512	1/6	500 - 500	110	NA	200 n	1000	ME MEGs	NO	BSL
	7440097	Potassium	691	1370	µg/L	LO58-DW01-100512	6/6	NA	1370	NA	NUT	NBA	---	NO	See text
	7440235	Sodium	2750	12300	µg/L	LO58-DW-DUP-01	6/6	NA	12300	NA	NUT	20000	ME MEGs	NO	See text
	7440622	Vanadium	1.5	1.6	µg/L	LO58-DW01-100512	2/6	50 - 50	1.6	NA	8.6 n	200	ME MEGs	NO	BSL
	7440666	Zinc	19.1	46.7	µg/L	LO58-DW-DUP-01	3/6	20 - 20	46.7	NA	600 n	2000	ME MEGs	NO	BSL

Notes/sources:

(1) Maximum detected concentration used for screening.

(2) Risk-based residential residential tapwater concentrations obtained from the Regional Screening Level (RSL) Table (May, 2016).

Surrogate screening values used:

- Acenaphthene value used for acenaphthylene.
- Naphthene value used for benzo(g,h,i)perylene.
- Anthracene value used for phenanthrene.
- Hexavalent chromium used for chromium.

(3) Maine Maximum Exposure Guidelines for Drinking Water (ME MEGs)(MEDEP, 2016).

Surrogate screening values used:

- Hexavalent chromium used for chromium.

(4) In the absence of an EPA residential tapwater RSL, the ME MEG value was used.

(5) Due to a lack of available toxicity criteria, Aromatic and Aliphatic Hydrocarbons were not carried through the risk assessment process.

ASL = above screening level.
BSL = below screening level.
C = cancer based screening value set at a target risk of 1E-06.
NA = not available.
NBA = no benchmark available.
NC = noncancer based screening value set at a target hazard quotient of 0.1.
NUT = essential nutrient.
µg/L = micrograms per liter.

Table 5-6
Occurrence, Distribution, and Selection of Contaminants of Potential Concern - Indoor Air
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current/Future
Medium: Air
Exposure Medium: Indoor Air

Exposure Point	CAS Number	Contaminant	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (N/C) (2)	Potential ARAR/TBC Value (3)	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
AMAC Building Area	71556	1,1,1-Trichloroethane (TO-15)	0.060	0.060	µg/m3	LO58-IA01-042212	1/4	0.082 - 0.22	0.060	NA	520 n	5200	MEDEP IATs	NO	BSL
	107062	1,2-Dichloroethane (TO-15)	0.11	0.11	µg/m3	LO58-IA01-042212	1/4	0.12 - 0.32	0.11	NA	0.11 c	0.94	MEDEP IATs	NO	BSL
	540841	2,2,4-Trimethylpentane (TO-15)	0.079	0.084	µg/m3	LO58-IA02-042212	1/4	0.047 - 0.19	0.084	NA	NBA	NBA	---	NO	NBA
	622968	4-Ethyltoluene (TO-15)	0.084	0.088	µg/m3	LO58-IA-DUP-01-042212	2/4	0.074 - 0.20	0.088	NA	NBA	NBA	---	NO	NBA
	71432	Benzene (APH)	0.66	0.66	µg/m3	LO58-IA01-042212	1/4	0.64 - 0.64	0.66	NA	0.36 c	3.1	MEDEP IATs	YES	ASL
	71432	Benzene (TO-15)	0.21	0.26	µg/m3	LO58-IA02-100712	4/4	NA	0.26	NA	0.36 c	3.1	MEDEP IATs	NO	BSL
	---	C5-C8 Aliphatic Hydrocarbons (APH)	150	200	µg/m3	LO58-IA02-042212	4/4	NA	200	NA	630 (4)	630	MEDEP IATs	NO	BSL
	---	C9-C10 Aromatic Hydrocarbons (APH)	6.0	24.0	µg/m3	LO58-IA02-042212	2/4	5.0 - 5.00	24	NA	52 (4)	52	MEDEP IATs	NO	BSL
	---	C9-C12 Aliphatic Hydrocarbons (APH)	37	130	µg/m3	LO58-IA02-042212	4/4	NA	130	NA	210 (4)	210	MEDEP IATs	NO	BSL
	56235	Carbon tetrachloride (TO-15)	0.38	0.44	µg/m3	LO58-IA02-042212	4/4	NA	0.44	NA	0.47 c	4.1	MEDEP IATs	NO	BSL
	67663	Chloroform (TO-15)	0.20	1.3	µg/m3	LO58-IA02-042212	4/4	NA	1.3	NA	0.12 c	1.1	MEDEP IATs	YES	ASL
	110827	Cyclohexane (TO-15)	0.055	0.096	µg/m3	LO58-IA02-042212	2/4	0.14 - 0.14	0.096	NA	630 n	NBA	---	NO	BSL
	75718	Dichlorodifluoromethane (TO-15)	2.1	3.8	µg/m3	LO58-IA01-100712	4/4	NA	3.8	NA	10 n	210	MEDEP IATs	NO	BSL
	100414	Ethyl benzene (APH)	3.4	3.4	µg/m3	LO58-IA01-042212	1/4	0.87 - 0.87	3.4	NA	1.1 c	9.7	MEDEP IATs	YES	ASL
	100414	Ethyl benzene (TO-15)	0.23	0.36	µg/m3	LO58-IA01-100712	4/4	NA	0.36	NA	1.1 c	9.7	MEDEP IATs	NO	BSL
	179601231	m,p-Xylene (APH)	1.3	2.2	µg/m3	LO58-IA01-042212	2/4	0.87 - 0.87	2.2	NA	10 n	100	MEDEP IATs	NO	BSL
	179601231	m,p-Xylene (TO-15)	0.69	0.95	µg/m3	LO58-IA01-100712	4/4	NA	0.95	NA	10 n	100	MEDEP IATs	NO	BSL
	1634044	Methyl tert-butyl ether (APH)	4.4	4.4	µg/m3	LO58-IA01-042212	1/4	0.72 - 0.72	4.4	NA	11 c	94	MEDEP IATs	NO	BSL
	75092	Methylene chloride (TO-15)	0.42	3.3	µg/m3	LO58-IA02-100712	4/4	0.52 - 0.52	3.3	NA	63 n	630	MEDEP IATs	NO	BSL
	91203	Naphthalene (APH)	1.1	1.5	µg/m3	LO58-IA-DUP-01-100712	2/4	1.1 - 1.1	1.5	NA	0.083 c	0.72	MEDEP IATs	YES	ASL
	142825	n-Heptane (TO-15)	0.82	1.6	µg/m3	LO58-IA02-042212	4/4	NA	1.6	NA	NBA	NBA	---	NO	NBA
	110543	n-Hexane (TO-15)	0.20	0.32	µg/m3	LO58-IA01-100712	4/4	0.28 - 0.28	0.32	NA	73 n	NBA	---	NO	BSL
	95476	o-Xylene (APH)	2.1	2.3	µg/m3	LO58-IA01-042212	2/4	0.87 - 0.87	2.3	NA	10 n	100	MEDEP IATs	NO	BSL
	95476	o-Xylene (TO-15)	0.29	0.48	µg/m3	LO58-IA01-100712	4/4	NA	0.48	NA	10 n	100	MEDEP IATs	NO	BSL
	127184	Tetrachloroethene (TO-15)	0.40	2.8	µg/m3	LO58-IA01-100712	3/4	0.068 - 0.10	2.8	NA	4.2 n	42	MEDEP IATs	NO	BSL
	108883	Toluene (APH)	2.7	3.4	µg/m3	LO58-IA01-042212	4/4	NA	3.4	NA	520 n	5200	MEDEP IATs	NO	BSL
	108883	Toluene (TO-15)	1.3	1.8	µg/m3	LO58-IA01-100712	4/4	NA	1.8	NA	520 n	5200	MEDEP IATs	NO	BSL
	79016	Trichloroethene (TO-15)	2.6	4.0	µg/m3	LO58-IA02-042212	4/4	NA	4.0	NA	0.21 n	2.1	MEDEP IATs	YES	ASL
	75694	Trichlorofluoromethane (TO-15)	5.6	12.9	µg/m3	LO58-IA01-100712	4/4	NA	12.9	NA	NBA	730	MEDEP IATs	NO	NBA
	1330207	Xylene (Total) (TO-15)	0.95	1.4	µg/m3	LO58-IA01-100712	4/4	NA	1.4	NA	10 n	100	MEDEP IATs	NO	BSL

Notes/sources:

(1) Maximum detected concentration used for screening.

(2) Risk-based residential indoor air concentrations obtained from the Regional Screening Level (RSL) Table (May, 2016).

(3) MEDEPs Residential Indoor Air Targets (MEDEP IATs)(MEDEP, 2016).

(4) In the absence of an EPA residential air RSL, the MEDEP IAT value was used.

APH = MADEP air-phase petroleum hydrocarbon method for petroleum hydrocarbons in air.

TO-15 = Toxic organics selective ion monitoring method for low level VOCs in air.

ASL = above screening level.

BSL = below screening level.

c = cancer based screening value set at a target risk of 1E-06.

NA = not available.

NBA = no benchmark available.

n = noncancer based screening value set at a target hazard quotient of 0.1.

µg/m3 = micrograms per cubic meter.

Table 5-7
Exposure Point Concentration Summary - Surface Soil
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Surface soil

Exposure Point	Contaminant of Potential Concern	Units	Detection Frequency	Arithmetic Mean	95% UCL	Maximum Concentration	Exposure Point Concentration			
							Value	Units	Statistic	Rationale
AMAC Building Area	Benzo(a)anthracene	mg/kg	2/3	0.062	NC	0.17	0.17	mg/kg	Maximum	See footnote
	Benzo(a)pyrene	mg/kg	2/3	0.061	NC	0.17	0.17	mg/kg	Maximum	See footnote
	Benzo(b)fluoranthene	mg/kg	3/3	0.075	NC	0.21	0.21	mg/kg	Maximum	See footnote
	Dibenzo(a,h)anthracene	mg/kg	2/3	0.013	NC	0.035	0.035	mg/kg	Maximum	See footnote
	Aluminum	mg/Kg	3/3	19067	NC	25600	25600	mg/Kg	Maximum	See footnote
	Arsenic	mg/Kg	3/3	6.5	NC	8.5	8.5	mg/Kg	Maximum	See footnote
	Chromium	mg/Kg	3/3	41	NC	56	56	mg/Kg	Maximum	See footnote
	Cobalt	mg/Kg	3/3	14	NC	20	20	mg/Kg	Maximum	See footnote
	Iron	mg/Kg	3/3	37267	NC	49300	49300	mg/Kg	Maximum	See footnote
	Manganese	mg/Kg	3/3	542	NC	654	654	mg/Kg	Maximum	See footnote
Launcher Area	Benzo(a)pyrene	mg/kg	12/12	0.0053	0.010	0.022	0.010	mg/kg	95% Approximate Gamma UCL	ProUCL Recommendation
	Aluminum	mg/Kg	12/12	16313	17298	19000	17298	mg/Kg	95% Student's-t UCL	ProUCL Recommendation
	Arsenic	mg/Kg	12/12	7.8	8.6	11	8.6	mg/Kg	95% Student's-t UCL	ProUCL Recommendation
	Chromium	mg/Kg	12/12	30	32	35	32	mg/Kg	95% Student's-t UCL	ProUCL Recommendation
	Cobalt	mg/Kg	12/12	12	13	14	13	mg/Kg	95% Student's-t UCL	ProUCL Recommendation
	Iron	mg/Kg	12/12	31438	32533	36500	32533	mg/Kg	95% Student's-t UCL	ProUCL Recommendation
	Manganese	mg/Kg	12/12	607	649	780	649	mg/Kg	95% Student's-t UCL	ProUCL Recommendation
	Thallium	mg/Kg	1/12	1.8	NC	0.49	0.49	mg/Kg	Maximum	See footnote

Note: If < 8 samples and/or < 4 detects, the EPC was the maximum detected concentration.

mg/kg = milligrams per kilogram.

NC = not calculated.

Table 5-8
Exposure Point Concentration Summary - Total Soil
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Total soil

Exposure Point	Contaminant of Potential Concern	Units	Detection Frequency	Arithmetic Mean	95% UCL	Maximum Concentration	Exposure Point Concentration			
							Value	Units	Statistic	Rationale
Entire Site	Benzo(a)anthracene	mg/kg	20/32	0.0085	0.061	0.17	0.061	mg/kg	99% KM (Chebyshev) UCL	ProUCL Recommendation
	Benzo(a)pyrene	mg/kg	20/32	0.0087	0.062	0.17	0.062	mg/kg	99% KM (Chebyshev) UCL	ProUCL Recommendation
	Benzo(b)fluoranthene	mg/kg	32/32	0.011	0.039	0.21	0.039	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL Recommendation
	Dibenzo(a,h)anthracene	mg/kg	16/32	0.0021	0.0042	0.035	0.0042	mg/kg	95% KM (BCA) UCL	ProUCL Recommendation
	Aluminum	mg/Kg	32/32	16471	17645	29900	17645	mg/Kg	95% Approximate Gamma UCL	ProUCL Recommendation
	Arsenic	mg/Kg	32/32	6.5	7.1	11	7.1	mg/Kg	95% Student's-t UCL	ProUCL Recommendation
	Chromium	mg/Kg	32/32	34	36	61	36	mg/Kg	95% Student's-t UCL	ProUCL Recommendation
	Cobalt	mg/Kg	32/32	13	14	21	13.9	mg/Kg	95% Student's-t UCL	ProUCL Recommendation
	Iron	mg/Kg	32/32	31325	32794	49300	32794	mg/Kg	95% Student's-t UCL	ProUCL Recommendation
	Manganese	mg/Kg	32/32	550	588	897	588	mg/Kg	95% Student's-t UCL	ProUCL Recommendation
	Thallium	mg/Kg	5/32	1.7	0.55	0.60	0.55	mg/Kg	95% KM (t) UCL	ProUCL Recommendation

mg/kg = milligrams per kilogram.

Table 5-9
Exposure Point Concentration Summary - Groundwater
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Contaminant of Potential Concern	Units	Detection Frequency	Arithmetic Mean	95% UCL	Maximum Concentration	Exposure Point Concentration			
							Value	Units	Statistic	Rationale
AMAC Building Area	1,1-Biphenyl	µg/L	1/1	0.15	NC	0.15	0.15	µg/L	Maximum	See footnote
	cis-1,2-Dichloroethene	µg/L	13/13	2.4	4.09	9.2	4.1	µg/L	95% Approximate Gamma UCL	ProUCL Recommendation
	Trichloroethene	µg/L	13/13	4.9	5.65	7.4	5.6	µg/L	95% Student's-t UCL	ProUCL Recommendation
	Chromium	µg/L	1/1	2.3	NC	2.4	2.4	µg/L	Maximum	See footnote
	Manganese	µg/L	1/1	67	NC	67	67	µg/L	Maximum	See footnote
Entire Site	1,1-Biphenyl	µg/L	2/6	1.5	NC	10	10	µg/L	Maximum	See footnote
	1,2,4-Trimethylbenzene	µg/L	5/36	1.3	9.63	29	9.6	µg/L	99% KM (Chebyshev) UCL	ProUCL Recommendation
	1-Methylnaphthalene	µg/L	3/6	8	NC	53	53	µg/L	Maximum	See footnote
	Benzo(a)anthracene	µg/L	3/6	0.23	NC	0.017	0.017	µg/L	Maximum	See footnote
	Benzo(a)pyrene	µg/L	2/6	0.2	NC	0.018	0.018	µg/L	Maximum	See footnote
	cis-1,2-Dichloroethene	µg/L	13/36	1.2	1.52	9.2	1.5	µg/L	95% KM (t) UCL	ProUCL Recommendation
	Dibenzo(a,h)anthracene	µg/L	1/6	0.2	NC	0.0076	0.0076	µg/L	Maximum	See footnote
	Dibenzofuran	µg/L	1/6	8.1	NC	1.6	1.6	µg/L	Maximum	See footnote
	Naphthalene	µg/L	3/36	0.65	NC	9.3	9.3	µg/L	Maximum	See footnote
	Trichloroethene	µg/L	26/36	2.1	4.50	7.4	4.5	µg/L	97.5% KM (Chebyshev) UCL	ProUCL Recommendation
	Cadmium	µg/L	1/6	4.3	NC	1.0	1.0	µg/L	Maximum	See footnote
	Chromium	µg/L	2/6	7.3	NC	2.4	2.4	µg/L	Maximum	See footnote
	Cobalt	µg/L	1/6	43	NC	5.2	5.2	µg/L	Maximum	See footnote
	Manganese	µg/L	3/6	240	NC	1330	1330	µg/L	Maximum	See footnote
	Nitrate	µg/L	5/6	2750	NC	5000	5000	µg/L	Maximum	See footnote

Note: If < 8 samples and/or < 4 detects, the EPC was the maximum detected concentration.

µg/L = micrograms per liter.

NC = not calculated.

Table 5-10
Exposure Point Concentration Summary - Indoor Air
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Medium: Air
Exposure Medium: Indoor Air

Exposure Point	Contaminant of Potential Concern	Units	Detection Frequency	Arithmetic Mean	95% UCL	Maximum Concentration	Exposure Point Concentration			
							Value	Units	Statistic	Rationale
AMAC Building Area	Benzene (APH)	µg/m3	1/4	0.65	NC	0.66	0.66	µg/m3	Maximum	See footnote
	Chloroform (TO-15)	µg/m3	4/4	0.59	NC	1.3	1.3	µg/m3	Maximum	See footnote
	Ethyl benzene (APH)	µg/m3	1/4	1.5	NC	3.4	3.4	µg/m3	Maximum	See footnote
	Naphthalene (APH)	µg/m3	2/4	1.2	NC	1.5	1.5	µg/m3	Maximum	See footnote
	Trichloroethene (TO-15)	µg/m3	4/4	3.3	NC	4.0	4.0	µg/m3	Maximum	See footnote

Note: If < 8 samples and/or < 4 detects, the EPC was the maximum detected concentration.

µg/m3 = micrograms per cubic meter.

NC = not calculated.

TABLE 5-11
VALUES USED FOR DAILY INTAKE CALCULATIONS - CURRENT AMAC WORKER - SOIL EXPOSURE
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Medium: Soils
Exposure Medium: Surface Soils
Receptor Population: AMAC Staff
Receptor Age: Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation
Ingestion	Surface Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-7	Chronic daily intake (mg/kg-day) =
		IRS	Ingestion Rate of Soil	100	mg/day	EPA, 2014	EPC x IRS x CF1 x FI x EF x ED x 1/BW x 1/AT
		FI	Fraction Ingested	1	unitless	Professional Judgement	
		EF	Exposure Frequency	150	days/year	5 days/week over thirty week duration	
		ED	Exposure Duration	35	years	Professional Judgement	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		BW	Body Weight	80	kg	EPA, 2014	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	12,775	days	Calculated	
Dermal	Surface Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-7	Dermally Absorbed Dose (mg/kg-day) =
		SA	Exposed Skin Surface Area	3,527	cm^2/day	EPA, 2014	EPC x SA x AF x EF x ED x CF1 x ABS x 1/BW x 1/AT
		AF	Soil to Skin Adherence Factor	0.12	mg/cm^2	EPA, 2014	
		EF	Exposure Frequency	150	days/year	5 days/week over thirty week duration	
		ED	Exposure Duration	35	years	Professional Judgement	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		ABS	Dermal Absorption Factor	COPC-specific	unitless	EPA, 2004	
		BW	Body Weight	80	kg	EPA, 2014	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	12,775	days	Calculated	
Inhalation	Particulate/Volatiles Released from Soil	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-7	Average Daily Concentration (µg/m^3) =
		CA	COPC Air Concentration	COPC-specific	µg/m^3	Calculated	CA x ET x EF x ED x CF2 x 1/AT
		ET	Exposure Time	1	hours/day	Professional Judgement	where:
		EF	Exposure Frequency	150	days/year	5 days/week over thirty week duration	CA (µg/m^3) = EPC/PEF x CF3
		ED	Exposure Duration	35	years	Professional Judgement	or
		CF2	Conversion Factor 2	0.042	days/hour	-----	CA (µg/m^3) = EPC/VF x CF3
		CF3	Conversion Factor 3	1000	µg/mg	-----	
		PEF	Particulate Emission Factor	1.36E+09	m^3/kg	EPA, 2002a	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	12,775	days	Calculated	

TABLE 5-12

VALUES USED FOR DAILY INTAKE CALCULATIONS - CURRENT AMAC WORKER - GROUNDWATER EXPOSURE

REASONABLE MAXIMUM EXPOSURE

LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Medium: Groundwater
Exposure Medium: Groundwater
Receptor Population: AMAC Staff
Receptor Age: Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation
Ingestion	Tap Water	EPC	Exposure Point Concentration	COPC-specific	µg/L	See Table 5-9	Chronic daily intake (mg/kg-day) = EPC x IRW x CF1 x FI x EF x ED x 1/BW x 1/AT
		IRW	Ingestion Rate of Water	2.5	L/day	EPA, 2014	
		FI	Fraction Ingested	0.5	unitless	Professional Judgement	
		EF	Exposure Frequency	250	days/year	5 days/week over 50 week duration	
		ED	Exposure Duration	35	years	Professional Judgement	
		CF1	Conversion Factor 1	1.00E-03	mg/µg	-----	
		BW	Body Weight	80	kg	EPA, 2014	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	12,775	days	Calculated	

TABLE 5-13
VALUES USED FOR DAILY INTAKE CALCULATIONS - CURRENT AMAC WORKER - INDOOR AIR EXPOSURE
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Medium: Air
Exposure Medium: Indoor Air
Receptor Population: AMAC Staff
Receptor Age: Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation
Inhalation	Indoor Air	CA	COPC Air Concentration	COPC-specific	$\mu g/m^3$	See Table 5-10	Average Daily Concentration ($\mu g/m^3$) = CA x ET x EF x ED x CF x 1/AT
		ET	Exposure Time	7	hours/day	Professional Judgement	
		EF	Exposure Frequency	250	days/year	5 days/week over 50 week duration	
		ED	Exposure Duration	35	years	Professional Judgement	
		CF	Conversion Factor	0.042	days/hour	-----	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	12,775	days	Calculated	

TABLE 5-14
VALUES USED FOR DAILY INTAKE CALCULATIONS - CURRENT AMAC CLIENT - SOIL EXPOSURE
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Medium: Soils
Exposure Medium: Surface Soils
Receptor Population: AMAC Client
Receptor Age: Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation
Ingestion	Surface Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-7	Chronic daily intake (mg/kg-day) =
		IRS	Ingestion Rate of Soil	100	mg/day	EPA, 2014	EPC x IRS x CF1 x FI x EF x ED x 1/BW x 1/AT
		FI	Fraction Ingested	1	unitless	Professional Judgement	
		EF	Exposure Frequency	150	days/year	5 days/week over thirty week duration	
		ED	Exposure Duration	10	years	Professional Judgement	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		BW	Body Weight	80	kg	EPA, 2014	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	3,650	days	Calculated	
Dermal	Surface Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-7	Dermally Absorbed Dose (mg/kg-day) =
		SA	Exposed Skin Surface Area	3,527	cm^2/day	EPA, 2014	EPC x SA x AF x EF x ED x CF1 x ABS x 1/BW x 1/AT
		AF	Soil to Skin Adherence Factor	0.12	mg/cm^2	EPA, 2014	
		EF	Exposure Frequency	150	days/year	5 days/week over thirty week duration	
		ED	Exposure Duration	10	years	Professional Judgement	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		ABS	Dermal Absorption Factor	COPC-specific	unitless	EPA, 2004	
		BW	Body Weight	80	kg	EPA, 2014	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	3,650	days	Calculated	
Inhalation	Particulate/Volatiles Released from Soil	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-7	Average Daily Concentration (µg/m^3) =
		CA	COPC Air Concentration	COPC-specific	µg/m^3	Calculated	CA x ET x EF x ED x CF2 x 1/AT
		ET	Exposure Time	0.25	hours/day	Professional Judgement	where:
		EF	Exposure Frequency	150	days/year	5 days/week over thirty week duration	CA (µg/m^3) = EPC/PEF x CF3
		ED	Exposure Duration	10	years	Professional Judgement	or
		CF2	Conversion Factor 2	0.042	days/hour	-----	CA (µg/m^3) = EPC/VF x CF3
		CF3	Conversion Factor 3	1000	µg/mg	-----	
		PEF	Particulate Emission Factor	1.36E+09	m^3/kg	EPA, 2002a	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	3,650	days	Calculated	

TABLE 5-15
VALUES USED FOR DAILY INTAKE CALCULATIONS - CURRENT AMAC CLIENT - GROUNDWATER EXPOSURE
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Medium: Groundwater
Exposure Medium: Groundwater
Receptor Population: AMAC Client
Receptor Age: Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation
Ingestion	Tap Water	EPC	Exposure Point Concentration	COPC-specific	µg/L	See Table 5-9	Chronic daily intake (mg/kg-day) = EPC x IRW x CF1 x FI x EF x ED x 1/BW x 1/AT
		IRW	Ingestion Rate of Water	2.5	L/day	EPA, 2014	
		FI	Fraction Ingested	0.5	unitless	Professional Judgement	
		EF	Exposure Frequency	250	days/year	5 days/week over 50 week duration	
		ED	Exposure Duration	10	years	Professional Judgement	
		CF1	Conversion Factor 1	1.00E-03	mg/µg	-----	
		BW	Body Weight	80	kg	EPA, 2014	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	3,650	days	Calculated	

TABLE 5-16
VALUES USED FOR DAILY INTAKE CALCULATIONS - CURRENT AMAC CLIENT - INDOOR AIR EXPOSURE
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Medium: Air
Exposure Medium: Indoor Air
Receptor Population: AMAC Client
Receptor Age: Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation
Inhalation	Indoor Air	CA	COPC Air Concentration	COPC-specific	µg/m^3	See Table 5-10	Average Daily Concentration (µg/m^3) = CA x ET x EF x ED x CF x 1/AT
		ET	Exposure Time	4.75	hours/day	Professional Judgement	
		EF	Exposure Frequency	250	days/year	5 days/week over 50 week duration	
		ED	Exposure Duration	10	years	Professional Judgement	
		CF	Conversion Factor	0.042	days/hour	-----	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	3,650	days	Calculated	

TABLE 5-17
VALUES USED FOR DAILY INTAKE CALCULATIONS - CURRENT TRESPASSER
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Medium: Soils
Exposure Medium: Surface Soils (0-1 ft bgs)
Receptor Population: Trespasser (11-18 years)
Receptor Age: Older Child

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation
Ingestion	Surface Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-7	Chronic daily intake (mg/kg-day) = EPC x IRS x CF1 x FI x EF x ED x 1/BW x 1/AT
		IRS	Ingestion Rate of Soil	100	mg/day	EPA, 2014	
		FI	Fraction Ingested	0.5	unitless	Professional Judgement	
		EF	Exposure Frequency	36	days/year	3 days per month	
		ED	Exposure Duration	7	years	EPA, 2002a	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		BW	Body Weight	52	kg	EPA, 2008a	
		AT$_C$	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT$_{NC}$	Averaging Time (Non-Cancer)	2,555	days	Calculated	
Dermal	Surface Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-7	Dermally Absorbed Dose (mg/kg-day) = EPC x SA x AF x EF x ED x CF1 x ABS x 1/BW x 1/AT
		SA	Exposed Skin Surface Area	5,000	cm^2/day	EPA, 2004	
		AF	Soil to Skin Adherence Factor	0.04	mg/cm^2	EPA, 2004	
		EF	Exposure Frequency	36	days/year	3 days per month	
		ED	Exposure Duration	7	years	EPA, 2002a	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		ABS	Dermal Absorption Factor	COPC-specific	unitless	EPA, 2004	
		BW	Body Weight	52	kg	EPA, 2008a	
		AT$_C$	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT$_{NC}$	Averaging Time (Non-Cancer)	2,555	days	Calculated	
Inhalation	Particulate/Volatiles Released from Soil	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-7	Average Daily Concentration (µg/m^3) = CA x ET x EF x ED x CF2 x 1/AT where: CA (µg/m^3) = EPC/PEF x CF3 or CA (µg/m^3) = EPC/VF x CF3
		CA	COPC Air Concentration	COPC-specific	µg/m^3	Calculated	
		ET	Exposure Time	2	hours/day	EPA, 2002a	
		EF	Exposure Frequency	36	days/year	3 days per month	
		ED	Exposure Duration	7	years	EPA, 2002a	
		CF2	Conversion Factor 2	0.042	days/hour	-----	
		CF3	Conversion Factor 3	1000	µg/mg	-----	
		PEF	Particulate Emission Factor	1.36E+09	m^3/kg	EPA, 2002a	
		AT$_C$	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT$_{NC}$	Averaging Time (Non-Cancer)	2,555	days	Calculated	

TABLE 5-18
VALUES USED FOR DAILY INTAKE CALCULATIONS - CURRENT SITE WORKER
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Medium: Soils
Exposure Medium: Surface Soils
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation
Ingestion	Surface Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-7	Chronic daily intake (mg/kg-day) =
		IRS	Ingestion Rate of Soil	100	mg/day	EPA, 2014	EPC x IRS x CF1 x FI x EF x ED x 1/BW x 1/AT
		FI	Fraction Ingested	1	unitless	Professional Judgement	
		EF	Exposure Frequency	150	days/year	5 days/week over 50 week duration	
		ED	Exposure Duration	25	years	EPA, 2014	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		BW	Body Weight	80	kg	EPA, 2014	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	9,125	days	Calculated	
Dermal	Surface Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-7	Dermally Absorbed Dose (mg/kg-day) =
		SA	Exposed Skin Surface Area	3,527	cm^2/day	EPA, 2014	EPC x SA x AF x EF x ED x CF1 x ABS x 1/BW x 1/AT
		AF	Soil to Skin Adherence Factor	0.12	mg/cm^2	EPA, 2014	
		EF	Exposure Frequency	150	days/year	5 days/week over 50 week duration	
		ED	Exposure Duration	25	years	EPA, 2014	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		ABS	Dermal Absorption Factor	COPC-specific	unitless	EPA, 2004	
		BW	Body Weight	80	kg	EPA, 2014	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	9,125	days	Calculated	
Inhalation	Particulate/Volatiles Released from Soil	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-7	Average Daily Concentration (µg/m^3) =
		CA	COPC Air Concentration	COPC-specific	µg/m^3	Calculated	CA x ET x EF x ED x CF2 x 1/AT
		ET	Exposure Time	8	hours/day	EPA, 2014	where:
		EF	Exposure Frequency	150	days/year	5 days/week over 50 week duratio	CA (µg/m^3) = EPC/PEF x CF3
		ED	Exposure Duration	25	years	EPA, 2014	or
		CF2	Conversion Factor 2	0.042	days/hour	-----	CA (µg/m^3) = EPC/VF x CF3
		CF3	Conversion Factor 3	1000	µg/mg	-----	
		PEF	Particulate Emission Factor	1.36E+09	m^3/kg	EPA, 2002a	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	9,125	days	Calculated	

TABLE 5-19
VALUES USED FOR DAILY INTAKE CALCULATIONS - FUTURE CONSTRUCTION WORKER
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Medium: Soils
Exposure Medium: Total Soils (0-10 ft bgs)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation
Ingestion	Total Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-8	Chronic daily intake (mg/kg-day) =
		IRS	Ingestion Rate of Soil	330	mg/day	EPA, 2002a	EPC x IRS x CF1 x FI x EF x ED x 1/BW x 1/AT
		FI	Fraction Ingested	1	unitless	Professional Judgement	
		EF	Exposure Frequency	130	days/year	5 days/week over 6 month duration	
		ED	Exposure Duration	0.5	years	EPA, 2002a	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		BW	Body Weight	80	kg	EPA, 2014	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	183	days	Calculated	
Dermal	Total Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-8	Dermally Absorbed Dose (mg/kg-day) =
		SA	Exposed Skin Surface Area	3,527	cm^2/day	EPA, 2014	EPC x SA x AF x EF x ED x CF1 x ABS x 1/BW x 1/AT
		AF	Soil to Skin Adherence Factor	0.3	mg/cm^2	EPA, 2011a	
		EF	Exposure Frequency	130	days/year	5 days/week over 6 month duration	
		ED	Exposure Duration	0.5	years	EPA, 2002a	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		ABS	Dermal Absorption Factor	COPC-specific	unitless	EPA, 2004	
		BW	Body Weight	80	kg	EPA, 2014	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	183	days	Calculated	
Inhalation	Particulate/Volatiles Released from Soil	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-8	Average Daily Concentration (µg/m^3) =
		CA	COPC Air Concentration	COPC-specific	µg/m^3	Calculated	CA x ET x EF x ED x CF2 x 1/AT
		ET	Exposure Time	8	hours/day	EPA, 2014	where:
		EF	Exposure Frequency	130	days/year	5 days/week over 6 month duration	CA (µg/m^3) = EPC/PEF x CF3
		ED	Exposure Duration	0.5	years	EPA, 2002a	or
		CF2	Conversion Factor 2	0.042	days/hour	-----	CA (µg/m^3) = EPC/VF x CF3
		CF3	Conversion Factor 3	1000	µg/mg	-----	
		PEF	Particulate Emission Factor	1.36E+09	m^3/kg	EPA, 2002a	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	183	days	Calculated	

TABLE 5-20
VALUES USED FOR DAILY INTAKE CALCULATIONS - FUTURE COMMERCIAL/INDUSTRIAL WORKER - SOIL EXPOSURE
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Medium: Soils
Exposure Medium: Total Soils
Receptor Population: Commerical/Industrial Worker
Receptor Age: Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation
Ingestion	Total Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-8	Chronic daily intake (mg/kg-day) =
		IRS	Ingestion Rate of Soil	50	mg/day	EPA, 2014	EPC x IRS x CF1 x FI x EF x ED x 1/BW x 1/AT
		FI	Fraction Ingested	1	unitless	Professional Judgement	
		EF	Exposure Frequency	26	days/year	1 day/week over 6 month duration	
		ED	Exposure Duration	25	years	EPA, 2014	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		BW	Body Weight	80	kg	EPA, 2014	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	9,125	days	Calculated	
Dermal	Total Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-8	Dermally Absorbed Dose (mg/kg-day) =
		SA	Exposed Skin Surface Area	3,527	cm^2/day	EPA, 2014	EPC x SA x AF x EF x ED x CF1 x ABS x 1/BW x 1/AT
		AF	Soil to Skin Adherence Factor	0.12	mg/cm^2	EPA, 2014	
		EF	Exposure Frequency	26	days/year	1 day/week over 6 month duration	
		ED	Exposure Duration	25	years	EPA, 2014	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		ABS	Dermal Absorption Factor	COPC-specific	unitless	EPA, 2004	
		BW	Body Weight	80	kg	EPA, 2014	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 1989a	
		AT_{NC}	Averaging Time (Non-Cancer)	9,125	days	Calculated	
Inhalation	Particulate/Volatiles Released from Soil	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-8	Average Daily Concentration (µg/m^3) =
		CA	COPC Air Concentration	COPC-specific	µg/m^3	Calculated	CA x ET x EF x ED x CF2 x 1/AT
		ET	Exposure Time	8	hours/day	EPA, 2002a	where:
		EF	Exposure Frequency	26	days/year	1 day/week over 6 month duration	CA (µg/m^3) = EPC/PEF x CF3
		ED	Exposure Duration	25	years	EPA, 2002a	or
		CF2	Conversion Factor 2	0.042	days/hour	-----	CA (µg/m^3) = EPC/VF x CF3
		CF3	Conversion Factor 3	1000	µg/mg	-----	
		PEF	Particulate Emission Factor	1.36E+09	m^3/kg	EPA, 2002a	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 1989a	
		AT_{NC}	Averaging Time (Non-Cancer)	9,125	days	Calculated	

TABLE 5-21
VALUES USED FOR DAILY INTAKE CALCULATIONS - FUTURE COMMERCIAL/INDUSTRIAL WORKER - GROUNDWATER EXPOSURE
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Receptor Population: Commerical/Industrial Worker
Receptor Age: Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation
Ingestion	Tap Water	EPC	Exposure Point Concentration	COPC-specific	µg/L	See Table 5-9	Chronic daily intake (mg/kg-day) =
		IRW	Ingestion Rate of Water	2.5	L/day	EPA, 2014	EPC x IRW x CF1 x FI x EF x ED x 1/BW x 1/AT
		FI	Fraction Ingested	0.5	unitless	Professional Judgement	
		EF	Exposure Frequency	250	days/year	5 days/week over 50 week duration	
		ED	Exposure Duration	25	years	EPA, 2014	
		CF1	Conversion Factor 1	1.00E-03	mg/µg	-----	
		BW	Body Weight	80	kg	EPA, 2014	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	9,125	days	Calculated	

TABLE 5-22
VALUES USED FOR DAILY INTAKE CALCULATIONS - FUTURE COMMERCIAL/INDUSTRIAL WORKER - INDOOR AIR EXPOSURE
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Medium: Air
Exposure Medium: Indoor Air
Receptor Population: Commerical/Industrial Worker
Receptor Age: Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation
Inhalation	Indoor Air	CA	COPC Air Concentration	COPC-specific	$\mu g/m^3$	See Table 5-10	Average Daily Concentration ($\mu g/m^3$) = CA x ET x EF x ED x CF x 1/AT
		ET	Exposure Time	8	hours/day	EPA, 2014	
		EF	Exposure Frequency	250	days/year	5 days/week over 50 week duration	
		ED	Exposure Duration	25	years	EPA, 2014	
		CF	Conversion Factor	0.042	days/hour	-----	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	9,125	days	Calculated	

TABLE 5-23
VALUES USED FOR DAILY INTAKE CALCULATIONS - FUTURE RESIDENTS - SOIL EXPOSURE
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Medium: Soils
Exposure Medium: Total Soils (0-10 ft bgs)
Receptor Population: Future Residents
Receptor Age: Child/Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion (cancer effects)	Total Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-8	Chronic daily intake (CDI)(mg/kg-day) =
		IFS_{adj}	Age-adjusted soil ingestion factor	105	mg-year/kg-day	Calculated	EPC x IFS_{adj} x CF1 x FI x EF x 1/AT
		FI	Fraction Ingested	1	unitless	Professional Judgement	Where
		EF	Exposure Frequency	350	days/year	EPA, 2014	IFS_{adj} = (IRS_c x ED_c x 1/BW_c) + (IRS_a x ED_a x 1/BW_a)
		ED_c	Exposure Duration - child	6	years	EPA, 2014	
		ED_a	Exposure Duration - adult	20	years	EPA, 2014	
		IRS_c	Ingestion Rate of Soil - child	200	mg/day	EPA, 2014	
		IRS_a	Ingestion Rate of Soil - adult	100	mg/day	EPA, 2014	
		BW_c	Body Weight - child	15	kg	EPA, 2014	
		BW_a	Body Weight - adult	80	kg	EPA, 2014	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
Ingestion (child noncancer)	Total Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-8	Chronic daily intake (CDI)(mg/kg-day) =
		IRS	Ingestion Rate of Soil	200	mg/day	EPA, 2014	EPC x IRS x CF1 x FI x EF x ED x 1/BW x 1/AT
		FI	Fraction Ingested	1	unitless	Professional Judgement	
		EF	Exposure Frequency	350	days/year	EPA, 2014	
		ED	Exposure Duration	6	years	EPA, 2014	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		BW	Body Weight	15	kg	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	2,190	days	Calculated	
Ingestion (adult noncancer)	Total Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-8	Chronic daily intake (CDI)(mg/kg-day) =
		IRS	Ingestion Rate of Soil	100	mg/day	EPA, 2014	EPC x IRS x CF1 x FI x EF x ED x 1/BW x 1/AT
		FI	Fraction Ingested	1	unitless	Professional Judgement	
		EF	Exposure Frequency	350	days/year	EPA, 2014	
		ED	Exposure Duration	20	years	EPA, 2014	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		BW	Body Weight	80	kg	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	7,300	days	Calculated	

TABLE 5-23
VALUES USED FOR DAILY INTAKE CALCULATIONS - FUTURE RESIDENTS - SOIL EXPOSURE
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Medium: Soils
Exposure Medium: Total Soils (0-10 ft bgs)
Receptor Population: Future Residents
Receptor Age: Child/Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal	Total Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-8	Dermally Absorbed Dose (DAD)(mg/kg-day) =
(cancer effects)		SFS_{adj}	Age-adjusted soil contact factor	295	mg -year/kg-day	Calculated	EPC x CF1 x SFS_{adj} x ABS x EF x 1/AT
		ABS	Dermal Absorption Factor	COPC-specific	unitless	EPA, 2004	Where
		EF	Exposure Frequency	350	days/year	EPA, 2014	SFS_{adj} = (SA_c x AF_c x ED_c x 1/BW_c) + (SA_a x AF_a x ED_a x 1/BW_a)
		SA_c	Exposed Skin Surface Area - child	2,373	cm^2/day	EPA, 2014	
		SA_a	Exposed Skin Surface Area - adult	6,032	cm^2/day	EPA, 2014	
		AF_c	Soil to Skin Adherence Factor - child	0.2	mg/cm^2	EPA, 2014	
		AF_a	Soil to Skin Adherence Factor - adult	0.07	mg/cm^2	EPA, 2014	
		ED_c	Exposure Duration - child	6	years	EPA, 2014	
		ED_a	Exposure Duration - adult	20	years	EPA, 2014	
		BW_c	Body Weight - child	15	kg	EPA, 2014	
		BW_a	Body Weight - adult	80	kg	EPA, 2014	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
Dermal	Total Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-8	Dermally Absorbed Dose (DAD)(mg/kg-day) =
(child noncancer)		SA	Exposed Skin Surface Area	2,373	cm^2/day	EPA, 2014	EPC x CF1 x SA x AF x ABS x EF x ED x 1/BW x 1/AT
		AF	Soil to Skin Adherence Factor	0.2	mg/cm^2	EPA, 2014	
		EF	Exposure Frequency	350	days/year	EPA, 2014	
		ED	Exposure Duration	6	years	EPA, 2014	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		ABS	Dermal Absorption Factor	COPC-specific	unitless	EPA, 2004	
		BW	Body Weight	15	kg	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	2,190	days	Calculated	
Dermal	Total Soils	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-8	Dermally Absorbed Dose (DAD)(mg/kg-day) =
(adult noncancer)		SA	Exposed Skin Surface Area	6,032	cm^2/day	EPA, 2014	EPC x CF1 x SA x AF x ABS x EF x ED x 1/BW x 1/AT
		AF	Soil to Skin Adherence Factor	0.07	mg/cm^2	EPA, 2014	
		EF	Exposure Frequency	350	days/year	EPA, 2014	
		ED	Exposure Duration	20	years	EPA, 2014	
		CF1	Conversion Factor 1	1.00E-06	kg/mg	-----	
		ABS	Dermal Absorption Factor	COPC-specific	unitless	EPA, 2004	
		BW	Body Weight	80	kg	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	7,300	days	Calculated	

TABLE 5-23
VALUES USED FOR DAILY INTAKE CALCULATIONS - FUTURE RESIDENTS - SOIL EXPOSURE
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Medium: Soils
Exposure Medium: Total Soils (0-10 ft bgs)
Receptor Population: Future Residents
Receptor Age: Child/Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Particulate/Volatiles Released from Soil	EPC	Exposure Point Concentration	COPC-specific	mg/kg	See Table 5-8	Average Daily Concentration (µg/m^3) =
		CA	COPC Air Concentration	COPC-specific	µg/m^3	Calculated	CA x ET x EF x ED x CF2 x 1/AT
		ET	Exposure Time	24	hours/day	EPA, 2014	where:
		EF	Exposure Frequency	350	days/year	EPA, 2014	CA (µg/m^3) = EPC/PEF x CF3
		ED	Exposure Duration	26	years	EPA, 2014	or
		CF2	Conversion Factor 2	0.042	days/hour	-----	CA (µg/m^3) = EPC/VF x CF3
		CF3	Conversion Factor 3	1000	µg/mg	-----	
		PEF	Particulate Emission Factor	1.36E+09	m^3/kg	EPA, 2002a	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	9,490	days	Calculated	

TABLE 5-24
VALUES USED FOR DAILY INTAKE CALCULATIONS - FUTURE RESIDENTS - GROUNDWATER EXPOSURE
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Receptor Population: Future Residents
Receptor Age: Child/Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Tap Water	EPC	Exposure Point Concentration	COPC-specific	µg/L	See Table 5-9	Chronic daily intake (CDI) (mg/kg-day) = EPC x IFW_{adj} x CF1 x FI x EF x 1/AT_C Where IFW_{adj} = (IRW_c x ED_c x 1/BW_c) + (IRW_a x ED_a x 1/BW_a)
		IFW_{adj}	Age-adjusted water ingestion factor	0.9	L-year/kg-day	Calculated	
		FI	Fraction Ingested	1	unitless	EPA, 1989a	
		EF	Exposure Frequency	350	days/year	EPA, 2014	
		ED_c	Exposure Duration - child	6	years	EPA, 2014	
		ED_a	Exposure Duration - adult	20	years	EPA, 2014	
		IRW_c	Ingestion Rate of Water - child	0.78	L/day	EPA, 2014	
		IRW_a	Ingestion Rate of Water - adult	2.5	L/day	EPA, 2014	
		BW_c	Body Weight - child	15	kg	EPA, 2014	
		BW_a	Body Weight - adult	80	kg	EPA, 2014	
		CF1	Conversion Factor 1	1.00E-03	mg/µg	-----	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
	Tap Water (Child Exposure)	EPC	Exposure Point Concentration	COPC-specific	µg/L	See Table 5-9	Chronic daily intake (CDI) (mg/kg-day) = EPC x IRW x CF1 x FI x EF x ED x 1/BW x 1/AT_{NC}
		IRW	Ingestion Rate of Water	0.78	L/day	EPA, 2014	
		FI	Fraction Ingested	1	unitless	EPA, 1989a	
		EF	Exposure Frequency	350	days/year	EPA, 2014	
		ED	Exposure Duration	6	years	EPA, 2014	
		CF1	Conversion Factor 1	1.00E-03	mg/µg	-----	
		BW	Body Weight	15	kg	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	2,190	days	Calculated	
	Tap Water (Adult Exposure)	EPC	Exposure Point Concentration	COPC-specific	µg/L	See Table 5-9	Chronic daily intake (CDI) (mg/kg-day) = EPC x IRW x CF1 x FI x EF x ED x 1/BW x 1/AT_{NC}
		IRW	Ingestion Rate of Water	2.5	L/day	EPA, 2014	
		FI	Fraction Ingested	1	unitless	EPA, 1989a	
		EF	Exposure Frequency	350	days/year	EPA, 2014	
		ED	Exposure Duration	20	years	EPA, 2014	
		CF1	Conversion Factor 1	1.00E-03	mg/µg	-----	
		BW	Body Weight	80	kg	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	7,300	days	Calculated	

TABLE 5-24
VALUES USED FOR DAILY INTAKE CALCULATIONS - FUTURE RESIDENTS - GROUNDWATER EXPOSURE
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Receptor Population: Future Residents
Receptor Age: Child/Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal Contact	Tap Water While Bathing/Showering	SFS_{adj}	Age-adjusted skin contact factor	7.78E+03	event-year-cm^2/kg-day	Calculated	Dermally Absorbed Dose (DAD) (mg/kg-day) =
		SA_c	Skin Surface Area Available for Contact - child	6,378	cm^2	EPA, 2014	$DA_{EVENT\text{-}adj}$ x SFS_{adj} x EF x $1/AT_C$
		SA_a	Skin Surface Area Available for Contact - adult	20,900	cm^2	EPA, 2014	
		$DA_{EVENT\text{-}adj}$	Absorbed Dose Per Event	COPC-specific	mg/cm^2-event	See Table 5-26	$SFS_{adj} = (SA_c \times EV_c \times ED_c \times 1/BW_c) + (SA_a \times EV_a \times ED_a \times 1/BW_a)$
		EV_c	Event Frequency - child	1	event/day	EPA, 2004	$\underline{DA_{EVENT\text{-}adj}\text{ Calculations}}$
		EV_a	Event Frequency - adult	1	event/day	EPA, 2004	$t_{event\text{-}adj} = (ED_c \times t_{event\text{-}c}) + (ED_a \times t_{event\text{-}a})/(ED_c + ED_a)$
		EF	Exposure Frequency	350	days/year	EPA, 2014	
		ED_c	Exposure Duration - child	6	years	EPA, 2014	if $t_{event\text{-}adj} \leq t^*$, then $DA_{EVENT\text{-}adj}$ (Organic) =
		ED_a	Exposure Duration - adult	20	years	EPA, 2014	$2\ FA \times K_p \times C_w \times CF2 \times CF3 \times \sqrt{}\ (6\tau_{event} \times t_{event\text{-}adj}/\pi)$
		BW_c	Body Weight - child	15	kg	EPA, 2014	
		BW_a	Body Weight - adult	80	kg	EPA, 2014	otherwise if $t_{event\text{-}adj} > t^*$, then $DA_{EVENT\text{-}adj}$ (Organic) =
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	$FA \times K_p \times C_w \times CF2 \times CF3 \times$
		$t_{event\text{-}adj}$	Age-adjusted event duration	0.67	hr/event	Calculated	$[((t_{event\text{-}adj})/(1+B)) + 2\tau_{event}\ ((1 + 3B + 3B^2)/(1+B)^2)$
		$t_{event\text{-}c}$	Event Duration - child	0.54	hr/event	EPA, 2014	
		$t_{event\text{-}a}$	Event Duration - adult	0.71	hr/event	EPA, 2014	$DA_{EVENT\text{-}adj}$ (Inorganic) =
		FA	Fraction Absorbed Water	COPC-specific	unitless	EPA, 2004	$K_p \times C_w \times CF2 \times CF3 \times t_{event\text{-}adj}$
		K_p	Dermal Permeability Coefficient	COPC-specific	cm/hour	EPA, 2004	
		C_w	Chemical Concentration in Water	COPC-specific	µg/L	See Table 5-9	
		CF2	Conversion Factor 2	1.0E-03	mg/µg	-----	
		CF3	Conversion Factor 3	1.0E-03	L/cm^3	-----	
		B	Ratio of Permeability Coefficient	COPC-specific	unitless	EPA, 2004	
		t*	Time to Reach Steady State	COPC-specific	hour	EPA, 2004	
		τ_{event}	Lag Time Per Event	COPC-specific	hr/event	EPA, 2004	

TABLE 5-24
VALUES USED FOR DAILY INTAKE CALCULATIONS - FUTURE RESIDENTS - GROUNDWATER EXPOSURE
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Receptor Population: Future Residents
Receptor Age: Child/Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal Contact	Tap Water	SA	Skin Surface Area Available for Contact - child	6,378	cm^2	EPA, 2014	Dermally Absorbed Dose (DAD) (mg/kg-day) =
(continued)	While Bathing	DA_{EVENT}	Absorbed Dose Per Event	COPC-specific	mg/cm^2-event	See Table 5-26	DA_{EVENT} x EV x SA x EF x ED x 1/BW x 1/AT_{NC}
	(Child Exposure)	EV	Event Frequency	1	event/day	EPA, 2004	
		EF	Exposure Frequency - child	350	days/year	EPA, 2014	<u>DA_{EVENT} Calculations</u>
		ED	Exposure Duration - child	6	years	EPA, 2014	if $t_{event} \le t^*$, then DA_{EVENT} (Organic) =
		BW	Body Weight - child	15	kg	EPA, 2014	$2\ FA \times K_p \times C_w \times CF2 \times CF3 \times \sqrt{(6\tau_{event} \times t_{event}/\pi)}$
		AT_{NC}	Averaging Time (Non-Cancer)	2,190	days	Calculated	
		FA	Fraction Absorbed Water	COPC-specific	unitless	EPA, 2004	otherwise if $t_{event} > t^*$, then DA_{EVENT} (Organic) =
		K_p	Dermal Permeability Coefficient	COPC-specific	cm/hour	EPA, 2004	$FA \times K_p \times C_w \times CF2 \times CF3 \times$
		C_w	Chemical Concentration in Water	COPC-specific	µg/L	See Table 5-9	$[((t_{event})/(1+B)) + 2\tau_{event}\ ((1 + 3B + 3B^2)/(1+B)^2)$
		CF2	Conversion Factor 2	1.0E-03	mg/µg	-----	
		CF3	Conversion Factor 3	1.0E-03	L/cm^3	-----	DA_{EVENT} (Inorganic) =
		B	Ratio of Permeability Coefficient	COPC-specific	unitless	EPA, 2004	$K_p \times C_w \times CF2 \times CF3 \times t_{event}$
		t*	Time to Reach Steady State	COPC-specific	hour	EPA, 2004	
		τ_{event}	Lag Time Per Event	COPC-specific	hr/event	EPA, 2004	
		t_{event}	Event Duration - child	0.54	hr/event	EPA, 2014	
	Tap Water	SA	Skin Surface Area Available for Contact - adult	20,900	cm^2	EPA, 2014	Dermally Absorbed Dose (DAD) (mg/kg-day) =
	While Showering	DA_{EVENT}	Absorbed Dose Per Event	COPC-specific	mg/cm^2-event	See Table 5-26	DA_{EVENT} x EV x SA x EF x ED x 1/BW x 1/AT_{NC}
	(Adult Exposure)	EV	Event Frequency	1	event/day	EPA, 2004	
		EF	Exposure Frequency - adult	350	days/year	EPA, 2014	<u>DA_{EVENT} Calculations</u>
		ED	Exposure Duration - adult	20	years	EPA, 2014	if $t_{event} \le t^*$, then DA_{EVENT} (Organic) =
		BW	Body Weight- adult	80	kg	EPA, 2014	$2\ FA \times K_p \times C_w \times CF2 \times CF3 \times \sqrt{(6\tau_{event} \times t_{event}/\pi)}$
		AT_{NC}	Averaging Time (Non-Cancer)	7,300	days	Calculated	
		FA	Fraction Absorbed Water	COPC-specific	unitless	EPA, 2004	otherwise if $t_{event} > t^*$, then DA_{EVENT} (Organic) =
		K_p	Dermal Permeability Coefficient	COPC-specific	cm/hour	EPA, 2004	$FA \times K_p \times C_w \times CF2 \times CF3 \times$
		C_w	Chemical Concentration in Water	COPC-specific	µg/L	See Table 5-9	$[((t_{event})/(1+B)) + 2\tau_{event}\ ((1 + 3B + 3B^2)/(1+B)^2)$
		CF2	Conversion Factor 2	1.0E-03	mg/µg	-----	
		CF3	Conversion Factor 3	1.0E-03	L/cm^3	-----	DA_{EVENT} (Inorganic) =
		B	Ratio of Permeability Coefficient	COPC-specific	unitless	EPA, 2004	$K_p \times C_w \times CF2 \times CF3 \times t_{event}$
		t*	Time to Reach Steady State	COPC-specific	hour	EPA, 2004	
		τ_{event}	Lag Time Per Event	COPC-specific	hr/event	EPA, 2004	
		t_{event}	Event Duration - adult	0.71	hr/event	EPA, 2014	

TABLE 5-24
VALUES USED FOR DAILY INTAKE CALCULATIONS - FUTURE RESIDENTS - GROUNDWATER EXPOSURE
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Receptor Population: Future Residents
Receptor Age: Child/Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Vapors While Showering (Adult Exposure)	E	Inhalation Exposure per Shower	COPC-specific	mg/kg/shower	Calculated	Exposure Concentration (EC) (mg/m^3) = E x BW x CF1 x 1/IR x CF2 x EF x ED x 1/AT
		BW	Body Weight	80	kg	EPA, 2014	
		CF1	Conversion Factor	1.00E+03	L/m^3	-----	
		IR	Inhalation rate while showering	1.50E+01	L/minute	Foster and Chrostowski, 1987	
		CF2	Conversion Factor	6.94E-04	d/min	-----	
		EF	Exposure Frequency	350	days/year	EPA, 2014	
		ED	Exposure Duration	20	years	EPA, 2014	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	7,300	days	Calculated	

TABLE 5-25
VALUES USED FOR DAILY INTAKE CALCULATIONS - FUTURE RESIDENTS - INDOOR AIR EXPOSURE
REASONABLE MAXIMUM EXPOSURE
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Medium: Air
Exposure Medium: Indoor Air
Receptor Population: Future Residents
Receptor Age: Child/Adult

Exposure Route	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Indoor Air	CA	COPC Air Concentration	COPC-specific	μg/m^3	See Table 5-10	Average Daily Concentration (μg/m^3) = CA x ET x EF x ED x CF x 1/AT
		ET	Exposure Time	24	hours/day	EPA, 2014	
		EF	Exposure Frequency	350	days/year	EPA, 2014	
		ED	Exposure Duration	26	years	EPA, 2014	
		CF	Conversion Factor	0.042	days/hour	-----	
		AT_C	Averaging Time (Cancer)	25,550	days	EPA, 2014	
		AT_{NC}	Averaging Time (Non-Cancer)	9,490	days	Calculated	

Table 5-26

Dermally Absorbed Dose Per Event (DA_{event}) Calculations[a] - Entire Site Groundwater
LO-58 Site, Caribou, Maine

COPC	EPC[b] (µg/L)	(mg/cm^3)	FA (unitless)	K_p (cm/hr)	τ_{event} (hr/event)	B (unitless)	t^* (hr)	$DA_{event-adj}$[c] (mg/cm^2-event)	DA_{event} (mg/cm^2-event)[d] Child	Adult
VOCs										
1,1-Biphenyl	1.00E+01	1.00E-05	1.0 [e]	9.62E-02 [f]	7.67E-01 [g]	4.59E-01 [h]	1.84E+00	1.91E-06	1.71E-06	1.96E-06
1,2,4-Trimethylbenzene	9.63E+00	9.63E-06	1.0 [e]	1.05E-01 [f]	4.95E-01 [g]	4.43E-01 [h]	1.19E+00	1.61E-06	1.45E-06	1.66E-06
1-Methylnaphthalene	5.30E+01	5.30E-05	1.0 [e]	9.08E-02 [f]	6.57E-01 [g]	4.16E-01 [h]	1.58E+00	8.82E-06	7.92E-06	9.08E-06
Benzo(a)anthracene	1.70E-02	1.70E-08	2.0 [e]	8.35E-05 [f]	1.99E+00 [g]	4.85E-04 [h]	4.78E+00	9.07E-12	8.14E-12	9.33E-12
Benzo(a)pyrene	1.80E-02	1.80E-08	1.0	7.00E-01	2.69E+00	4.30E+00	1.17E+01	4.68E-08	4.20E-08	4.81E-08
cis-1,2-Dichloroethene	1.52E+00	1.52E-06	1.0 [e]	7.67E-03 [f]	3.66E-01 [g]	2.90E-02 [h]	8.80E-01	1.60E-08	1.43E-08	1.64E-08
Dibenzo(a,h)anthracene	7.60E-03	7.60E-09	0.6	1.50E+00	3.88E+00	9.70E+00	1.76E+01	3.05E-08	2.74E-08	3.14E-08
Dibenzofuran	1.60E+00	1.60E-06	1.0 [e]	9.49E-02 [f]	9.19E-01 [g]	4.73E-01 [h]	2.20E+00	3.29E-07	2.96E-07	3.39E-07
Naphthalene	9.30E+00	9.30E-06	1.0	4.70E-02	5.60E-01	2.00E-01	1.34E+00	7.40E-07	6.65E-07	7.62E-07
Trichloroethene	4.50E+00	4.50E-06	1.0	1.20E-02	5.80E-01	1.00E-01	1.39E+00	9.31E-08	8.36E-08	9.59E-08
Cadmium	1.00E+00	1.00E-06	NA	1.00E-03	NA	NA	NA	6.70E-10	5.40E-10	7.10E-10
Chromium	2.40E+00	2.40E-06	NA	1.00E-03	NA	NA	NA	1.61E-09	1.30E-09	1.70E-09
Cobalt	5.20E+00	5.20E-06	NA	1.00E-03	NA	NA	NA	3.48E-09	2.81E-09	3.69E-09
Manganese	1.33E+03	1.33E-03	NA	1.00E-03	NA	NA	NA	8.91E-07	7.18E-07	9.44E-07
Nitrate	5.00E+03	5.00E-03	NA	1.00E-03	NA	NA	NA	3.35E-06	2.70E-06	3.55E-06

[a] EPA, 2004

[b] See Table 5-9

[c] tevent was age-adjusted assuming tevent of 0.54 for 6 years and tevent 0.71 for 24 years. Adjusted value equals 0.67.

[d] Calculated based on Equation 3.2 or 3.3 for organics and Equation 3.4 for inorganics in EPA, 2004 where t_{event} equals 0.54 for children and 0.71 for adults.

[e] In the absence of chemical-specific data, the FA was conservatively assumed to be 1.

[f] Calculated based on Equation 3.8 in EPA, 2004.

[g] Calculated based on Equation A.4 in EPA, 2004.

[h] Calculated based on Equation A.1 in EPA, 2004.

B = Ratio of the permeability coefficient of a COPC through the stratum corneum relative to its permeability coefficient across the viable epidermis.

FA = Fraction absorbed.

K_p = Dermal permeability coefficient.

NA = Not applicable.

τ_{event} = Lag time per event.

t^* = Time to reach steady-state.

Table 5-27

Inhalation Exposure Per Shower (E)
LO-58 Site, Caribou, Maine

$$E = \frac{VR \times S}{BW \times R \times 10^6} \times \frac{D_S + \exp(-R \times D_T)}{R - \frac{\exp[R \times (D_S - D_T)]}{R}}$$

Parameter	Definition	Value	Reference
E	Inhalation exposure per shower (mg/m^3).		
VR	Ventilation rate (L/minute).	15	Foster and Chrostowski, 1987
S	Indoor VOC generation rate (µg/m^3-minute).	Calculated	See Table 5-28
BW	Body weight (kg).	70	EPA, 1989
R	Air exchange rate (minute^{-1}).	90	Foster and Chrostowski, 1987; upper-bound value
CF	Conversion factor.	10^6	Foster and Chrostowski, 1987
Ds	Shower duration (minute).	34.8	EPA, 1997; RME value
Dt	Total duration in shower room (minute).	60	Professional judgment

Table 5-28

Indoor VOC Generation Rate (S)
LO-58 Site, Caribou, Maine

$$S = \frac{C_{WD} \times FR}{SV}$$

Parameter	Definition	Value	Reference
S	Indoor VOC generation rate (µg/m^3-minute).		
C_{WD}	Concentration leaving shower droplet after time t_s (µg/L).	Calculated	See Table 5-29
FR	Indoor shower water flow rate (L/minute).	10	Foster and Chrostowski, 1987
SV	Shower room air volume (m^3).	12	Professional Judgement

Table 5-29

Concentration Leaving Shower Droplet After Time T_S (C_{WD})
LO-58 Site, Caribou, Maine

$$C_{WD} = C_{WO} \times \left(1 - \exp\left(-\frac{K_{aL} \times t_s}{60 \times d}\right)\right)$$

Parameter	Definition	Value	Reference
C_{WD}	Concentration leaving shower droplet after time t_s (µg/L).		
C_{WO}	Shower water concentration (µg/L).	COPC-Specific	See Table 5-9
K_{aL}	Adjusted overall mass transfer coefficient (cm/hr).	Calculated	See Table 5-30
t_s	Shower droplet drop time (seconds).	0.5	Foster and Chrostowski, 2003
d	Shower droplet diameter (mm).	1	Foster and Chrostowski, 1987

Table 5-30

Adjusted Overall Mass Transfer Coefficient (Ka$_L$)
LO-58 Site, Caribou, Maine

$$K_{aL} = K_L \times \left(\frac{T_1 \times \mu_s}{T_s \times \mu_1} \right)^{-0.5}$$

Parameter	Definition	Value	Reference
Ka$_L$	Adjusted overall mass transfer coefficient (cm/hr).		
K$_L$	Overall mass transfer coeeficient (cm/hr).	Calculated	See Table 5-31
T$_1$	Calibration water temperature of K$_L$ (K).	293	Foster and Chrostowski, 1987
μ_s	Water viscosity at T$_s$ (cp).	0.59	Foster and Chrostowski, 1987
T$_s$	Shower water temperature (K).	318	Foster and Chrostowski, 1987; upper-bound value
μ_1	Water viscosity at T$_1$ (cp).	1.002	Foster and Chrostowski, 2003

Table 5-31

Overall Mass Transfer Coefficient (K_L)
LO-58 Site, Caribou, Maine

$$K_L = \left(\frac{1}{k_{l(VOC)}} + \frac{R \times T}{H \times k_{g(VOC)}} \right)^{-1}$$

Parameter	Definition	Value	Reference
K_L	Overall mass transfer coefficient (cm/hr).		
$k_{l\,(VOC)}$	Liquid-film mass transfer coefficient for VOC (cm/hr).	Calculated; COPC-Specific	See Table 5-32
R	Gas constant (atm-m^3/mol-K).	0.000082	Foster and Chrostowski, 1987
T	Absolute temperature (K).	293	Foster and Chrostowski, 1987
H	Henry's law constant (atm-m^3/mol).	COPC-Specific	See Table 5-34
$k_{g\,(VOC)}$	Gas-film mass transfer coefficient for VOC (cm/hr).	Calculated; COPC-Specific	See Table 5-33

Table 5-32

Liquid-Film Mass Transfer Coefficient ($k_{l\ (VOC)}$)
LO-58 Site, Caribou, Maine

$$k_{l(VOC)} = k_{l(CO_2)} \times \left(\frac{44}{MW_{VOC}} \right)^{0.5}$$

Parameter	Definition	Value	Reference
$k_{l\ (VOC)}$	Liquid-film mass transfer coefficient for VOC (cm/hr).		
$k_{l\ (CO2)}$	Liquid-film mass transfer coefficient for CO_2(cm/hr).	20	Foster and Chrostowski, 1987
MW_{VOC}	Molecular weight of VOC (g/mol).	COPC-Specific	See Table 5-34

Table 5-33

Gas-Film Mass Transfer Coefficient (kg $_{(VOC)}$)
LO-58 Site, Caribou, Maine

$$k_{g\,(VOC)} = k_{g(H_2O)} \times \left(\frac{18}{MW_{VOC}} \right)^{0.5}$$

Parameter	Definition	Value	Reference
$K_{g\ (VOC)}$	Gas-film mass transfer coefficient for VOC (cm/hr).		
$kg_{\ (H2O)}$	Gas-film mass transfer coefficient for H_2O (cm/hr).	3,000	Foster and Chrostowski, 1987
MW_{VOC}	Molecular weight of VOC (g/mol).	COPC-Specific	See Table 5-34

Table 5-34

COPC-Specific Henry's Law Constant (H) and Molecular Weight (MW)
LO-58 Site, Caribou, Maine

COPC	H (atm-m^3/mol)	MW (g/mol)
1,1-Biphenyl	3.08E-04 (EPA, 2012)	1.54E+02 (EPA, 2012)
1,2,4-Trimethylbenzene	6.16E-03 (EPA, 2012)	1.20E+02 (EPA, 2012)
1-Methylnaphthalene	5.14E-04 (EPA, 2012)	1.42E+02 (EPA, 2012)
cis-1,2-Dichloroethene	4.08E-03 (EPA, 2012)	9.69E+01 (EPA, 2012)
Dibenzofuran	2.13E-04 (EPA, 2012)	1.68E+02(EPA, 2012)
Ethylbenzene	7.88E-03 (EPA, 2012)	1.06E+02 (EPA, 2012)
Naphthalene	4.40E-04 (EPA, 2012)	1.28E+02 (EPA, 2012)
Trichloroethene	9.85E-03 (EPA, 2012)	1.31E+02 (EPA, 2012)

Table 5-35
Non-Cancer Toxicity Data -- Oral/Dermal
LO-58 Site, Caribou, Maine

Contaminant of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal (1)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD: Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Dates (2)
1,1-Biphenyl	Chronic	5.00E-01	mg/kg-day	1.0	5.00E-01	mg/kg-day	Kidney	100	IRIS	6/1/2016
1,2,4-Trimethylbenzene	---	NA	---	---	NA	---	---	---	---	---
1-Methylnaphthalene	Chronic	7.00E-02	mg/kg-day	1.0	7.00E-02	mg/kg-day	Respiratory System	1,000	ATSDR	2016 RSL Table
Benzo(a)anthracene	---	NA	---	---	NA	---	---	---	---	---
Benzo(a)pyrene	---	NA	---	---	NA	---	---	---	---	---
Benzo(b)fluoranthene	---	NA	---	---	NA	---	---	---	---	---
cis-1,2-Dichloroethene	Chronic	2.00E-03	mg/kg-day	1.0	2.00E-03	mg/kg-day	Kidney	3,000	IRIS	6/1/2016
Dibenzo(a,h)anthracene	---	NA	---	---	NA	---	---	---	---	---
Dibenzofuran	Chronic	1.00E-03	mg/kg-day	1.0	1.00E-03	mg/kg-day	Body and organ weight	10,000	PPRTV Appendix	2016 RSL Table
Naphthalene	Chronic	2.00E-02	mg/kg-day	1.0	2.00E-02	mg/kg-day	Body Weight	3,000	IRIS	6/1/2016
Trichloroethene	Chronic	5.00E-04	mg/kg-day	1.0	5.00E-04	mg/kg-day	Immune System, Cardiovascular System, Developmental	100	IRIS	6/1/2016
Aluminum	Chronic	1.00E+00	mg/kg-day	1.0	1.00E+00	mg/kg-day	Nervous system	100	PPRTV	2016 RSL Table
Arsenic	Chronic	3.00E-04	mg/kg-day	1.0	3.00E-04	mg/kg-day	Skin	3	IRIS	6/1/2016
Cadmium	Chronic	5.00E-04	mg/kg-day	0.050	2.50E-05	mg/kg-day	Kidney	10	IRIS	6/1/2016
Chromium (3)	Chronic	3.00E-03	mg/kg-day	0.025	7.50E-05	mg/kg-day	None observed	900	IRIS	6/1/2016
Cobalt	Chronic	3.00E-04	mg/kg-day	1.0	3.00E-04	mg/kg-day	Thyroid	3,000	PPRTV	2016 RSL Table
Iron	Chronic	7.00E-01	mg/kg-day	1.0	7.00E-01	mg/kg-day	Gastrointestinal	1.5	PPRTV	2016 RSL Table
Manganese	Chronic	2.40E-02	mg/kg-day	0.04	9.60E-04	mg/kg-day	Nervous system	1	IRIS	6/1/2016
Nitrate	Chronic	1.60E+00	mg/kg-day	1.0	1.60E+00	mg/kg-day	Blood	1	IRIS	6/1/2016
Thallium	Chronic	1.00E-05	mg/kg-day	1.0	1.00E-05	mg/kg-day	Hair	3,000	PPRTV Appendix	2016 RSL Table

(1) Source: RAGS Part E Guidance.

(2) Represents date source was searched.

(3) Chromium VI value used due to the absence of chromium speciation data.

Definitions:

ATSDR = Agency for Toxic Substances and Disease Registry.

HEAST = Health Effects Assessment Summary Tables.

IRIS = Integrated Risk Information System.

NA = not available.

PPRTV = Provisional Peer-Reviewed Toxicity Value.

Table 5-36
Non-Cancer Toxicity Data -- Inhalation
LO-58 Site, Caribou, Maine

Contaminant of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC: Target Organ(s)	
		Value	Units			Source(s)	Dates (1)
1,1-Biphenyl	Chronic	4.00E-04	mg/m^3	Respiratory System	3,000	PPRTV Appendix	2016 RSL Table
1,2,4-Trimethylbenzene	Chronic	7.00E-03	mg/m^3	None observed	3,000	PPRTV	2016 RSL Table
1-Methylnaphthalene	---	NA	---	---	---	---	---
Benzene	Chronic	3.00E-02	mg/m^3	Blood	300	IRIS	6/1/2016
Benzo(a)anthracene	---	NA	---	---	---	---	---
Benzo(a)pyrene	---	NA	---	---	---	---	---
Benzo(b)fluoranthene	---	NA	---	---	---	---	---
Chloroform	Chronic	9.80E-02	mg/m^3	Liver	100	ATSDR	2016 RSL Table
cis-1,2-Dichloroethene	---	NA	---	---	---	---	---
Dibenzo(a,h)anthracene	---	NA	---	---	---	---	---
Dibenzofuran	---	NA	---	---	---	---	---
Ethyl benzene	Chronic	1.00E+00	mg/m^3	Developmental	3,000	IRIS	6/1/2016
Naphthalene	Chronic	3.00E-03	mg/m^3	Respiratory System	3,000	IRIS	6/1/2016
Trichloroethene	Chronic	2.00E-03	mg/m^3	Immune System, Cardiovascular System, Developmental	100	IRIS	6/1/2016
Aluminum	Chronic	5.00E-03	mg/m^3	Nervous system	300	PPRTV	2016 RSL Table
Arsenic	Chronic	1.50E-05	mg/m^3	Developmental, Cardiovascular system, Nervous system, Lung, Skin	30	CalEPA	2016 RSL Table
Cadmium	Chronic	1.00E-05	mg/m^3	Kidney	9	ATSDR	2016 RSL Table
Chromium (2)	Chronic	1.00E-04	mg/m^3	Respiratory System	300	IRIS	6/1/2016
Cobalt	Chronic	6.00E-06	mg/m^3	Respiratory System	300	PPRTV	2016 RSL Table
Iron	---	NA	---	---	---	---	---
Manganese	Chronic	5.00E-05	mg/m^3	Nervous system	1,000	IRIS	6/1/2016
Nitrate	---	NA	---	---	---	---	---
Thallium	---	NA	---	---	---	---	---

(1) Represents date source was searched.

(2) Chromium VI (particulates) value used due to the absence of chromium speciation data.

Definitions: ATSDR = Agency for Toxic Substances and Disease Registry.
CalEPA = California Environmental Protection Agency.
IRIS = Integrated Risk Information System.
NA = not available.
PPRTV = Provisional Peer-Reviewed Toxicity Value.

Table 5-37
Cancer Toxicity Data -- Oral/Dermal
LO-58 Site, Caribou, Maine

Contaminant of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal (1)		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Dates (2)
1,1-Biphenyl	8.00E-03	$(mg/kg\text{-}day)^{-1}$	1.0	8.00E-03	$(mg/kg\text{-}day)^{-1}$	D	IRIS	6/1/2016
1,2,4-Trimethylbenzene	NA	---	---	NA	---	No information	---	---
1-Methylnaphthalene	2.90E-02	$(mg/kg\text{-}day)^{-1}$	1.0	2.90E-02	$(mg/kg\text{-}day)^{-1}$	No information	PPRTV	2016 RSL Table
Benzo(a)anthracene	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.0	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	6/1/2016
Benzo(a)pyrene	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.0	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	6/1/2016
Benzo(b)fluoranthene	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.0	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	6/1/2016
cis-1,2-Dichloroethene	NA	---	---	NA	---	Inadequate Information	---	---
Dibenzo(a,h)anthracene	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.0	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	6/1/2016
Dibenzofuran	NA	---	---	NA	---	D	---	---
Naphthalene	NA	---	---	NA	---	C	---	---
Trichloroethene	4.60E-02	$(mg/kg\text{-}day)^{-1}$	1.0	4.60E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	6/1/2016
Aluminum	NA	---	---	NA	---	No information	---	---
Arsenic	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.0	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	6/1/2016
Cadmium	NA	---	---	NA	---	B1	---	---
Chromium (3)	5.00E-01	$(mg/kg\text{-}day)^{-1}$	0.025	2.00E+01	$(mg/kg\text{-}day)^{-1}$	D	NJDEP	2016 RSL Table
Cobalt	NA	---	---	NA	---	No information	---	---
Iron	NA	---	---	NA	---	No information	---	---
Manganese	NA	---	---	NA	---	D	---	---
Nitrate	NA	---	---	NA	---	Not assessed under IRIS	---	---
Thallium	NA	---	---	NA	---	No information	---	---

(1) Source: RAGS Part E Guidance.

(2) Represents date source was searched.

(3) Chromium VI, NJDEP value endorsed by OSWER, September 28, 2009. Chromium VI value used due to the absence of chromium speciation data.

Definitions:
CalEPA = California Environmental Protection Agency.
IRIS = Integrated Risk Information System.
NJDEP = New Jersey Department of Environmental Protection.
NA = not available.
PPRTV = Provisional Peer-Reviewed Toxicity Value.
A - Human carcinogen.
B1 - Probable human carcinogen - indicates that limited human data are available.
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans.
C - Possible human carcinogen.
D - Not classifiable as a human carcinogen.

Table 5-38
Cancer Toxicity Data -- Inhalation
LO-58 Site, Caribou, Maine

Contaminant of Potential Concern	Unit Risk		Weight of Evidence/ Cancer Guideline Description	Unit Risk: Inhalation CSF	
	Value	Units		Source(s)	Dates (1)
1,1-Biphenyl	NA	---	D	---	---
1,2,4-Trimethylbenzene	NA	---	No information	---	---
1-Methylnaphthalene	NA	---	No information	---	---
Benzene	7.80E-06	$(\mu g/m^3)^{-1}$		IRIS	6/1/2016
Benzo(a)anthracene	1.10E-04	$(\mu g/m^3)^{-1}$	B2	CalEPA	2016 RSL Table
Benzo(a)pyrene	1.10E-03	$(\mu g/m^3)^{-1}$	B2	CalEPA	2016 RSL Table
Benzo(b)fluoranthene	1.10E-04	$(\mu g/m^3)^{-1}$	B2	CalEPA	2016 RSL Table
Chloroform	2.30E-05	$(\mu g/m^3)^{-1}$		IRIS	6/1/2016
cis-1,2-Dichloroethene	NA	---	Inadequate information	---	---
Dibenzo(a,h)anthracene	1.20E-03	$(\mu g/m^3)^{-1}$	B2	CalEPA	2016 RSL Table
Dibenzofuran	NA	---	D	---	---
Ethyl benzene	2.50E-06	$(\mu g/m^3)^{-1}$	D	CalEPA	2016 RSL Table
Naphthalene	3.40E-05	$(\mu g/m^3)^{-1}$	C	CalEPA	2016 RSL Table
Trichloroethene	4.10E-06	$(\mu g/m^3)^{-1}$	A	IRIS	6/1/2016
Aluminum	NA	---	No information	---	---
Arsenic	4.30E-03	$(\mu g/m^3)^{-1}$	A	IRIS	6/1/2016
Cadmium	1.80E-03	$(\mu g/m^3)^{-1}$	B1	IRIS	6/1/2016
Chromium (2)	8.40E-02	$(\mu g/m^3)^{-1}$	D	IRIS	6/1/2016
Cobalt	9.00E-03	$(\mu g/m^3)^{-1}$	No information	PPRTV	2016 RSL Table
Iron	NA	---	No information	---	---
Manganese	NA	---	D	---	---
Nitrate	NA	---	Not assessed under IRIS	---	---
Thallium	NA	---	No information	---	---

(1) Represents date source was searched.

(2) Chromium VI value used due to the absence of chromium speciation data.

Definitions: CalEPA = California Environmental Protection Agency.
IRIS = Integrated Risk Information System.
NA = not available.
PPRTV = Provisional Peer-Reviewed Toxicity Value.
A - Human carcinogen.
B1 - Probable human carcinogen - indicates that limited human data are available.
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans.
C - Possible human carcinogen.
D - Not classifiable as a human carcinogen.

Table 5-39

Calculation of Cancer Risks - Mutagenic Mode of Action - Future Residential Exposure to Entire Site Total Soil
LO-58 Site, Caribou, Maine

Incidental Soil Ingestion Risk

Where:

$$\text{Risk} = \text{EPC x} \sum_{i} \frac{\text{IRS x FI x CF x EF x ED}}{\text{BW x AT}} \text{ x CSFo x ADAF}$$

Exposure Parameters (by age interval, i)					
Parameter	**Units**	**0-<2**	**2-<6**	**6-<16**	**16-<26**
EPC	mg/kg	See Below			
IRS	mg/day	200	200	100	100
FI	unitless	1	1	1	1
CF	kg/mg	1E-06	1E-06	1E-06	1E-06
EF	days/year	350	350	350	350
ED	years	2	4	10	10
BW	kg	15	15	80	80
AT	days	25550	25550	25550	25550
CSFo	$(\text{mg/kg-day})^{-1}$	See Below			
ADAF	unitless	10	3	3	1

	Incidential Soil Ingestion Risks					
COPC	**EPC**	**CSFo**	**0-<2**	**2-<6**	**6-<16**	**16-<26**
Benzo(a)anthracene	6.14E-02	7.3E-01	1.6E-07	9.8E-08	2.3E-08	7.7E-09
Benzo(a)pyrene	6.16E-02	7.3E+00	1.6E-06	9.9E-07	2.3E-07	7.7E-08
Benzo(b)fluoranthene	3.94E-02	7.3E-01	1.1E-07	6.3E-08	1.5E-08	4.9E-09
Dibenz(a,h)anthracene	4.18E-03	7.3E+00	1.1E-07	6.7E-08	1.6E-08	5.2E-09
Chromium	3.63E+01	5.0E-01	6.6E-05	4.0E-05	9.3E-06	3.1E-06

Dermal Contact Risk

Where:

$$\text{Risk} = \text{EPC x} \sum_{i} \frac{\text{SA x AF x ABS x EF x ED x CF}}{\text{BW x AT}} \text{ x CSFd x ADAF}$$

Exposure Parameters (by age interval, i)					
Parameter	**Units**	**0-<2**	**2-<6**	**6-<16**	**16-<26**
EPC	mg/kg	See Below			
SA	cm^2/day	2373	2373	6032	6032
AF	mg/cm^2	0.2	0.2	0.07	0.07
ABS	unitless	See Below			
EF	days/year	350	350	350	350
ED	years	2	4	10	10
CF	kg/mg	1E-06	1E-06	1E-06	1E-06
BW	kg	15	15	80	80
AT	days	25550	25550	25550	25550
CSFd	$(\text{mg/kg-day})^{-1}$	See Below			
ADAF	unitless	10	3	3	1

	Dermal Contact Risks						
COPC	**EPC**	**CSFd**	**ABS**	**0-<2**	**2-<6**	**6-<16**	**16-<26**
Benzo(a)anthracene	6.14E-02	7.3E-01	0.13	5.1E-08	3.0E-08	1.3E-08	4.2E-09
Benzo(a)pyrene	6.16E-02	7.3E+00	0.13	5.1E-07	3.0E-07	1.3E-07	4.2E-08
Benzo(b)fluoranthene	3.94E-02	7.3E-01	0.13	3.2E-08	1.9E-08	8.1E-09	2.7E-09
Dibenz(a,h)anthracene	4.18E-03	7.3E+00	0.13	3.4E-08	2.1E-08	8.6E-09	2.9E-09
Chromium	3.63E+01	2.0E+01	NA	NA	NA	NA	NA

Inhalation of Particulate Risk

Where:

$$\text{Risk} = \text{EPC x 1/PEF} \sum_{i} \frac{\text{ET x EF x ED x CF}}{\text{AT}} \text{ x URF x ADAF}$$

Exposure Parameters (by age interval, i)					
Parameter	**Units**	**0-<2**	**2-<6**	**6-<16**	**16-<26**
EPC	mg/kg	See Below			
PEF	m^3/kg	1.4E+09	1.4E+09	1.4E+09	1.4E+09
ET	hours/day	24	24	24	24
EF	days/year	350	350	350	350
ED	years	2	4	10	10
CF	µg/mg	1000	1000	1000	1000
AT	hours	613200	613200	613200	613200
URF	$(\mu\text{g/m}^3)^{-1}$	See Below			
ADAF	unitless	10	3	3	1

	Inhalation of Particulate Risks					
COPC	**EPC**	**URFi**	**0-<2**	**2-<6**	**6-<16**	**16-<26**
Benzo(a)anthracene	6.14E-02	1.1E-04	1.4E-12	8.2E-13	2.0E-12	6.8E-13
Benzo(a)pyrene	6.16E-02	1.1E-03	1.4E-11	8.2E-12	2.0E-11	6.8E-12
Benzo(b)fluoranthene	3.94E-02	1.1E-04	8.7E-13	5.2E-13	1.3E-12	4.4E-13
Dibenz(a,h)anthracene	4.18E-03	1.2E-03	1.0E-12	6.1E-13	1.5E-12	5.1E-13
Chromium	3.63E+01	8.4E-02	6.1E-07	3.7E-07	9.2E-07	3.1E-07

	Total Cancer Risks			
COPC	**Soil Ingestion**	**Dermal Contact**	**Inhalation**	**Total**
Benzo(a)anthracene	2.9E-07	9.8E-08	4.9E-12	**3.9E-07**
Benzo(a)pyrene	2.9E-06	9.8E-07	4.9E-11	**3.9E-06**
Benzo(b)fluoranthene	1.9E-07	6.3E-08	3.1E-12	**2.5E-07**
Dibenz(a,h)anthracene	2.0E-07	6.6E-08	3.6E-12	**2.7E-07**
Chromium	1.2E-04	NA	2.2E-06	**1.2E-04**

Table 5-40

Calculation of Cancer Risks - Mutagenic Mode of Action - Future Residential Exposure to Entire Site Groundwater
LO-58 Site, Caribou, Maine

Tapwater Ingestion Risk

Where:

$$\text{Risk} = \text{EPC} \times \sum_{i} \frac{\text{IRW} \times \text{FI} \times \text{EF} \times \text{ED} \times \text{CF}}{\text{BW} \times \text{AT}} \times \text{CSFo} \times \text{ADAF}$$

Exposure Parameters (by age interval, i)					
Parameter	**Units**	**0-<2**	**2-<6**	**6-<16**	**16-<26**
EPC	µg/L	See Below			
IRW	L/day	0.78	0.78	2.5	2.5
FI	unitless	1	1	1	1
CF	mg/µg	1E-03	1E-03	1E-03	1E-03
EF	days/year	350	350	350	350
ED	years	2	4	10	10
BW	kg	15	15	80	80
AT	days	25550	25550	25550	25550
CSFo	$(\text{mg/kg-day})^{-1}$	See Below			
ADAF	unitless	10	3	3	1

		Tapwater Ingestion Risks				
COPC	**EPC**	**CSFo**	**0-<2**	**2-<6**	**6-<16**	**16-<26**
Benzo(a)pyrene	1.80E-02	7.3E+00	1.9E-06	1.1E-06	1.7E-06	5.6E-07
Dibenz(a,h)anthracene	7.60E-03	7.3E+00	7.9E-07	4.7E-07	7.1E-07	2.4E-07
Chromium	2.40E+00	5.0E-01	1.7E-05	1.0E-05	1.5E-05	5.1E-06

Dermal Contact Risk

Where:

$$\text{Risk} = \sum_{i} \frac{\text{DAevent} \times \text{EV} \times \text{SA} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT}} \times \text{CSFd} \times \text{ADAF}$$

Exposure Parameters (by age interval, i)					
Parameter	**Units**	**0-<2**	**2-<6**	**6-<16**	**16-<26**
DAevent	$\text{mg/cm}^2\text{-event}$	See Below			
EV	event/day	1	1	1	1
SA	cm^2	6378	6378	20900	20900
EF	days/year	350	350	350	350
ED	years	2	4	10	10
BW	kg	15	15	80	80
AT	days	25550	25550	25550	25550
CSFd	$(\text{mg/kg-day})^{-1}$	See Below			
ADAF	unitless	10	3	3	1

	Dermal Contact Risks					
COPC	**DAevent**	**CSFd**	**0-<2**	**2-<6**	**6-<16**	**16-<26**
Benzo(a)pyrene	4.71E-08	7.3E+00	4.0E-05	2.4E-05	3.7E-05	1.2E-05
Dibenz(a,h)anthracene	3.07E-08	7.3E+00	2.6E-05	1.6E-05	2.4E-05	8.0E-06
Chromium	1.63E-09	2.0E+01	3.8E-06	2.3E-06	3.5E-06	1.2E-06

	Total Cancer Risks		
COPC	**Tapwater Ingestion**	**Dermal Contact**	**Total**
Benzo(a)pyrene	5.2E-06	1.1E-04	**1.2E-04**
Dibenz(a,h)anthracene	2.2E-06	7.4E-05	**7.6E-05**
Chromium	4.8E-05	1.1E-05	**5.9E-05**

Table 5-41

Calculation of Cancer Risks - Mutagenic Mode of Action - Current Trespasser Exposure to Launcher Area Surface Soil
LO-58 Site, Caribou, Maine

Incidental Soil Ingestion Risk

Where:

$$\text{Risk} = \text{EPC x} \sum_{i} \frac{\text{IRS x FI x CF x EF x ED}}{\text{BW x AT}} \text{ x CSFo x ADAF}$$

Exposure Parameters (by age interval, i)			
Parameter	**Units**	**11-<16**	**16-<18**
EPC	mg/kg	See Below	
IRS	mg/day	100	100
FI	unitless	0.5	0.5
CF	kg/mg	1E-06	1E-06
EF	days/year	36	36
ED	years	5	2
BW	kg	52	52
AT	days	25550	25550
CSFo	$(\text{mg/kg-day})^{-1}$	See Below	
ADAF	unitless	3	1

	Incidential Soil Ingestion Risks			
COPC	**EPC**	**CSFo**	**11-<16**	**16-<18**
Benzo(a)pyrene	1.04E-02	7.3E+00	1.5E-09	4.3E-20
Chromium	3.15E+01	5.0E-01	3.2E-07	2.7E-14

Dermal Contact Risk

Where:

$$\text{Risk} = \text{EPC x} \sum_{i} \frac{\text{SA x AF x ABS x EF x ED x CF}}{\text{BW x AT}} \text{ x CSFd x ADAF}$$

Exposure Parameters (by age interval, i)			
Parameter	**Units**	**11-<16**	**16-<18**
EPC	mg/kg	See Below	
SA	cm^2/day	5000	5000
AF	mg/cm^2	0.04	0.04
ABS	unitless	See Below	
EF	days/year	36	36
ED	years	5	2
CF	kg/mg	1E-06	1E-06
BW	kg	52	52
AT	days	25550	25550
CSFd	$(\text{mg/kg-day})^{-1}$	See Below	
ADAF	unitless	3	1

	Dermal Contact Risks				
COPC	**EPC**	**CSFd**	**ABS**	**11-<16**	**16-<18**
Benzo(a)pyrene	1.04E-02	7.3E+00	0.13	8.0E-10	1.1E-10
Chromium	3.15E+01	2.0E+01	NA	NA	NA

Inhalation of Particulate Risk

Where:

$$\text{Risk} = \text{EPC x 1/PEF} \sum_{i} \frac{\text{ET x EF x ED x CF}}{\text{AT}} \text{ x URF x ADAF}$$

Exposure Parameters (by age interval, i)			
Parameter	**Units**	**11-<16**	**16-<18**
EPC	mg/kg	See Below	
PEF	m^3/kg	1.4E+09	1.4E+09
ET	hours/day	2	2
EF	days/year	36	36
ED	years	5	2
CF	µg/mg	1000	1000
AT	hours	613200	613200
URF	$(\mu\text{g/m}^3)^{-1}$	See Below	
ADAF	unitless	3	1

	Inhalation of Particulate Risks			
COPC	**EPC**	**URFi**	**11-<16**	**16-<18**
Benzo(a)pyrene	1.04E-02	1.1E-03	1.5E-14	2.0E-15
Chromium	3.15E+01	8.4E-02	3.4E-09	4.6E-10

	Total Cancer Risks			
COPC	**Soil Ingestion**	**Dermal Contact**	**Inhalation**	**Total**
Benzo(a)pyrene	1.5E-09	9.1E-10	1.7E-14	**2.5E-09**
Chromium	3.2E-07	NA	3.9E-09	**3.2E-07**

Table 5-42

Calculation of Cancer Risks from Trichloroethylene - Mutagenic Mode of Action - Future Residential Exposure to Groundwater
LO-58 Site, Caribou, Maine

Tapwater Ingestion Risk

Where:

$$\text{Risk} = \text{EPC} \times \sum_i \left(\left(\frac{\text{IRW} \times \text{FI} \times \text{EF} \times \text{ED} \times \text{CF}}{\text{BW} \times \text{AT}} \right) \times \text{CSF}_{\text{kidney}} \times \text{ADAF} \right) + \left(\left(\frac{\text{IRW} \times \text{FI} \times \text{EF} \times \text{ED} \times \text{CF}}{\text{BW} \times \text{AT}} \right) \times \text{CSF}_{\text{Liver + NHL}} \right)$$

Exposure Parameters (by age interval, i)					
Parameter	**Units**	**0-<2**	**2-<6**	**6-<16**	**16-<26**
EPC	µg/L	See Below			
IRW	L/day	0.78	0.78	2.5	2.5
FI	unitless	1	1	1	1
CF	mg/µg	1E-03	1E-03	1E-03	1E-03
EF	days/year	350	350	350	350
ED	years	2	4	10	10
BW	kg	15	15	80	80
AT	days	25550	25550	25550	25550
$\text{CSF}_{\text{kidney}}$	$(\text{mg/kg-day})^{-1}$	9.3E-03			
ADAF	unitless	10	3	3	1
$\text{CSF}_{\text{liver+NHL}}$	$(\text{mg/kg-day})^{-1}$	3.7E-02			

	EPC	Tapwater Ingestion Risks			
COPC	**(µg/L)**	**0-<2**	**2-<6**	**6-<16**	**16-<26**
Trichloroethylene	4.50E+00	8.3E-07	8.3E-07	1.3E-06	8.9E-07

Dermal Contact Risk

Where:

$$\text{Risk} = \sum_i \left(\left(\frac{\text{DAevent} \times \text{EV} \times \text{SA} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT}} \right) \times \text{CSF}_{\text{kidney}} \times \text{ADAF} \right) + \left(\left(\frac{\text{DAevent} \times \text{EV} \times \text{SA} \times \text{EF} \times \text{ED}}{\text{BW} \times \text{AT}} \right) \times \text{CSF}_{\text{Liver + NHL}} \right)$$

Exposure Parameters (by age interval, i)					
Parameter	**Units**	**0-<2**	**2-<6**	**6-<16**	**16-<26**
DAevent	$\text{mg/cm}^2\text{-event}$	See Below			
EV	event/day	1	1	1	1
SA	cm^2	6378	6378	20900	20900
EF	days/year	350	350	350	350
ED	years	2	4	10	10
BW	kg	15	15	80	80
AT	days	25550	25550	25550	25550
$\text{CSF}_{\text{kidney}}$	$(\text{mg/kg-day})^{-1}$	9.3E-03			
ADAF	unitless	10	3	3	1
$\text{CSF}_{\text{liver+NHL}}$	$(\text{mg/kg-day})^{-1}$	3.7E-02			

	DAevent	Dermal Contact Risks			
COPC	**$(\text{mg/cm}^2\text{-event})$**	**0-<2**	**2-<6**	**6-<16**	**16-<26**
Trichloroethylene	9.31E-08	1.4E-07	1.4E-07	2.2E-07	1.5E-07

	Total Cancer Risks		
COPC	**Tapwater Ingestion**	**Dermal Contact**	**Total**
Trichloroethylene	3.8E-06	6.5E-07	4.5E-06

Table 5-43

Calculation of Cancer Risks from Trichloroethylene - Mutagenic Mode of Action - Future Residential Exposure to Indoor Air
LO-58 Site, Caribou, Maine

Indoor Air Inhalation Risk

Where:

$$\text{Risk} = \text{CA x } \sum_{i}\left(\left(\frac{\text{ET x EF x ED x CF}}{\text{AT}}\right)\text{x IUR}_{\text{kidney}}\text{ x ADAF}\right)+\left(\left(\frac{\text{ET x EF x ED x CF}}{\text{AT}}\right)\text{x IUR}_{\text{Liver + NHL}}\right)$$

Exposure Parameters (by age interval, i)					
Parameter	**Units**	**0-<2**	**2-<6**	**6-<16**	**16-<26**
CA	$\mu g/m^3$	See Below			
ET	hrs/day	24	24	24	24
CF	day/hour	0.042	0.042	0.042	0.042
EF	days/year	350	350	350	350
ED	years	2	4	10	10
AT	days	25550	25550	25550	25550
IUR_{kidney}	$(\mu g/m^3)^{-1}$	1.0E-06			
ADAF	unitless	10	3	3	1
$IUR_{liver+NHL}$	$(\mu g/m^3)^{-1}$	3.1E-06			

COPC	CA ($\mu g/m^3$)	Indoor Air Inhalation Risks				
		0-<2	**2-<6**	**6-<16**	**16-<26**	**Total**
Entire Site						
Trichloroethylene	4.0E+00	1.4E-06	1.3E-06	3.3E-06	2.3E-06	8.4E-06

Table 5-44
Summary of Cancer Risks and Noncancer Hazard Indices
LO-58 Site, Caribou, Maine

Media	Exposure Area	Scenario Timeframe	Receptor	CR>1E-04 or HI>1	Total CR[a]	Major Contributors to Total CR (Individual CR >1E-06)	Individual COPC CR	Total Noncancer HI	Organ-Specific HI Above 1.0	Major Contributors to Total HI (Individual HI > 1.0)	Individual COPC HQ
Soil	AMAC Building Area	Current	AMAC Staff	No	1.2E-05	Arsenic	3.7E-06	0.12	---	---	---
						Chromium	7.3E-06				
			AMAC Client	No	3.3E-06	Arsenic	1.1E-06	0.12	---	---	---
						Chromium	2.1E-06				
			Site Worker	No	8.5E-06	Arsenic	2.6E-06	0.13	---	---	---
						Chromium	5.3E-06				
	Launcher Area	Current	AMAC Staff	No	7.8E-06	Arsenic	3.7E-06	0.12	---	---	---
						Chromium	4.1E-06				
			AMAC Client	No	2.2E-06	Arsenic	1.1E-06	0.12	---	---	---
						Chromium	1.2E-06				
			Site Worker	No	5.7E-06	Arsenic	2.7E-06	0.12	---	---	---
						Chromium	3.0E-06				
			Trespasser	No	4.6E-07	---	---	0.021	---	---	---
	Entire Site	Future	Age-Adjusted Resident	Yes	1.3E-04	Benzo(a)pyrene	3.9E-06	NE	---	---	---
						Arsenic	7.1E-06				
						Chromium[b]	1.2E-04				
			Adult Resident	No	NE	---	---	0.12	---	---	---
			Child Resident	Yes	NE	---	---	1.2 [c]	---	---	---
			Construction Worker	No	3.2E-07	---	---	0.34	---	---	---
			Commercial/Industrial Worker	No	5.4E-07	---	---	0.011	---	---	---
Groundwater	AMAC Building Area	Current	AMAC Staff	No	7.8E-06	Trichloroethene	1.4E-06	0.18	---	---	---
						Chromium	6.4E-06				
			AMAC Client	No	2.2E-06	Chromium	1.8E-06	0.18	---	---	---
	Entire Site	Future	Age-Adjusted Resident	Yes	3.1E-04	1,1-Biphenyl	2.7E-06	NE	---	---	---
						1-Methylnaphthalene	4.7E-05				
						Benzo(a)pyrene	1.2E-04				
						Dibenzo(a,h)anthracene	7.6E-05				
						Trichloroethene	4.5E-06				
						Chromium[b]	5.9E-05				
			Adult Resident	Yes	NE	---	---	3.2	Nervous system	Manganese	1.9
			Child Resident	Yes	NE	---	---	5.1 [b]	Nervous system	Manganese	3.1
			Commercial/Industrial Worker	No	1.2E-05	1-Methylnaphthalene	5.9E-06	0.98	---	---	---
						Chromium	4.6E-06				
Indoor Air	AMAC Building Area	Current	AMAC Staff	No	1.1E-05	Chloroform	3.1E-06	0.51	---	---	---
						Naphthalene	5.1E-06				
						Trichloroethene	1.6E-06				
			AMAC Client	No	2.2E-06 [b]	Naphthalene	1.0E-06	0.35	---	---	---
		Future	Adult/Child Resident	Yes	4.2E-05	Benzene	1.8E-06	2.4	Immune System	Trichloroethene	1.9
						Chloroform	1.1E-05				
						Ethylbenzene	3.1E-06				
						Naphthalene	1.8E-05				
						Trichloroethene	8.4E-06				
			Commercial/Industrial Worker	No	9.1E-06	Chloroform	2.5E-06	0.58	---	---	---
						Naphthalene	4.2E-06				
						Trichloroethene	1.3E-06				
Cumulative Risks											
All Media	AMAC Building Area	Current	AMAC Staff	No	3.1E-05	See above		0.81	See above		
			AMAC Client	No	7.7E-06			0.65			
			Site Worker	No	8.5E-06			0.13			
	Launcher Area	Current	AMAC Staff	No	7.8E-06	See above		0.12	See above		
			AMAC Client	No	2.2E-06			0.12			
			Trespasser	No	4.6E-07			0.021			
			Site Worker	No	5.7E-06			0.12			
	Entire Site	Future	Construction Worker	No	3.2E-07	See above		0.34	See above		
			Commercial/Industrial Worker	No	2.2E-05			1.57			
			Resident	Yes	4.9E-04			12.1			

Table 5-44
Summary of Cancer Risks and Noncancer Hazard Indices
LO-58 Site, Caribou, Maine

Media	Exposure Area	Scenario Timeframe	Receptor	CR>1E-04 or HI>1	Total CR[a]	Major Contributors to Total CR (Individual CR >1E-06)	Individual COPC CR	Total Noncancer HI	Organ-Specific HI Above 1.0	Major Contributors to Total HI (Individual HI > 1.0)	Individual COPC HQ

Notes:

[a] Note that for conservatism, total chromium results are based on hexavalent chromium toxicity criteria.

[b] Note that although either the total CR exceeded 1E-04 or the THQ exceeded 1.0, based on site detected concentrations falling within the range of site and regional background concentrations, these COPCs are likely not attributable to site-related activities and will not considered for remediation.

[c] Note that although the total CR or the total HI exceeded 1E-06 or 1.0,respectively, none of the individual COPC CRs were greater than 1E-06 or none of the individual HIs were greater than 1.0.

NE	Not Evaluated	🟩	Tota cancer risks are above 1E-04 or Hazard Indices are above 1.
CR	Cancer risk	🟦	Total cancer risks fall in the range of 10^{-6} to 10^{-4}.
HI	Hazard Index		
HQ	Hazard Quotient		

Table 5-45
Calculation of COPC Cancer Risks and Noncancer Hazards - AMAC Staff - Soil Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Staff
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	AMAC Building Area	Ingestion	Benzo(a)anthracene	1.70E-01	mg/kg	4.37E-08	mg/kg-day	7.3E-01	(mg/kg-day)^-1	3.2E-08	8.73E-08	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	1.70E-01	mg/kg	4.37E-08	mg/kg-day	7.3E+00	(mg/kg-day)^-1	3.2E-07	8.73E-08	mg/kg-day	NA	---	NA
				Benzo(b)fluoranthene	2.10E-01	mg/kg	5.39E-08	mg/kg-day	7.3E-01	(mg/kg-day)^-1	3.9E-08	1.08E-07	mg/kg-day	NA	---	NA
				Dibenzo(a,h)anthracene	3.50E-02	mg/kg	8.99E-09	mg/kg-day	7.3E+00	(mg/kg-day)^-1	6.6E-08	1.80E-08	mg/kg-day	NA	---	NA
				Aluminum	2.56E+04	mg/kg	6.58E-03	mg/kg-day	NA	---	NA	1.32E-02	mg/kg-day	1E+00	(mg/kg-day)	0.013
				Arsenic	8.50E+00	mg/kg	2.18E-06	mg/kg-day	1.5E+00	(mg/kg-day)^-1	3.3E-06	4.37E-06	mg/kg-day	3E-04	(mg/kg-day)	0.015
				Chromium	5.63E+01	mg/kg	1.45E-05	mg/kg-day	5.0E-01	(mg/kg-day)^-1	7.2E-06	2.89E-05	mg/kg-day	3E-03	(mg/kg-day)	0.0096
				Cobalt	1.96E+01	mg/kg	5.03E-06	mg/kg-day	NA	---	NA	1.01E-05	mg/kg-day	3E-04	(mg/kg-day)	0.034
				Iron	4.93E+04	mg/kg	1.27E-02	mg/kg-day	NA	---	NA	2.53E-02	mg/kg-day	7E-01	(mg/kg-day)	0.036
				Manganese	6.54E+02	mg/kg	1.68E-04	mg/kg-day	NA	---	NA	3.36E-04	mg/kg-day	2E-02	(mg/kg-day)	0.014
			Ingestion Total								1.1E-05					0.12
			Dermal	Benzo(a)anthracene	1.70E-01	mg/kg	2.40E-08	mg/kg-day	7.3E-01	(mg/kg-day)^-1	1.8E-08	4.80E-08	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	1.70E-01	mg/kg	2.40E-08	mg/kg-day	7.3E+00	(mg/kg-day)^-1	1.8E-07	4.80E-08	mg/kg-day	NA	---	NA
				Benzo(b)fluoranthene	2.10E-01	mg/kg	2.97E-08	mg/kg-day	7.3E-01	(mg/kg-day)^-1	2.2E-08	5.94E-08	mg/kg-day	NA	---	NA
				Dibenzo(a,h)anthracene	3.50E-02	mg/kg	4.95E-09	mg/kg-day	7.3E+00	(mg/kg-day)^-1	3.6E-08	9.89E-09	mg/kg-day	NA	---	NA
				Aluminum	2.56E+04	mg/kg	NA	---	NA	---	NA	NA	---	1E+00	(mg/kg-day)	NA
				Arsenic	8.50E+00	mg/kg	2.77E-07	mg/kg-day	1.5E+00	(mg/kg-day)^-1	4.2E-07	5.54E-07	mg/kg-day	3E-04	(mg/kg-day)	0.0018
				Chromium	5.63E+01	mg/kg	NA	---	2.0E+01	(mg/kg-day)^-1	NA	NA	---	8E-05	(mg/kg-day)	NA
				Cobalt	1.96E+01	mg/kg	NA	---	NA	---	NA	NA	---	3E-04	(mg/kg-day)	NA
				Iron	4.93E+04	mg/kg	NA	---	NA	---	NA	NA	---	7E-01	(mg/kg-day)	NA
				Manganese	6.54E+02	mg/kg	NA	---	NA	---	NA	NA	---	1E-03	(mg/kg-day)	NA
			Dermal Total								6.7E-07					0.0018
	Total AMAC Building Area Surface Soil										1.2E-05					0.12
	Air	AMAC Building Area	Inhalation	Benzo(a)anthracene	1.70E-01	mg/kg	1.08E-09	µg/m^3	1.1E-04	(µg/m3)^-1	1.2E-13	2.16E-09	µg/m^3	NA	---	NA
				Benzo(a)pyrene	1.70E-01	mg/kg	1.08E-09	µg/m^3	1.1E-03	(µg/m3)^-1	1.2E-12	2.16E-09	µg/m^3	NA	---	NA
				Benzo(b)fluoranthene	2.10E-01	mg/kg	1.33E-09	µg/m^3	1.1E-04	(µg/m3)^-1	1.5E-13	2.67E-09	µg/m^3	NA	---	NA
				Dibenzo(a,h)anthracene	3.50E-02	mg/kg	2.22E-10	µg/m^3	1.2E-03	(µg/m3)^-1	2.7E-13	4.44E-10	µg/m^3	NA	---	NA
				Aluminum	2.56E+04	mg/kg	1.62E-04	µg/m^3	NA	---	NA	3.25E-04	µg/m^3	5E-03	mg/m^3	0.000065
				Arsenic	8.50E+00	mg/kg	5.39E-08	µg/m^3	4.3E-03	(µg/m3)^-1	2.3E-10	1.08E-07	µg/m^3	2E-05	mg/m^3	0.0000072
				Chromium	5.63E+01	mg/kg	3.57E-07	µg/m^3	8.4E-02	(µg/m3)^-1	3.0E-08	7.15E-07	µg/m^3	1E-04	mg/m^3	0.0000071
				Cobalt	1.96E+01	mg/kg	1.24E-07	µg/m^3	9.0E-03	(µg/m3)^-1	1.1E-09	2.49E-07	µg/m^3	6E-06	mg/m^3	0.000041
				Iron	4.93E+04	mg/kg	3.13E-04	µg/m^3	NA	---	NA	6.26E-04	µg/m^3	NA	---	NA
				Manganese	6.54E+02	mg/kg	4.15E-06	µg/m^3	NA	---	NA	8.30E-06	µg/m^3	5E-05	mg/m^3	0.00017
			Inhalation Total								3.1E-08					0.00029
	Total AMAC Building Area Air										3.1E-08					0.00029
Total AMAC Building Area Surface Soil											1.2E-05					0.12

Table 5-45
Calculation of COPC Cancer Risks and Noncancer Hazards - AMAC Staff - Soil Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Staff
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	Launcher Area	Ingestion	Benzo(a)pyrene	1.04E-02	mg/kg	2.67E-09	mg/kg-day	7.3E+00	(mg/kg-day)^-1	2.0E-08	5.34E-09	mg/kg-day	NA	---	NA
				Aluminum	1.73E+04	mg/kg	4.44E-03	mg/kg-day	NA	---	NA	8.89E-03	mg/kg-day	1E+00	(mg/kg-day)	0.0089
				Arsenic	8.59E+00	mg/kg	2.21E-06	mg/kg-day	1.5E+00	(mg/kg-day)^-1	3.3E-06	4.41E-06	mg/kg-day	3E-04	(mg/kg-day)	0.015
				Chromium	3.15E+01	mg/kg	8.09E-06	mg/kg-day	5.0E-01	(mg/kg-day)^-1	4.0E-06	1.62E-05	mg/kg-day	3E-03	(mg/kg-day)	0.0054
				Cobalt	1.28E+01	mg/kg	3.29E-06	mg/kg-day	NA	---	NA	6.58E-06	mg/kg-day	3E-04	(mg/kg-day)	0.022
				Iron	3.25E+04	mg/kg	8.36E-03	mg/kg-day	NA	---	NA	1.67E-02	mg/kg-day	7E-01	(mg/kg-day)	0.024
				Manganese	6.49E+02	mg/kg	1.67E-04	mg/kg-day	NA	---	NA	3.34E-04	mg/kg-day	2E-02	(mg/kg-day)	0.014
				Thallium	4.90E-01	mg/kg	1.26E-07	mg/kg-day	NA	---	NA	2.52E-07	mg/kg-day	1E-05	(mg/kg-day)	0.025
			Ingestion Total								7.4E-06					0.11
			Dermal	Benzo(a)pyrene	1.04E-02	mg/kg	1.47E-09	mg/kg-day	7.3E+00	(mg/kg-day)^-1	1.1E-08	2.94E-09	mg/kg-day	NA	---	NA
				Aluminum	1.73E+04	mg/kg	NA	---	NA	---	NA	NA	---	1E+00	(mg/kg-day)	NA
				Arsenic	8.59E+00	mg/kg	2.80E-07	mg/kg-day	1.5E+00	(mg/kg-day)^-1	4.2E-07	5.60E-07	mg/kg-day	3E-04	(mg/kg-day)	0.0019
				Chromium	3.15E+01	mg/kg	NA	---	2.0E+01	(mg/kg-day)^-1	NA	NA	---	8E-05	(mg/kg-day)	NA
				Cobalt	1.28E+01	mg/kg	NA	---	NA	---	NA	NA	---	3E-04	(mg/kg-day)	NA
				Iron	3.25E+04	mg/kg	NA	---	NA	---	NA	NA	---	7E-01	(mg/kg-day)	NA
				Manganese	6.49E+02	mg/kg	NA	---	NA	---	NA	NA	---	1E-03	(mg/kg-day)	NA
				Thallium	4.90E-01	mg/kg	NA	---	NA	---	NA	NA	---	1E-05	(mg/kg-day)	NA
			Dermal Total								4.3E-07					0.0019
	Total Launcher Area Surface Soil										7.8E-06					0.12
	Air	Launcher Area	Inhalation	Benzo(a)pyrene	1.04E-02	mg/kg	6.60E-11	µg/m^3	1.1E-03	(µg/m3)^-1	7.3E-14	1.32E-10	µg/m^3	NA	---	NA
				Aluminum	1.73E+04	mg/kg	1.10E-04	µg/m^3	NA	---	NA	2.20E-04	µg/m^3	5E-03	mg/m^3	0.000044
				Arsenic	8.59E+00	mg/kg	5.45E-08	µg/m^3	4.3E-03	(µg/m3)^-1	2.3E-10	1.09E-07	µg/m^3	2E-05	mg/m^3	0.0000073
				Chromium	3.15E+01	mg/kg	2.00E-07	µg/m^3	8.4E-02	(µg/m3)^-1	1.7E-08	4.00E-07	µg/m^3	1E-04	mg/m^3	0.0000040
				Cobalt	1.28E+01	mg/kg	8.12E-08	µg/m^3	9.0E-03	(µg/m3)^-1	7.3E-10	1.62E-07	µg/m^3	6E-06	mg/m^3	0.000027
				Iron	3.25E+04	mg/kg	2.06E-04	µg/m^3	NA	---	NA	4.13E-04	µg/m^3	NA	---	NA
				Manganese	6.49E+02	mg/kg	4.12E-06	µg/m^3	NA	---	NA	8.24E-06	µg/m^3	5E-05	mg/m^3	0.00016
				Thallium	4.90E-01	mg/kg	3.11E-09	µg/m^3	NA	---	NA	6.22E-09	µg/m^3	NA	---	NA
			Inhalation Total								1.8E-08					0.00025
	Total Launcher Area Air										1.8E-08					0.00025
Total Launcher Area Surface Soil											7.8E-06					0.12

Table 5-46
Calculation of COPC Cancer Risks and Noncancer Hazards - AMAC Staff - Groundwater Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Staff
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	AMAC Building Area	Ingestion	1,1-Biphenyl	1.50E-01	µg/L	8.0E-07	mg/kg-day	8.0E-03	(mg/kg-day)^-1	6.4E-09	1.61E-06	mg/kg-day	5E-01	(mg/kg-day)	0.0000032
				cis-1,2-Dichloroethene	4.09E+00	µg/L	2.2E-05	mg/kg-day	NA	---	NA	4.38E-05	mg/kg-day	2E-03	(mg/kg-day)	0.022
				Trichloroethene	5.65E+00	µg/L	3.0E-05	mg/kg-day	4.6E-02	(mg/kg-day)^-1	1.4E-06	6.04E-05	mg/kg-day	5E-04	(mg/kg-day)	0.12
				Chromium	2.40E+00	µg/L	1.3E-05	mg/kg-day	5.0E-01	(mg/kg-day)^-1	6.4E-06	2.57E-05	mg/kg-day	3E-03	(mg/kg-day)	0.0086
				Manganese	6.70E+01	µg/L	3.6E-04	mg/kg-day	NA	---	NA	7.17E-04	mg/kg-day	2E-02	(mg/kg-day)	0.030
			Ingestion Total								7.8E-06					0.18
Total AMAC Building Area Groundwater											7.8E-06					0.18

Table 5-47

Calculation of COPC Cancer Risks and Noncancer Hazards - AMAC Staff - Indoor Air Exposure

LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Staff
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CA		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Air	Indoor Air	AMAC Building Area	Inhalation	Benzene	6.60E-01	µg/m^3	6.6E-02	µg/m^3	7.8E-06	(µg/m3)^-1	5.2E-07	1.3E-01	µg/m^3	3.0E-02	mg/m^3	0.0044
				Chloroform	1.32E+00	µg/m^3	1.3E-01	µg/m^3	2.3E-05	(µg/m3)^-1	3.1E-06	2.7E-01	µg/m^3	9.8E-02	mg/m^3	0.0027
				Ethyl benzene	3.40E+00	µg/m^3	3.4E-01	µg/m^3	2.5E-06	(µg/m3)^-1	8.6E-07	6.8E-01	µg/m^3	1.0E+00	mg/m^3	0.00068
				Naphthalene	1.50E+00	µg/m^3	1.5E-01	µg/m^3	3.4E-05	(µg/m3)^-1	5.1E-06	3.0E-01	µg/m^3	3.0E-03	mg/m^3	0.10
				Trichloroethene	3.98E+00	µg/m^3	4.0E-01	µg/m^3	4.1E-06	(µg/m3)^-1	1.6E-06	8.0E-01	µg/m^3	2.0E-03	mg/m^3	0.40
			Inhalation Total								1.1E-05					0.51
Total AMAC Building Area Indoor Air											1.1E-05					0.51

Table 5-48
Calculation of COPC Cancer Risks and Noncancer Hazards - AMAC Client - Soil Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Client
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	AMAC Building Area	Ingestion	Benzo(a)anthracene	1.70E-01	mg/kg	1.25E-08	mg/kg-day	7.3E-01	(mg/kg-day)^-1	9.1E-09	8.73E-08	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	1.70E-01	mg/kg	1.25E-08	mg/kg-day	7.3E+00	(mg/kg-day)^-1	9.1E-08	8.73E-08	mg/kg-day	NA	---	NA
				Benzo(b)fluoranthene	2.10E-01	mg/kg	1.54E-08	mg/kg-day	7.3E-01	(mg/kg-day)^-1	1.1E-08	1.08E-07	mg/kg-day	NA	---	NA
				Dibenzo(a,h)anthracene	3.50E-02	mg/kg	2.57E-09	mg/kg-day	7.3E+00	(mg/kg-day)^-1	1.9E-08	1.80E-08	mg/kg-day	NA	---	NA
				Aluminum	2.56E+04	mg/kg	1.88E-03	mg/kg-day	NA	---	NA	1.32E-02	mg/kg-day	1E+00	(mg/kg-day)	0.013
				Arsenic	8.50E+00	mg/kg	6.24E-07	mg/kg-day	1.5E+00	(mg/kg-day)^-1	9.4E-07	4.37E-06	mg/kg-day	3E-04	(mg/kg-day)	0.015
				Chromium	5.63E+01	mg/kg	4.13E-06	mg/kg-day	5.0E-01	(mg/kg-day)^-1	2.1E-06	2.89E-05	mg/kg-day	3E-03	(mg/kg-day)	0.0096
				Cobalt	1.96E+01	mg/kg	1.44E-06	mg/kg-day	NA	---	NA	1.01E-05	mg/kg-day	3E-04	(mg/kg-day)	0.034
				Iron	4.93E+04	mg/kg	3.62E-03	mg/kg-day	NA	---	NA	2.53E-02	mg/kg-day	7E-01	(mg/kg-day)	0.036
				Manganese	6.54E+02	mg/kg	4.80E-05	mg/kg-day	NA	---	NA	3.36E-04	mg/kg-day	2E-02	(mg/kg-day)	0.014
			Ingestion Total								3.1E-06					0.12
			Dermal	Benzo(a)anthracene	1.70E-01	mg/kg	6.86E-09	mg/kg-day	7.3E-01	(mg/kg-day)^-1	5.0E-09	4.80E-08	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	1.70E-01	mg/kg	6.86E-09	mg/kg-day	7.3E+00	(mg/kg-day)^-1	5.0E-08	4.80E-08	mg/kg-day	NA	---	NA
				Benzo(b)fluoranthene	2.10E-01	mg/kg	8.48E-09	mg/kg-day	7.3E-01	(mg/kg-day)^-1	6.2E-09	5.94E-08	mg/kg-day	NA	---	NA
				Dibenzo(a,h)anthracene	3.50E-02	mg/kg	1.41E-09	mg/kg-day	7.3E+00	(mg/kg-day)^-1	1.0E-08	9.89E-09	mg/kg-day	NA	---	NA
				Aluminum	2.56E+04	mg/kg	NA	---	NA	---	NA	NA	---	1E+00	(mg/kg-day)	NA
				Arsenic	8.50E+00	mg/kg	7.92E-08	mg/kg-day	1.5E+00	(mg/kg-day)^-1	1.2E-07	5.54E-07	mg/kg-day	3E-04	(mg/kg-day)	0.0018
				Chromium	5.63E+01	mg/kg	NA	---	2.0E+01	(mg/kg-day)^-1	NA	NA	---	8E-05	(mg/kg-day)	NA
				Cobalt	1.96E+01	mg/kg	NA	---	NA	---	NA	NA	---	3E-04	(mg/kg-day)	NA
				Iron	4.93E+04	mg/kg	NA	---	NA	---	NA	NA	---	7E-01	(mg/kg-day)	NA
				Manganese	6.54E+02	mg/kg	NA	---	NA	---	NA	NA	---	1E-03	(mg/kg-day)	NA
			Dermal Total								1.9E-07					0.0018
	Total AMAC Building Area Surface Soil										3.3E-06					0.12
	Air	AMAC Building Area	Inhalation	Benzo(a)anthracene	1.70E-01	mg/kg	7.71E-11	µg/m^3	1.1E-04	(µg/m3)^-1	8.5E-15	5.39E-10	µg/m^3	NA	---	NA
				Benzo(a)pyrene	1.70E-01	mg/kg	7.71E-11	µg/m^3	1.1E-03	(µg/m3)^-1	8.5E-14	5.39E-10	µg/m^3	NA	---	NA
				Benzo(b)fluoranthene	2.10E-01	mg/kg	9.52E-11	µg/m^3	1.1E-04	(µg/m3)^-1	1.0E-14	6.66E-10	µg/m^3	NA	---	NA
				Dibenzo(a,h)anthracene	3.50E-02	mg/kg	1.59E-11	µg/m^3	1.2E-03	(µg/m3)^-1	1.9E-14	1.11E-10	µg/m^3	NA	---	NA
				Aluminum	2.56E+04	mg/kg	1.16E-05	µg/m^3	NA	---	NA	8.12E-05	µg/m^3	5E-03	mg/m^3	0.000016
				Arsenic	8.50E+00	mg/kg	3.85E-09	µg/m^3	4.3E-03	(µg/m3)^-1	1.7E-11	2.70E-08	µg/m^3	2E-05	mg/m^3	0.0000018
				Chromium	5.63E+01	mg/kg	2.55E-08	µg/m^3	8.4E-02	(µg/m3)^-1	2.1E-09	1.79E-07	µg/m^3	1E-04	mg/m^3	0.0000018
				Cobalt	1.96E+01	mg/kg	8.88E-09	µg/m^3	9.0E-03	(µg/m3)^-1	8.0E-11	6.22E-08	µg/m^3	6E-06	mg/m^3	0.000010
				Iron	4.93E+04	mg/kg	2.23E-05	µg/m^3	NA	---	NA	1.56E-04	µg/m^3	NA	---	NA
				Manganese	6.54E+02	mg/kg	2.96E-07	µg/m^3	NA	---	NA	2.08E-06	µg/m^3	5E-05	mg/m^3	0.000042
			Inhalation Total								2.2E-09					0.000072
	Total AMAC Building Area Air										2.2E-09					0.000072
Total AMAC Building Area Surface Soil											3.3E-06					0.12

Table 5-48
Calculation of COPC Cancer Risks and Noncancer Hazards - AMAC Client - Soil Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Client
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	Launcher Area	Ingestion	Benzo(a)pyrene	1.04E-02	mg/kg	7.63E-10	mg/kg-day	7.3E+00	(mg/kg-day)^-1	5.6E-09	5.34E-09	mg/kg-day	NA	---	NA
				Aluminum	1.73E+04	mg/kg	1.27E-03	mg/kg-day	NA	---	NA	8.89E-03	mg/kg-day	1E+00	(mg/kg-day)	0.0089
				Arsenic	8.59E+00	mg/kg	6.30E-07	mg/kg-day	1.5E+00	(mg/kg-day)^-1	9.5E-07	4.41E-06	mg/kg-day	3E-04	(mg/kg-day)	0.015
				Chromium	3.15E+01	mg/kg	2.31E-06	mg/kg-day	5.0E-01	(mg/kg-day)^-1	1.2E-06	1.62E-05	mg/kg-day	3E-03	(mg/kg-day)	0.0054
				Cobalt	1.28E+01	mg/kg	9.39E-07	mg/kg-day	NA	---	NA	6.58E-06	mg/kg-day	3E-04	(mg/kg-day)	0.022
				Iron	3.25E+04	mg/kg	2.39E-03	mg/kg-day	NA	---	NA	1.67E-02	mg/kg-day	7E-01	(mg/kg-day)	0.024
				Manganese	6.49E+02	mg/kg	4.76E-05	mg/kg-day	NA	---	NA	3.34E-04	mg/kg-day	2E-02	(mg/kg-day)	0.014
				Thallium	4.90E-01	mg/kg	3.60E-08	mg/kg-day	NA	---	NA	2.52E-07	mg/kg-day	1E-05	(mg/kg-day)	0.025
			Ingestion Total								2.1E-06					0.11
			Dermal	Benzo(a)pyrene	1.04E-02	mg/kg	4.20E-10	mg/kg-day	7.3E+00	(mg/kg-day)^-1	3.1E-09	2.94E-09	mg/kg-day	NA	---	NA
				Aluminum	1.73E+04	mg/kg	NA	---	NA	---	NA	NA	---	1E+00	(mg/kg-day)	NA
				Arsenic	8.59E+00	mg/kg	8.00E-08	mg/kg-day	1.5E+00	(mg/kg-day)^-1	1.2E-07	5.60E-07	mg/kg-day	3E-04	(mg/kg-day)	0.0019
				Chromium	3.15E+01	mg/kg	NA	---	2.0E+01	(mg/kg-day)^-1	NA	NA	---	8E-05	(mg/kg-day)	NA
				Cobalt	1.28E+01	mg/kg	NA	---	NA	---	NA	NA	---	3E-04	(mg/kg-day)	NA
				Iron	3.25E+04	mg/kg	NA	---	NA	---	NA	NA	---	7E-01	(mg/kg-day)	NA
				Manganese	6.49E+02	mg/kg	NA	---	NA	---	NA	NA	---	1E-03	(mg/kg-day)	NA
				Thallium	4.90E-01	mg/kg	NA	---	NA	---	NA	NA	---	1E-05	(mg/kg-day)	NA
			Dermal Total								1.2E-07					0.0019
	Total Launcher Area Surface Soil										2.2E-06					0.12
	Air	Launcher Area	Inhalation	Benzo(a)pyrene	1.04E-02	mg/kg	4.71E-12	µg/m^3	1.1E-03	(µg/m3)^-1	5.2E-15	3.30E-11	µg/m^3	NA	---	NA
				Aluminum	1.73E+04	mg/kg	7.84E-06	µg/m^3	NA	---	NA	5.49E-05	µg/m^3	5E-03	mg/m^3	0.000011
				Arsenic	8.59E+00	mg/kg	3.89E-09	µg/m^3	4.3E-03	(µg/m3)^-1	1.7E-11	2.73E-08	µg/m^3	2E-05	mg/m^3	0.0000018
				Chromium	3.15E+01	mg/kg	1.43E-08	µg/m^3	8.4E-02	(µg/m3)^-1	1.2E-09	1.00E-07	µg/m^3	1E-04	mg/m^3	0.0000010
				Cobalt	1.28E+01	mg/kg	5.80E-09	µg/m^3	9.0E-03	(µg/m3)^-1	5.2E-11	4.06E-08	µg/m^3	6E-06	mg/m^3	0.0000068
				Iron	3.25E+04	mg/kg	1.47E-05	µg/m^3	NA	---	NA	1.03E-04	µg/m^3	NA	---	NA
				Manganese	6.49E+02	mg/kg	2.94E-07	µg/m^3	NA	---	NA	2.06E-06	µg/m^3	5E-05	mg/m^3	0.000041
				Thallium	4.90E-01	mg/kg	2.22E-10	µg/m^3	NA	---	NA	1.55E-09	µg/m^3	NA	---	NA
			Inhalation Total								1.3E-09					0.000062
	Total Launcher Area Air										1.3E-09					0.000062
Total Launcher Area Surface Soil											2.2E-06					0.12

Table 5-49
Calculation of COPC Cancer Risks and Noncancer Hazards - AMAC Client - Groundwater Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Client
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	AMAC Building Area	Ingestion	1,1-Biphenyl	1.50E-01	µg/L	2.3E-07	mg/kg-day	8.0E-03	(mg/kg-day)^-1	1.8E-09	1.61E-06	mg/kg-day	5E-01	(mg/kg-day)	0.0000032
				cis-1,2-Dichloroethene	4.09E+00	µg/L	6.3E-06	mg/kg-day	NA	---	NA	4.38E-05	mg/kg-day	2E-03	(mg/kg-day)	0.022
				Trichloroethene	5.65E+00	µg/L	8.6E-06	mg/kg-day	4.6E-02	(mg/kg-day)^-1	4.0E-07	6.04E-05	mg/kg-day	5E-04	(mg/kg-day)	0.12
				Chromium	2.40E+00	µg/L	3.7E-06	mg/kg-day	5.0E-01	(mg/kg-day)^-1	1.8E-06	2.57E-05	mg/kg-day	3E-03	(mg/kg-day)	0.0086
				Manganese	6.70E+01	µg/L	1.0E-04	mg/kg-day	NA	---	NA	7.17E-04	mg/kg-day	2E-02	(mg/kg-day)	0.030
			Ingestion Total								2.2E-06					0.18
Total AMAC Building Area Groundwater											2.2E-06					0.18

Table 5-50
Calculation of COPC Cancer Risks and Noncancer Hazards - AMAC Client - Indoor Air Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Client
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CA		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Air	Indoor Air	AMAC Building Area	Inhalation	Benzene	6.60E-01	μg/m^3	1.3E-02	μg/m^3	7.8E-06	(μg/m3)^-1	1.0E-07	9.0E-02	μg/m^3	3.0E-02	mg/m^3	0.0030
				Chloroform	1.32E+00	μg/m^3	2.6E-02	μg/m^3	2.3E-05	(μg/m3)^-1	5.9E-07	1.8E-01	μg/m^3	9.8E-02	mg/m^3	0.0018
				Ethyl benzene	3.40E+00	μg/m^3	6.6E-02	μg/m^3	2.5E-06	(μg/m3)^-1	1.7E-07	4.6E-01	μg/m^3	1.0E+00	mg/m^3	0.00046
				Naphthalene	1.50E+00	μg/m^3	2.9E-02	μg/m^3	3.4E-05	(μg/m3)^-1	1.0E-06	2.0E-01	μg/m^3	3.0E-03	mg/m^3	0.068
				Trichloroethene	3.98E+00	μg/m^3	7.8E-02	μg/m^3	4.1E-06	(μg/m3)^-1	3.2E-07	5.4E-01	μg/m^3	2.0E-03	mg/m^3	0.27
			Inhalation Total								2.2E-06					0.35
Total AMAC Building Area Indoor Air											2.2E-06					0.35

Table 5-51
Calculation of COPC Cancer Risks and Noncancer Hazards - Trespasser - Soil Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Older Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	Launcher Area	Ingestion	Benzo(a)pyrene	1.04E-02	mg/kg	Mutagenic Mode of Action; See Table 5-41				1.5E-09	9.86E-10	mg/kg-day	NA	---	NA
				Aluminum	1.73E+04	mg/kg	1.64E-04	mg/kg-day	NA	---	NA	1.64E-03	mg/kg-day	1E+00	(mg/kg-day)	0.0016
				Arsenic	8.59E+00	mg/kg	8.15E-08	mg/kg-day	1.5E+00	(mg/kg-day)^-1	1.2E-07	8.15E-07	mg/kg-day	3E-04	(mg/kg-day)	0.0027
				Chromium	3.15E+01	mg/kg	Mutagenic Mode of Action; See Table 5-41				3.2E-07	2.99E-06	mg/kg-day	3E-03	(mg/kg-day)	0.0010
				Cobalt	1.28E+01	mg/kg	1.21E-07	mg/kg-day	NA	---	NA	1.21E-06	mg/kg-day	3E-04	(mg/kg-day)	0.0040
				Iron	3.25E+04	mg/kg	3.09E-04	mg/kg-day	NA	---	NA	3.09E-03	mg/kg-day	7E-01	(mg/kg-day)	0.0044
				Manganese	6.49E+02	mg/kg	6.16E-06	mg/kg-day	NA	---	NA	6.16E-05	mg/kg-day	2E-02	(mg/kg-day)	0.0026
				Thallium	4.90E-01	mg/kg	4.65E-09	mg/kg-day	NA	---	NA	4.65E-08	mg/kg-day	1E-05	(mg/kg-day)	0.0046
			Ingestion Total								4.4E-07					0.021
			Dermal	Benzo(a)pyrene	1.04E-02	mg/kg	Mutagenic Mode of Action; See Table 5-41				9.1E-10	5.13E-10	mg/kg-day	NA	---	NA
				Aluminum	1.73E+04	mg/kg	NA	---	NA	---	NA	NA	---	1E+00	(mg/kg-day)	NA
				Arsenic	8.59E+00	mg/kg	9.77E-09	mg/kg-day	1.5E+00	(mg/kg-day)^-1	1.5E-08	9.77E-08	mg/kg-day	3E-04	(mg/kg-day)	0.00033
				Chromium	3.15E+01	mg/kg	Mutagenic Mode of Action; See Table 5-41				NA	NA	---	8E-05	(mg/kg-day)	NA
				Cobalt	1.28E+01	mg/kg	NA	---	NA	---	NA	NA	---	3E-04	(mg/kg-day)	NA
				Iron	3.25E+04	mg/kg	NA	---	NA	---	NA	NA	---	7E-01	(mg/kg-day)	NA
				Manganese	6.49E+02	mg/kg	NA	---	NA	---	NA	NA	---	1E-03	(mg/kg-day)	NA
				Thallium	4.90E-01	mg/kg	NA	---	NA	---	NA	NA	---	1E-05	(mg/kg-day)	NA
			Dermal Total								1.6E-08					0.00033
	Total Launcher Area Surface Soil										4.6E-07					0.021
	Air	Launcher Area	Inhalation	Benzo(a)pyrene	1.04E-02	mg/kg	Mutagenic Mode of Action; See Table 5-41				1.7E-14	6.34E-11	µg/m^3	NA	---	NA
				Aluminum	1.73E+04	mg/kg	1.05E-05	µg/m^3	NA	---	NA	1.05E-04	µg/m^3	5E-03	mg/m^3	0.000021
				Arsenic	8.59E+00	mg/kg	5.23E-09	µg/m^3	4.3E-03	(µg/m3)^-1	2.2E-11	5.23E-08	µg/m^3	2E-05	mg/m^3	0.0000035
				Chromium	3.15E+01	mg/kg	Mutagenic Mode of Action; See Table 5-41				3.9E-09	1.92E-07	µg/m^3	1E-04	mg/m^3	0.0000019
				Cobalt	1.28E+01	mg/kg	7.80E-09	µg/m^3	9.0E-03	(µg/m3)^-1	7.0E-11	7.80E-08	µg/m^3	6E-06	mg/m^3	0.000013
				Iron	3.25E+04	mg/kg	1.98E-05	µg/m^3	NA	---	NA	1.98E-04	µg/m^3	NA	---	NA
				Manganese	6.49E+02	mg/kg	3.96E-07	µg/m^3	NA	---	NA	3.96E-06	µg/m^3	5E-05	mg/m^3	0.000079
				Thallium	4.90E-01	mg/kg	2.99E-10	µg/m^3	NA	---	NA	2.99E-09	µg/m^3	NA	---	NA
			Inhalation Total								4.0E-09					0.00012
	Total Launcher Area Air										4.0E-09					0.00012
Total Launcher Area Surface Soil											4.6E-07					0.021

Table 5-52
Calculation of COPC Cancer Risks and Noncancer Hazards - Site Worker - Soil Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: Site Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	AMAC Building Area	Ingestion	Benzo(a)anthracene	1.70E-01	mg/kg	3.12E-08	mg/kg-day	7.3E-01	(mg/kg-day)^-1	2.3E-08	8.73E-08	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	1.70E-01	mg/kg	3.12E-08	mg/kg-day	7.3E+00	(mg/kg-day)^-1	2.3E-07	8.73E-08	mg/kg-day	NA	---	NA
				Benzo(b)fluoranthene	2.10E-01	mg/kg	3.85E-08	mg/kg-day	7.3E-01	(mg/kg-day)^-1	2.8E-08	1.08E-07	mg/kg-day	NA	---	NA
				Dibenzo(a,h)anthracene	3.50E-02	mg/kg	6.42E-09	mg/kg-day	7.3E+00	(mg/kg-day)^-1	4.7E-08	1.80E-08	mg/kg-day	NA	---	NA
				Aluminum	2.56E+04	mg/kg	4.70E-03	mg/kg-day	NA	---	NA	1.32E-02	mg/kg-day	1E+00	(mg/kg-day)	0.013
				Arsenic	8.50E+00	mg/kg	1.56E-06	mg/kg-day	1.5E+00	(mg/kg-day)^-1	2.3E-06	4.37E-06	mg/kg-day	3E-04	(mg/kg-day)	0.015
				Chromium	5.63E+01	mg/kg	1.03E-05	mg/kg-day	5.0E-01	(mg/kg-day)^-1	5.2E-06	2.89E-05	mg/kg-day	3E-03	(mg/kg-day)	0.0096
				Cobalt	1.96E+01	mg/kg	3.60E-06	mg/kg-day	NA	---	NA	1.01E-05	mg/kg-day	3E-04	(mg/kg-day)	0.034
				Iron	4.93E+04	mg/kg	9.04E-03	mg/kg-day	NA	---	NA	2.53E-02	mg/kg-day	7E-01	(mg/kg-day)	0.036
				Manganese	6.54E+02	mg/kg	1.20E-04	mg/kg-day	NA	---	NA	3.36E-04	mg/kg-day	2E-02	(mg/kg-day)	0.014
			Ingestion Total								7.8E-06					0.12
			Dermal	Benzo(a)anthracene	1.70E-01	mg/kg	1.72E-08	mg/kg-day	7.3E-01	(mg/kg-day)^-1	1.3E-08	4.80E-08	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	1.70E-01	mg/kg	1.72E-08	mg/kg-day	7.3E+00	(mg/kg-day)^-1	1.3E-07	4.80E-08	mg/kg-day	NA	---	NA
				Benzo(b)fluoranthene	2.10E-01	mg/kg	2.12E-08	mg/kg-day	7.3E-01	(mg/kg-day)^-1	1.5E-08	5.94E-08	mg/kg-day	NA	---	NA
				Dibenzo(a,h)anthracene	3.50E-02	mg/kg	3.53E-09	mg/kg-day	7.3E+00	(mg/kg-day)^-1	2.6E-08	9.89E-09	mg/kg-day	NA	---	NA
				Aluminum	2.56E+04	mg/kg	NA	---	NA	---	NA	NA	---	1E+00	(mg/kg-day)	NA
				Arsenic	8.50E+00	mg/kg	1.98E-07	mg/kg-day	1.5E+00	(mg/kg-day)^-1	3.0E-07	5.54E-07	mg/kg-day	3E-04	(mg/kg-day)	0.0018
				Chromium	5.63E+01	mg/kg	NA	---	2.0E+01	(mg/kg-day)^-1	NA	NA	---	8E-05	(mg/kg-day)	NA
				Cobalt	1.96E+01	mg/kg	NA	---	NA	---	NA	NA	---	3E-04	(mg/kg-day)	NA
				Iron	4.93E+04	mg/kg	NA	---	NA	---	NA	NA	---	7E-01	(mg/kg-day)	NA
				Manganese	6.54E+02	mg/kg	NA	---	NA	---	NA	NA	---	1E-03	(mg/kg-day)	NA
			Dermal Total								4.8E-07					0.0018
	Total AMAC Building Area Surface Soil										8.3E-06					0.12
	Air	AMAC Building Area	Inhalation	Benzo(a)anthracene	1.70E-01	mg/kg	6.16E-09	µg/m^3	1.1E-04	(µg/m3)^-1	6.8E-13	1.73E-08	µg/m^3	NA	---	NA
				Benzo(a)pyrene	1.70E-01	mg/kg	6.16E-09	µg/m^3	1.1E-03	(µg/m3)^-1	6.8E-12	1.73E-08	µg/m^3	NA	---	NA
				Benzo(b)fluoranthene	2.10E-01	mg/kg	7.61E-09	µg/m^3	1.1E-04	(µg/m3)^-1	8.4E-13	2.13E-08	µg/m^3	NA	---	NA
				Dibenzo(a,h)anthracene	3.50E-02	mg/kg	1.27E-09	µg/m^3	1.2E-03	(µg/m3)^-1	1.5E-12	3.55E-09	µg/m^3	NA	---	NA
				Aluminum	2.56E+04	mg/kg	9.28E-04	µg/m^3	NA	---	NA	2.60E-03	µg/m^3	5E-03	mg/m^3	0.00052
				Arsenic	8.50E+00	mg/kg	3.08E-07	µg/m^3	4.3E-03	(µg/m3)^-1	1.3E-09	8.63E-07	µg/m^3	2E-05	mg/m^3	0.000058
				Chromium	5.63E+01	mg/kg	2.04E-06	µg/m^3	8.4E-02	(µg/m3)^-1	1.7E-07	5.72E-06	µg/m^3	1E-04	mg/m^3	0.000057
				Cobalt	1.96E+01	mg/kg	7.11E-07	µg/m^3	9.0E-03	(µg/m3)^-1	6.4E-09	1.99E-06	µg/m^3	6E-06	mg/m^3	0.00033
				Iron	4.93E+04	mg/kg	1.79E-03	µg/m^3	NA	---	NA	5.01E-03	µg/m^3	NA	---	NA
				Manganese	6.54E+02	mg/kg	2.37E-05	µg/m^3	NA	---	NA	6.64E-05	µg/m^3	5E-05	mg/m^3	0.0013
			Inhalation Total								1.8E-07					0.0023
	Total AMAC Building Area Air										1.8E-07					0.0023
Total AMAC Building Area Surface Soil											8.5E-06					0.13

Table 5-52
Calculation of COPC Cancer Risks and Noncancer Hazards - Site Worker - Soil Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: Site Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil	Launcher Area	Ingestion	Benzo(a)pyrene	1.04E-02	mg/kg	1.91E-09	mg/kg-day	7.3E+00	(mg/kg-day)^-1	1.4E-08	5.34E-09	mg/kg-day	NA	---	NA
				Aluminum	1.73E+04	mg/kg	3.17E-03	mg/kg-day	NA	---	NA	8.89E-03	mg/kg-day	1E+00	(mg/kg-day)	0.0089
				Arsenic	8.59E+00	mg/kg	1.58E-06	mg/kg-day	1.5E+00	(mg/kg-day)^-1	2.4E-06	4.41E-06	mg/kg-day	3E-04	(mg/kg-day)	0.015
				Chromium	3.15E+01	mg/kg	5.78E-06	mg/kg-day	5.0E-01	(mg/kg-day)^-1	2.9E-06	1.62E-05	mg/kg-day	3E-03	(mg/kg-day)	0.0054
				Cobalt	1.28E+01	mg/kg	2.35E-06	mg/kg-day	NA	---	NA	6.58E-06	mg/kg-day	3E-04	(mg/kg-day)	0.022
				Iron	3.25E+04	mg/kg	5.97E-03	mg/kg-day	NA	---	NA	1.67E-02	mg/kg-day	7E-01	(mg/kg-day)	0.024
				Manganese	6.49E+02	mg/kg	1.19E-04	mg/kg-day	NA	---	NA	3.34E-04	mg/kg-day	2E-02	(mg/kg-day)	0.014
				Thallium	4.90E-01	mg/kg	8.99E-08	mg/kg-day	NA	---	NA	2.52E-07	mg/kg-day	1E-05	(mg/kg-day)	0.025
			Ingestion Total								5.3E-06					0.11
			Dermal	Benzo(a)pyrene	1.04E-02	mg/kg	1.05E-09	mg/kg-day	7.3E+00	(mg/kg-day)^-1	7.7E-09	2.94E-09	mg/kg-day	NA	---	NA
				Aluminum	1.73E+04	mg/kg	NA	---	NA	---	NA	NA	---	1E+00	(mg/kg-day)	NA
				Arsenic	8.59E+00	mg/kg	2.00E-07	mg/kg-day	1.5E+00	(mg/kg-day)^-1	3.0E-07	5.60E-07	mg/kg-day	3E-04	(mg/kg-day)	0.0019
				Chromium	3.15E+01	mg/kg	NA	---	2.0E+01	(mg/kg-day)^-1	NA	NA	---	8E-05	(mg/kg-day)	NA
				Cobalt	1.28E+01	mg/kg	NA	---	NA	---	NA	NA	---	3E-04	(mg/kg-day)	NA
				Iron	3.25E+04	mg/kg	NA	---	NA	---	NA	NA	---	7E-01	(mg/kg-day)	NA
				Manganese	6.49E+02	mg/kg	NA	---	NA	---	NA	NA	---	1E-03	(mg/kg-day)	NA
				Thallium	4.90E-01	mg/kg	NA	---	NA	---	NA	NA	---	1E-05	(mg/kg-day)	NA
			Dermal Total								3.1E-07					0.0019
	Total Launcher Area Surface Soil										5.6E-06					0.12
	Air	Launcher Area	Inhalation	Benzo(a)pyrene	1.04E-02	mg/kg	3.77E-10	µg/m^3	1.1E-03	(µg/m3)^-1	4.1E-13	1.06E-09	µg/m^3	NA	---	NA
				Aluminum	1.73E+04	mg/kg	6.27E-04	µg/m^3	NA	---	NA	1.76E-03	µg/m^3	5E-03	mg/m^3	0.00035
				Arsenic	8.59E+00	mg/kg	3.11E-07	µg/m^3	4.3E-03	(µg/m3)^-1	1.3E-09	8.72E-07	µg/m^3	2E-05	mg/m^3	0.000058
				Chromium	3.15E+01	mg/kg	1.14E-06	µg/m^3	8.4E-02	(µg/m3)^-1	9.6E-08	3.20E-06	µg/m^3	1E-04	mg/m^3	0.000032
				Cobalt	1.28E+01	mg/kg	4.64E-07	µg/m^3	9.0E-03	(µg/m3)^-1	4.2E-09	1.30E-06	µg/m^3	6E-06	mg/m^3	0.00022
				Iron	3.25E+04	mg/kg	1.18E-03	µg/m^3	NA	---	NA	3.30E-03	µg/m^3	NA	---	NA
				Manganese	6.49E+02	mg/kg	2.35E-05	µg/m^3	NA	---	NA	6.59E-05	µg/m^3	5E-05	mg/m^3	0.0013
				Thallium	4.90E-01	mg/kg	1.78E-08	µg/m^3	NA	---	NA	4.98E-08	µg/m^3	NA	---	NA
			Inhalation Total								1.0E-07					0.0020
	Total Launcher Area Air										1.0E-07					0.0020
Total Launcher Area Surface Soil											5.7E-06					0.12

Table 5-53
Calculation of COPC Cancer Risks and Noncancer Hazards - Construction Worker - Soil Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Total Soil	Entire Site	Ingestion	Benzo(a)anthracene	6.14E-02	mg/kg	6.44E-10	mg/kg-day	7.3E-01	(mg/kg-day)^-1	4.7E-10	9.00E-08	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	6.16E-02	mg/kg	6.46E-10	mg/kg-day	7.3E+00	(mg/kg-day)^-1	4.7E-09	9.03E-08	mg/kg-day	NA	---	NA
				Benzo(b)fluoranthene	3.94E-02	mg/kg	4.13E-10	mg/kg-day	7.3E-01	(mg/kg-day)^-1	3.0E-10	5.77E-08	mg/kg-day	NA	---	NA
				Dibenzo(a,h)anthracene	4.18E-03	mg/kg	4.39E-11	mg/kg-day	7.3E+00	(mg/kg-day)^-1	3.2E-10	6.12E-09	mg/kg-day	NA	---	NA
				Aluminum	1.76E+04	mg/kg	1.85E-04	mg/kg-day	NA	---	NA	2.59E-02	mg/kg-day	1E+00	(mg/kg-day)	0.026
				Arsenic	7.08E+00	mg/kg	7.43E-08	mg/kg-day	1.5E+00	(mg/kg-day)^-1	1.1E-07	1.04E-05	mg/kg-day	3E-04	(mg/kg-day)	0.035
				Chromium	3.63E+01	mg/kg	3.81E-07	mg/kg-day	5.0E-01	(mg/kg-day)^-1	1.9E-07	5.32E-05	mg/kg-day	3E-03	(mg/kg-day)	0.018
				Cobalt	1.39E+01	mg/kg	1.45E-07	mg/kg-day	NA	---	NA	2.03E-05	mg/kg-day	3E-04	(mg/kg-day)	0.068
				Iron	3.28E+04	mg/kg	3.44E-04	mg/kg-day	NA	---	NA	4.80E-02	mg/kg-day	7E-01	(mg/kg-day)	0.069
				Manganese	5.88E+02	mg/kg	6.17E-06	mg/kg-day	NA	---	NA	8.62E-04	mg/kg-day	2E-02	(mg/kg-day)	0.036
				Thallium	5.45E-01	mg/kg	5.72E-09	mg/kg-day	NA	---	NA	7.99E-07	mg/kg-day	1E-05	(mg/kg-day)	0.080
			Ingestion Total								3.1E-07					0.33
			Dermal	Benzo(a)anthracene	6.14E-02	mg/kg	2.69E-10	mg/kg-day	7.3E-01	(mg/kg-day)^-1	2.0E-10	3.75E-08	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	6.16E-02	mg/kg	2.69E-10	mg/kg-day	7.3E+00	(mg/kg-day)^-1	2.0E-09	3.76E-08	mg/kg-day	NA	---	NA
				Benzo(b)fluoranthene	3.94E-02	mg/kg	1.72E-10	mg/kg-day	7.3E-01	(mg/kg-day)^-1	1.3E-10	2.41E-08	mg/kg-day	NA	---	NA
				Dibenzo(a,h)anthracene	4.18E-03	mg/kg	1.83E-11	mg/kg-day	7.3E+00	(mg/kg-day)^-1	1.3E-10	2.55E-09	mg/kg-day	NA	---	NA
				Aluminum	1.76E+04	mg/kg	NA	---	NA	---	NA	NA	---	1E+00	(mg/kg-day)	NA
				Arsenic	7.08E+00	mg/kg	7.15E-09	mg/kg-day	1.5E+00	(mg/kg-day)^-1	1.1E-08	9.98E-07	mg/kg-day	3E-04	(mg/kg-day)	0.0033
				Chromium	3.63E+01	mg/kg	NA	---	2.0E+01	(mg/kg-day)^-1	NA	NA	---	8E-05	(mg/kg-day)	NA
				Cobalt	1.39E+01	mg/kg	NA	---	NA	---	NA	NA	---	3E-04	(mg/kg-day)	NA
				Iron	3.28E+04	mg/kg	NA	---	NA	---	NA	NA	---	7E-01	(mg/kg-day)	NA
				Manganese	5.88E+02	mg/kg	NA	---	NA	---	NA	NA	---	1E-03	(mg/kg-day)	NA
				Thallium	5.45E-01	mg/kg	NA	---	NA	---	NA	NA	---	1E-05	(mg/kg-day)	NA
			Dermal Total								1.3E-08					0.0033
	Total Entire Site Total Soil										3.2E-07					0.33
	Air	Entire Site	Inhalation	Benzo(a)anthracene	6.14E-02	mg/kg	3.86E-11	µg/m^3	1.1E-04	(µg/m3)^-1	4.2E-15	5.39E-09	µg/m^3	NA	---	NA
				Benzo(a)pyrene	6.16E-02	mg/kg	3.87E-11	µg/m^3	1.1E-03	(µg/m3)^-1	4.3E-14	5.41E-09	µg/m^3	NA	---	NA
				Benzo(b)fluoranthene	3.94E-02	mg/kg	2.48E-11	µg/m^3	1.1E-04	(µg/m3)^-1	2.7E-15	3.46E-09	µg/m^3	NA	---	NA
				Dibenzo(a,h)anthracene	4.18E-03	mg/kg	2.63E-12	µg/m^3	1.2E-03	(µg/m3)^-1	3.2E-15	3.67E-10	µg/m^3	NA	---	NA
				Aluminum	1.76E+04	mg/kg	1.11E-05	µg/m^3	NA	---	NA	1.55E-03	µg/m^3	5E-03	mg/m^3	0.00031
				Arsenic	7.08E+00	mg/kg	4.45E-09	µg/m^3	4.3E-03	(µg/m3)^-1	1.9E-11	6.22E-07	µg/m^3	2E-05	mg/m^3	0.000041
				Chromium	3.63E+01	mg/kg	2.28E-08	µg/m^3	8.4E-02	(µg/m3)^-1	1.9E-09	3.19E-06	µg/m^3	1E-04	mg/m^3	0.000032
				Cobalt	1.39E+01	mg/kg	8.71E-09	µg/m^3	9.0E-03	(µg/m3)^-1	7.8E-11	1.22E-06	µg/m^3	6E-06	mg/m^3	0.00020
				Iron	3.28E+04	mg/kg	2.06E-05	µg/m^3	NA	---	NA	2.88E-03	µg/m^3	NA	---	NA
				Manganese	5.88E+02	mg/kg	3.70E-07	µg/m^3	NA	---	NA	5.16E-05	µg/m^3	5E-05	mg/m^3	0.0010
				Thallium	5.45E-01	mg/kg	3.43E-10	µg/m^3	NA	---	NA	4.78E-08	µg/m^3	NA	---	NA
			Inhalation Total								2.0E-09					0.0016
	Total Entire Site Air										2.0E-09					0.0016
Total Entire Site Total Soil											3.2E-07					0.34

Table 5-54
Calculation of COPC Cancer Risks and Noncancer Hazards - Commercial/Industrial Worker - Soil Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Total Soil	Entire Site	Ingestion	Benzo(a)anthracene	6.14E-02	mg/kg	9.76E-10	mg/kg-day	7.3E-01	(mg/kg-day)^-1	7.1E-10	2.73E-09	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	6.16E-02	mg/kg	9.79E-10	mg/kg-day	7.3E+00	(mg/kg-day)^-1	7.2E-09	2.74E-09	mg/kg-day	NA	---	NA
				Benzo(b)fluoranthene	3.94E-02	mg/kg	6.26E-10	mg/kg-day	7.3E-01	(mg/kg-day)^-1	4.6E-10	1.75E-09	mg/kg-day	NA	---	NA
				Dibenzo(a,h)anthracene	4.18E-03	mg/kg	6.65E-11	mg/kg-day	7.3E+00	(mg/kg-day)^-1	4.9E-10	1.86E-10	mg/kg-day	NA	---	NA
				Aluminum	1.76E+04	mg/kg	2.81E-04	mg/kg-day	NA	---	NA	7.86E-04	mg/kg-day	1E+00	(mg/kg-day)	0.00079
				Arsenic	7.08E+00	mg/kg	1.13E-07	mg/kg-day	1.5E+00	(mg/kg-day)^-1	1.7E-07	3.15E-07	mg/kg-day	3E-04	(mg/kg-day)	0.0011
				Chromium	3.63E+01	mg/kg	5.77E-07	mg/kg-day	5.0E-01	(mg/kg-day)^-1	2.9E-07	1.62E-06	mg/kg-day	3E-03	(mg/kg-day)	0.00054
				Cobalt	1.39E+01	mg/kg	2.20E-07	mg/kg-day	NA	---	NA	6.17E-07	mg/kg-day	3E-04	(mg/kg-day)	0.0021
				Iron	3.28E+04	mg/kg	5.21E-04	mg/kg-day	NA	---	NA	1.46E-03	mg/kg-day	7E-01	(mg/kg-day)	0.0021
				Manganese	5.88E+02	mg/kg	9.36E-06	mg/kg-day	NA	---	NA	2.62E-05	mg/kg-day	2E-02	(mg/kg-day)	0.0011
				Thallium	5.45E-01	mg/kg	8.67E-09	mg/kg-day	NA	---	NA	2.43E-08	mg/kg-day	1E-05	(mg/kg-day)	0.0024
			Ingestion Total								4.7E-07					0.010
			Dermal	Benzo(a)anthracene	6.14E-02	mg/kg	1.07E-09	mg/kg-day	7.3E-01	(mg/kg-day)^-1	7.8E-10	3.01E-09	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	6.16E-02	mg/kg	1.08E-09	mg/kg-day	7.3E+00	(mg/kg-day)^-1	7.9E-09	3.02E-09	mg/kg-day	NA	---	NA
				Benzo(b)fluoranthene	3.94E-02	mg/kg	6.89E-10	mg/kg-day	7.3E-01	(mg/kg-day)^-1	5.0E-10	1.93E-09	mg/kg-day	NA	---	NA
				Dibenzo(a,h)anthracene	4.18E-03	mg/kg	7.31E-11	mg/kg-day	7.3E+00	(mg/kg-day)^-1	5.3E-10	2.05E-10	mg/kg-day	NA	---	NA
				Aluminum	1.76E+04	mg/kg	NA	---	NA	---	NA	NA	---	1E+00	(mg/kg-day)	NA
				Arsenic	7.08E+00	mg/kg	2.86E-08	mg/kg-day	1.5E+00	(mg/kg-day)^-1	4.3E-08	8.01E-08	mg/kg-day	3E-04	(mg/kg-day)	0.00027
				Chromium	3.63E+01	mg/kg	NA	---	2.0E+01	(mg/kg-day)^-1	NA	NA	---	8E-05	(mg/kg-day)	NA
				Cobalt	1.39E+01	mg/kg	NA	---	NA	---	NA	NA	---	3E-04	(mg/kg-day)	NA
				Iron	3.28E+04	mg/kg	NA	---	NA	---	NA	NA	---	7E-01	(mg/kg-day)	NA
				Manganese	5.88E+02	mg/kg	NA	---	NA	---	NA	NA	---	1E-03	(mg/kg-day)	NA
				Thallium	5.45E-01	mg/kg	NA	---	NA	---	NA	NA	---	1E-05	(mg/kg-day)	NA
			Dermal Total								5.3E-08					0.00027
	Total Entire Site Total Soil										5.2E-07					0.010
	Air	Entire Site	Inhalation	Benzo(a)anthracene	6.14E-02	mg/kg	3.86E-10	µg/m^3	1.1E-04	(µg/m3)^-1	4.2E-14	1.08E-09	µg/m^3	NA	---	NA
				Benzo(a)pyrene	6.16E-02	mg/kg	3.87E-10	µg/m^3	1.1E-03	(µg/m3)^-1	4.3E-13	1.08E-09	µg/m^3	NA	---	NA
				Benzo(b)fluoranthene	3.94E-02	mg/kg	2.48E-10	µg/m^3	1.1E-04	(µg/m3)^-1	2.7E-14	6.93E-10	µg/m^3	NA	---	NA
				Dibenzo(a,h)anthracene	4.18E-03	mg/kg	2.63E-11	µg/m^3	1.2E-03	(µg/m3)^-1	3.2E-14	7.36E-11	µg/m^3	NA	---	NA
				Aluminum	1.76E+04	mg/kg	1.11E-04	µg/m^3	NA	---	NA	3.11E-04	µg/m^3	5E-03	mg/m^3	0.000062
				Arsenic	7.08E+00	mg/kg	4.45E-08	µg/m^3	4.3E-03	(µg/m3)^-1	1.9E-10	1.25E-07	µg/m^3	2E-05	mg/m^3	0.0000083
				Chromium	3.63E+01	mg/kg	2.28E-07	µg/m^3	8.4E-02	(µg/m3)^-1	1.9E-08	6.39E-07	µg/m^3	1E-04	mg/m^3	0.0000064
				Cobalt	1.39E+01	mg/kg	8.71E-08	µg/m^3	9.0E-03	(µg/m3)^-1	7.8E-10	2.44E-07	µg/m^3	6E-06	mg/m^3	0.000041
				Iron	3.28E+04	mg/kg	2.06E-04	µg/m^3	NA	---	NA	5.77E-04	µg/m^3	NA	---	NA
				Manganese	5.88E+02	mg/kg	3.70E-06	µg/m^3	NA	---	NA	1.04E-05	µg/m^3	5E-05	mg/m^3	0.00021
				Thallium	5.45E-01	mg/kg	3.43E-09	µg/m^3	NA	---	NA	9.59E-09	µg/m^3	NA	---	NA
			Inhalation Total								2.0E-08					0.00032
	Total Entire Site Air										2.0E-08					0.00032
Total Entire Site Total Soil											5.4E-07					0.011

Table 5-55
Calculation of COPC Cancer Risks and Noncancer Hazards - Commercial/Industrial Worker - Groundwater Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Entire Site	Ingestion	1,1-Biphenyl	1.00E+01	µg/L	3.8E-05	mg/kg-day	8.0E-03	(mg/kg-day)^-1	3.1E-07	1.07E-04	mg/kg-day	5E-01	(mg/kg-day)	0.00021
				1,2,4-Trimethylbenzene	9.63E+00	µg/L	3.7E-05	mg/kg-day	NA	---	NA	1.03E-04	mg/kg-day	NA	---	NA
				1-Methylnaphthalene	5.30E+01	µg/L	2.0E-04	mg/kg-day	2.9E-02	(mg/kg-day)^-1	5.9E-06	5.67E-04	mg/kg-day	7E-02	(mg/kg-day)	0.0081
				Benzo(a)anthracene	1.70E-02	µg/L	6.5E-08	mg/kg-day	7.3E-01	(mg/kg-day)^-1	4.7E-08	1.82E-07	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	1.80E-02	µg/L	6.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)^-1	5.0E-07	1.93E-07	mg/kg-day	NA	---	NA
				cis-1,2-Dichloroethene	1.52E+00	µg/L	5.8E-06	mg/kg-day	NA	---	NA	1.63E-05	mg/kg-day	2E-03	(mg/kg-day)	0.0081
				Dibenzo(a,h)anthracene	7.60E-03	µg/L	2.9E-08	mg/kg-day	7.3E+00	(mg/kg-day)^-1	2.1E-07	8.13E-08	mg/kg-day	NA	---	NA
				Dibenzofuran	1.60E+00	µg/L	6.1E-06	mg/kg-day	NA	---	NA	1.71E-05	mg/kg-day	1E-03	(mg/kg-day)	0.017
				Naphthalene	9.30E+00	µg/L	3.6E-05	mg/kg-day	NA	---	NA	9.95E-05	mg/kg-day	2E-02	(mg/kg-day)	0.0050
				Trichloroethene	4.50E+00	µg/L	1.7E-05	mg/kg-day	4.6E-02	(mg/kg-day)^-1	7.9E-07	4.82E-05	mg/kg-day	5E-04	(mg/kg-day)	0.096
				Cadmium	1.00E+00	µg/L	3.8E-06	mg/kg-day	NA	---	NA	1.07E-05	mg/kg-day	5E-04	(mg/kg-day)	0.021
				Chromium	2.40E+00	µg/L	9.2E-06	mg/kg-day	5.0E-01	(mg/kg-day)^-1	4.6E-06	2.57E-05	mg/kg-day	3E-03	(mg/kg-day)	0.0086
				Cobalt	5.20E+00	µg/L	2.0E-05	mg/kg-day	NA	---	NA	5.57E-05	mg/kg-day	3E-04	(mg/kg-day)	0.19
				Manganese	1.33E+03	µg/L	5.1E-03	mg/kg-day	NA	---	NA	1.42E-02	mg/kg-day	2E-02	(mg/kg-day)	0.59
				Nitrate	5.00E+03	µg/L	1.9E-02	mg/kg-day	NA	---	NA	5.35E-02	mg/kg-day	2E+00	(mg/kg-day)	0.033
			Ingestion Total								1.2E-05					0.98
Total Entire Site Groundwater											1.2E-05					0.98

Table 5-56

Calculation of COPC Cancer Risks and Noncancer Hazards - Commercial/Industrial Worker - Indoor Air Exposure

LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CA		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Air	Indoor Air	Entire Site	Inhalation	Benzene	6.60E-01	$\mu g/m^3$	5.4E-02	$\mu g/m^3$	7.8E-06	(μg/m3)^-1	4.2E-07	1.5E-01	$\mu g/m^3$	3.0E-02	mg/m^3	0.0051
				Chloroform	1.32E+00	$\mu g/m^3$	1.1E-01	$\mu g/m^3$	2.3E-05	(μg/m3)^-1	2.5E-06	3.0E-01	$\mu g/m^3$	9.8E-02	mg/m^3	0.0031
				Ethyl benzene	3.40E+00	$\mu g/m^3$	2.8E-01	$\mu g/m^3$	2.5E-06	(μg/m3)^-1	7.0E-07	7.8E-01	$\mu g/m^3$	1.0E+00	mg/m^3	0.00078
				Naphthalene	1.50E+00	$\mu g/m^3$	1.2E-01	$\mu g/m^3$	3.4E-05	(μg/m3)^-1	4.2E-06	3.5E-01	$\mu g/m^3$	3.0E-03	mg/m^3	0.12
				Trichloroethene	3.98E+00	$\mu g/m^3$	3.3E-01	$\mu g/m^3$	4.1E-06	(μg/m3)^-1	1.3E-06	9.1E-01	$\mu g/m^3$	2.0E-03	mg/m^3	0.46
			Inhalation Total								9.1E-06					0.58
Total Entire Site Indoor Air											9.1E-06					0.58

Table 5-57
Calculation of COPC Cancer Risks and Noncancer Hazards - Age-Adjusted Residents - Soil Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-adjusted

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Total Soil	Entire Site	Ingestion	Benzo(a)anthracene	6.14E-02	mg/kg	Mutagenic Mode of Action; See Table 5-39				2.9E-07	---	---	---	---	---
				Benzo(a)pyrene	6.16E-02	mg/kg	Mutagenic Mode of Action; See Table 5-39				2.9E-06	---	---	---	---	---
				Benzo(b)fluoranthene	3.94E-02	mg/kg	Mutagenic Mode of Action; See Table 5-39				1.9E-07	---	---	---	---	---
				Dibenzo(a,h)anthracene	4.18E-03	mg/kg	Mutagenic Mode of Action; See Table 5-39				2.0E-07	---	---	---	---	---
				Aluminum	1.76E+04	mg/kg	1.09E-02	mg/kg-day	NA	---	NA	---	---	---	---	---
				Arsenic	7.08E+00	mg/kg	4.37E-06	mg/kg-day	1.5E+00	(mg/kg-day)^-1	6.5E-06	---	---	---	---	---
				Chromium	3.63E+01	mg/kg	Mutagenic Mode of Action; See Table 5-39				1.2E-04	---	---	---	---	---
				Cobalt	1.39E+01	mg/kg	8.54E-06	mg/kg-day	NA	---	NA	---	---	---	---	---
				Iron	3.28E+04	mg/kg	2.02E-02	mg/kg-day	NA	---	NA	---	---	---	---	---
				Manganese	5.88E+02	mg/kg	3.63E-04	mg/kg-day	NA	---	NA	---	---	---	---	---
				Thallium	5.45E-01	mg/kg	3.36E-07	mg/kg-day	NA	---	NA	---	---	---	---	---
			Ingestion Total								1.3E-04					---
			Dermal	Benzo(a)anthracene	6.14E-02	mg/kg	Mutagenic Mode of Action; See Table 5-39				9.8E-08	---	---	---	---	---
				Benzo(a)pyrene	6.16E-02	mg/kg	Mutagenic Mode of Action; See Table 5-39				9.8E-07	---	---	---	---	---
				Benzo(b)fluoranthene	3.94E-02	mg/kg	Mutagenic Mode of Action; See Table 5-39				6.3E-08	---	---	---	---	---
				Dibenzo(a,h)anthracene	4.18E-03	mg/kg	Mutagenic Mode of Action; See Table 5-39				6.6E-08	---	---	---	---	---
				Aluminum	1.76E+04	mg/kg	NA	---	NA	---	NA	---	---	---	---	---
				Arsenic	7.08E+00	mg/kg	3.69E-07	mg/kg-day	1.5E+00	(mg/kg-day)^-1	5.5E-07	---	---	---	---	---
				Chromium	3.63E+01	mg/kg	Mutagenic Mode of Action; See Table 5-39				NA	---	---	---	---	---
				Cobalt	1.39E+01	mg/kg	NA	---	NA	---	NA	---	---	---	---	---
				Iron	3.28E+04	mg/kg	NA	---	NA	---	NA	---	---	---	---	---
				Manganese	5.88E+02	mg/kg	NA	---	NA	---	NA	---	---	---	---	---
				Thallium	5.45E-01	mg/kg	NA	---	NA	---	NA	---	---	---	---	---
			Dermal Total								1.8E-06					---
	Total Entire Site Total Soil										1.3E-04					---
	Air	Entire Site	Inhalation	Benzo(a)anthracene	6.14E-02	mg/kg	Mutagenic Mode of Action; See Table 5-39				4.9E-12	---	---	---	---	---
				Benzo(a)pyrene	6.16E-02	mg/kg	Mutagenic Mode of Action; See Table 5-39				4.9E-11	---	---	---	---	---
				Benzo(b)fluoranthene	3.94E-02	mg/kg	Mutagenic Mode of Action; See Table 5-39				3.1E-12	---	---	---	---	---
				Dibenzo(a,h)anthracene	4.18E-03	mg/kg	Mutagenic Mode of Action; See Table 5-39				3.6E-12	---	---	---	---	---
				Aluminum	1.76E+04	mg/kg	2.00E-03	µg/m^3	NA	---	NA	---	---	---	---	---
				Arsenic	7.08E+00	mg/kg	8.01E-07	µg/m^3	4.3E-03	(µg/m3)^-1	3.4E-09	---	---	---	---	---
				Chromium	3.63E+01	mg/kg	Mutagenic Mode of Action; See Table 5-39				2.2E-06	---	---	---	---	---
				Cobalt	1.39E+01	mg/kg	1.57E-06	µg/m^3	9.0E-03	(µg/m3)^-1	1.4E-08	---	---	---	---	---
				Iron	3.28E+04	mg/kg	3.71E-03	µg/m^3	NA	---	NA	---	---	---	---	---
				Manganese	5.88E+02	mg/kg	6.66E-05	µg/m^3	NA	---	NA	---	---	---	---	---
				Thallium	5.45E-01	mg/kg	6.17E-08	µg/m^3	NA	---	NA	---	---	---	---	---
			Inhalation Total								2.2E-06					---
	Total Entire Site Air										2.2E-06					---
Total Entire Site Total Soil											1.3E-04					---

Table 5-58
Calculation of COPC Cancer Risks and Noncancer Hazards - Adult Residents - Soil Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Total Soil	Entire Site	Ingestion	Benzo(a)anthracene	6.14E-02	mg/kg	---	---	---	---	---	3.15E-08	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	6.16E-02	mg/kg	---	---	---	---	---	3.16E-08	mg/kg-day	NA	---	NA
				Benzo(b)fluoranthene	3.94E-02	mg/kg	---	---	---	---	---	2.02E-08	mg/kg-day	NA	---	NA
				Dibenzo(a,h)anthracene	4.18E-03	mg/kg	---	---	---	---	---	2.15E-09	mg/kg-day	NA	---	NA
				Aluminum	1.76E+04	mg/kg	---	---	---	---	---	9.06E-03	mg/kg-day	1E+00	(mg/kg-day)	0.0091
				Arsenic	7.08E+00	mg/kg	---	---	---	---	---	3.64E-06	mg/kg-day	3E-04	(mg/kg-day)	0.012
				Chromium	3.63E+01	mg/kg	---	---	---	---	---	1.87E-05	mg/kg-day	3E-03	(mg/kg-day)	0.0062
				Cobalt	1.39E+01	mg/kg	---	---	---	---	---	7.11E-06	mg/kg-day	3E-04	(mg/kg-day)	0.024
				Iron	3.28E+04	mg/kg	---	---	---	---	---	1.68E-02	mg/kg-day	7E-01	(mg/kg-day)	0.024
				Manganese	5.88E+02	mg/kg	---	---	---	---	---	3.02E-04	mg/kg-day	2E-02	(mg/kg-day)	0.013
				Thallium	5.45E-01	mg/kg	---	---	---	---	---	2.80E-07	mg/kg-day	1E-05	(mg/kg-day)	0.028
			Ingestion Total								---					0.12
			Dermal	Benzo(a)anthracene	6.14E-02	mg/kg	---	---	---	---	---	1.73E-08	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	6.16E-02	mg/kg	---	---	---	---	---	1.74E-08	mg/kg-day	NA	---	NA
				Benzo(b)fluoranthene	3.94E-02	mg/kg	---	---	---	---	---	1.11E-08	mg/kg-day	NA	---	NA
				Dibenzo(a,h)anthracene	4.18E-03	mg/kg	---	---	---	---	---	1.18E-09	mg/kg-day	NA	---	NA
				Aluminum	1.76E+04	mg/kg	---	---	---	---	---	NA	---	1E+00	(mg/kg-day)	NA
				Arsenic	7.08E+00	mg/kg	---	---	---	---	---	4.61E-07	mg/kg-day	3E-04	(mg/kg-day)	0.0015
				Chromium	3.63E+01	mg/kg	---	---	---	---	---	NA	---	8E-05	(mg/kg-day)	NA
				Cobalt	1.39E+01	mg/kg	---	---	---	---	---	NA	---	3E-04	(mg/kg-day)	NA
				Iron	3.28E+04	mg/kg	---	---	---	---	---	NA	---	7E-01	(mg/kg-day)	NA
				Manganese	5.88E+02	mg/kg	---	---	---	---	---	NA	---	1E-03	(mg/kg-day)	NA
				Thallium	5.45E-01	mg/kg	---	---	---	---	---	NA	---	1E-05	(mg/kg-day)	NA
			Dermal Total								---					0.0015
	Total Entire Site Total Soil										---					0.12
	Air	Entire Site	Inhalation	Benzo(a)anthracene	6.14E-02	mg/kg	---	---	---	---	---	1.87E-08	µg/m^3	NA	---	NA
				Benzo(a)pyrene	6.16E-02	mg/kg	---	---	---	---	---	1.88E-08	µg/m^3	NA	---	NA
				Benzo(b)fluoranthene	3.94E-02	mg/kg	---	---	---	---	---	1.20E-08	µg/m^3	NA	---	NA
				Dibenzo(a,h)anthracene	4.18E-03	mg/kg	---	---	---	---	---	1.27E-09	µg/m^3	NA	---	NA
				Aluminum	1.76E+04	mg/kg	---	---	---	---	---	5.37E-03	µg/m^3	5E-03	mg/m^3	0.0011
				Arsenic	7.08E+00	mg/kg	---	---	---	---	---	2.16E-06	µg/m^3	2E-05	mg/m^3	0.00014
				Chromium	3.63E+01	mg/kg	---	---	---	---	---	1.11E-05	µg/m^3	1E-04	mg/m^3	0.00011
				Cobalt	1.39E+01	mg/kg	---	---	---	---	---	4.22E-06	µg/m^3	6E-06	mg/m^3	0.00070
				Iron	3.28E+04	mg/kg	---	---	---	---	---	9.99E-03	µg/m^3	NA	---	NA
				Manganese	5.88E+02	mg/kg	---	---	---	---	---	1.79E-04	µg/m^3	5E-05	mg/m^3	0.0036
				Thallium	5.45E-01	mg/kg	---	---	---	---	---	1.66E-07	µg/m^3	NA	---	NA
			Inhalation Total								---					0.0056
	Total Entire Site Air										---					0.0056
Total Entire Site Total Soil											---					0.12

Table 5-59
Calculation of COPC Cancer Risks and Noncancer Hazards - Child Residents - Soil Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Total Soil	Entire Site	Ingestion	Benzo(a)anthracene	6.14E-02	mg/kg	---	---	---	---	---	3.36E-07	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	6.16E-02	mg/kg	---	---	---	---	---	3.38E-07	mg/kg-day	NA	---	NA
				Benzo(b)fluoranthene	3.94E-02	mg/kg	---	---	---	---	---	2.16E-07	mg/kg-day	NA	---	NA
				Dibenzo(a,h)anthracene	4.18E-03	mg/kg	---	---	---	---	---	2.29E-08	mg/kg-day	NA	---	NA
				Aluminum	1.76E+04	mg/kg	---	---	---	---	---	9.67E-02	mg/kg-day	1E+00	(mg/kg-day)	0.097
				Arsenic	7.08E+00	mg/kg	---	---	---	---	---	3.88E-05	mg/kg-day	3E-04	(mg/kg-day)	0.13
				Chromium	3.63E+01	mg/kg	---	---	---	---	---	1.99E-04	mg/kg-day	3E-03	(mg/kg-day)	0.066
				Cobalt	1.39E+01	mg/kg	---	---	---	---	---	7.59E-05	mg/kg-day	3E-04	(mg/kg-day)	0.25
				Iron	3.28E+04	mg/kg	---	---	---	---	---	1.80E-01	mg/kg-day	7E-01	(mg/kg-day)	0.26
				Manganese	5.88E+02	mg/kg	---	---	---	---	---	3.22E-03	mg/kg-day	2E-02	(mg/kg-day)	0.13
				Thallium	5.45E-01	mg/kg	---	---	---	---	---	2.99E-06	mg/kg-day	1E-05	(mg/kg-day)	0.30
			Ingestion Total								---					1.2
			Dermal	Benzo(a)anthracene	6.14E-02	mg/kg	---	---	---	---	---	1.04E-07	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	6.16E-02	mg/kg	---	---	---	---	---	1.04E-07	mg/kg-day	NA	---	NA
				Benzo(b)fluoranthene	3.94E-02	mg/kg	---	---	---	---	---	6.66E-08	mg/kg-day	NA	---	NA
				Dibenzo(a,h)anthracene	4.18E-03	mg/kg	---	---	---	---	---	7.07E-09	mg/kg-day	NA	---	NA
				Aluminum	1.76E+04	mg/kg	---	---	---	---	---	NA	---	1E+00	(mg/kg-day)	NA
				Arsenic	7.08E+00	mg/kg	---	---	---	---	---	2.76E-06	mg/kg-day	3E-04	(mg/kg-day)	0.0092
				Chromium	3.63E+01	mg/kg	---	---	---	---	---	NA	---	8E-05	(mg/kg-day)	NA
				Cobalt	1.39E+01	mg/kg	---	---	---	---	---	NA	---	3E-04	(mg/kg-day)	NA
				Iron	3.28E+04	mg/kg	---	---	---	---	---	NA	---	7E-01	(mg/kg-day)	NA
				Manganese	5.88E+02	mg/kg	---	---	---	---	---	NA	---	1E-03	(mg/kg-day)	NA
				Thallium	5.45E-01	mg/kg	---	---	---	---	---	NA	---	1E-05	(mg/kg-day)	NA
			Dermal Total								---					0.0092
	Total Entire Site Total Soil										---					1.2
	Air	Entire Site	Inhalation	Benzo(a)anthracene	6.14E-02	mg/kg	---	---	---	---	---	1.87E-08	µg/m^3	NA	---	NA
				Benzo(a)pyrene	6.16E-02	mg/kg	---	---	---	---	---	1.88E-08	µg/m^3	NA	---	NA
				Benzo(b)fluoranthene	3.94E-02	mg/kg	---	---	---	---	---	1.20E-08	µg/m^3	NA	---	NA
				Dibenzo(a,h)anthracene	4.18E-03	mg/kg	---	---	---	---	---	1.27E-09	µg/m^3	NA	---	NA
				Aluminum	1.76E+04	mg/kg	---	---	---	---	---	5.37E-03	µg/m^3	5E-03	mg/m^3	0.0011
				Arsenic	7.08E+00	mg/kg	---	---	---	---	---	2.16E-06	µg/m^3	2E-05	mg/m^3	0.00014
				Chromium	3.63E+01	mg/kg	---	---	---	---	---	1.11E-05	µg/m^3	1E-04	mg/m^3	0.00011
				Cobalt	1.39E+01	mg/kg	---	---	---	---	---	4.22E-06	µg/m^3	6E-06	mg/m^3	0.00070
				Iron	3.28E+04	mg/kg	---	---	---	---	---	9.99E-03	µg/m^3	NA	---	NA
				Manganese	5.88E+02	mg/kg	---	---	---	---	---	1.79E-04	µg/m^3	5E-05	mg/m^3	0.0036
				Thallium	5.45E-01	mg/kg	---	---	---	---	---	1.66E-07	µg/m^3	NA	---	NA
			Inhalation Total								---					0.0056
	Total Entire Site Air										---					0.0056
Total Entire Site Total Soil											---					1.2

Table 5-60
Calculation of COPC Cancer Risks and Noncancer Hazards - Age-Adjusted Resident - Groundwater Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-adjusted

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		
							Value	Units	Value	Units		Value	Units	Value	Units	Hazard Quotient
Groundwater	Groundwater	Entire Site	Ingestion	1,1-Biphenyl	1.00E+01	µg/L	1.3E-04	mg/kg-day	8.0E-03	(mg/kg-day)^-1	1.0E-06	---	---	---	---	---
				1,2,4-Trimethylbenzene	9.63E+00	µg/L	1.2E-04	mg/kg-day	NA	---	NA	---	---	---	---	---
				1-Methylnaphthalene	5.30E+01	µg/L	6.8E-04	mg/kg-day	2.9E-02	(mg/kg-day)^-1	2.0E-05	---	---	---	---	---
				Benzo(a)anthracene	1.70E-02	µg/L	2.2E-07	mg/kg-day	7.3E-01	(mg/kg-day)^-1	1.6E-07	---	---	---	---	---
				Benzo(a)pyrene	1.80E-02	µg/L	Mutagenic Mode of Action; See Table 5-40				5.2E-06	---	---	---	---	---
				cis-1,2-Dichloroethene	1.52E+00	µg/L	2.0E-05	mg/kg-day	NA	---	NA	---	---	---	---	---
				Dibenzo(a,h)anthracene	7.60E-03	µg/L	Mutagenic Mode of Action; See Table 5-40				2.2E-06	---	---	---	---	---
				Dibenzofuran	1.60E+00	µg/L	2.1E-05	mg/kg-day	NA	---	NA	---	---	---	---	---
				Naphthalene	9.30E+00	µg/L	1.2E-04	mg/kg-day	NA	---	NA	---	---	---	---	---
				Trichloroethene	4.50E+00	µg/L	Mutagenic Mode of Action; See Table 5-42				3.8E-06	---	---	---	---	---
				Cadmium	1.00E+00	µg/L	1.3E-05	mg/kg-day	NA	---	NA	---	---	---	---	---
				Chromium	2.40E+00	µg/L	Mutagenic Mode of Action; See Table 5-40				4.8E-05	---	---	---	---	---
				Cobalt	5.20E+00	µg/L	6.7E-05	mg/kg-day	NA	---	NA	---	---	---	---	---
				Manganese	1.33E+03	µg/L	1.7E-02	mg/kg-day	NA	---	NA	---	---	---	---	---
				Nitrate	5.00E+03	µg/L	6.4E-02	mg/kg-day	NA	---	NA	---	---	---	---	---
			Ingestion Total								8.0E-05					---
			Dermal	1,1-Biphenyl	1.00E+01	µg/L	2.0E-04	mg/kg-day	8.0E-03	(mg/kg-day)^-1	1.6E-06	---	---	---	---	---
				1,2,4-Trimethylbenzene	9.63E+00	µg/L	1.7E-04	mg/kg-day	NA	---	NA	---	---	---	---	---
				1-Methylnaphthalene	5.30E+01	µg/L	9.4E-04	mg/kg-day	2.9E-02	(mg/kg-day)^-1	2.7E-05	---	---	---	---	---
				Benzo(a)anthracene	1.70E-02	µg/L	9.7E-10	mg/kg-day	7.3E-01	(mg/kg-day)^-1	7.1E-10	---	---	---	---	---
				Benzo(a)pyrene	1.80E-02	µg/L	Mutagenic Mode of Action; See Table 5-40				1.1E-04	---	---	---	---	---
				cis-1,2-Dichloroethene	1.52E+00	µg/L	1.7E-06	mg/kg-day	NA	---	NA	---	---	---	---	---
				Dibenzo(a,h)anthracene	7.60E-03	µg/L	Mutagenic Mode of Action; See Table 5-40				7.4E-05	---	---	---	---	---
				Dibenzofuran	1.60E+00	µg/L	3.5E-05	mg/kg-day	NA	---	NA	---	---	---	---	---
				Naphthalene	9.30E+00	µg/L	7.9E-05	mg/kg-day	NA	---	NA	---	---	---	---	---
				Trichloroethene	4.50E+00	µg/L	Mutagenic Mode of Action; See Table 5-42				6.6E-07	---	---	---	---	---
				Cadmium	1.00E+00	µg/L	7.1E-08	mg/kg-day	NA	---	NA	---	---	---	---	---
				Chromium	2.40E+00	µg/L	Mutagenic Mode of Action; See Table 5-40				1.1E-05	---	---	---	---	---
				Cobalt	5.20E+00	µg/L	3.7E-07	mg/kg-day	NA	---	NA	---	---	---	---	---
				Manganese	1.33E+03	µg/L	9.5E-05	mg/kg-day	NA	---	NA	---	---	---	---	---
				Nitrate	5.00E+03	µg/L	3.6E-04	mg/kg-day	NA	---	NA	---	---	---	---	---
			Dermal Total								2.3E-04					---
	Total Entire Site Groundwater										3.1E-04					---

Table 5-60
Calculation of COPC Cancer Risks and Noncancer Hazards - Age-Adjusted Resident - Groundwater Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-adjusted

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
	Indoor Air (while showering)	Entire Site	Inhalation	1,1-Biphenyl	1.00E+01	µg/L	4.7E-08	mg/m^3	NA	---	NA	---	---	---	---	---
				1,2,4-Trimethylbenzene	9.63E+00	µg/L	2.6E-07	mg/m^3	NA	---	NA	---	---	---	---	---
				1-Methylnaphthalene	5.30E+01	µg/L	3.2E-07	mg/m^3	NA	---	NA	---	---	---	---	---
				cis-1,2-Dichloroethene	1.52E+00	µg/L	9.0E-08	mg/m^3	NA	---	NA	---	---	---	---	---
				Dibenzofuran	1.60E+00	µg/L	6.1E-09	mg/m^3	NA	---	NA	---	---	---	---	---
				Naphthalene	9.30E+00	µg/L	5.5E-08	mg/m^3	3.4E-05	(µg/m3)^-1	1.9E-09	---	---	---	---	---
				Trichloroethene	4.50E+00	µg/L	6.5E-08	mg/m^3	4.1E-06	(µg/m3)^-1	2.7E-10	---	---	---	---	---
			Inhalation Total								2.1E-09					---
	Total Entire Site Indoor Air										2.1E-09					---
Total Entire Site Groundwater											3.1E-04					---

Table 5-61
Calculation of COPC Cancer Risks and Noncancer Hazards - Adult Resident - Groundwater Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Entire Site	Ingestion	1,1-Biphenyl	1.00E+01	µg/L	---	---	---	---	---	3.00E-04	mg/kg-day	5E-01	(mg/kg-day)	0.00060
				1,2,4-Trimethylbenzene	9.63E+00	µg/L	---	---	---	---	---	2.89E-04	mg/kg-day	NA	---	NA
				1-Methylnaphthalene	5.30E+01	µg/L	---	---	---	---	---	1.59E-03	mg/kg-day	7E-02	(mg/kg-day)	0.023
				Benzo(a)anthracene	1.70E-02	µg/L	---	---	---	---	---	5.09E-07	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	1.80E-02	µg/L	---	---	---	---	---	5.39E-07	mg/kg-day	NA	---	NA
				cis-1,2-Dichloroethene	1.52E+00	µg/L	---	---	---	---	---	4.56E-05	mg/kg-day	2E-03	(mg/kg-day)	0.023
				Dibenzo(a,h)anthracene	7.60E-03	µg/L	---	---	---	---	---	2.28E-07	mg/kg-day	NA	---	NA
				Dibenzofuran	1.60E+00	µg/L	---	---	---	---	---	4.79E-05	mg/kg-day	1E-03	(mg/kg-day)	0.048
				Naphthalene	9.30E+00	µg/L	---	---	---	---	---	2.79E-04	mg/kg-day	2E-02	(mg/kg-day)	0.014
				Trichloroethene	4.50E+00	µg/L	---	---	---	---	---	1.35E-04	mg/kg-day	5E-04	(mg/kg-day)	0.27
				Cadmium	1.00E+00	µg/L	---	---	---	---	---	3.00E-05	mg/kg-day	5E-04	(mg/kg-day)	0.060
				Chromium	2.40E+00	µg/L	---	---	---	---	---	7.19E-05	mg/kg-day	3E-03	(mg/kg-day)	0.024
				Cobalt	5.20E+00	µg/L	---	---	---	---	---	1.56E-04	mg/kg-day	3E-04	(mg/kg-day)	0.52
				Manganese	1.33E+03	µg/L	---	---	---	---	---	3.99E-02	mg/kg-day	2E-02	(mg/kg-day)	1.7
				Nitrate	5.00E+03	µg/L	---	---	---	---	---	1.50E-01	mg/kg-day	2E+00	(mg/kg-day)	0.094
			Ingestion Total								---					2.7
			Dermal	1,1-Biphenyl	1.00E+01	µg/L	---	---	---	---	---	4.91E-04	mg/kg-day	5E-01	(mg/kg-day)	0.00098
				1,2,4-Trimethylbenzene	9.63E+00	µg/L	---	---	---	---	---	4.16E-04	mg/kg-day	NA	---	NA
				1-Methylnaphthalene	5.30E+01	µg/L	---	---	---	---	---	2.28E-03	mg/kg-day	7E-02	(mg/kg-day)	0.033
				Benzo(a)anthracene	1.70E-02	µg/L	---	---	---	---	---	2.34E-09	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	1.80E-02	µg/L	---	---	---	---	---	1.21E-05	mg/kg-day	NA	---	NA
				cis-1,2-Dichloroethene	1.52E+00	µg/L	---	---	---	---	---	4.12E-06	mg/kg-day	2E-03	(mg/kg-day)	0.0021
				Dibenzo(a,h)anthracene	7.60E-03	µg/L	---	---	---	---	---	7.86E-06	mg/kg-day	NA	---	NA
				Dibenzofuran	1.60E+00	µg/L	---	---	---	---	---	8.49E-05	mg/kg-day	1E-03	(mg/kg-day)	0.085
				Naphthalene	9.30E+00	µg/L	---	---	---	---	---	1.91E-04	mg/kg-day	2E-02	(mg/kg-day)	0.0095
				Trichloroethene	4.50E+00	µg/L	---	---	---	---	---	2.40E-05	mg/kg-day	5E-04	(mg/kg-day)	0.048
				Cadmium	1.00E+00	µg/L	---	---	---	---	---	1.78E-07	mg/kg-day	3E-05	(mg/kg-day)	0.0071
				Chromium	2.40E+00	µg/L	---	---	---	---	---	4.27E-07	mg/kg-day	8E-05	(mg/kg-day)	0.0057
				Cobalt	5.20E+00	µg/L	---	---	---	---	---	9.25E-07	mg/kg-day	3E-04	(mg/kg-day)	0.0031
				Manganese	1.33E+03	µg/L	---	---	---	---	---	2.37E-04	mg/kg-day	1E-03	(mg/kg-day)	0.25
				Nitrate	5.00E+03	µg/L	---	---	---	---	---	8.89E-04	mg/kg-day	2E+00	(mg/kg-day)	0.00056
			Dermal Total								---					0.44
	Total Entire Site Groundwater										---					3.2

Table 5-61

Calculation of COPC Cancer Risks and Noncancer Hazards - Adult Resident - Groundwater Exposure

LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
	Indoor Air (while showering)	Entire Site	Inhalation	1,1-Biphenyl	1.00E+01	µg/L	---	---	---	---	---	1.38E-07	mg/m^3	4E-04	mg/m^3	0.00034
				1,2,4-Trimethylbenzene	9.63E+00	µg/L	---	---	---	---	---	7.65E-07	mg/m^3	7E-03	mg/m^3	0.00011
				1-Methylnaphthalene	5.30E+01	µg/L	---	---	---	---	---	9.20E-07	mg/m^3	NA	---	NA
				cis-1,2-Dichloroethene	1.52E+00	µg/L	---	---	---	---	---	2.63E-07	mg/m^3	NA	---	NA
				Dibenzofuran	1.60E+00	µg/L	---	---	---	---	---	1.77E-08	mg/m^3	NA	---	NA
				Naphthalene	9.30E+00	µg/L	---	---	---	---	---	1.61E-07	mg/m^3	3E-03	mg/m^3	0.000054
				Trichloroethene	4.50E+00	µg/L	---	---	---	---	---	1.90E-07	mg/m^3	2E-03	mg/m^3	0.000095
			Inhalation Total								---					0.00060
	Total Entire Site Indoor Air										---					0.00060
Total Entire Site Groundwater											---					3.2

Table 5-62
Calculation of COPC Cancer Risks and Noncancer Hazards - Child Resident - Groundwater Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Entire Site	Ingestion	1,1-Biphenyl	1.00E+01	µg/L	---	---	---	---	---	4.99E-04	mg/kg-day	5E-01	(mg/kg-day)	0.0010
				1,2,4-Trimethylbenzene	9.63E+00	µg/L	---	---	---	---	---	4.80E-04	mg/kg-day	NA	---	NA
				1-Methylnaphthalene	5.30E+01	µg/L	---	---	---	---	---	2.64E-03	mg/kg-day	7E-02	(mg/kg-day)	0.038
				Benzo(a)anthracene	1.70E-02	µg/L	---	---	---	---	---	8.48E-07	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	1.80E-02	µg/L	---	---	---	---	---	8.98E-07	mg/kg-day	NA	---	NA
				cis-1,2-Dichloroethene	1.52E+00	µg/L	---	---	---	---	---	7.58E-05	mg/kg-day	2E-03	(mg/kg-day)	0.038
				Dibenzo(a,h)anthracene	7.60E-03	µg/L	---	---	---	---	---	3.79E-07	mg/kg-day	NA	---	NA
				Dibenzofuran	1.60E+00	µg/L	---	---	---	---	---	7.98E-05	mg/kg-day	1E-03	(mg/kg-day)	0.080
				Naphthalene	9.30E+00	µg/L	---	---	---	---	---	4.64E-04	mg/kg-day	2E-02	(mg/kg-day)	0.023
				Trichloroethene	4.50E+00	µg/L	---	---	---	---	---	2.25E-04	mg/kg-day	5E-04	(mg/kg-day)	0.45
				Cadmium	1.00E+00	µg/L	---	---	---	---	---	4.99E-05	mg/kg-day	5E-04	(mg/kg-day)	0.10
				Chromium	2.40E+00	µg/L	---	---	---	---	---	1.20E-04	mg/kg-day	3E-03	(mg/kg-day)	0.040
				Cobalt	5.20E+00	µg/L	---	---	---	---	---	2.59E-04	mg/kg-day	3E-04	(mg/kg-day)	0.86
				Manganese	1.33E+03	µg/L	---	---	---	---	---	6.63E-02	mg/kg-day	2E-02	(mg/kg-day)	2.8
				Nitrate	5.00E+03	µg/L	---	---	---	---	---	2.49E-01	mg/kg-day	2E+00	(mg/kg-day)	0.16
			Ingestion Total								---					4.6
			Dermal	1,1-Biphenyl	1.00E+01	µg/L	---	---	---	---	---	6.98E-04	mg/kg-day	5E-01	(mg/kg-day)	0.0014
				1,2,4-Trimethylbenzene	9.63E+00	µg/L	---	---	---	---	---	5.90E-04	mg/kg-day	NA	---	NA
				1-Methylnaphthalene	5.30E+01	µg/L	---	---	---	---	---	3.23E-03	mg/kg-day	7E-02	(mg/kg-day)	0.046
				Benzo(a)anthracene	1.70E-02	µg/L	---	---	---	---	---	3.32E-09	mg/kg-day	NA	---	NA
				Benzo(a)pyrene	1.80E-02	µg/L	---	---	---	---	---	1.71E-05	mg/kg-day	NA	---	NA
				cis-1,2-Dichloroethene	1.52E+00	µg/L	---	---	---	---	---	5.85E-06	mg/kg-day	2E-03	(mg/kg-day)	0.0029
				Dibenzo(a,h)anthracene	7.60E-03	µg/L	---	---	---	---	---	1.12E-05	mg/kg-day	NA	---	NA
				Dibenzofuran	1.60E+00	µg/L	---	---	---	---	---	1.21E-04	mg/kg-day	1E-03	(mg/kg-day)	0.12
				Naphthalene	9.30E+00	µg/L	---	---	---	---	---	2.71E-04	mg/kg-day	2E-02	(mg/kg-day)	0.014
				Trichloroethene	4.50E+00	µg/L	---	---	---	---	---	3.41E-05	mg/kg-day	5E-04	(mg/kg-day)	0.068
				Cadmium	1.00E+00	µg/L	---	---	---	---	---	2.20E-07	mg/kg-day	3E-05	(mg/kg-day)	0.0088
				Chromium	2.40E+00	µg/L	---	---	---	---	---	5.28E-07	mg/kg-day	8E-05	(mg/kg-day)	0.0070
				Cobalt	5.20E+00	µg/L	---	---	---	---	---	1.14E-06	mg/kg-day	3E-04	(mg/kg-day)	0.0038
				Manganese	1.33E+03	µg/L	---	---	---	---	---	2.93E-04	mg/kg-day	1E-03	(mg/kg-day)	0.31
				Nitrate	5.00E+03	µg/L	---	---	---	---	---	1.10E-03	mg/kg-day	2E+00	(mg/kg-day)	0.00069
			Dermal Total								---					0.58
Total Entire Site Groundwater											---					5.1

Table 5-63
Calculation of COPC Cancer Risks and Noncancer Hazards - Resident - Indoor Air Exposure
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	CA		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Air	Indoor Air	AMAC Building Area	Inhalation	Benzene	6.60E-01	$\mu g/m^3$	2.4E-01	$\mu g/m^3$	7.8E-06	(µg/m3)^-1	1.8E-06	6.4E-01	$\mu g/m^3$	3.0E-02	mg/m^3	0.021
				Chloroform	1.32E+00	$\mu g/m^3$	4.7E-01	$\mu g/m^3$	2.3E-05	(µg/m3)^-1	1.1E-05	1.3E+00	$\mu g/m^3$	9.8E-02	mg/m^3	0.013
				Ethyl benzene	3.40E+00	$\mu g/m^3$	1.2E+00	$\mu g/m^3$	2.5E-06	(µg/m3)^-1	3.1E-06	3.3E+00	$\mu g/m^3$	1.0E+00	mg/m^3	0.0033
				Naphthalene	1.50E+00	$\mu g/m^3$	5.4E-01	$\mu g/m^3$	3.4E-05	(µg/m3)^-1	1.8E-05	1.4E+00	$\mu g/m^3$	3.0E-03	mg/m^3	0.48
				Trichloroethene	3.98E+00	$\mu g/m^3$	Mutagenic Mode of Action; See Table 5-43				8.4E-06	3.8E+00	$\mu g/m^3$	2.0E-03	mg/m^3	1.9
			Inhalation Total								4.2E-05					2.4
Total AMAC Building Area Indoor Air											4.2E-05					2.4

Table 5-64
Summary of Receptor Risks and Hazards for COPCs - AMAC Staff
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Staff
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	AMAC Building Area	Benzo(a)anthracene	3.2E-08	---	1.8E-08	4.9E-08	---	---	---	---	---
			Benzo(a)pyrene	3.2E-07	---	1.8E-07	4.9E-07	---	---	---	---	---
			Benzo(b)fluoranthene	3.9E-08	---	2.2E-08	6.1E-08	---	---	---	---	---
			Dibenzo(a,h)anthracene	6.6E-08	---	3.6E-08	1.0E-07	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	0.013	---	---	0.013
			Arsenic	3.3E-06	---	4.2E-07	3.7E-06	Skin	0.015	---	0.0018	0.016
			Chromium	7.2E-06	---	---	7.2E-06	None observed	0.0096	---	---	0.0096
			Cobalt	---	---	---	---	Thyroid	0.034	---	---	0.034
			Iron	---	---	---	---	Gastrointestinal	0.036	---	---	0.036
			Manganese	---	---	---	---	Nervous system	0.014	---	---	0.014
			Chemical Total	1.1E-05	---	6.7E-07	1.2E-05		0.12	---	0.0018	0.12
		AMAC Building Area Total					1.2E-05					0.12
	Surface Soil Total						1.2E-05					0.12
	Air	AMAC Building Area	Benzo(a)anthracene	---	1.2E-13	---	1.2E-13	---	---	---	---	---
			Benzo(a)pyrene	---	1.2E-12	---	1.2E-12	---	---	---	---	---
			Benzo(b)fluoranthene	---	1.5E-13	---	1.5E-13	---	---	---	---	---
			Dibenzo(a,h)anthracene	---	2.7E-13	---	2.7E-13	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	---	0.000065	---	0.000065
			Arsenic	---	2.3E-10	---	2.3E-10	Developmental, Cardiovascular system, Nervous system, Lung, Skin	---	0.0000072	---	0.0000072
			Chromium	---	3.0E-08	---	3.0E-08	Respiratory System	---	0.0000071	---	0.0000071
			Cobalt	---	1.1E-09	---	1.1E-09	Respiratory System	---	0.000041	---	0.000041
			Iron	---	---	---	---	---	---	---	---	---
			Manganese	---	---	---	---	Nervous system	---	0.00017	---	0.00017
			Chemical Total	---	3.1E-08	---	3.1E-08		---	0.00029	---	0.00029
		AMAC Building Area Total					3.1E-08					0.00029
	Air Total						3.1E-08					0.00029
Total AMAC Building Area Soil							1.2E-05					0.12

Table 5-64
Summary of Receptor Risks and Hazards for COPCs - AMAC Staff
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Staff
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	Launcher Area	Benzo(a)pyrene	2.0E-08	---	1.1E-08	3.0E-08	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	0.0089	---	---	0.0089
			Arsenic	3.3E-06	---	4.2E-07	3.7E-06	Skin	0.015	---	0.0019	0.017
			Chromium	4.0E-06	---	---	4.0E-06	None observed	0.0054	---	---	0.0054
			Cobalt	---	---	---	---	Thyroid	0.022	---	---	0.022
			Iron	---	---	---	---	Gastrointestinal	0.024	---	---	0.024
			Manganese	---	---	---	---	Nervous system	0.014	---	---	0.014
			Thallium	---	---	---	---	Hair	0.025	---	---	0.025
			Chemical Total	7.4E-06	---	4.3E-07	7.8E-06		0.11	---	0.0019	0.12
		Launcher Area Total					7.8E-06					0.12
	Surface Soil Total						7.8E-06					0.12
	Air	Launcher Area	Benzo(a)pyrene	---	7.3E-14	---	7.3E-14	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	---	0.000044	---	0.000044
			Arsenic	---	2.3E-10	---	2.3E-10	Developmental, Cardiovascular system, Nervous system, Lung, Skin	---	0.0000073	---	0.0000073
			Chromium	---	1.7E-08	---	1.7E-08	Respiratory System	---	0.0000040	---	0.0000040
			Cobalt	---	7.3E-10	---	7.3E-10	Respiratory System	---	0.000027	---	0.000027
			Iron	---	---	---	---	---	---	---	---	---
			Manganese	---	---	---	---	Nervous system	---	0.00016	---	0.00016
			Thallium	---	---	---	---	---	---	---	---	---
			Chemical Total	---	1.8E-08	---	1.8E-08		---	0.00025	---	0.00025
		Launcher Area Total					1.8E-08					0.00025
	Air Total						1.8E-08					0.00025
Total Launcher Area Soil							7.8E-06					0.12

Total Risk Across All Media - AMAC Building Area	1.2E-05	Total Hazard Across All Media - AMAC Building Area	0.12
Total Risk Across All Media - Launcher Area	7.8E-06	Total Hazard Across All Media - Launcher Area	0.12

Table 5-65
Summary of Receptor Risks and Hazards for COPCs - AMAC Staff
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Staff
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	AMAC Building Area	1,1-Biphenyl	6.4E-09	---	---	6.4E-09	Kidney	0.0000032	---	---	0.0000032
			cis-1,2-Dichloroethene	---	---	---	---	Kidney	0.022	---	---	0.022
			Trichloroethene	1.4E-06	---	---	1.4E-06	Immune System, Cardiovascular System, Developmental	0.12	---	---	0.12
			Chromium	6.4E-06	---	---	6.4E-06	None observed	0.0086	---	---	0.0086
			Manganese	---	---	---	---	Nervous system	0.030	---	---	0.030
			Chemical Total	7.8E-06	---	---	7.8E-06		0.18	---	---	0.18
		AMAC Building Area Total					7.8E-06					0.18
	Groundwater Total						7.8E-06					0.18
Total AMAC Building Area							7.8E-06					0.18

Total Risk Across All Media	7.8E-06	Total Hazard Across All Media	0.18

Table 5-66
Summary of Receptor Risks and Hazards for COPCs - AMAC Staff
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Staff
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Air	Indoor Air	AMAC Building Area	Benzene	---	5.2E-07	---	5.2E-07	Blood	---	0.0044	---	0.0044
			Chloroform	---	3.1E-06	---	3.1E-06	Liver	---	0.0027	---	0.0027
			Ethyl benzene	---	8.6E-07	---	8.6E-07	Developmental	---	0.00068	---	0.00068
			Naphthalene	---	5.1E-06	---	5.1E-06	Respiratory System	---	0.10	---	0.10
			Trichloroethene	---	1.6E-06	---	1.6E-06	Immune System, Cardiovascular System, Developmental	---	0.40	---	0.40
			Chemical Total	---	1.1E-05	---	1.1E-05		---	0.51	---	0.51
		AMAC Building Area Total					1.1E-05					0.51
	Indoor Air Total						1.1E-05					0.51
Total AMAC Building Area							1.1E-05					0.51

Total Risk Across All Media	1.1E-05
Total Hazard Across All Media	0.51

Table 5-67
Summary of Receptor Risks and Hazards for COPCs - AMAC Client
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Client
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	AMAC Building Area	Benzo(a)anthracene	9.1E-09	---	5.0E-09	1.4E-08	---	---	---	---	---
			Benzo(a)pyrene	9.1E-08	---	5.0E-08	1.4E-07	---	---	---	---	---
			Benzo(b)fluoranthene	1.1E-08	---	6.2E-09	1.7E-08	---	---	---	---	---
			Dibenzo(a,h)anthracene	1.9E-08	---	1.0E-08	2.9E-08	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	0.013	---	---	0.013
			Arsenic	9.4E-07	---	1.2E-07	1.1E-06	Skin	0.015	---	0.0018	0.016
			Chromium	2.1E-06	---	---	2.1E-06	None observed	0.0096	---	---	0.0096
			Cobalt	---	---	---	---	Thyroid	0.034	---	---	0.034
			Iron	---	---	---	---	Gastrointestinal	0.036	---	---	0.036
			Manganese	---	---	---	---	Nervous system	0.014	---	---	0.014
			Chemical Total	3.1E-06	---	1.9E-07	3.3E-06		0.12	---	0.0018	0.12
		AMAC Building Area Total					3.3E-06					0.12
	Surface Soil Total						3.3E-06					0.12
	Air	AMAC Building Area	Benzo(a)anthracene	---	8.5E-15	---	8.5E-15	---	---	---	---	---
			Benzo(a)pyrene	---	8.5E-14	---	8.5E-14	---	---	---	---	---
			Benzo(b)fluoranthene	---	1.0E-14	---	1.0E-14	---	---	---	---	---
			Dibenzo(a,h)anthracene	---	1.9E-14	---	1.9E-14	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	---	0.000016	---	0.000016
			Arsenic	---	1.7E-11	---	1.7E-11	Developmental, Cardiovascular system, Nervous system, Lung, Skin	---	0.0000018	---	0.0000018
			Chromium	---	2.1E-09	---	2.1E-09	Respiratory System	---	0.0000018	---	0.0000018
			Cobalt	---	8.0E-11	---	8.0E-11	Respiratory System	---	0.000010	---	0.000010
			Iron	---	---	---	---	---	---	---	---	---
			Manganese	---	---	---	---	Nervous system	---	0.000042	---	0.000042
			Chemical Total	---	2.2E-09	---	2.2E-09		---	0.000072	---	0.000072
		AMAC Building Area Total					2.2E-09					0.000072
	Air Total						2.2E-09					0.000072
Total AMAC Building Area Soil							3.3E-06					0.12

Table 5-67
Summary of Receptor Risks and Hazards for COPCs - AMAC Client
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Client
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	Launcher Area	Benzo(a)pyrene	5.6E-09	---	3.1E-09	8.6E-09	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	0.009	---	---	0.0089
			Arsenic	9.5E-07	---	1.2E-07	1.1E-06	Skin	0.015	---	0.0019	0.017
			Chromium	1.2E-06	---	---	1.2E-06	None observed	0.0054	---	---	0.0054
			Cobalt	---	---	---	---	Thyroid	0.022	---	---	0.022
			Iron	---	---	---	---	Gastrointestinal	0.024	---	---	0.024
			Manganese	---	---	---	---	Nervous system	0.014	---	---	0.014
			Thallium	---	---	---	---	Hair	0.025	---	---	0.025
			Chemical Total	2.1E-06	---	1.2E-07	2.2E-06		0.11	---	0.0019	0.12
		Launcher Area Total					2.2E-06					0.12
	Surface Soil Total						2.2E-06					0.12
	Air	Launcher Area	Benzo(a)pyrene	---	5.2E-15	---	5.2E-15	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	---	0.000011	---	0.000011
			Arsenic	---	1.7E-11	---	1.7E-11	Developmental, Cardiovascular system, Nervous system, Lung, Skin	---	0.0000018	---	0.0000018
			Chromium	---	1.2E-09	---	1.2E-09	Respiratory System	---	0.0000010	---	0.0000010
			Cobalt	---	5.2E-11	---	5.2E-11	Respiratory System	---	0.0000068	---	0.0000068
			Iron	---	---	---	---	---	---	---	---	---
			Manganese	---	---	---	---	Nervous system	---	0.000041	---	0.000041
			Thallium	---	---	---	---	---	---	---	---	---
			Chemical Total	---	1.3E-09	---	1.3E-09		---	0.000062	---	0.000062
		Launcher Area Total					1.3E-09					0.000062
	Air Total						1.3E-09					0.000062
Total Launcher Area Soil							2.2E-06					0.12

Total Risk Across All Media - AMAC Building Area	3.3E-06	Total Hazard Across All Media - AMAC Building Area	0.12
Total Risk Across All Media - Launcher Area	2.2E-06	Total Hazard Across All Media - Launcher Area	0.12

Table 5-68
Summary of Receptor Risks and Hazards for COPCs - AMAC Client
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Client
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	AMAC Building Area	1,1-Biphenyl	1.8E-09	---	---	1.8E-09	Kidney	0.0000032	---	---	0.0000032
			cis-1,2-Dichloroethene	---	---	---	---	Kidney	0.022	---	---	0.022
			Trichloroethene	4.0E-07	---	---	4.0E-07	Immune System, Cardiovascular System, Developmental	0.12	---	---	0.12
			Chromium	1.8E-06	---	---	1.8E-06	None observed	0.0086	---	---	0.0086
			Manganese	---	---	---	---	Nervous system	0.030	---	---	0.030
			Chemical Total	2.2E-06	---	---	2.2E-06		0.18	---	---	0.18
		AMAC Building Area Total					2.2E-06					0.18
	Groundwater Total						2.2E-06					0.18
Total AMAC Building Area							2.2E-06					0.18

Total Risk Across All Media 2.2E-06

Total Hazard Across All Media 0.18

Table 5-69
Summary of Receptor Risks and Hazards for COPCs - AMAC Client
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Client
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Air	Indoor Air	AMAC Building Area	Benzene	---	1.0E-07	---	1.0E-07	Blood	---	0.0030	---	0.0030
			Chloroform	---	5.9E-07	---	5.9E-07	Liver	---	0.0018	---	0.0018
			Ethyl benzene	---	1.7E-07	---	1.7E-07	Developmental	---	0.00046	---	0.00046
			Naphthalene	---	1.0E-06	---	1.0E-06	Respiratory System	---	0.068	---	0.068
			Trichloroethene	---	3.2E-07	---	3.2E-07	Immune System, Cardiovascular System, Developmental	---	0.27	---	0.27
			Chemical Total	---	2.2E-06	---	2.2E-06		---	0.35	---	0.35
		AMAC Building Area Total					2.2E-06					0.35
	Indoor Air Total						2.2E-06					0.35
Total AMAC Building Area							2.2E-06					0.35

Total Risk Across All Media 2.2E-06

Total Hazard Across All Media 0.35

Table 5-70
Summary of Receptor Risks and Hazards for COPCs - Trespasser
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Older Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	Launcher Area	Benzo(a)pyrene	1.5E-09	---	9.1E-10	2.5E-09	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	0.0016	---	---	0.0016
			Arsenic	1.2E-07	---	1.5E-08	1.4E-07	Skin	0.0027	---	0.00033	0.0030
			Chromium	3.2E-07	---	---	3.2E-07	None observed	0.0010	---	---	0.0010
			Cobalt	---	---	---	---	Thyroid	0.0040	---	---	0.0040
			Iron	---	---	---	---	Gastrointestinal	0.0044	---	---	0.0044
			Manganese	---	---	---	---	Nervous system	0.0026	---	---	0.0026
			Thallium	---	---	---	---	Hair	0.0046	---	---	0.0046
			Chemical Total	4.4E-07	---	1.6E-08	4.6E-07		0.021	---	0.00033	0.021
		Launcher Area Total					4.6E-07					0.021
	Surface Soil Total						4.6E-07					0.021
	Air	Launcher Area	Benzo(a)pyrene	---	1.7E-14	---	1.7E-14	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	---	0.000021	---	0.000021
			Arsenic	---	2.2E-11	---	2.2E-11	Developmental, Cardiovascular system, Nervous system, Lung, Skin	---	0.0000035	---	0.0000035
			Chromium	---	3.9E-09	---	3.9E-09	Respiratory System	---	0.0000019	---	0.0000019
			Cobalt	---	7.0E-11	---	7.0E-11	Respiratory System	---	0.000013	---	0.000013
			Iron	---	---	---	---	---	---	---	---	---
			Manganese	---	---	---	---	Nervous system	---	0.000079	---	0.000079
			Thallium	---	---	---	---	---	---	---	---	---
			Chemical Total	---	4.0E-09	---	4.0E-09		---	0.00012	---	0.00012
		Launcher Area Total					4.0E-09					0.00012
	Air Total						4.0E-09					0.00012
Total Launcher Area Soil							4.6E-07					0.021

Total Risk Across All Media - Launcher Area	4.6E-07	Total Hazard Across All Media - Launcher Area	0.021

Table 5-71
Summary of Receptor Risks and Hazards for COPCs - Site Worker
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: Site Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	AMAC Building Area	Benzo(a)anthracene	2.3E-08	---	1.3E-08	3.5E-08	---	---	---	---	---
			Benzo(a)pyrene	2.3E-07	---	1.3E-07	3.5E-07	---	---	---	---	---
			Benzo(b)fluoranthene	2.8E-08	---	1.5E-08	4.4E-08	---	---	---	---	---
			Dibenzo(a,h)anthracene	4.7E-08	---	2.6E-08	7.3E-08	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	0.013	---	---	0.013
			Arsenic	2.3E-06	---	3.0E-07	2.6E-06	Skin	0.015	---	0.0018	0.016
			Chromium	5.2E-06	---	---	5.2E-06	None observed	0.0096	---	---	0.0096
			Cobalt	---	---	---	---	Thyroid	0.034	---	---	0.034
			Iron	---	---	---	---	Gastrointestinal	0.036	---	---	0.036
			Manganese	---	---	---	---	Nervous system	0.014	---	---	0.014
			Chemical Total	7.8E-06	---	4.8E-07	8.3E-06		0.12	---	0.0018	0.12
		AMAC Building Area Total					8.3E-06					0.12
	Surface Soil Total						8.3E-06					0.12
	Air	AMAC Building Area	Benzo(a)anthracene	---	6.8E-13	---	6.8E-13	---	---	---	---	---
			Benzo(a)pyrene	---	6.8E-12	---	6.8E-12	---	---	---	---	---
			Benzo(b)fluoranthene	---	8.4E-13	---	8.4E-13	---	---	---	---	---
			Dibenzo(a,h)anthracene	---	1.5E-12	---	1.5E-12	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	---	0.00052	---	0.00052
			Arsenic	---	1.3E-09	---	1.3E-09	Developmental, Cardiovascular system, Nervous system, Lung, Skin	---	0.000058	---	0.000058
			Chromium	---	1.7E-07	---	1.7E-07	Respiratory System	---	0.000057	---	0.000057
			Cobalt	---	6.4E-09	---	6.4E-09	Respiratory System	---	0.00033	---	0.00033
			Iron	---	---	---	---	---	---	---	---	---
			Manganese	---	---	---	---	Nervous system	---	0.0013	---	0.0013
			Chemical Total	---	1.8E-07	---	1.8E-07		---	0.0023	---	0.0023
		AMAC Building Area Total					1.8E-07					0.0023
	Air Total						1.8E-07					0.0023
Total AMAC Building Area Soil							8.5E-06					0.13

Table 5-71
Summary of Receptor Risks and Hazards for COPCs - Site Worker
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: Site Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	Launcher Area	Benzo(a)pyrene	1.4E-08	---	7.7E-09	2.2E-08	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	0.009	---	---	0.009
			Arsenic	2.4E-06	---	3.0E-07	2.7E-06	Skin	0.015	---	0.0019	0.017
			Chromium	2.9E-06	---	---	2.9E-06	None observed	0.0054	---	---	0.0054
			Cobalt	---	---	---	---	Thyroid	0.022	---	---	0.022
			Iron	---	---	---	---	Gastrointestinal	0.024	---	---	0.024
			Manganese	---	---	---	---	Nervous system	0.014	---	---	0.014
			Thallium	---	---	---	---	Hair	0.025	---	---	0.025
			Chemical Total	5.3E-06	---	3.1E-07	5.6E-06		0.11	---	0.0019	0.12
		Launcher Area Total					5.6E-06					0.12
	Surface Soil Total						5.6E-06					0.12
	Air	Launcher Area	Benzo(a)pyrene	---	4.1E-13	---	4.1E-13	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	---	0.00035	---	0.00035
			Arsenic	---	1.3E-09	---	1.3E-09	Developmental, Cardiovascular system, Nervous system, Lung, Skin	---	0.000058	---	0.000058
			Chromium	---	9.6E-08	---	9.6E-08	Respiratory System	---	0.000032	---	0.000032
			Cobalt	---	4.2E-09	---	4.2E-09	Respiratory System	---	0.00022	---	0.00022
			Iron	---	---	---	---	---	---	---	---	---
			Manganese	---	---	---	---	Nervous system	---	0.0013	---	0.0013
			Thallium	---	---	---	---	---	---	---	---	---
			Chemical Total	---	1.0E-07	---	1.0E-07		---	0.0020	---	0.0020
		Launcher Area Total					1.0E-07					0.0020
	Air Total						1.0E-07					0.0020
Total Launcher Area Soil							5.7E-06					0.12

Total Risk Across All Media - AMAC Building Area	8.5E-06	Total Hazard Across All Media - AMAC Building Area	0.13
Total Risk Across All Media - Launcher Area	5.7E-06	Total Hazard Across All Media - Launcher Area	0.12

Table 5-72
Summary of Receptor Risks and Hazards for COPCs - Construction Worker
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Total Soil	Entire Site	Benzo(a)anthracene	4.7E-10	---	2.0E-10	6.7E-10	---	---	---	---	---
			Benzo(a)pyrene	4.7E-09	---	2.0E-09	6.7E-09	---	---	---	---	---
			Benzo(b)fluoranthene	3.0E-10	---	1.3E-10	4.3E-10	---	---	---	---	---
			Dibenzo(a,h)anthracene	3.2E-10	---	1.3E-10	4.5E-10	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	0.026	---	---	0.026
			Arsenic	1.1E-07	---	1.1E-08	1.2E-07	Skin	0.035	---	0.0033	0.038
			Chromium	1.9E-07	---	---	1.9E-07	None observed	0.018	---	---	0.018
			Cobalt	---	---	---	---	Thyroid	0.068	---	---	0.068
			Iron	---	---	---	---	Gastrointestinal	0.069	---	---	0.069
			Manganese	---	---	---	---	Nervous system	0.036	---	---	0.036
			Thallium	---	---	---	---	Hair	0.080	---	---	0.080
			Chemical Total	3.1E-07	---	1.3E-08	3.2E-07		0.33	---	0.0033	0.33
		Entire Site Total					3.2E-07					0.33
	Total Soil Total						3.2E-07					0.33
	Air	Entire Site	Benzo(a)anthracene	---	4.2E-15	---	4.2E-15	---	---	---	---	---
			Benzo(a)pyrene	---	4.3E-14	---	4.3E-14	---	---	---	---	---
			Benzo(b)fluoranthene	---	2.7E-15	---	2.7E-15	---	---	---	---	---
			Dibenzo(a,h)anthracene	---	3.2E-15	---	3.2E-15	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	---	0.00031	---	0.00031
			Arsenic	---	1.9E-11	---	1.9E-11	Developmental, Cardiovascular system, Nervous system, Lung, Skin	---	0.000041	---	0.000041
			Chromium	---	1.9E-09	---	1.9E-09	Respiratory System	---	0.000032	---	0.000032
			Cobalt	---	7.8E-11	---	7.8E-11	Respiratory System	---	0.00020	---	0.00020
			Iron	---	---	---	---	---	---	---	---	---
			Manganese	---	---	---	---	Nervous system	---	0.0010	---	0.0010
			Thallium	---	---	---	---	---	---	---	---	---
			Chemical Total	---	2.0E-09	---	2.0E-09		---	0.0016	---	0.0016
		Entire Site Total					2.0E-09					0.0016
	Air Total						2.0E-09					0.0016
Total Entire Site Soil							3.2E-07					0.34

Total Risk Across All Media - Entire Site	3.2E-07	Total Hazard Across All Media - Entire Site	0.34

Table 5-73
Summary of Receptor Risks and Hazards for COPCs - Commercial/Industrial Worker
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Total Soil	Entire Site	Benzo(a)anthracene	7.1E-10	---	7.8E-10	1.5E-09	---	---	---	---	---
			Benzo(a)pyrene	7.2E-09	---	7.9E-09	1.5E-08	---	---	---	---	---
			Benzo(b)fluoranthene	4.6E-10	---	5.0E-10	9.6E-10	---	---	---	---	---
			Dibenzo(a,h)anthracene	4.9E-10	---	5.3E-10	1.0E-09	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	0.00079	---	---	0.00079
			Arsenic	1.7E-07	---	4.3E-08	2.1E-07	Skin	0.0011	---	0.00027	0.0013
			Chromium	2.9E-07	---	---	2.9E-07	None observed	0.00054	---	---	0.00054
			Cobalt	---	---	---	---	Thyroid	0.0021	---	---	0.0021
			Iron	---	---	---	---	Gastrointestinal	0.0021	---	---	0.0021
			Manganese	---	---	---	---	Nervous system	0.0011	---	---	0.0011
			Thallium	---	---	---	---	Hair	0.0024	---	---	0.0024
			Chemical Total	4.7E-07	---	5.3E-08	5.2E-07		0.010	---	0.000267	0.010
		Entire Site Total					5.2E-07					0.010
	Total Soil Total						5.2E-07					0.010
	Air	Entire Site	Benzo(a)anthracene	---	4.2E-14	---	4.2E-14	---	---	---	---	---
			Benzo(a)pyrene	---	4.3E-13	---	4.3E-13	---	---	---	---	---
			Benzo(b)fluoranthene	---	2.7E-14	---	2.7E-14	---	---	---	---	---
			Dibenzo(a,h)anthracene	---	3.2E-14	---	3.2E-14	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	---	0.000062	---	0.000062
			Arsenic	---	1.9E-10	---	1.9E-10	Developmental, Cardiovascular system, Nervous system, Lung, Skin	---	0.0000083	---	0.0000083
			Chromium	---	1.9E-08	---	1.9E-08	Respiratory System	---	0.0000064	---	0.0000064
			Cobalt	---	7.8E-10	---	7.8E-10	Respiratory System	---	0.000041	---	0.000041
			Iron	---	---	---	---	---	---	---	---	---
			Manganese	---	---	---	---	Nervous system	---	0.00021	---	0.00021
			Thallium	---	---	---	---	---	---	---	---	---
			Chemical Total	---	2.0E-08	---	2.0E-08		---	0.00032	---	0.00032
		Entire Site Total					2.0E-08					0.00032
	Air Total						2.0E-08					0.00032
Total Entire Site Soil							5.4E-07					0.011

Total Risk Across All Media - Entire Site	5.4E-07	Total Hazard Across All Media - Entire Site	0.011

Table 5-74
Summary of Receptor Risks and Hazards for COPCs - Commercial/Industrial Worker
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Entire Site	1,1-Biphenyl	3.1E-07	---	---	3.1E-07	Kidney	0.0002140	---	---	0.00021
			1,2,4-Trimethylbenzene	---	---	---	---	---	---	---	---	---
			1-Methylnaphthalene	5.9E-06	---	---	5.9E-06	Respiratory System	0.008103	---	---	0.0081
			Benzo(a)pyrene	5.0E-07	---	---	5.0E-07	---	---	---	---	---
			cis-1,2-Dichloroethene	---	---	---	---	Kidney	0.0081	---	---	0.0081
			Dibenzo(a,h)anthracene	2.1E-07	---	---	2.1E-07	---	---	---	---	---
			Dibenzofuran	---	---	---	---	Body and organ weight	0.017	---	---	0.017
			Naphthalene	---	---	---	---	Body Weight	0.00498	---	---	0.0050
			Trichloroethene	7.9E-07	---	---	7.9E-07	Immune System, Cardiovascular System, Developmental	0.096	---	---	0.096
			Cadmium	---	---	---	---	Kidney	0.021	---	---	0.021
			Chromium	4.6E-06	---	---	4.6E-06	None observed	0.0086	---	---	0.0086
			Cobalt	---	---	---	---	Thyroid	0.19	---	---	0.19
			Manganese	---	---	---	---	Nervous system	0.593	---	---	0.59
			Nitrate	---	---	---	---	Blood	0.033	---	---	0.033
			Chemical Total	1.2E-05	---	---	1.2E-05		0.98	---	---	0.98
		Entire Site Total					1.2E-05					0.98
	Groundwater Total						1.2E-05					0.98
Total Entire Site							1.2E-05					0.98

Total Risk Across All Media	1.2E-05	Total Hazard Across All Media	0.98

Table 5-75
Summary of Receptor Risks and Hazards for COPCs - Commercial/Industrial Worker
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Air	Indoor Air	Entire Site	Benzene	---	4.2E-07	---	4.2E-07	Blood	---	0.0051	---	0.0051
			Chloroform	---	2.5E-06	---	2.5E-06	Liver	---	0.0031	---	0.0031
			Ethyl benzene	---	7.0E-07	---	7.0E-07	Developmental	---	0.00078	---	0.00078
			Naphthalene	---	4.2E-06	---	4.2E-06	Respiratory System	---	0.115	---	0.12
			Trichloroethene	---	1.3E-06	---	1.3E-06	Immune System, Cardiovascular System, Developmental	---	0.46	---	0.46
			Chemical Total	---	9.1E-06	---	9.1E-06		---	0.58	---	0.58
		Entire Site Total					9.1E-06					0.58
	Indoor Air Total						9.1E-06					0.58
Total Entire Site							9.1E-06					0.58

Total Risk Across All Media 9.1E-06

Total Hazard Across All Media 0.58

Table 5-76
Summary of Receptor Risks and Hazards for COPCs - Age-Adjusted Resident
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Total Soil	Entire Site	Benzo(a)anthracene	2.9E-07	---	9.8E-08	3.9E-07	---	---	---	---	---
			Benzo(a)pyrene	2.9E-06	---	9.8E-07	3.9E-06	---	---	---	---	---
			Benzo(b)fluoranthene	1.9E-07	---	6.3E-08	2.5E-07	---	---	---	---	---
			Dibenzo(a,h)anthracene	2.0E-07	---	6.6E-08	2.7E-07	---	---	---	---	---
			Aluminum	---	---	---	---	---	---	---	---	---
			Arsenic	6.5E-06	---	5.5E-07	7.1E-06	---	---	---	---	---
			Chromium	1.2E-04	---	---	1.2E-04	---	---	---	---	---
			Cobalt	---	---	---	---	---	---	---	---	---
			Iron	---	---	---	---	---	---	---	---	---
			Manganese	---	---	---	---	---	---	---	---	---
			Thallium	---	---	---	---	---	---	---	---	---
			Chemical Total	1.3E-04	---	1.8E-06	1.3E-04		---	---	---	---
		Entire Site Total					1.3E-04					---
	Total Soil Total						1.3E-04					---
	Air	Entire Site	Benzo(a)anthracene	---	4.9E-12	---	4.9E-12	---	---	---	---	---
			Benzo(a)pyrene	---	4.9E-11	---	4.9E-11	---	---	---	---	---
			Benzo(b)fluoranthene	---	3.1E-12	---	3.1E-12	---	---	---	---	---
			Dibenzo(a,h)anthracene	---	3.6E-12	---	3.6E-12	---	---	---	---	---
			Aluminum	---	---	---	---	---	---	---	---	---
			Arsenic	---	3.4E-09	---	3.4E-09	---	---	---	---	---
			Chromium	---	2.2E-06	---	2.2E-06	---	---	---	---	---
			Cobalt	---	1.4E-08	---	1.4E-08	---	---	---	---	---
			Iron	---	---	---	---	---	---	---	---	---
			Manganese	---	---	---	---	---	---	---	---	---
			Thallium	---	---	---	---	---	---	---	---	---
			Chemical Total	---	2.2E-06	---	2.2E-06		---	---	---	---
		Entire Site Total					2.2E-06					---
	Air Total						2.2E-06					---
Total Entire Site Soil							1.3E-04					---

Total Risk Across All Media - Entire Site	1.3E-04	Total Hazard Across All Media - Entire Site	---

Table 5-77
Summary of Receptor Risks and Hazards for COPCs - Adult Resident
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Total Soil	Entire Site	Benzo(a)anthracene	---	---	---	---	---	---	---	---	---
			Benzo(a)pyrene	---	---	---	---	---	---	---	---	---
			Benzo(b)fluoranthene	---	---	---	---	---	---	---	---	---
			Dibenzo(a,h)anthracene	---	---	---	---	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	0.0091	---	---	0.0091
			Arsenic	---	---	---	---	Skin	0.012	---	0.0015	0.014
			Chromium	---	---	---	---	None observed	0.0062	---	---	0.0062
			Cobalt	---	---	---	---	Thyroid	0.024	---	---	0.024
			Iron	---	---	---	---	Gastrointestinal	0.024	---	---	0.024
			Manganese	---	---	---	---	Nervous system	0.013	---	---	0.013
			Thallium	---	---	---	---	Hair	0.028	---	---	0.028
			Chemical Total	---	---	---	---		0.12	---	0.0015	0.12
		Entire Site Total					---					0.12
	Total Soil Total						---					0.12
	Air	Entire Site	Benzo(a)anthracene	---	---	---	---	---	---	---	---	---
			Benzo(a)pyrene	---	---	---	---	---	---	---	---	---
			Benzo(b)fluoranthene	---	---	---	---	---	---	---	---	---
			Dibenzo(a,h)anthracene	---	---	---	---	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	---	0.0011	---	0.0011
			Arsenic	---	---	---	---	Developmental, Cardiovascular system, Nervous system, Lung, Skin	---	0.00014	---	0.00014
			Chromium	---	---	---	---	Respiratory System	---	0.00011	---	0.00011
			Cobalt	---	---	---	---	Respiratory System	---	0.00070	---	0.00070
			Iron	---	---	---	---	---	---	---	---	---
			Manganese	---	---	---	---	Nervous system	---	0.0036	---	0.0036
			Thallium	---	---	---	---	---	---	---	---	---
			Chemical Total	---	---	---	---		---	0.0056	---	0.0056
		Entire Site Total					---					0.0056
	Air Total						---					0.0056
Total Entire Site Soil							---					0.12

Total Risk Across All Media - Entire Site	---	Total Hazard Across All Media - Entire Site	0.12

Table 5-78
Summary of Receptor Risks and Hazards for COPCs - Child Resident
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Total Soil	Entire Site	Benzo(a)anthracene	---	---	---	---	---	---	---	---	---
			Benzo(a)pyrene	---	---	---	---	---	---	---	---	---
			Benzo(b)fluoranthene	---	---	---	---	---	---	---	---	---
			Dibenzo(a,h)anthracene	---	---	---	---	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	0.10	---	---	0.10
			Arsenic	---	---	---	---	Skin	0.13	---	0.0092	0.14
			Chromium	---	---	---	---	None observed	0.066	---	---	0.066
			Cobalt	---	---	---	---	Thyroid	0.25	---	---	0.25
			Iron	---	---	---	---	Gastrointestinal	0.26	---	---	0.26
			Manganese	---	---	---	---	Nervous system	0.13	---	---	0.13
			Thallium	---	---	---	---	Hair	0.30	---	---	0.30
			Chemical Total	---	---	---	---		1.2	---	0.0092	1.2
		Entire Site Total					---					1.2
	Total Soil Total						---					1.2
	Air	Entire Site	Benzo(a)anthracene	---	---	---	---	---	---	---	---	---
			Benzo(a)pyrene	---	---	---	---	---	---	---	---	---
			Benzo(b)fluoranthene	---	---	---	---	---	---	---	---	---
			Dibenzo(a,h)anthracene	---	---	---	---	---	---	---	---	---
			Aluminum	---	---	---	---	Nervous system	---	0.0011	---	0.0011
			Arsenic	---	---	---	---	Developmental, Cardiovascular system, Nervous system, Lung, Skin	---	0.00014	---	0.00014
			Chromium	---	---	---	---	Respiratory System	---	0.00011	---	0.00011
			Cobalt	---	---	---	---	Respiratory System	---	0.00070	---	0.00070
			Iron	---	---	---	---	---	---	---	---	---
			Manganese	---	---	---	---	Nervous system	---	0.0036	---	0.0036
			Thallium	---	---	---	---	---	---	---	---	---
			Chemical Total	---	---	---	---		---	0.0056	---	0.0056
		Entire Site Total					---					0.0056
	Air Total						---					0.0056
Total Entire Site Soil							---					1.2

Total Risk Across All Media - Entire Site ---

Total Hazard Across All Media - Entire Site 1.2

Total Nervous System HI Across All Media	0.24
Total Skin HI Across All Media	0.14
Total Thyroid HI Across All Media	0.25
Total Gastrointestinal HI Across All Media	0.26
Total Hair HI Across All Media	0.30
Total Developmental HI Across All Media	0.00014

Table 5-78
Summary of Receptor Risks and Hazards for COPCs - Child Resident
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
											Total Cardiovascular System HI Across All Media	0.00014
											Total Respiratory System/Lung HI Across All Media	0.00096

Table 5-79

Summary of Receptor Risks and Hazards for COPCs - Age-Adjusted Resident

LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Entire Site	1,1-Biphenyl	1.0E-06	---	1.6E-06	2.7E-06	---	---	---	---	---
			1,2,4-Trimethylbenzene	---	---	---	---	---	---	---	---	---
			1-Methylnaphthalene	2.0E-05	---	2.7E-05	4.7E-05	---	---	---	---	---
			Benzo(a)pyrene	5.2E-06	---	1.1E-04	1.2E-04	---	---	---	---	---
			cis-1,2-Dichloroethene	---	---	---	---	---	---	---	---	---
			Dibenzo(a,h)anthracene	2.2E-06	---	7.4E-05	7.6E-05	---	---	---	---	---
			Dibenzofuran	---	---	---	---	---	---	---	---	---
			Naphthalene	---	---	---	---	---	---	---	---	---
			Trichloroethene	3.8E-06	---	6.6E-07	4.5E-06	---	---	---	---	---
			Cadmium	---	---	---	---	---	---	---	---	---
			Chromium	4.8E-05	---	1.1E-05	5.9E-05	---	---	---	---	---
			Cobalt	---	---	---	---	---	---	---	---	---
			Manganese	---	---	---	---	---	---	---	---	---
			Nitrate	---	---	---	---	---	---	---	---	---
			Chemical Total	8.0E-05	---	2.3E-04	3.1E-04		---	---	---	---
		Entire Site Total					3.1E-04					---
	Groundwater Total						3.1E-04					---
	Indoor Air (while showering)	Entire Site	1,1-Biphenyl	---	---	---	---	---	---	---	---	---
			1,2,4-Trimethylbenzene	---	---	---	---	---	---	---	---	---
			1-Methylnaphthalene	---	---	---	---	---	---	---	---	---
			cis-1,2-Dichloroethene	---	---	---	---	---	---	---	---	---
			Dibenzofuran	---	---	---	---	---	---	---	---	---
			Naphthalene	---	1.9E-09	---	1.9E-09	---	---	---	---	---
			Trichloroethene	---	2.7E-10	---	2.7E-10	---	---	---	---	---
			Chemical Total	---	2.1E-09	---	2.1E-09		---	---	---	---
		Entire Site Total					2.1E-09					---
	Indoor Air Total						2.1E-09					---
Total Entire Site							3.1E-04					---

Total Risk Across All Media	3.1E-04
Total Hazard Across All Media	---

Table 5-80
Summary of Receptor Risks and Hazards for COPCs - Adult Resident
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Entire Site	1,1-Biphenyl	---	---	---	---	Kidney	0.00060	---	0.00098	0.0016
			1,2,4-Trimethylbenzene	---	---	---	---	---	---	---	---	---
			1-Methylnaphthalene	---	---	---	---	Respiratory System	0.023	---	0.033	0.055
			Benzo(a)pyrene	---	---	---	---	---	---	---	---	---
			cis-1,2-Dichloroethene	---	---	---	---	Kidney	0.023	---	0.0021	0.025
			Dibenzo(a,h)anthracene	---	---	---	---	---	---	---	---	---
			Dibenzofuran	---	---	---	---	Body and organ weight	0.048	---	0.085	0.13
			Naphthalene	---	---	---	---	Body Weight	0.014	---	0.0095	0.023
			Trichloroethene	---	---	---	---	Immune System, Cardiovascular System, Developmental	0.27	---	0.048	0.32
			Cadmium	---	---	---	---	Kidney	0.060	---	0.0071	0.067
			Chromium	---	---	---	---	None observed	0.024	---	0.0057	0.030
			Cobalt	---	---	---	---	Thyroid	0.52	---	0.0031	0.52
			Manganese	---	---	---	---	Nervous system	1.7	---	0.25	1.9
			Nitrate	---	---	---	---	Blood	0.094	---	0.00056	0.094
			Chemical Total	---	---	---	---		2.7	---	0.44	3.2
		Entire Site Total					---					3.2
	Groundwater Total						---					3.2
	Indoor Air (while showering)	Entire Site	1,1-Biphenyl	---	---	---	---	Respiratory System	---	0.00034	---	0.00034
			1,2,4-Trimethylbenzene	---	---	---	---	None observed	---	0.00011	---	0.00011
			1-Methylnaphthalene	---	---	---	---	---	---	---	---	---
			cis-1,2-Dichloroethene	---	---	---	---	---	---	---	---	---
			Dibenzofuran	---	---	---	---	---	---	---	---	---
			Naphthalene	---	---	---	---	Respiratory System	---	0.000054	---	0.000054
			Trichloroethene	---	---	---	---	Immune System, Cardiovascular System, Developmental	---	0.000095	---	0.000095
			Chemical Total	---	---	---	---		---	0.00060	---	0.00060
		Entire Site Total					---					0.00060
	Indoor Air Total						---					0.00060
Total Entire Site							---					3.2

Total Risk Across All Media	---
Total Hazard Across All Media	3.2

Total Kidney HI Across All Media	0.093
Total Respiratory System HI Across All Media	0.056
Total Body and Organ Weight HI Across All Media	0.16
Total Immune System HI Across All Media	0.32
Total Thyroid HI Across All Media	0.52
Total Nervous System HI Across All Media	1.9
Total Blood HI Across All Media	0.094

Table 5-80
Summary of Receptor Risks and Hazards for COPCs - Adult Resident
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
											Total Cardiovascular System HI Across All Media	0.32
											Total Developmental HI Across All Media	0.32

Table 5-81
Summary of Receptor Risks and Hazards for COPCs - Child Resident
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Entire Site	1,1-Biphenyl	---	---	---	---	Kidney	0.0010	---	0.0014	0.0024
			1,2,4-Trimethylbenzene	---	---	---	---	---	---	---	---	---
			1-Methylnaphthalene	---	---	---	---	Respiratory System	0.038	---	0.046	0.084
			Benzo(a)anthracene	---	---	---	---	---	---	---	---	---
			Benzo(a)pyrene	---	---	---	---	---	---	---	---	---
			cis-1,2-Dichloroethene	---	---	---	---	Kidney	0.038	---	0.0029	0.041
			Dibenzo(a,h)anthracene	---	---	---	---	---	---	---	---	---
			Dibenzofuran	---	---	---	---	Body and organ weight	0.080	---	0.12	0.20
			Naphthalene	---	---	---	---	Body Weight	0.023	---	0.014	0.037
			Trichloroethene	---	---	---	---	Immune System, Cardiovascular System, Developmental	0.45	---	0.068	0.52
			Cadmium	---	---	---	---	Kidney	0.10	---	0.0088	0.11
			Chromium	---	---	---	---	None observed	0.040	---	0.0070	0.047
			Cobalt	---	---	---	---	Thyroid	0.86	---	0.0038	0.87
			Manganese	---	---	---	---	Nervous system	2.8	---	0.31	3.1
			Nitrate	---	---	---	---	Blood	0.16	---	0.00069	0.16
			Chemical Total	---	---	---	---		4.6	---	0.58	5.1
		Entire Site Total					---					5.1
	Groundwater Total						---					5.1
Total Entire Site							---					5.1

Total Risk Across All Media	---
Total Hazard Across All Media	5.1

Total Kidney HI Across All Media	0.15
Total Respiratory System HI Across All Media	0.084
Total Body and Organ Weight HI Across All Media	0.24
Total Immune System HI Across All Media	0.52
Total Developmental HI Across All Media	0.52
TotalCardiovascular System HI Across All Media	0.52
Total Thyroid HI Across All Media	0.87
Total Nervous System HI Across All Media	3.1
Total Blood HI Across All Media	0.16

Table 5-82
Summary of Receptor Risks and Hazards for COPCs - Resident
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Air	Indoor Air	AMAC Building Area	Benzene	---	1.8E-06	---	1.8E-06	Blood	---	0.021	---	0.021
			Chloroform	---	1.1E-05	---	1.1E-05	Liver	---	0.0130	---	0.013
			Ethyl benzene	---	3.1E-06	---	3.1E-06	Developmental	---	0.0033	---	0.0033
			Naphthalene	---	1.8E-05	---	1.8E-05	Respiratory System	---	0.48	---	0.48
			Trichloroethene	---	8.4E-06	---	8.4E-06	Immune System, Cardiovascular System, Developmental	---	1.9	---	1.9
			Chemical Total	---	4.2E-05	---	4.2E-05		---	2.4	---	2.4
		AMAC Building Area Total					4.2E-05					2.4
	Indoor Air Total						4.2E-05					2.4
Total AMAC Building Area							4.2E-05					2.4

Total Risk Across All Media	4.2E-05
Total Hazard Across All Media	2.4

Total Blood HI Across All Media	0.021
Total Liver HI Across All Media	1.9
Total Developmental HI Across All Media	0.0033
Total Respiratory System/Lung HI Across All Media	0.48
Total Immune System HI Across All Media	1.9
Total Cardiovascular System HI Across All Media	1.9

Table 5-83
Risk Summary - AMAC Staff
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Staff
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	AMAC Building Area	Arsenic	3.3E-06	---	4.2E-07	3.7E-06	---	---	---	---	---
			Chromium	7.2E-06	---	---	7.2E-06	---	---	---	---	---
			Chemical Total	1.1E-05	---	4.2E-07	1.1E-05		---	---	---	---
		AMAC Building Area Total					1.1E-05					---
	Surface Soil Total						1.1E-05					---
	Air	AMAC Building Area	Arsenic	---	2.3E-10	---	2.3E-10	---	---	---	---	---
			Chromium	---	3.0E-08	---	3.0E-08	---	---	---	---	---
			Chemical Total	---	3.0E-08	---	3.0E-08		---	---	---	---
		AMAC Building Area Total					3.0E-08					---
	Air Total						3.0E-08					---
Total AMAC Building Area Soil							1.1E-05					---
Soil	Surface Soil	Launcher Area	Arsenic	3.3E-06	---	4.2E-07	3.7E-06	---	---	---	---	---
			Chromium	4.0E-06	---	---	4.0E-06	---	---	---	---	---
			Chemical Total	7.4E-06	---	4.2E-07	7.8E-06		---	---	---	---
		Launcher Area Total					7.8E-06					---
	Surface Soil Total						7.8E-06					---
	Air	Launcher Area	Arsenic	---	2.3E-10	---	2.3E-10	---	---	---	---	---
			Chromium	---	1.7E-08	---	1.7E-08	---	---	---	---	---
			Chemical Total	---	1.7E-08	---	1.7E-08		---	---	---	---
		Launcher Area Total					1.7E-08					---
	Air Total						1.7E-08					---
Total Launcher Area Soil							7.8E-06					---

Total Risk Across All Media - AMAC Building Area	1.1E-05
Total Risk Across All Media - Launcher Area	7.8E-06

Total Hazard Across All Media - AMAC Building Area	---
Total Hazard Across All Media - Launcher Area	---

Table 5-84
Risk Summary - AMAC Staff
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Staff
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	AMAC Building Area	Trichloroethene	1.4E-06	---	---	1.4E-06	---	---	---	---	---
			Chromium	6.4E-06	---	---	6.4E-06	---	---	---	---	---
			Chemical Total	7.8E-06	---	---	7.8E-06		---	---	---	---
		AMAC Building Area Total					7.8E-06					---
	Groundwater Total						7.8E-06					---
Total AMAC Building Area							7.8E-06					---

Total Risk Across All Media	7.8E-06	Total Hazard Across All Media	---

Table 5-85
Risk Summary - AMAC Staff
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Staff
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Air	Indoor Air	AMAC Building Area	Chloroform	---	3.1E-06	---	3.1E-06	---	---	---	---	---
			Naphthalene	---	5.1E-06	---	5.1E-06	---	---	---	---	---
			Trichloroethene	---	1.6E-06	---	1.6E-06	---	---	---	---	---
			Chemical Total	---	9.8E-06	---	9.8E-06		---	---	---	---
		AMAC Building Area Total					9.8E-06					---
	Indoor Air Total						9.8E-06					---
Total AMAC Building Area							9.8E-06					---

Total Risk Across All Media	9.8E-06
Total Hazard Across All Media	---

Table 5-86
Risk Summary - AMAC Client
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Client
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	AMAC Building Area	Arsenic	9.4E-07	---	1.2E-07	1.1E-06	---	---	---	---	---
			Chromium	2.1E-06	---	---	2.1E-06	---	---	---	---	---
			Chemical Total	3.0E-06	---	1.2E-07	3.1E-06		---	---	---	---
		AMAC Building Area Total					3.1E-06					---
	Surface Soil Total						3.1E-06					---
	Air	AMAC Building Area	Arsenic	---	1.7E-11	---	1.7E-11	---	---	---	---	---
			Chromium	---	2.1E-09	---	2.1E-09	---	---	---	---	---
			Chemical Total	---	2.2E-09	---	2.2E-09		---	---	---	---
		AMAC Building Area Total					2.2E-09					---
	Air Total						2.2E-09					---
Total AMAC Building Area Soil							3.1E-06					---
Soil	Surface Soil	Launcher Area	Arsenic	9.5E-07	---	1.2E-07	1.1E-06	---	---	---	---	---
			Chromium	1.2E-06	---	---	1.2E-06	---	---	---	---	---
			Chemical Total	2.1E-06	---	1.2E-07	2.2E-06		---	---	---	---
		Launcher Area Total					2.2E-06					---
	Surface Soil Total						2.2E-06					---
	Air	Launcher Area	Arsenic	---	1.7E-11	---	1.7E-11	---	---	---	---	---
			Chromium	---	1.2E-09	---	1.2E-09	---	---	---	---	---
			Chemical Total	---	1.2E-09	---	1.2E-09	---	---	---	---	---
		Launcher Area Total					1.2E-09					---
	Air Total						1.2E-09					---
Total Launcher Area Soil							2.2E-06					---

Total Risk Across All Media - AMAC Building Area	3.1E-06	Total Hazard Across All Media - AMAC Building Area	---
Total Risk Across All Media - Launcher Area	2.2E-06	Total Hazard Across All Media - Launcher Area	---

Table 5-86
Risk Summary - AMAC Client
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Client
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Air	Indoor Air	AMAC Building Area	Naphthalene	---	5.1E-06	---	5.1E-06	---	---	---	---	---
			Chemical Total	---	5.1E-06	---	5.1E-06		---	---	---	---
		AMAC Building Area Total					5.1E-06					---
	Indoor Air Total						5.1E-06					---
Total AMAC Building Area							5.1E-06					---

Total Risk Across All Media	5.1E-06
Total Hazard Across All Media	---

Table 5-87
Risk Summary - AMAC Client
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: AMAC Client
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	AMAC Building Area	Chromium	1.8E-06	---	---	1.8E-06	---	---	---	---	---
			Chemical Total	1.8E-06	---	---	1.8E-06		---	---	---	---
		AMAC Building Area Total					1.8E-06					---
	Groundwater Total						1.8E-06					---
Total AMAC Building Area							1.8E-06					---

Total Risk Across All Media	1.8E-06	Total Hazard Across All Media	---

Table 5-88
Risk Summary - Site Worker
LO-58 Site, Caribou, Maine

Scenario Timeframe: Current
Receptor Population: Site Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	AMAC Building Area	Arsenic	2.3E-06	---	3.0E-07	2.6E-06	---	---	---	---	---
			Chromium	5.2E-06	---	---	5.2E-06	---	---	---	---	---
			Chemical Total	7.5E-06	---	3.0E-07	7.8E-06		---	---	---	---
		AMAC Building Area Total					7.8E-06					---
	Surface Soil Total						7.8E-06					---
	Air	AMAC Building Area	Arsenic	---	1.3E-09	---	1.3E-09	---	---	---	---	---
			Chromium	---	1.7E-07	---	1.7E-07	---	---	---	---	---
			Chemical Total	---	1.7E-07	---	1.7E-07		---	---	---	---
		AMAC Building Area Total					1.7E-07					---
	Air Total						1.7E-07					---
Total AMAC Building Area Soil							8.0E-06					---
Soil	Surface Soil	Launcher Area	Arsenic	2.4E-06	---	3.0E-07	2.7E-06	---	---	---	---	---
			Chromium	2.9E-06	---	---	2.9E-06	---	---	---	---	---
			Chemical Total	5.3E-06	---	3.0E-07	5.6E-06		---	---	---	---
		Launcher Area Total					5.6E-06					---
	Surface Soil Total						5.6E-06					---
	Air	Launcher Area	Arsenic	---	1.3E-09	---	1.3E-09	---	---	---	---	---
			Chromium	---	9.6E-08	---	9.6E-08	---	---	---	---	---
			Chemical Total	---	9.7E-08	---	9.7E-08		---	---	---	---
		Launcher Area Total					9.7E-08					---
	Air Total						9.7E-08					---
Total Launcher Area Soil							5.7E-06					---

Total Risk Across All Media - AMAC Building Area	8.0E-06	Total Hazard Across All Media - AMAC Building Area	---
Total Risk Across All Media - Launcher Area	5.7E-06	Total Hazard Across All Media - Launcher Area	---

Table 5-89
Risk Summary - Commercial/Industrial Worker
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Entire Site	1-Methylnaphthalene	5.9E-06	---	---	5.9E-06	---	---	---	---	---
			Chromium	4.6E-06	---	---	4.6E-06	---	---	---	---	---
			Chemical Total	4.6E-06	---	---	4.6E-06		---	---	---	---
		Entire Site Total					4.6E-06					---
	Groundwater Total						4.6E-06					---
Total Entire Site							4.6E-06					---

Total Risk Across All Media 4.6E-06

Total Hazard Across All Media ---

Table 5-90
Risk Summary - Commercial/Industrial Worker
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Air	Indoor Air	AMAC Building Area	Chloroform	---	2.5E-06	---	2.5E-06	---	---	---	---	---
			Naphthalene	---	4.2E-06	---	4.2E-06	---	---	---	---	---
			Trichloroethene	---	1.3E-06	---	1.3E-06	---	---	---	---	---
			Chemical Total	---	8.0E-06	---	8.0E-06		---	---	---	---
		AMAC Building Area Total					8.0E-06					---
	Indoor Air Total						8.0E-06					---
Total AMAC Building Area							8.0E-06					---

Total Risk Across All Media	8.0E-06	Total Hazard Across All Media	---

Table 5-91
Risk Summary - Age-Adjusted Resident
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Total Soil	Entire Site	Benzo(a)pyrene	2.9E-06	---	9.8E-07	3.9E-06	---	---	---	---	---
			Arsenic	6.5E-06	---	5.5E-07	7.1E-06	---	---	---	---	---
			Chromium	1.2E-04	---	---	1.2E-04	---	---	---	---	---
			Chemical Total	1.3E-04	---	1.5E-06	1.3E-04		---	---	---	---
		Entire Site Total					1.3E-04					---
	Total Soil Total						1.3E-04					---
	Air	Entire Site	Benzo(a)pyrene	---	4.9E-11	---	4.9E-11	---	---	---	---	---
			Arsenic	---	3.4E-09	---	3.4E-09	---	---	---	---	---
			Chromium	---	2.2E-06	---	2.2E-06	---	---	---	---	---
			Chemical Total	---	2.2E-06	---	2.2E-06		---	---	---	---
		Entire Site Total					2.2E-06					---
	Air Total						2.2E-06					---
Total Entire Site Soil							1.3E-04					---

Total Risk Across All Media - Entire Site	1.3E-04	Total Hazard Across All Media - Entire Site	---

Table 5-92
Risk Summary - Age-Adjusted Resident
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Entire Site	1,1-Biphenyl	1.0E-06	---	1.6E-06	2.7E-06	---	---	---	---	---
			1-Methylnaphthalene	2.0E-05	---	2.7E-05	4.7E-05	---	---	---	---	---
			Benzo(a)pyrene	5.2E-06	---	1.1E-04	1.2E-04	---	---	---	---	---
			Dibenzo(a,h)anthracene	2.2E-06	---	7.4E-05	7.6E-05	---	---	---	---	---
			Trichloroethene	3.8E-06	---	6.6E-07	4.5E-06	---	---	---	---	---
			Chromium	4.8E-05	---	1.1E-05	5.9E-05	---	---	---	---	---
			Chemical Total	2.8E-05	---	2.2E-04	3.1E-04		---	---	---	---
		Entire Site Total					3.1E-04					---
	Groundwater Total						3.1E-04					---
Total Entire Site							3.1E-04					---

Total Risk Across All Media	3.1E-04
Total Hazard Across All Media	---

Table 5-93
Risk Summary - Adult Resident
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Entire Site	Manganese	---	---	---	---	Nervous system	1.7	---	---	1.7
			Chemical Total	---	---	---	---		1.7	---	---	1.7
		Entire Site Total					---					1.7
	Groundwater Total						---					1.7
Total Entire Site							---					1.7

Total Risk Across All Media	---	Total Hazard Across All Media	1.7

Table 5-94
Risk Summary - Child Resident
LO-58 Site, Caribou, Maine

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Entire Site	Manganese	---	---	---	---	Nervous system	2.8	---	0.3050	3.1
			Chemical Total	---	---	---	---		2.8	---	0.3050	3.1
		Entire Site Total					---					3.1
	Groundwater Total						---					3.1
Total Entire Site							---					3.1

Total Risk Across All Media	---	Total Hazard Across All Media	3.1

Table 5-95

Summary of Cumulative Cancer Risks
LO-58 Site, Caribou, Maine

	Cancer Risks											
	AMAC Building Area				Launcher Area				Entire Site			
Receptor	**Soil**	**Groundwater**	**Indoor Air**	**Total**	**Soil**	**Groundwater**	**Indoor Air**	**Total**	**Soil**	**Groundwater**	**Indoor Air**	**Total**
AMAC Staff	1.2E-05	7.8E-06	1.1E-05	3.1E-05	7.8E-06	---	---	7.8E-06	---	---	---	---
AMAC Client	3.3E-06	2.2E-06	2.2E-06	7.7E-06	2.2E-06	---	---	2.2E-06	---	---	---	---
Launcher Area Trespasser	---	---	---	---	4.6E-07	---	---	4.6E-07	---	---	---	---
Site Worker	8.5E-06	---	---	8.5E-06	5.7E-06	---	---	5.7E-06	---	---	---	---
Future Construction Worker	---	---	---	---	---	---	---	---	3.2E-07	---	---	3.2E-07
Future Commercial/Industrial Worker	---	---	---	---	---	---	---	---	5.4E-07	1.2E-05	9.1E-06	2.2E-05
Hypothetical Future Resident	---	---	---	---	---	---	---	---	**1.3E-04**	**3.1E-04**	4.2E-05	**4.9E-04**

Note: Bolded values indicate an exceedance of the EPA acceptable cancer risk range of 1E-04 to 1E-06.

Table 5-96

Summary of Cumulative Noncancer HIs
LO-58 Site, Caribou, Maine

Receptor	Noncancer HIs													
	AMAC Building Area				Launcher Area				Entire Site					
	Soil	Groundwater	Indoor Air	Total	Soil	Groundwater	Indoor Air	Total	Soil	Groundwater	Groundwater Target Organ HI > 1	Indoor Air	Indoor Air Target Organ HI > 1	Total
AMAC Staff	0.12	0.18	0.51	0.81	0.12	---	---	0.12	---	---	---	---	---	---
AMAC Client	0.12	0.18	0.35	0.65	0.12	---	---	0.12	---	---	---	---	---	---
Launcher Area Trespasser	---	---	---	---	0.021	---	---	0.021	---	---	---	---	---	---
Site Worker	0.13	---	---	0.13	0.12	---	---	0.12	---	---	---	---	---	---
Future Construction Worker	---	---	---	---	---	---	---	---	0.34	---	---	---	---	0.34
Future Commercial/Industrial Worker	---	---	---	---	---	---	---	---	0.011	0.98	---	0.58	---	1.57
Hypothetical Future Resident	---	---	---	---	---	---	---	---	**1.4** *	**8.3**	Nervous System	**2.4**	Immune System	**12.1**

Note: Bolded values indicate an exceedance of the noncancer threshold of 1.0.
* Although the total HI exceeded 1.0, none of the individual COPCs had target organs HIs greater than 1.0.

SECTION 6

TABLES

Table 6-1
Surface Soil Summary Table
LO-58
Caribou, Maine

Analyte	Units	FOD	Range of Detects			Maximum Detect Sample ID	Range of LOQs			Average	Standard Deviation
1,1-Biphenyl	mg/kg	1/16	3.30E-03	-	3.30E-03	LO58-SD-DUP-01	7.20E-04	-	1.10E-02	1.48E-03	2.10E-03
1,4-Dichlorobenzene	mg/kg	5/17	7.20E-04	-	3.60E-03	LO58-SB14-0001	5.30E-03	-	5.60E-01	3.71E-02	1.33E-01
2-Butanone (MEK)	mg/kg	13/16	6.00E-03	-	3.30E-02	LO58-SB03-0002 and LO58-SD02-100712	4.70E-03	-	5.80E-03	1.35E-02	9.59E-03
4-Isopropyltoluene	mg/kg	3/16	1.70E-04	-	3.50E-04	LO58-SD02-100712	5.30E-03	-	6.90E-03	4.80E-03	2.29E-03
4-Methyl-2-pentanone	mg/kg	5/16	2.00E-03	-	6.50E-03	LO58-SD02-100712	5.30E-03	-	7.80E-03	5.48E-03	1.34E-03
Acetone	mg/kg	16/16	7.40E-02	-	5.90E-01	LO58-SB-DUP-02	NA			2.46E-01	1.28E-01
Carbon disulfide	mg/kg	5/16	5.80E-04	-	1.80E-02	LO58-SB07-0002	5.30E-03	-	1.10E-02	6.50E-03	4.56E-03
Iodomethane	mg/kg	4/16	1.10E-03	-	3.00E-03	LO58-SD02-100712	4.70E-03	-	6.90E-03	4.78E-03	1.77E-03
Methyl acetate	mg/kg	14/16	3.60E-03	-	1.80E-01	LO58-SD02-100712	6.10E-03	-	7.80E-03	2.56E-02	4.28E-02
n-Butylbenzene	mg/kg	3/16	4.00E-04	-	5.80E-04	LO58-SB11-0001	4.70E-03	-	1.10E-02	5.19E-03	2.75E-03
o-Xylene	mg/kg	1/16	9.90E-05	-	9.90E-05	LO58-SB10-0002	4.70E-03	-	1.10E-02	5.87E-03	2.13E-03
p-Chlorotoluene	mg/kg	1/16	5.60E-04	-	5.60E-04	LO58-SB09-0002	4.70E-03	-	1.10E-02	5.92E-03	2.04E-03
Toluene	mg/kg	2/16	2.50E-04	-	6.30E-04	LO58-SD02-100712	5.30E-03	-	7.80E-03	5.29E-03	2.01E-03
Xylene (total)	mg/kg	1/16	9.90E-05	-	9.90E-05	LO58-SB10-0002	4.70E-03	-	1.10E-02	5.87E-03	2.13E-03
Bis(2-Ethylhexyl)phthalate	mg/kg	7/16	2.50E-02	-	5.20E-02	LO58-SD-DUP-01	3.60E-01	-	5.60E-01	2.28E-01	1.76E-01
1-Methylnaphthalene	mg/kg	9/16	1.90E-04	-	4.00E-03	LO58-SD02-042112	7.20E-04	-	9.00E-03	1.25E-03	2.25E-03
1-Methylphenanthrene	mg/kg	12/16	6.40E-04	-	4.20E-02	LO58-SD02-042112	7.20E-04	-	7.90E-04	6.15E-03	1.17E-02
2,3,5-Trimethylnaphthalene	mg/kg	2/16	5.40E-04	-	3.80E-03	LO58-SD02-042112	7.20E-04	-	9.00E-03	1.44E-03	2.12E-03
2,6-Dimethylnaphthalene	mg/kg	6/16	1.90E-04	-	2.80E-03	LO58-SD02-042112	7.20E-04	-	1.10E-02	1.26E-03	2.15E-03
2-Methylnaphthalene	mg/kg	11/16	2.10E-04	-	4.60E-03	LO58-SD-DUP-01	7.20E-04	-	9.00E-03	1.26E-03	2.31E-03
Acenaphthene	mg/kg	6/16	2.30E-04	-	6.40E-03	LO58-SB03-0002	7.20E-04	-	9.10E-04	1.39E-03	1.75E-03
Acenaphthylene	mg/kg	11/16	3.40E-04	-	2.20E-02	LO58-SD-DUP-01	7.20E-04	-	7.90E-04	2.36E-03	4.85E-03
Anthracene	mg/kg	12/16	2.80E-04	-	2.60E-02	LO58-SB03-0002	7.20E-04	-	9.10E-04	3.19E-03	6.84E-03
Benzo(a)anthracene	mg/kg	15/16	2.00E-04	-	2.20E-01	LO58-SD02-042112	7.90E-04	-	7.90E-04	2.83E-02	6.37E-02
Benzo(a)pyrene	mg/kg	15/16	1.90E-04	-	2.40E-01	LO58-SD02-042112	7.90E-04	-	7.90E-04	2.96E-02	6.66E-02
Benzo(b)fluoranthene	mg/kg	16/16	2.20E-04	-	3.90E-01	LO58-SD02-042112	NA			4.24E-02	9.88E-02
Benzo(e)pyrene	mg/kg	15/16	2.40E-04	-	2.00E-01	LO58-SD02-042112	7.90E-04	-	7.90E-04	2.46E-02	5.31E-02
Benzo(g,h,i)perylene	mg/kg	14/16	3.70E-04	-	1.70E-01	LO58-SD02-042112	7.50E-04	-	7.90E-04	1.67E-02	4.19E-02
Benzo(k)fluoranthene	mg/kg	15/16	1.90E-04	-	1.60E-01	LO58-SB03-0002	7.90E-04	-	7.90E-04	2.21E-02	4.54E-02
Chrysene	mg/kg	15/16	2.90E-04	-	2.30E-01	LO58-SD02-042112	7.90E-04	-	7.90E-04	3.07E-02	6.67E-02
Dibenzo(a,h)anthracene	mg/kg	12/16	4.20E-04	-	4.60E-02	LO58-SD02-042112	7.20E-04	-	7.90E-04	6.27E-03	1.34E-02
Dibenzothiophene	mg/kg	12/16	2.10E-04	-	9.50E-03	LO58-SD02-042112	7.20E-04	-	9.10E-04	1.48E-03	2.60E-03
Fluoranthene	mg/kg	15/16	5.30E-04	-	4.10E-01	LO58-SD02-042112	7.90E-04	-	7.90E-04	5.59E-02	1.22E-01
Fluorene	mg/kg	12/16	2.30E-04	-	9.50E-03	LO58-SD02-042112	7.20E-04	-	7.90E-04	1.53E-03	2.58E-03
High Molecular Weight PAHs	mg/kg	16/16	4.28E-03	-	2.14E+00	LO58-SD02-042112	NA			2.81E-01	6.27E-01
Indeno(1,2,3-cd)pyrene	mg/kg	15/16	1.90E-04	-	1.50E-01	LO58-SD02-042112	7.90E-04	-	7.90E-04	1.88E-02	4.15E-02
Low Molecular Weight PAHs	mg/kg	16/17	9.06E-03	-	1.22E+00	LO58-SD02-042112	1.10E-02	-	1.10E-02	1.28E-01	3.14E-01
Naphthalene	mg/kg	6/17	2.40E-04	-	5.10E-03	LO58-SD-DUP-01	7.20E-04	-	1.10E-02	1.98E-03	3.22E-03
Perylene	mg/kg	12/16	5.30E-04	-	5.90E-02	LO58-SD02-042112	7.20E-04	-	7.90E-04	7.42E-03	1.63E-02
Phenanthrene	mg/kg	15/16	2.80E-04	-	1.70E-01	LO58-SD02-042112	7.90E-04	-	7.90E-04	2.22E-02	4.68E-02
Pyrene	mg/kg	15/16	3.70E-04	-	4.40E-01	LO58-SD02-042112	7.90E-04	-	7.90E-04	5.46E-02	1.24E-01
Aroclor 1260	mg/kg	4/18	5.30E-03	-	4.90E-02	LO58-SS02-100212	1.80E-02	-	2.30E-02	2.05E-02	8.05E-03
Aluminum	mg/Kg	16/16	1.30E+04	-	2.56E+04	LO58-SB03-0002	NA			1.71E+04	3.06E+03

Table 6-1
Surface Soil Summary Table
LO-58
Caribou, Maine

Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of LOQs	Average	Standard Deviation
Antimony	mg/Kg	7/9	3.50E-01 - 6.80E-01	LO58-SD-DUP-01	4.60E+00 - 8.30E+00	1.43E+00	1.80E+00
Arsenic	mg/Kg	16/16	4.80E+00 - 2.40E+01	LO58-SD02-042112	NA	8.58E+00	4.37E+00
Barium	mg/Kg	16/16	2.92E+01 - 8.51E+01	LO58-SD02-042112	NA	4.65E+01	1.50E+01
Beryllium	mg/Kg	16/16	5.00E-01 - 1.40E+00	LO58-SB03-0002	NA	7.23E-01	2.32E-01
Cadmium	mg/Kg	14/16	6.50E-02 - 5.30E-01	LO58-SD-DUP-01	3.30E-01 - 2.30E+00	3.04E-01	5.49E-01
Calcium	mg/Kg	16/16	5.71E+02 - 9.57E+03	LO58-SB07-0002	NA	3.71E+03	3.33E+03
Chromium	mg/Kg	16/16	2.80E+01 - 5.63E+01	LO58-SB03-0002	NA	3.24E+01	6.83E+00
Cobalt	mg/Kg	16/16	9.10E+00 - 1.96E+01	LO58-SB03-0002	NA	1.22E+01	2.49E+00
Copper	mg/Kg	16/16	1.87E+01 - 7.31E+01	LO58-SD-DUP-01	NA	3.46E+01	1.42E+01
Iron	mg/Kg	16/16	2.84E+04 - 4.93E+04	LO58-SB03-0002	NA	3.25E+04	4.85E+03
Lead	mg/Kg	16/16	1.29E+01 - 3.42E+01	LO58-SB08-0001	NA	1.93E+01	5.57E+00
Magnesium	mg/Kg	16/16	6.10E+03 - 1.66E+04	LO58-SB03-0002	NA	8.68E+03	2.36E+03
Manganese	mg/Kg	16/16	4.64E+02 - 7.80E+02	LO58-SB12-0001	NA	5.89E+02	8.52E+01
Mercury	mg/Kg	16/16	2.50E-02 - 3.50E-01	LO58-SB08-0001	NA	8.70E-02	8.60E-02
Nickel	mg/Kg	16/16	3.20E+01 - 8.46E+01	LO58-SB03-0002	NA	4.35E+01	1.24E+01
Potassium	mg/Kg	16/16	6.11E+02 - 1.31E+03	LO58-SB03-0002	NA	8.77E+02	2.19E+02
Selenium	mg/Kg	9/16	8.50E-01 - 2.30E+00	LO58-SB11-0001	2.40E+00 - 1.62E+01	2.95E+00	3.65E+00
Sodium	mg/Kg	16/16	2.27E+01 - 9.90E+01	LO58-SD02-042112	NA	3.62E+01	1.71E+01
Thallium	mg/Kg	1/16	4.90E-01 - 4.90E-01	LO58-SB04-0002	1.60E+00 - 3.50E+00	1.92E+00	5.33E-01
Vanadium	mg/Kg	16/16	1.64E+01 - 3.01E+01	LO58-SD02-042112	NA	2.39E+01	3.84E+00
Zinc	mg/Kg	16/16	5.00E+01 - 1.25E+02	LO58-SD-DUP-01	NA	6.44E+01	1.94E+01
Total Organic Carbon (TOC)	mg/Kg	1/1	5.79E+04 - 6.06E+04	LO58-SD-DUP-01	NA	5.93E+04	NC

FOD = Frequency of Detection.
LOQ = Limit of Quantitation.

Table 6-2
Drainageway Soil Summary Table
LO-58
Caribou, Maine

Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of LOQs	Average	Standard Deviation
1,1-Biphenyl	mg/kg	1/3	3.30E-03 - 3.30E-03	LO58-SD-DUP-01	9.70E-03 - 2.40E-02	1.23E-02	1.06E-02
2-Butanone (MEK)	mg/kg	3/3	3.30E-02 - 4.10E-02	LO58-SD01-100712	NA	3.63E-02	4.16E-03
2-Hexanone	mg/kg	1/3	9.70E-02 - 9.70E-02	LO58-SD01-100712	5.80E-03 - 1.10E-02	3.79E-02	5.12E-02
4-Isopropyltoluene	mg/kg	3/3	3.50E-04 - 2.30E-03	LO58-SD03-100712	NA	1.14E-03	1.02E-03
4-Methyl-2-pentanone	mg/kg	2/3	6.50E-03 - 6.60E-03	LO58-SD03-100712	1.20E-02 - 1.20E-02	8.37E-03	3.15E-03
Acetone	mg/kg	3/3	3.90E-01 - 5.30E-01	LO58-SD01-100712	NA	4.43E-01	7.57E-02
Carbon disulfide	mg/kg	1/3	8.80E-04 - 8.80E-04	LO58-SD03-100712	1.10E-02 - 1.20E-02	7.96E-03	6.15E-03
Iodomethane	mg/kg	3/3	2.10E-03 - 4.50E-03	LO58-SD01-100712	NA	3.20E-03	1.21E-03
Methyl acetate	mg/kg	3/3	1.20E-02 - 1.80E-01	LO58-SD02-100712	NA	1.01E-01	8.44E-02
Styrene	mg/kg	1/3	2.20E-03 - 2.20E-03	LO58-SD01-100712	5.80E-03 - 1.10E-02	6.33E-03	4.42E-03
Toluene	mg/kg	3/3	6.30E-04 - 2.40E-03	LO58-SD03-100712	NA	1.29E-03	9.67E-04
Bis(2-Ethylhexyl)phthalate	mg/kg	2/3	5.20E-02 - 8.80E-02	LO58-SD03-042112	5.60E-01 - 5.60E-01	2.33E-01	2.83E-01
Butylbenzylphthalate	mg/kg	1/3	4.00E-02 - 4.00E-02	LO58-SD03-042112	5.50E-01 - 5.60E-01	3.85E-01	2.99E-01
Di-n-octyl phthalate	mg/kg	1/3	8.80E-02 - 8.80E-02	LO58-SD03-042112	5.50E-01 - 5.60E-01	4.01E-01	2.71E-01
1-Methylnaphthalene	mg/kg	3/3	3.40E-03 - 9.60E-03	LO58-SD03-042112	NA	5.63E-03	3.44E-03
1-Methylphenanthrene	mg/kg	3/3	3.30E-02 - 1.20E-01	LO58-SD03-042112	NA	6.47E-02	4.81E-02
2,3,5-Trimethylnaphthalene	mg/kg	3/3	2.90E-03 - 1.20E-02	LO58-SD03-042112	NA	6.15E-03	5.07E-03
2,6-Dimethylnaphthalene	mg/kg	2/3	2.80E-03 - 9.30E-03	LO58-SD03-042112	9.70E-03 - 1.10E-02	7.27E-03	3.87E-03
2-Methylnaphthalene	mg/kg	3/3	3.40E-03 - 1.10E-02	LO58-SD03-042112	NA	6.32E-03	4.10E-03
Acenaphthene	mg/kg	2/3	5.00E-03 - 1.20E-02	LO58-SD03-042112	9.70E-03 - 9.70E-03	8.95E-03	3.49E-03
Acenaphthylene	mg/kg	3/3	1.60E-02 - 2.60E-02	LO58-SD03-042112	NA	2.13E-02	4.04E-03
Anthracene	mg/kg	3/3	9.40E-03 - 5.20E-02	LO58-SD03-042112	NA	2.48E-02	2.36E-02
Benzo(a)anthracene	mg/kg	3/3	1.50E-01 - 5.70E-01	LO58-SD03-042112	NA	3.10E-01	2.27E-01
Benzo(a)pyrene	mg/kg	3/3	1.70E-01 - 4.90E-01	LO58-SD03-042112	NA	2.95E-01	1.71E-01
Benzo(b)fluoranthene	mg/kg	3/3	2.70E-01 - 7.60E-01	LO58-SD03-042112	NA	4.63E-01	2.61E-01
Benzo(e)pyrene	mg/kg	3/3	1.40E-01 - 3.90E-01	LO58-SD03-042112	NA	2.38E-01	1.33E-01
Benzo(g,h,i)perylene	mg/kg	3/3	1.50E-01 - 3.40E-01	LO58-SD03-042112	NA	2.20E-01	1.04E-01
Benzo(k)fluoranthene	mg/kg	3/3	8.50E-02 - 2.50E-01	LO58-SD03-042112	NA	1.48E-01	8.89E-02
Carbazole	mg/kg	1/3	3.50E-02 - 3.50E-02	LO58-SD03-042112	5.50E-01 - 5.60E-01	3.83E-01	3.02E-01
Chrysene	mg/kg	3/3	1.70E-01 - 5.30E-01	LO58-SD03-042112	NA	3.07E-01	1.95E-01
Dibenzo(a,h)anthracene	mg/kg	3/3	4.40E-02 - 1.00E-01	LO58-SD03-042112	NA	6.32E-02	3.19E-02
Dibenzothiophene	mg/kg	3/3	7.60E-03 - 3.00E-02	LO58-SD03-042112	NA	1.56E-02	1.25E-02
Fluoranthene	mg/kg	3/3	3.00E-01 - 9.70E-01	LO58-SD03-042112	NA	5.52E-01	3.65E-01
Fluorene	mg/kg	3/3	7.70E-03 - 2.90E-02	LO58-SD03-042112	NA	1.53E-02	1.19E-02
High Molecular Weight PAHs	mg/kg	3/3	1.66E+00 - 4.97E+00	LO58-SD03-042112	NA	2.92E+00	1.79E+00
Indeno(1,2,3-cd)pyrene	mg/kg	3/3	1.40E-01 - 3.10E-01	LO58-SD03-042112	NA	1.98E-01	9.67E-02
Low Molecular Weight PAHs	mg/kg	3/6	1.10E+00 - 1.82E+00	LO58-SD03-042112	5.80E-03 - 1.20E-02	6.95E-01	7.90E-01
Naphthalene	mg/kg	3/6	3.90E-03 - 8.80E-03	LO58-SD03-042112	5.80E-03 - 1.20E-02	7.74E-03	3.35E-03
Perylene	mg/kg	3/3	3.90E-02 - 1.30E-01	LO58-SD03-042112	NA	7.45E-02	4.87E-02
Phenanthrene	mg/kg	3/3	1.30E-01 - 5.00E-01	LO58-SD03-042112	NA	2.63E-01	2.06E-01
Pyrene	mg/kg	3/3	2.90E-01 - 1.10E+00	LO58-SD03-042112	NA	6.05E-01	4.34E-01
Aroclor 1260	mg/kg	2/3	2.00E-02 - 3.60E-02	LO58-SD03-042112	2.90E-02 - 2.90E-02	2.83E-02	8.02E-03
Aluminum	mg/Kg	3/3	1.73E+04 - 2.22E+04	LO58-SD01-042112	NA	2.03E+04	2.60E+03
Antimony	mg/Kg	1/3	6.80E-01 - 6.80E-01	LO58-SD-DUP-01	6.70E+00 - 1.68E+01	8.06E+00	8.15E+00

Drainageway Soil Summary Table
LO-58
Caribou, Maine

Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of LOQs	Average	Standard Deviation
Arsenic	mg/Kg	3/3	1.68E+01 - 2.40E+01	LO58-SD02-042112	NA	1.98E+01	3.68E+00
Barium	mg/Kg	3/3	6.84E+01 - 1.00E+02	LO58-SD01-042112	NA	8.43E+01	1.58E+01
Beryllium	mg/Kg	3/3	5.70E-01 - 7.70E-01	LO58-SD01-042112	NA	6.52E-01	1.05E-01
Cadmium	mg/Kg	3/3	3.70E-01 - 5.30E-01	LO58-SD-DUP-01	NA	4.48E-01	7.32E-02
Calcium	mg/Kg	3/3	4.80E+03 - 7.61E+03	LO58-SD03-042112	NA	6.30E+03	1.41E+03
Chromium	mg/Kg	3/3	2.96E+01 - 3.35E+01	LO58-SD01-042112	NA	3.16E+01	1.95E+00
Cobalt	mg/Kg	3/3	9.00E+00 - 1.07E+01	LO58-SD03-042112	NA	9.65E+00	9.18E-01
Copper	mg/Kg	3/3	4.74E+01 - 7.31E+01	LO58-SD-DUP-01	NA	6.22E+01	1.31E+01
Iron	mg/Kg	3/3	3.01E+04 - 3.15E+04	LO58-SD03-042112	NA	3.07E+04	7.29E+02
Lead	mg/Kg	3/3	2.28E+01 - 3.01E+01	LO58-SD-DUP-01	NA	2.72E+01	3.78E+00
Magnesium	mg/Kg	3/3	5.59E+03 - 7.45E+03	LO58-SD03-042112	NA	6.42E+03	9.45E+02
Manganese	mg/Kg	3/3	5.12E+02 - 8.98E+02	LO58-SD01-042112	NA	7.03E+02	1.93E+02
Mercury	mg/Kg	3/3	1.50E-01 - 3.10E-01	LO58-SD01-042112	NA	2.28E-01	8.01E-02
Nickel	mg/Kg	3/3	3.20E+01 - 3.49E+01	LO58-SD03-042112	NA	3.31E+01	1.56E+00
Potassium	mg/Kg	3/3	8.44E+02 - 1.24E+03	LO58-SD02-042112	NA	1.07E+03	1.94E+02
Selenium	mg/Kg	1/3	1.30E+00 - 1.30E+00	LO58-SD03-042112	4.20E+00 - 9.80E+00	5.22E+00	4.29E+00
Sodium	mg/Kg	3/3	9.63E+01 - 1.20E+02	LO58-SD03-042112	NA	1.07E+02	1.17E+01
Vanadium	mg/Kg	3/3	2.76E+01 - 3.01E+01	LO58-SD02-042112	NA	2.87E+01	1.10E+00
Zinc	mg/Kg	3/3	1.17E+02 - 1.32E+02	LO58-SD03-042112	NA	1.24E+02	7.51E+00
Total Organic Carbon (TOC)	mg/Kg	3/3	3.28E+04 - 6.47E+04	LO58-SD01-042112	NA	5.23E+04	1.71E+04

FOD = Frequency of Detection.
LOQ = Limit of Quantitation.

Table 6-3
Surface Soil Background Summary Table
LO-58
Caribou, Maine

Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of LOQs	Average	Standard Deviation
2-Butanone	mg/kg	3/3	2.30E-02 - 4.40E-02	LO58-BK-DUP-01	NA	3.42E-02	9.67E-03
4-Isopropyltoluene	mg/kg	1/3	3.40E-03 - 3.40E-03	LO58-BK01-0001	5.80E-03 - 8.70E-03	5.95E-03	2.63E-03
4-Methyl-2-pentanone	mg/kg	2/3	2.00E-02 - 2.60E-02	LO58-BK02-0001	5.80E-03 - 5.80E-03	1.64E-02	9.37E-03
Acetone	mg/kg	3/3	3.80E-01 - 6.40E-01	LO58-BK02-0001	NA	5.18E-01	1.21E-01
Iodomethane	mg/kg	3/3	1.10E-03 - 2.40E-03	LO58-BK03-0001	NA	1.77E-03	5.51E-04
Methyl acetate	mg/kg	3/3	5.20E-02 - 1.30E+00	LO58-BK02-0001	NA	5.11E-01	6.87E-01
n-Butylbenzene	mg/kg	2/3	6.60E-04 - 7.70E-04	LO58-BK02-0001	5.80E-03 - 8.70E-03	2.41E-03	2.94E-03
Toluene	mg/kg	2/3	1.90E-04 - 4.50E-04	LO58-BK01-0001	5.80E-03 - 8.70E-03	2.15E-03	3.17E-03
Butylbenzylphthalate	mg/kg	1/3	4.50E-02 - 4.50E-02	LO58-BK01-0001	4.20E-01 - 4.40E-01	3.02E-01	2.23E-01
1-Methylnaphthalene	mg/kg	3/3	6.30E-04 - 1.00E-03	LO58-BK02-0001	NA	7.68E-04	8.52E-05
1-Methylphenanthrene	mg/kg	3/3	6.10E-03 - 1.80E-02	LO58-BK02-0001	NA	1.17E-02	5.08E-03
2,3,5-Trimethylnaphthalene	mg/kg	3/3	7.40E-04 - 1.30E-03	LO58-BK02-0001	NA	1.01E-03	2.39E-04
2,6-Dimethylnaphthalene	mg/kg	2/3	4.40E-04 - 5.50E-04	LO58-BK01-0001	2.20E-03 - 3.00E-03	1.20E-03	1.22E-03
2-Methylnaphthalene	mg/kg	3/3	5.70E-04 - 8.90E-04	LO58-BK02-0001	NA	6.92E-04	1.07E-04
Acenaphthene	mg/kg	3/3	4.40E-04 - 1.20E-03	LO58-BK02-0001	NA	8.63E-04	3.74E-04
Acenaphthylene	mg/kg	3/3	2.60E-03 - 3.60E-03	LO58-BK01-0001	NA	3.07E-03	5.03E-04
Anthracene	mg/kg	3/3	1.40E-03 - 3.10E-03	LO58-BK02-0001	NA	2.32E-03	7.97E-04
Benzo(a)anthracene	mg/kg	3/3	1.80E-02 - 3.10E-02	LO58-BK01-0001, LO58-BK02-0001, LO58-BK-DUP-01	NA	2.67E-02	7.51E-03
Benzo(a)pyrene	mg/kg	3/3	1.50E-02 - 4.10E-02	LO58-BK02-0001	NA	2.90E-02	1.25E-02
Benzo(b)fluoranthene	mg/kg	3/3	3.00E-02 - 5.90E-02	LO58-BK02-0001	NA	4.47E-02	1.31E-02
Benzo(e)pyrene	mg/kg	3/3	1.80E-02 - 3.70E-02	LO58-BK02-0001	NA	2.77E-02	8.50E-03
Benzo(g,h,i)perylene	mg/kg	3/3	8.60E-03 - 1.90E-02	LO58-BK02-0001	NA	1.37E-02	4.42E-03
Benzo(k)fluoranthene	mg/kg	3/3	2.00E-02 - 4.10E-02	LO58-BK02-0001	NA	3.05E-02	9.50E-03
Chrysene	mg/kg	3/3	2.60E-02 - 4.20E-02	LO58-BK01-0001	NA	3.63E-02	8.96E-03
Dibenzo(a,h)anthracene	mg/kg	3/3	3.70E-03 - 8.10E-03	LO58-BK02-0001	NA	6.03E-03	2.06E-03
Dibenzothiophene	mg/kg	3/3	1.50E-03 - 2.70E-03	LO58-BK02-0001	NA	1.98E-03	4.37E-04
Fluoranthene	mg/kg	3/3	4.50E-02 - 9.60E-02	LO58-BK02-0001	NA	7.07E-02	2.24E-02
Fluorene	mg/kg	3/3	1.30E-03 - 2.10E-03	LO58-BK02-0001	NA	1.65E-03	3.04E-04
High Molecular Weight PAHs	mg/kg	3/3	1.96E-01 - 3.66E-01	LO58-BK02-0001	NA	3.01E-01	9.19E-02
Indeno(1,2,3-cd)pyrene	mg/kg	3/3	1.40E-02 - 2.90E-02	LO58-BK02-0001	NA	2.13E-02	6.43E-03
Low Molecular Weight PAHs	mg/kg	3/3	8.50E-02 - 1.60E-01	LO58-BK02-0001	NA	1.30E-01	3.96E-02
Perylene	mg/kg	3/3	3.80E-03 - 9.80E-03	LO58-BK02-0001	NA	6.90E-03	2.76E-03
Phenanthrene	mg/kg	3/3	2.30E-02 - 4.40E-02	LO58-BK02-0001	NA	3.22E-02	8.13E-03
Pyrene	mg/kg	3/3	3.90E-02 - 7.50E-02	LO58-BK02-0001	NA	5.85E-02	1.69E-02
Aluminum	mg/Kg	3/3	1.50E+04 - 1.77E+04	LO58-BK03-0001	NA	1.70E+04	1.10E+03
Antimony	mg/Kg	3/3	5.50E-01 - 1.10E+00	LO58-BK03-0001	NA	7.47E-01	3.07E-01
Arsenic	mg/Kg	3/3	1.40E+01 - 2.24E+01	LO58-BK03-0001	NA	1.72E+01	4.54E+00
Barium	mg/Kg	3/3	5.72E+01 - 6.50E+01	LO58-BK03-0001	NA	6.10E+01	3.71E+00
Beryllium	mg/Kg	3/3	3.70E-01 - 4.50E-01	LO58-BK03-0001	NA	4.15E-01	3.77E-02
Cadmium	mg/Kg	3/3	2.10E-01 - 3.70E-01	LO58-BK-DUP-01	NA	2.70E-01	5.20E-02
Calcium	mg/Kg	3/3	7.32E+02 - 1.06E+03	LO58-BK02-0001	NA	9.22E+02	1.66E+02
Chromium	mg/Kg	3/3	2.60E+01 - 4.03E+01	LO58-BK02-0001	NA	3.42E+01	3.03E+00
Cobalt	mg/Kg	3/3	9.10E+00 - 1.39E+01	LO58-BK-DUP-01	NA	1.16E+01	2.08E-01

Surface Soil Background Summary Table
LO-58
Caribou, Maine

Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of LOQs	Average	Standard Deviation
Copper	mg/Kg	3/3	7.21E+01 - 1.19E+02	LO58-BK03-0001	NA	9.01E+01	2.50E+01
Iron	mg/Kg	3/3	2.77E+04 - 3.31E+04	LO58-BK03-0001	NA	3.01E+04	2.59E+03
Lead	mg/Kg	3/3	2.29E+01 - 3.63E+01	LO58-BK-DUP-01	NA	2.80E+01	4.48E+00
Magnesium	mg/Kg	3/3	4.06E+03 - 5.00E+03	LO58-BK03-0001	NA	4.69E+03	3.77E+02
Manganese	mg/Kg	3/3	6.55E+02 - 1.61E+03	LO58-BK-DUP-01	NA	1.31E+03	3.52E+02
Mercury	mg/Kg	3/3	1.40E-02 - 1.90E-01	LO58-BK-DUP-01	NA	1.10E-01	8.73E-02
Nickel	mg/Kg	3/3	2.20E+01 - 2.93E+01	LO58-BK03-0001	NA	2.65E+01	2.78E+00
Potassium	mg/Kg	3/3	9.15E+02 - 9.80E+02	LO58-BK-DUP-01	NA	9.57E+02	8.46E+00
Selenium	mg/Kg	3/3	1.60E+00 - 2.10E+00	LO58-BK02-0001	NA	1.83E+00	2.08E-01
Silver	mg/Kg	1/3	1.20E-01 - 1.20E-01	LO58-BK-DUP-01	7.90E-01 - 1.00E+00	6.37E-01	4.60E-01
Sodium	mg/Kg	3/3	2.50E+01 - 2.56E+01	LO58-BK03-0001	NA	2.52E+01	3.21E-01
Vanadium	mg/Kg	3/3	3.09E+01 - 3.76E+01	LO58-BK-DUP-01	NA	3.39E+01	1.73E+00
Zinc	mg/Kg	3/3	6.44E+01 - 7.66E+01	LO58-BK03-0001	NA	7.38E+01	4.82E+00

FOD = Frequency of Detection.
LOQ = Limit of Quantitation.

Table 6-4
Soil Benchmarks - Phytotoxicity and Soil Invertebrate/Microbe
LO-58
Caribou, Maine

	Phytotoxicity			Soil Invertebrate		
Analyte	(mg/kg)	Basis	Source	(mg/kg)	Basis	Source
1,1-Biphenyl	60	-	Efroymson et al., 1997	1.1	SQB	EPA,1996
1,4-Dichlorobenzene	-	-	-	20	earthworm	Efroymson et al., 1997
2-Butanone	-	-	-	0.0424	-	EPA Region 5, 2003
2-Hexanone	-	-	-	0.0582	-	EPA Region 5, 2003
4-Isopropyltoluene	-	-	-	-	-	-
4-Methyl-2-pentanone	-	-	-	0.0251	-	EPA Region 5, 2003
Acetone	-	-	-	0.0099	-	EPA Region 5, 2003
Carbon disulfide	-	-	-	0.000851	-	EPA, 2006
Iodomethane	-	-	-	-	-	-
Methyl acetate	-	-	-	-	-	-
n-Butylbenzene	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-
p-Chlorotoluene	-	-	-	-	-	-
Styrene	300	-	Efroymson et al., 1997	0.559	-	EPA, 2006
Toluene	200	-	Efroymson et al., 1997	0.67	SQB	EPA,1996
Xylene (Total)	-	-	-	0.433	-	EPA Region 5, 2003
Bis(2-ethylhexyl)phthalate	-	-	-	0.18	-	EPA, 2006
Butylbenzylphthalate	-	-	-	11	SQB	EPA,1996
Di-n-octyl phthalate	-	-	-	40.6	-	EPA Region 5, 2003
High Molecular Weight PAHs	1.2	Benzo(a)pyrene value.	EPA, 1999	18	Benzo(a)pyrene value.	SSL
Low Molecular Weight PAHs	-	-	-	29	-	SSL
Aroclor 1260	10	Aroclor 1254 value	EPA, 1999	2.51	Aroclor 1254 value	EPA, 1999
Aluminum	5	-	EPA, 1999	600	microbe	Efroymson et al., 1997
Antimony	0.5	-	EPA, 1999	78	-	SSL
Arsenic	18	-	Eco SSL	0.25	-	EPA, 1999
Barium	5	-	EPA, 1999	330	-	SSL
Beryllium	0.1	-	EPA, 1999	40	-	SSL
Cadmium	32	-	Eco SSL	140	-	SSL
Calcium	-	-	-	-	-	-
Chromium	0.018	Chromium VI value	EPA, 1999	0.2	-	EPA, 1999
Cobalt	13	-	Eco SSL	1000	microbe	Efroymson et al., 1997
Copper	70	-	Eco SSL	80	-	SSL
Iron	-	-	-	200	microbe	Efroymson et al., 1997
Lead	120	-	Eco SSL	1700	-	SSL
Magnesium	-	-	-	-	-	-
Manganese	220	-	Eco SSL	450	-	SSL
Mercury	0.349	Mercuric chloride value	EPA, 1999	2.5	Methyl mercury value.	EPA, 1999
Nickel	38	-	Eco SSL	280	-	SSL
Potassium	-	-	-	-	-	-
Selenium	0.52	-	Eco SSL	4.1	-	SSL
Sodium	-	-	-	-	-	-
Thallium	0.01	-	EPA, 1999	-	-	-
Vanadium	2	-	Efroymson et al., 1997	20	microbe	Efroymson et al., 1997
Zinc	160	-	Eco SSL	120	-	SSL

Table 6-5
Soil Benchmarks - Wildlife
LO-58
Caribou, Maine

	Avian			Mammalian		
Analyte	(mg/kg)	Basis	Source	(mg/kg)	Basis	Source
1,1-Biphenyl	-	-	-	-	-	-
1,4-Dichlorobenzene	-	-	-	0.546	Masked shrew value	Region V ESL
2-Butanone	-	-	-	89.6	Vole value	Region V ESL
4-Isopropyltoluene	-	-	-	-	-	-
4-Methyl-2-pentanone	-	-	-	443	Masked shrew value	Region V ESL
Acetone	-	-	-	2.5	Vole value	Region V ESL
Carbon disulfide	-	-	-	0.0941	Masked shrew value	Region V ESL
Iodomethane	-	-	-	1.23	Masked shrew value	Region V ESL
Methyl acetate	-	-	-	-	-	-
n-Butylbenzene	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-
p-Chlorotoluene	-	-	-	-	-	-
Toluene	-	-	-	5.45	Masked shrew value	Region V ESL
Xylene (Total)	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate	-	-	-	0.925	Masked shrew value	Region V ESL
High Molecular Weight PAHs	-	-	-	1.1	Mammalian	SSL
Low Molecular Weight PAHs	-	-	-	100	Mammalian	SSL
Aroclor 1260	0.0655	PCBs value	Efroymson et al., 1997	0.0371	PCBs value	Efroymson et al., 1997
Aluminum	-	-	-	-	-	-
Antimony	-	-	-	0.27	Mammalian	SSL
Arsenic	43	Avian	SSL	46	Mammalian	SSL
Barium	28.3	American Woodcock	Efroymson et al., 1997	2000	Mammalian	SSL
Beryllium	-	-	-	21	Mammalian	SSL
Cadmium	0.77	Avian	SSL	0.36	Mammalian	SSL
Calcium	-	-	-	-	-	-
Chromium	26	Avian	SSL	34	Mammalian	SSL
Cobalt	120	Avian	SSL	230	Mammalian	SSL
Copper	28	Avian	SSL	49	Mammalian	SSL
Iron	-	-	-	-	-	-
Lead	11	Avian	SSL	56	Mammalian	SSL
Magnesium	-	-	-	-	-	-
Manganese	4300	Avian	SSL	4000	Mammalian	SSL
Mercury	0.000051	American Woodcock	Efroymson et al., 1997	0.0146	Short-tailed Shrew	Efroymson et al., 1997
Nickel	210	Avian	SSL	130	Mammalian	SSL
Potassium	-	-	-	-	-	-
Selenium	1.2	Avian	SSL	0.63	Mammalian	SSL
Sodium	-	-	-	-	-	-
Thallium	-	-	-	0.21	Short-tailed Shrew	Efroymson et al., 1997
Vanadium	7.8	Avian	SSL	280	Mammalian	SSL
Zinc	46	Avian	SSL	79	Mammalian	SSL

Table 6-6
Soil Screening
LO-58
Caribou, Maine

		Benchmark (mg/kg)							
	Maximum	Phytotoxicity		Soil Invertebrate		Avian		Mammalian	
Analyte	**Detect (mg/kg)**	**Value**	**FOE**	**Value**	**FOE**	**Value**	**FOE**	**Value**	**FOE**
1,1-Biphenyl	0.0033	60	-	1.1	-	-	-	-	-
1,4-Dichlorobenzene	0.0036	-	-	20	-	-	-	0.546	-
2-Butanone	0.033	-	-	0.0424	-	-	-	89.6	-
4-Isopropyltoluene	0.00035	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone	0.0065	-	-	0.0251	-	-	-	443	-
Acetone	0.59	-	-	0.0099	16/16	-	-	2.5	-
Carbon disulfide	0.018	-	-	0.00085	4/5	-	-	0.0941	-
Iodomethane	0.003	-	-	-	-	-	-	1.23	-
Methyl acetate	0.18	-	-	-	-	-	-	-	-
n-Butylbenzene	0.00058	-	-	-	-	-	-	-	-
o-Xylene	0.000099	-	-	-	-	-	-	-	-
p-Chlorotoluene	0.00056	-	-	-	-	-	-	-	-
Toluene	0.00063	200	-	0.67	-	-	-	5.45	-
Xylene (Total)	0.000099	-	-	0.433	-	-	-	-	-
Bis(2-ethylhexyl)phthalate	0.052	-	-	0.18	-	-	-	0.925	-
High Molecular Weight PAHs	2.14	1.2	2/16	18	-	-	-	1.1	2/16
Low Molecular Weight PAHs	1.2161	-	-	29	-	-	-	100	-
Aroclor 1260	0.049	10	-	2.51	-	0.0655	-	0.0371	1/4
Aluminum	25600	5	16/16	600	16/16	-	-	-	-
Antimony	0.68	0.5	4/7	78	-	-	-	0.27	7/7
Arsenic	24	18	1/16	0.25	16/16	43	-	46	-
Barium	85.1	5	16/16	330	-	28.3	16/16	2000	-
Beryllium	1.4	0.1	16/16	40	-	-	-	21	-
Cadmium	0.53	32	-	140	-	0.77	-	0.36	2/14
Calcium	9570	-	-	-	-	-	-	-	-
Chromium	56.3	0.018	16/16	0.2	16/16	26	16/16	34	4/16
Cobalt	19.6	13	5/16	1000	-	120	-	230	-
Copper	73.1	70	1/16	80	-	28	8/16	49	2/16
Iron	49300	-	-	200	16/16	-	-	-	-
Lead	34.2	120	-	1700	-	11	16/16	56	-
Magnesium	16600	-	-	-	-	-	-	-	-
Manganese	780	220	16/16	450	16/16	4300	-	4000	-
Mercury	0.35	0.349	1/16	2.5	-	5.1E-05	16/16	0.0146	16/16
Nickel	84.6	38	11/16	280	-	210	-	130	-
Potassium	1310	-	-	-	-	-	-	-	-
Selenium	2.3	0.52	9/9	4.1	-	1.2	4/9	0.63	9/9
Sodium	99	-	-	-	-	-	-	-	-
Thallium	0.49	0.01	1/1	-	-	-	-	0.21	1/1
Vanadium	30.1	2	16/16	20	15/16	7.8	16/16	280	-
Zinc	125	160	-	120	1/16	46	16/16	79	3/16

FOE = Frequency of Exceeding. Number of detected concentrations exceeding benchmark/number of detected concentrations.

Shading indicates maximum detected concentration exceeds benchmark.

Table 6-7
Drainageway Soil Screening
LO-58
Caribou, Maine

Analyte	Maximum Detect (mg/kg)	Benchmark (mg/kg)			
		Phytotoxicity		Soil Invertebrate	
		Value	FOE	Value	FOE
1,1-Biphenyl	0.0033	60	-	1.1	-
2-Butanone	0.041	-	-	0.0424	-
2-Hexanone	0.097	-	-	0.0582	1/1
4-Isopropyltoluene	0.0023	-	-	-	-
4-Methyl-2-pentanone	0.0066	-	-	0.0251	-
Acetone	0.53	-	-	0.0099	3/3
Carbon disulfide	0.00088	-	-	0.00085	1/1
Iodomethane	0.0045	-	-	-	-
Methyl acetate	0.18	-	-	-	-
Styrene	0.0022	300	-	0.559	-
Toluene	0.0024	200	-	0.67	-
Bis(2-ethylhexyl)phthalate	0.088	-	-	0.18	-
Butylbenzylphthalate	0.04	-	-	11	-
Di-n-octyl phthalate	0.088	-	-	40.6	-
High Molecular Weight PAHs	4.97	1.2	3/3	18	-
Low Molecular Weight PAHs	1.8247	-	-	29	-
Aroclor 1260	0.036	10	-	2.51	-
Aluminum	22200	5	3/3	600	3/3
Antimony	0.68	0.5	1/1	78	-
Arsenic	24	18	2/3	0.25	3/3
Barium	100	5	3/3	330	-
Beryllium	0.77	0.1	3/3	40	-
Cadmium	0.53	32	-	140	-
Calcium	7610	-	-	-	-
Chromium	33.5	0.018	3/3	0.2	3/3
Cobalt	10.7	13	-	1000	-
Copper	73.1	70	1/3	80	-
Iron	31500	-	-	200	3/3
Lead	30.1	120	-	1700	-
Magnesium	7450	-	-	-	-
Manganese	898	220	3/3	450	3/3
Mercury	0.31	0.349	-	2.5	-
Nickel	34.9	38	-	280	-
Potassium	1240	-	-	-	-
Selenium	1.3	0.52	1/1	4.1	-
Sodium	120	-	-	-	-
Vanadium	30.1	2	3/3	20	3/3
Zinc	132	160	-	120	2/3

FOE = Frequency of Exceeding. Number of detected concentrations exceeding benchmark/number of detected concentrations.

Shading indicates maximum detected concentration exceeds benchmark.

Table 6-8
COPEC List
LO-58
Caribou, Maine

Analyte	Soil		Drainageway Soil
	DC	FCM	
2-Hexanone			X
4-Isopropyltoluene	X*		X*
Acetone	X		X
Carbon disulfide	X		X
Iodomethane	X*		X*
Methyl acetate	X*		X*
n-Butylbenzene	X*		
o-Xylene	X*		
p-Chlorotoluene	X*		
High Molecular Weight PAHs	X	X	X
Aroclor 1260		X	
Aluminum	X	X*	X
Antimony	X	X	X
Arsenic	X		X
Barium	X	X	X
Beryllium	X		X
Cadmium		X	
Chromium	X	X	X
Cobalt	X		
Copper	X	X	X
Iron	X	X*	X
Lead		X	
Manganese	X		X
Mercury	X	X	
Nickel	X		
Selenium	X	X	X
Thallium	X	X	
Vanadium	X	X	X
Zinc	X	X	X

DC = Direct contact.
FCM = Food chain modeling.
X* = Not eliminated as a COPEC because benchmark not available.

Table 6-9
Exposure Point Concentrations - Site Soil
LO-58
Caribou, Maine

			RME		CTE
COPEC	Data Distribution[a]	95% UCL (mg/kg dw)	Exposure Point Concentration (mg/kg dw)	Calculation Method	Exposure Point Concentration (mg/kg dw)
Benzo(a)anthracene	Lognormal	2.12E-01	2.12E-01	99% Chebyshev (Mean, Sd) UCL	3.13E-02
Benzo(a)pyrene	Lognormal	2.21E-01	2.21E-01	99% Chebyshev (Mean, Sd) UCL	3.28E-02
Benzo(b)fluoranthene	Lognormal	3.27E-01	3.27E-01	99% Chebyshev (Mean, Sd) UCL	4.73E-02
Benzo(e)pyrene	Lognormal	1.77E-01	1.77E-01	99% Chebyshev (Mean, Sd) UCL	2.72E-02
Benzo(k)fluoranthene	Lognormal	1.53E-01	1.53E-01	99% Chebyshev (Mean, Sd) UCL	2.43E-02
Benzo(g,h,i)perylene	Lognormal	1.38E-01	1.38E-01	99% KM (Chebyshev) UCL	1.87E-02
Chrysene	Lognormal	2.23E-01	2.23E-01	99% Chebyshev (Mean, Sd) UCL	3.40E-02
Dibenzo(a,h)anthracene	Not Discernable	3.10E-02	3.10E-02	97.5% KM (Chebyshev) UCL	6.91E-03
Indeno(1,2,3-cd)pyrene	Lognormal	1.38E-01	1.38E-01	99% Chebyshev (Mean, Sd) UCL	2.08E-02
Perylene	Not Discernable	5.49E-02	5.49E-02	99% KM (Chebyshev) UCL	8.16E-03
Pyrene	Lognormal	4.12E-01	4.12E-01	99% Chebyshev (Mean, Sd) UCL	6.08E-02
Aroclor 1260	ND	NC	2.00E-02	75th Percentile	2.00E-02
Aluminum	Normal	1.89E+04	1.89E+04	95% Student's-t UCL	1.73E+04
Antimony	Normal	6.05E-01	6.05E-01	95% KM (t) UCL	6.00E-01
Barium	Approximate Normal	5.31E+01	5.31E+01	95% Student's-t UCL	4.57E+01
Cadmium	Not Discernable	3.19E-01	3.19E-01	95% KM (Chebyshev) UCL	1.78E-01
Chromium	Not Discernable	3.57E+01	3.57E+01	95% Student's-t UCL	3.22E+01
Copper	Normal	4.29E+01	4.29E+01	95% Student's-t UCL	3.60E+01
Iron	Not Discernable	3.51E+04	3.51E+04	95% Student's-t UCL	3.26E+04
Lead	Lognormal	2.26E+01	2.26E+01	95% Student's-t UCL	1.99E+01
Mercury	Gamma	1.49E-01	1.49E-01	95% Approximate Gamma UCL	9.14E-02
Selenium	Normal	1.91E+00	1.91E+00	95% KM (t) UCL	1.91E+00
Thallium	ND	NC	4.90E-01	Maximum	4.90E-01
Vanadium	Normal	2.62E+01	2.62E+01	95% Student's-t UCL	2.43E+01
Zinc	Not Discernable	7.55E+01	7.55E+01	95% Student's-t UCL	6.59E+01

See Subsection 6.2.2.1.1 for details regarding EPC development.

mg/kg dw = Milligrams per kilogram dry weight.

NC = Not calculated.

ND = Not determined.

Table 6-10
COPEC Concentrations in Plants Due to Root Uptake
LO-58
Caribou, Maine

Do not calculate for volatiles (EPA, 2007b).

Based on

Measured BCF: $C_{TP} = C_S \times BCF_r \times CF$

Regression Equation: $C_{Veg} = \left[e^{B0+B1*\ln(Cs)}\right] \times CF$

Log K_{ow}-based Regression: $C_{Veg} = C_S \times BAF \times CF$

Where: $BAF = 10^{B0+B1*\log Kow}$

Parameter	**Definition**	**Value**	**Reference**
C_{TP}	Concentration of COPEC in terrestrial plants (mg COPEC/kg WW).		
C_S	Concentration of COPEC in soil (mg COPEC/kg DW soil).	COPEC-specific	See Tables 6-9 and 6-10
BCF_r	Soil or sediment to plant bioconcentration factor based on root uptake [(mg COPEC/kg DW plant tissue)/(mg COPEC/kg DW soil)]	COPEC-specific	See Table 6-12
CF	Dry to wet weight conversion factor. Assumes plant material to contain 85% moisture (kg DW/kg WW).	0.15	EPA, 2007a
B0	y-intercept	COPEC-specific	See Table 6-12
B1	slope	COPEC-specific	See Table 6-12
BAF	Soil to plant bioaccumulation factor based on log Kow-based regression equation [(mg COPEC/kg DW plant tissue)/(mg COPEC/kg DW soil)]	Calculated	See Table 6-12
Log K_{ow}	Log octanol-water partitioning coefficient	COPEC-specific	See Table 6-12

Table 6-11
Values Used to Estimate COPEC Concentrations in Plants
LO-58
Caribou, Maine

	Measured BCF (mg COPC/kg dry tissue)/ (mg COPC/kg dry soil)		Regression Equation (mg/kg dry tissue)			Log Kow Model-Based BAF (mg COPC/kg dry tissue)/(mg COPC/kg dry soil)				
ANALYTE	**Value**	**Source**	**B0**	**B1**	**Source**	**B0**	**B1**	**Source**	**log Kow**	**BAF**
Benzo(a)anthracene			-2.7078	0.5944	EPA, 2007					
Benzo(a)pyrene			-2.0615	0.975	EPA, 2007					
Benzo(b)fluoranthene	0.31	EPA, 2007								
Benzo(e)pyrene	0.19	EPA, 2007								
Benzo(k)fluoranthene			-2.1579	0.8595	EPA, 2007					
Benzo(g,h,i)perylene			-0.9313	1.1829	EPA, 2007					
Chrysene			-2.7078	0.5944	EPA, 2007					
Dibenz(a,h)anthracene	0.13	EPA, 2007								
Indeno(1,2,3-cd)pyrene	0.11	EPA, 2007								
Perylene			-2.0615	0.975	EPA, 2007					
Pyrene	0.72	EPA, 2007								
Aroclor 1260						1.781	-0.4057	EPA, 2007; Figure 5	6.8	0.11
Aluminum	0.00065	Baes et al., 1984								
Antimony			-3.233	0.938	EPA, 2007					
Barium	0.156	EPA, 2007								
Cadmium			-0.475	0.546	EPA, 2007					
Chromium	0.041	EPA, 2007								
Copper			0.668	0.394	EPA, 2007					
Iron	0.001	Baes et al., 1984								
Lead			-1.328	0.561	EPA, 2007					
Mercury			-0.996	0.554	Bechtel-Jacobs, 1998					
Selenium			-0.677	1.104	EPA, 2007					
Thallium	0.0004	Baes et al., 1984								
Vanadium	0.00485	EPA, 2007								
Zinc			1.575	0.554	EPA, 2007					

Table 6-12
COPEC Concentrations in Soil Invertebrates
LO-58
Caribou, Maine

Do not calculate for volatiles (EPA, 2007b).

Based on

Measured BCF: $C_{INV} = C_S \times BCF_{S\text{-}INV} \times CF$

Regression Equation: $C_{INV} = \left[e^{B0 + B1*\ln(Cs)}\right] \times CF$

Log K_{ow}-based Regression: $C_{INV} = K_{ww} \times C_w$

Where: $K_{ww} = 10^{0.87*\log Kow\ -2.0}$, $C_w = C_S \div K_{ds}$, and $K_{ds} = f_{oc} \times K_{oc}$

Parameter	Definition	Value	Reference
C_{INV}	Concentration of COPEC in soil invertebrates (mg COPEC/kg WW).		
C_S	Concentration of COPEC in soil (mg COPEC/kg DW soil).	COPEC-specific	See Tables 6-9 and 6-10
$BCF_{S\text{-}INV}$	Soil to soil invertebrate bioconcentration factor [(mg COPEC/kg DW)/(mg COPEC/kg DW soil)]	COPEC-specific	See Table 6-14
CF	Dry to wet weight conversion factor. Assumes soil invertebrates to contain 84% moisture (kg DW/kg WW).	0.16	EPA, 2007a
B0	y-intercept	COPEC-specific	See Table 6-14
B1	slope	COPEC-specific	See Table 6-14
K_{ww}	Biota to soil water partitioning coefficient (L soil pore water/kg WW tissue)	COPEC-specific	Calculated
Log K_{ow}	Log octanol-water partitioning coefficient (unitless)	COPEC-specific	See Table 6-14
C_w	Concentration of COPEC in pore water (mg COPEC/L water).	Calculated	Calculated
K_{ds}	Soil to water partitioning coefficient (L soil pore water/kg DW soil)	Calculated	Calculated
f_{oc}	Fraction organic carbon (unitless)	0.01	Default (EPA, 2007a)
K_{oc}	Soil organic carbon to water partitioning coefficient (mL soil pore water/g DW soil or L soil pore water/kg DW soil)	COPEC-specific	See Table 6-14

Table 6-13
Values Used to Estimate COPEC Concentrations in Soil Invertebrates
LO-58
Caribou, Maine

	Measured BCF (mg COPC/kg dry tissue)/ (mg COPC/kg dry soil)		Regression Equation (mg/kg dry tissue)			Log Kow Model-Based Regression (mg/kg dry tissue)				
COPEC	**Value**	**Source**	**B0**	**B1**	**Source**	**B0**	**B1**	**Source**	**log Kow**	**Koc**
Benzo(a)anthracene						-2	0.87	EPA, 2007	5.7	358000
Benzo(a)pyrene						-2	0.87	EPA, 2007	6	969000
Benzo(b)fluoranthene						-2	0.87	EPA, 2007	6.124	105000
Benzo(e)pyrene						-2	0.87	EPA, 2007	6.44	908406
Benzo(k)fluoranthene						-2	0.87	EPA, 2007	6.1	992000
Benzo(g,h,i)perylene						-2	0.87	EPA, 2007	6.63	1267827
Chrysene						-2	0.87	EPA, 2007	5.7	401000
Dibenz(a,h)anthracene						-2	0.87	EPA, 2007	6.5	1790000
Indeno(1,2,3-cd)pyrene						-2	0.87	EPA, 2007	6.6	3080000
Perylene						-2	0.87	EPA, 2007	5.82	306084
Pyrene						-2	0.87	EPA, 2007	4.9	68000
Aroclor 1260	6.77	EPA, 1999; Aroclor 1254 value								
Aluminum	0.043	Sample et al., 1999								
Antimony	1	EPA, 2007								
Barium	0.091	EPA, 2007								
Cadmium			2.114	0.795	EPA, 2007					
Chromium	0.306	EPA, 2007; trivalent chromium								
Copper	0.515	EPA, 2007								
Iron	0.036	Sample et al., 1999								
Lead			-0.218	0.807	EPA, 2007					
Mercury	0.2	EPA, 1999								
Selenium			-0.075	0.733	EPA, 2007					
Thallium	0.6	EPA, 1999								
Vanadium	0.042	EPA, 2007								
Zinc	3.35	EPA, 1999								

Table 6-14
Estimated EPCs - Terrestrial Plants and Soil Invertebrates
LO-58
Caribou, Maine

	EPC (mg/kg wet weight)							
	RME				CTE			
	Site		Background		Site		Background	
COPEC	**Plants**	**Invertebrates**	**Plants**	**Invertebrates**	**Plants**	**Invertebrates**	**Plants**	**Invertebrates**
Benzo(a)anthracene	3.98E-03	5.39E-02	1.27E-03	7.88E-03	1.28E-03	7.95E-03	1.16E-03	6.78E-03
Benzo(a)pyrene	4.38E-03	3.79E-02	7.47E-04	6.17E-03	6.82E-04	5.62E-03	6.05E-04	4.97E-03
Benzo(b)fluoranthene	1.52E-02	6.63E-01	2.42E-03	1.05E-01	2.20E-03	9.59E-02	2.08E-03	9.05E-02
Benzo(e)pyrene	5.04E-03	7.81E-02	9.26E-04	1.43E-02	7.76E-04	1.20E-02	7.89E-04	1.22E-02
Benzo(k)fluoranthene	3.45E-03	3.13E-02	9.90E-04	7.31E-03	7.11E-04	4.98E-03	8.63E-04	6.23E-03
Benzo(g,h,i)perylene	5.68E-03	6.38E-02	4.52E-04	7.51E-03	5.33E-04	8.63E-03	3.69E-04	6.34E-03
Chrysene	4.10E-03	5.06E-02	1.51E-03	9.42E-03	1.34E-03	7.72E-03	1.39E-03	8.24E-03
Dibenzo(a,h)anthracene	6.05E-04	7.83E-03	1.40E-04	1.82E-03	1.35E-04	1.75E-03	1.18E-04	1.52E-03
Indeno(1,2,3-cd)pyrene	2.28E-03	2.47E-02	4.13E-04	4.48E-03	3.43E-04	3.73E-03	3.52E-04	3.82E-03
Perylene	1.13E-03	2.08E-02	1.82E-04	3.19E-03	1.76E-04	3.08E-03	1.49E-04	2.61E-03
Pyrene	4.45E-02	1.11E-01	7.37E-03	1.84E-02	6.57E-03	1.64E-02	6.32E-03	1.58E-02
Aroclor 1260	3.16E-04	2.17E-02	ND	ND	3.16E-04	2.17E-02	ND	ND
Aluminum	1.84E+00	1.30E+02	1.72E+00	1.21E+02	1.69E+00	1.19E+02	1.65E+00	1.17E+02
Antimony	3.69E-03	9.68E-02	5.05E-03	1.35E-01	3.66E-03	9.60E-02	4.50E-03	1.19E-01
Barium	1.24E+00	7.73E-01	1.46E+00	9.11E-01	1.07E+00	6.65E-01	1.43E+00	8.88E-01
Cadmium	5.00E-02	5.34E-01	4.83E-02	5.09E-01	3.64E-02	3.37E-01	4.56E-02	4.68E-01
Chromium	2.19E-01	1.75E+00	2.18E-01	1.73E+00	1.98E-01	1.58E+00	2.10E-01	1.67E+00
Copper	1.29E+00	3.54E+00	1.78E+00	8.03E+00	1.20E+00	2.96E+00	1.72E+00	7.42E+00
Iron	5.26E+00	2.02E+02	4.64E+00	1.78E+02	4.90E+00	1.88E+02	4.52E+00	1.73E+02
Lead	2.29E-01	1.59E+00	2.70E-01	2.03E+00	2.13E-01	1.44E+00	2.58E-01	1.89E+00
Mercury	1.93E-02	4.77E-03	1.99E-02	5.04E-03	1.47E-02	2.92E-03	1.63E-02	3.51E-03
Selenium	1.56E-01	2.39E-01	1.59E-01	2.42E-01	1.56E-01	2.39E-01	1.49E-01	2.31E-01
Thallium	2.94E-05	4.70E-02	ND	ND	2.94E-05	4.70E-02	ND	ND
Vanadium	1.91E-02	1.76E-01	2.53E-02	2.34E-01	1.77E-02	1.63E-01	2.47E-02	2.28E-01
Zinc	7.95E+00	4.05E+01	8.01E+00	4.10E+01	7.37E+00	3.53E+01	7.85E+00	3.95E+01

mg/kg ww = Milligrams per kilogram wet weight.
ND = Not detected.

Table 6-15
Calculation of Field Metabolic Rates*
LO-58
Caribou, Maine

$$\text{FMR (kcal/g BW - day)} = \text{a} \times \text{BW}^{\text{b}} \times \frac{1\,\text{kcal}}{4.1876\,\text{kJ}} \div \text{BW}$$

Target Receptor	Allometric Equation Basis	a	b	Body Weight in Grams	FMR (kcal/g BW-day)
Song Sparrow	Birds – Passerines	10.4	0.68	20 (Dunning, 1984)	0.95
American Robin	Birds – Passerines	10.4	0.68	77 (Sample and Suter, 1994)	0.62
Deer Mouse	Mammals – Rodentia	5.48	0.712	17.9 (Nagy, 2001)	0.57
Short-Tailed Shrew	Mammals – Insectivores	6.98	0.622	15 (EPA, 1993b)	0.60

*From Nagy et al., 1999 unless otherwise indicated.
BW = body weight
FMR = field metabolic rate
a = intercept of line fit using linear least-squares regression method
b = slope of line fit using linear least-squares regression method.

Table 6-16
AE and GE of Anticipated Prey Items
LO-58
Caribou, Maine

Predator/Prey Item	Assimilation Efficiency (unitless)	Basis of Value	Gross Energy (kcal/g ww)	Basis of Value
Birds				
Terrestrial Plants	0.75	Passerines – Wild Seeds	1.1	Terrestrial - Fruit (Pulp, Skin)
Soil Invertebrates	0.72	Birds – Terrestrial insects	1.3	Mean of earthworms, grasshoppers/crickets, and beetles
Mammals				
Terrestrial Plants	0.85	Voles, Mice – Seeds, Nuts	1.1	Terrestrial - Fruit (Pulp, Skin)
Soil Invertebrates	0.87	Small Mammals – Insects	1.3	Mean of earthworms, grasshoppers/crickets, and beetles

Source: EPA, 1993b.

Table 6-17
COPEC Dose Ingested Terms in Herbivorous Birds (Song Sparrow)
LO-58
Caribou, Maine

$$D_{HB} = (C_{TP} \times IR_{HB} \times P_{TP} \times F_{TP}) + (C_S \times IR_{S-HB} \times P_S)$$

Parameter	Definition	Value	Reference
D_{HB}	Dose ingested for herbivorous birds (song sparrow) (mg COPEC/kg BW-day).		
C_{TP}	COPEC concentration in terrestrial plants (mg COPEC/kg WW).	COPEC-specific	Calculated
IR_{HB}	Food ingestion rate of herbivorous birds (kg WW/kg BW-day).	1.2	Calculated
P_{TP}	Proportion of terrestrial plants diet that is contaminated (unitless).	1	Conservative assumption
F_{TP}	Fraction of diet comprised of terrestrial plants (unitless).	1	Cornell University, 2003
C_S	COPEC concentration in soil (mg COPEC/kg DW soil).	COPEC-specific	See Tables 6-9 and 6-10
$IR_{Soil-HB}$	Soil ingestion rate for herbivorous birds (kg DW/kg BW-day).	0.092	DW ingestion rate calculated by converting the WW ingestion rate, assuming 9.3% water content in the diet (water content in seeds; EPA, 2007a), and assuming a song sparrow ingests 8.8% of the dry food intake (based on median soil ingestion rate for dove; EPA, 2003d)
P_S	Proportion of ingested soil that is contaminated (unitless).	1	Conservative assumption

Table 6-18
COPEC Dose Ingested Terms in Invertivorous Birds (American Robin)
LO-58
Caribou, Maine

$$D_{IB} = (C_{INV} \times IR_{IB} \times P_{INV} \times F_{INV}) + (C_S \times IR_{S-IB} \times P_S)$$

Parameter	Definition	Value	Reference
D_{IB}	Dose ingested for invertivorous birds (American robin) (mg COPEC/kg BW-day).		
C_{INV}	COPEC concentration in soil invertebrates (mg COPEC/kg WW).	COPEC-specific	Calculated
IR_{IB}	Food ingestion rate of invertivorous birds (kg WW/kg BW-day).	0.66	Calculated
P_{INV}	Proportion of soil invertebrates diet that is contaminated (unitless).	1	Conservative assumption
F_{INV}	Fraction of diet comprised of soil invertebrates (unitless).	1	Conservative assumption
C_S	COPEC concentration in soil (mg COPEC/kg DW soil).	COPEC-specific	See Tables 6-9 and 6-10
$IR_{Soil-IB}$	Soil ingestion rate for invertivorous birds (kg DW/kg BW-day).	0.0044	DW ingestion rate calculated by converting the WW ingestion rate, assuming 84% water content in the diet (water content in earthworms; EPA, 1993a), and assuming an American robin ingests 4.2% of the dry food intake (Beyer et al., 1994)
P_S	Proportion of ingested soil that is contaminated (unitless).	1	Conservative assumption

Table 6-19
COPEC Dose Ingested Terms in Herbivorous Mammals (Deer Mouse)
LO-58
Caribou, Maine

$$D_{HM} = (C_{TP} \times IR_{HM} \times P_{TP} \times F_{TP}) + (C_S \times IR_{S-HM} \times P_S)$$

Parameter	Definition	Value	Reference
D_{HM}	Dose ingested for herbivorous mammals (deer mouse) (mg COPEC/kg BW-day).		
C_{TP}	COPEC concentration in terrestrial plants (mg COPEC/kg WW).	COPEC-specific	Calculated
IR_{HM}	Food ingestion rate of herbivorous mammals (kg WW/kg BW-day).	0.61	Calculated
P_{TP}	Proportion of terrestrial plants diet that is contaminated (unitless).	1	Conservative assumption
F_{TP}	Fraction of diet comprised of terrestrial plants (unitless).	1	Conservative assumption
C_S	COPEC concentration in soil (mg COPEC/kg DW soil).	COPEC-specific	See Tables 6-9 and 6-10
$IR_{Soil-HM}$	Soil ingestion rate for herbivorous mammals (kg DW/kg BW-day).	0.011	DW ingestion rate calculated by converting the WW ingestion rate, assuming 9.3% water content in the diet (water content in seeds; EPA, 2007a), and assuming a deer mouse ingests 2% of the dry food intake (based on white-footed mouse data; Beyer et al., 1994)
P_S	Proportion of ingested soil that is contaminated (unitless).	1	Conservative assumption

Table 6-20
COPEC Dose Ingested Terms in Invertivorous Small Mammals (Short-Tailed Shrew)
LO-58
Caribou, Maine

$$D_{ISM} = (C_{INV} \times IR_{ISM} \times P_{INV} \times F_{INV}) + (C_S \times IR_{S-ISM} \times P_S)$$

Parameter	Definition	Value	Reference
D_{ISM}	Dose ingested for invertivorous small mammals (short-tailed shrew) (mg COPEC/kg BW-day).		
C_{INV}	COPEC concentration in soil invertebrates (mg COPEC/kg WW).	COPEC-specific	Calculated
IR_{ISM}	Food ingestion rate of invertivorous small mammals (kg WW/kg BW-day).	0.53	Calculated
P_{INV}	Proportion of soil invertebrates diet that is contaminated (unitless).	1	Conservative assumption
F_{INV}	Fraction of diet comprised of soil invertebrates (unitless).	1	Merritt, 1987
C_S	COPEC concentration in soil (mg COPEC/kg DW soil).	COPEC- specific	See Tables 6-9 and 6-10
$IR_{Soil\text{-}ISM}$	Soil ingestion rate for invertivorous small mammals (kg DW/kg BW-day).	0.0025	DW ingestion rate calculated by converting the WW ingestion rate, assuming 84% water content in the diet (water content in earthworms; EPA, 1993a), and that a short-tailed shrew ingests 3% of the dry food intake (EPA, 2007a)
P_S	Proportion of ingested soil that is contaminated (unitless).	1	Conservative assumption

Table 6-21
Estimated Daily Intake - Song Sparrow - Site
LO-58
Caribou, Maine

	Intake (mg/kg bw-day)					
	RME			CTE		
COPEC	Plants	Soil	Total	Plants	Soil	Total
Benzo(a)anthracene	4.77E-03	1.95E-02	2.43E-02	1.53E-03	2.88E-03	4.41E-03
Benzo(a)pyrene	5.26E-03	2.03E-02	2.56E-02	8.18E-04	3.02E-03	3.83E-03
Benzo(b)fluoranthene	1.82E-02	3.01E-02	4.83E-02	2.64E-03	4.35E-03	6.99E-03
Benzo(e)pyrene	6.05E-03	1.63E-02	2.23E-02	9.32E-04	2.51E-03	3.44E-03
Benzo(k)fluoranthene	4.14E-03	1.41E-02	1.82E-02	8.54E-04	2.24E-03	3.09E-03
Benzo(g,h,i)perylene	6.81E-03	1.27E-02	1.95E-02	6.39E-04	1.72E-03	2.36E-03
Chrysene	4.92E-03	2.05E-02	2.54E-02	1.61E-03	3.13E-03	4.74E-03
Dibenzo(a,h)anthracene	7.25E-04	2.85E-03	3.58E-03	1.62E-04	6.36E-04	7.98E-04
Indeno(1,2,3-cd)pyrene	2.73E-03	1.27E-02	1.54E-02	4.12E-04	1.91E-03	2.33E-03
Perylene	1.35E-03	5.05E-03	6.40E-03	2.11E-04	7.51E-04	9.61E-04
Pyrene	5.34E-02	3.79E-02	9.13E-02	7.89E-03	5.60E-03	1.35E-02
High Molecular Weight PAHs	1.08E-01	1.92E-01	3.00E-01	1.77E-02	2.87E-02	4.64E-02
Aroclor 1260	3.79E-04	1.84E-03	2.22E-03	3.79E-04	1.84E-03	2.22E-03
Aluminum	2.21E+00	1.74E+03	1.74E+03	2.03E+00	1.59E+03	1.60E+03
Antimony	4.43E-03	5.57E-02	6.01E-02	4.40E-03	5.52E-02	5.96E-02
Barium	1.49E+00	4.88E+00	6.37E+00	1.28E+00	4.20E+00	5.48E+00
Cadmium	6.00E-02	2.93E-02	8.93E-02	4.37E-02	1.64E-02	6.01E-02
Chromium	2.63E-01	3.28E+00	3.55E+00	2.38E-01	2.97E+00	3.20E+00
Copper	1.54E+00	3.95E+00	5.49E+00	1.44E+00	3.31E+00	4.75E+00
Iron	6.32E+00	3.23E+03	3.24E+03	5.88E+00	3.00E+03	3.01E+03
Lead	2.74E-01	2.08E+00	2.36E+00	2.56E-01	1.83E+00	2.09E+00
Mercury	2.32E-02	1.37E-02	3.69E-02	1.77E-02	8.40E-03	2.61E-02
Selenium	1.87E-01	1.76E-01	3.63E-01	1.87E-01	1.76E-01	3.63E-01
Thallium	3.53E-05	4.51E-02	4.51E-02	3.53E-05	4.51E-02	4.51E-02
Vanadium	2.29E-02	2.41E+00	2.43E+00	2.12E-02	2.24E+00	2.26E+00
Zinc	9.54E+00	6.95E+00	1.65E+01	8.85E+00	6.06E+00	1.49E+01

CTE = Central tendency exposure.
mg/kg bw-day = Milligrams per kilogram body weight/day.
RME = Reasonable maximum exposure.

Table 6-22

Estimated Daily Intake - American Robin - Site LO-58

Caribou, Maine

COPEC	Intake (mg/kg bw-day)					
	RME			CTE		
	Soil Invertebrates	Soil	Total	Soil Invertebrates	Soil	Total
Benzo(a)anthracene	3.56E-02	9.33E-04	3.65E-02	5.25E-03	1.38E-04	5.38E-03
Benzo(a)pyrene	2.50E-02	9.72E-04	2.60E-02	3.71E-03	1.44E-04	3.85E-03
Benzo(b)fluoranthene	4.37E-01	1.44E-03	4.39E-01	6.33E-02	2.08E-04	6.35E-02
Benzo(e)pyrene	5.15E-02	7.79E-04	5.23E-02	7.93E-03	1.20E-04	8.05E-03
Benzo(k)fluoranthene	2.06E-02	6.73E-04	2.13E-02	3.28E-03	1.07E-04	3.39E-03
Benzo(g,h,i)perylene	4.21E-02	6.07E-04	4.27E-02	5.70E-03	8.22E-05	5.78E-03
Chrysene	3.34E-02	9.81E-04	3.44E-02	5.09E-03	1.50E-04	5.24E-03
Dibenzo(a,h)anthracene	5.16E-03	1.36E-04	5.30E-03	1.15E-03	3.04E-05	1.18E-03
Indeno(1,2,3-cd)pyrene	1.63E-02	6.07E-04	1.69E-02	2.46E-03	9.15E-05	2.55E-03
Perylene	1.37E-02	2.42E-04	1.39E-02	2.04E-03	3.59E-05	2.07E-03
Pyrene	7.33E-02	1.81E-03	7.51E-02	1.08E-02	2.68E-04	1.11E-02
High Molecular Weight PAHs	7.54E-01	9.18E-03	7.63E-01	1.11E-01	1.37E-03	1.12E-01
Aroclor 1260	1.43E-02	8.80E-05	1.44E-02	1.43E-02	8.80E-05	1.44E-02
Aluminum	8.56E+01	8.30E+01	1.69E+02	7.87E+01	7.62E+01	1.55E+02
Antimony	6.39E-02	2.66E-03	6.66E-02	6.34E-02	2.64E-03	6.60E-02
Barium	5.10E-01	2.34E-01	7.44E-01	4.39E-01	2.01E-01	6.40E-01
Cadmium	3.53E-01	1.40E-03	3.54E-01	2.22E-01	7.85E-04	2.23E-01
Chromium	1.15E+00	1.57E-01	1.31E+00	1.04E+00	1.42E-01	1.18E+00
Copper	2.33E+00	1.89E-01	2.52E+00	1.96E+00	1.58E-01	2.11E+00
Iron	1.33E+02	1.54E+02	2.88E+02	1.24E+02	1.44E+02	2.68E+02
Lead	1.05E+00	9.96E-02	1.15E+00	9.50E-01	8.77E-02	1.04E+00
Mercury	3.15E-03	6.56E-04	3.80E-03	1.93E-03	4.02E-04	2.33E-03
Selenium	1.58E-01	8.42E-03	1.66E-01	1.58E-01	8.42E-03	1.66E-01
Thallium	3.10E-02	2.16E-03	3.32E-02	3.10E-02	2.16E-03	3.32E-02
Vanadium	1.16E-01	1.15E-01	2.31E-01	1.08E-01	1.07E-01	2.15E-01
Zinc	2.67E+01	3.32E-01	2.70E+01	2.33E+01	2.90E-01	2.36E+01

CTE = Central tendency exposure.
mg/kg bw-day = Milligrams per kilogram body weight/day.
RME = Reasonable maximum exposure.

Table 6-23
Estimated Daily Intake - Deer Mouse - Site
LO-58
Caribou, Maine

	Intake (mg/kg bw-day)					
	RME			CTE		
COPEC	Plants	Soil	Total	Plants	Soil	Total
Benzo(a)anthracene	2.43E-03	2.33E-03	4.76E-03	7.78E-04	3.44E-04	1.12E-03
Benzo(a)pyrene	2.67E-03	2.43E-03	5.10E-03	4.16E-04	3.61E-04	7.77E-04
Benzo(b)fluoranthene	9.28E-03	3.60E-03	1.29E-02	1.34E-03	5.20E-04	1.86E-03
Benzo(e)pyrene	3.08E-03	1.95E-03	5.02E-03	4.74E-04	3.00E-04	7.73E-04
Benzo(k)fluoranthene	2.11E-03	1.68E-03	3.79E-03	4.34E-04	2.68E-04	7.02E-04
Benzo(g,h,i)perylene	3.46E-03	1.52E-03	4.98E-03	3.25E-04	2.05E-04	5.30E-04
Chrysene	2.50E-03	2.45E-03	4.95E-03	8.18E-04	3.74E-04	1.19E-03
Dibenzo(a,h)anthracene	3.69E-04	3.41E-04	7.10E-04	8.22E-05	7.60E-05	1.58E-04
Indeno(1,2,3-cd)pyrene	1.39E-03	1.52E-03	2.91E-03	2.09E-04	2.29E-04	4.38E-04
Perylene	6.87E-04	6.04E-04	1.29E-03	1.07E-04	8.98E-05	1.97E-04
Pyrene	2.71E-02	4.53E-03	3.17E-02	4.01E-03	6.69E-04	4.68E-03
High Molecular Weight PAHs	5.51E-02	2.30E-02	7.81E-02	8.99E-03	3.44E-03	1.24E-02
Aroclor 1260	1.93E-04	2.20E-04	4.13E-04	1.93E-04	2.20E-04	4.13E-04
Aluminum	1.12E+00	2.07E+02	2.09E+02	1.03E+00	1.91E+02	1.92E+02
Antimony	2.25E-03	6.66E-03	8.91E-03	2.23E-03	6.60E-03	8.83E-03
Barium	7.58E-01	5.84E-01	1.34E+00	6.52E-01	5.02E-01	1.15E+00
Cadmium	3.05E-02	3.51E-03	3.40E-02	2.22E-02	1.96E-03	2.42E-02
Chromium	1.34E-01	3.92E-01	5.26E-01	1.21E-01	3.55E-01	4.76E-01
Copper	7.85E-01	4.72E-01	1.26E+00	7.32E-01	3.95E-01	1.13E+00
Iron	3.21E+00	3.86E+02	3.89E+02	2.99E+00	3.59E+02	3.62E+02
Lead	1.40E-01	2.49E-01	3.88E-01	1.30E-01	2.19E-01	3.49E-01
Mercury	1.18E-02	1.64E-03	1.34E-02	8.98E-03	1.00E-03	9.98E-03
Selenium	9.52E-02	2.11E-02	1.16E-01	9.52E-02	2.11E-02	1.16E-01
Thallium	1.79E-05	5.39E-03	5.41E-03	1.79E-05	5.39E-03	5.41E-03
Vanadium	1.16E-02	2.88E-01	3.00E-01	1.08E-02	2.68E-01	2.78E-01
Zinc	4.85E+00	8.31E-01	5.68E+00	4.50E+00	7.25E-01	5.22E+00

CTE = Central tendency exposure.
mg/kg bw-day = Milligrams per kilogram body weight/day.
RME = Reasonable maximum exposure.

Table 6-24
Estimated Daily Intake - Short-tailed Shrew - Site
LO-58
Caribou, Maine

	Intake (mg/kg bw-day)					
	RME			CTE		
COPEC	Soil Invertebrates	Soil	Total	Soil Invertebrates	Soil	Total
Benzo(a)anthracene	2.86E-02	5.30E-04	2.91E-02	4.21E-03	7.82E-05	4.29E-03
Benzo(a)pyrene	2.01E-02	5.53E-04	2.06E-02	2.98E-03	8.20E-05	3.06E-03
Benzo(b)fluoranthene	3.51E-01	8.18E-04	3.52E-01	5.08E-02	1.18E-04	5.09E-02
Benzo(e)pyrene	4.14E-02	4.43E-04	4.18E-02	6.37E-03	6.81E-05	6.44E-03
Benzo(k)fluoranthene	1.66E-02	3.83E-04	1.70E-02	2.64E-03	6.09E-05	2.70E-03
Benzo(g,h,i)perylene	3.38E-02	3.45E-04	3.42E-02	4.58E-03	4.67E-05	4.62E-03
Chrysene	2.68E-02	5.58E-04	2.74E-02	4.09E-03	8.50E-05	4.18E-03
Dibenzo(a,h)anthracene	4.15E-03	7.75E-05	4.22E-03	9.25E-04	1.73E-05	9.42E-04
Indeno(1,2,3-cd)pyrene	1.31E-02	3.45E-04	1.35E-02	1.98E-03	5.20E-05	2.03E-03
Perylene	1.10E-02	1.37E-04	1.11E-02	1.63E-03	2.04E-05	1.66E-03
Pyrene	5.88E-02	1.03E-03	5.99E-02	8.69E-03	1.52E-04	8.84E-03
High Molecular Weight PAHs	6.05E-01	5.22E-03	6.11E-01	8.89E-02	7.81E-04	8.97E-02
Aroclor 1260	1.15E-02	5.00E-05	1.15E-02	1.15E-02	5.00E-05	1.15E-02
Aluminum	6.88E+01	4.71E+01	1.16E+02	6.32E+01	4.33E+01	1.07E+02
Antimony	5.13E-02	1.51E-03	5.28E-02	5.09E-02	1.50E-03	5.24E-02
Barium	4.10E-01	1.33E-01	5.42E-01	3.52E-01	1.14E-01	4.67E-01
Cadmium	2.83E-01	7.98E-04	2.84E-01	1.78E-01	4.46E-04	1.79E-01
Chromium	9.26E-01	8.92E-02	1.02E+00	8.36E-01	8.06E-02	9.17E-01
Copper	1.87E+00	1.07E-01	1.98E+00	1.57E+00	8.99E-02	1.66E+00
Iron	1.07E+02	8.77E+01	1.95E+02	9.97E+01	8.16E+01	1.81E+02
Lead	8.45E-01	5.66E-02	9.02E-01	7.63E-01	4.98E-02	8.13E-01
Mercury	2.53E-03	3.73E-04	2.90E-03	1.55E-03	2.28E-04	1.78E-03
Selenium	1.27E-01	4.79E-03	1.31E-01	1.27E-01	4.79E-03	1.31E-01
Thallium	2.49E-02	1.23E-03	2.62E-02	2.49E-02	1.23E-03	2.62E-02
Vanadium	9.33E-02	6.55E-02	1.59E-01	8.66E-02	6.08E-02	1.47E-01
Zinc	2.15E+01	1.89E-01	2.16E+01	1.87E+01	1.65E-01	1.89E+01

CTE = Central tendency exposure.
mg/kg bw-day = Milligrams per kilogram body weight/day.
RME = Reasonable maximum exposure.

Table 6-25
Avian Toxicity Reference Values (TRVs)
LO-58
Caribou, Maine

Analyte	Test Species	Study Duration	Effect	Dose (mg/kg-day)		TRV (mg/kg-day)*		Toxicity Value Form or Surrogate	Initial Value Source
				NOAEL	LOAEL	NOAEL	LOAEL		
High Molecular Weight PAHs	Mallard	Chronic	Reproduction	211		211	1055	weathered crude	Stubblefield et al., 1995
Aroclor 1260	Ringed dove	Chronic	Reproduction		0.72	0.144	0.72	Aroclor 1254	EPA, 1999
Aluminum	Ringed dove	Chronic	Reproduction	110		110	550	aluminum sulfate	EPA, 1999 and Sample et al., 1996
Antimony									
Barium	1-day old chick	Subchronic	Mortality	208.26	416.53	20.826	41.653		EPA, 1999 and Sample et al., 1996
Cadmium	Chicken	Chronic	Reproduction	0.593	2.37	0.593	2.37		EPA, 2005g
Chromium	Black duck	Chronic	Reproduction and growth	0.5	2.78	0.5	2.78	chromium III	EPA, 2008b
Copper	Chicken	Chronic	Reproduction	4.05	12.1	4.05	12.1		EPA, 2007b
Iron									
Lead	Chicken	Subchronic	Reproduction	1.63	3.26	0.163	0.326	lead acetate	EPA, 2005j
Mercury	Japanese quail	Chronic	Reproduction	0.45	0.9	0.45	0.9	mercuric chloride	Sample et al., 1996
Selenium	Mallard	Chronic	Reproduction	0.5	1	0.5	1	sodium selinite	EPA, 1999 and Sample et al., 1996
Thallium	Starling	Acute	Mortality		35 (LC50)	0.35	1.75		EPA, 1999
Vanadium	Mallard	Chronic	Mortality, body weight, blood chemistry	11.38		11.38	56.9		Sample et al., 1996
Zinc	Multiple	Multiple	Growth and reproduction	66.10		66.10	330.5	geomean of NOAELs	EPA, 2007i

*Derived using study dose and conversion/uncertainty factors as presented in Section 6.2.2.2.2

Table 6-26
Mammalian Toxicity Reference Values (TRVs)
LO-58
Caribou, Maine

Analyte	Test Species	Study Duration	Effect	Dose (mg/kg-day)		TRV (mg/kg-day)*		Toxicity Value Form or Surrogate	Initial Value Source
				NOAEL	LOAEL	NOAEL	LOAEL		
High Molecular Weight PAHs	Mouse	Chronic	Survival	0.615	3.07	0.615	3.07	benzo(a)pyrene	EPA, 2007e
Aroclor 1260	Rat	Chronic	Reproduction	0.32	1.5	0.32	1.5		Linder et al., 1974
Aluminum	Mouse	Chronic	Reproduction		19.3	3.86	19.3	aluminum chloride	EPA, 1999 and Sample et al., 1996
Antimony	Rat	Chronic	Reproduction	0.059	0.59	0.059	0.59		EPA, 2005c
Barium	Rat	Chronic	Growth and survival	61.1	121	61.1	121	reproduction, growth, or survival study with lowest bounded LOAEL	EPA, 2005e
Cadmium	Rat	Chronic	Growth	0.77	7.7	0.77	7.7		EPA, 2005g
Chromium	Rat	Chronic	Growth	8.09		8.09	40.45	chromium III	EPA, 2008b
Copper	Mouse	Subchronic	Reproduction	90.9	136	9.09	13.6		EPA, 2007b
Iron	Rat	Subchronic	Liver, heart, and pancreatic effects	31.5	315	3.15	31.5		Whittaker et al., 1994
Lead	Rat	Chronic	Growth	4.7	8.9	4.7	8.9		EPA, 2005j
Mercury	Mink	Chronic	Reproduction	1.01		1.01	5.05	mercuric chloride	EPA, 1999 and Sample et al., 1996
Selenium	Mouse	Subchronic	Reproduction	0.072	0.145	0.0072	0.0145		EPA, 2007h
Thallium	Rat	Subchronic	Reproduction (male testicular function)		0.74	0.0148	0.074		EPA, 1999 and Sample et al., 1996
Vanadium	Mouse	Chronic	Growth, reproduction, and survival	4.16	8.31	4.16	8.31		EPA, 2005k
Zinc	Rat	Subchronic	Reproduction	181.00	452	18.10	45.2	reproduction, growth, or survival study with lowest bounded LOAEL (non livestock)	EPA, 2007i

*Derived using study dose and conversion/uncertainty factors as presented in Section 6.2.2.2.2

Table 6-27
Sample by Sample Phytotoxicity Summary
LO-58
Caribou, Maine

Area/Analyte	FOE	Hazard Quotients		
		>=1 and <10	>=10 and <100	>= 100
AMAC Building				
High Molecular Weight PAHs	1/3	1	---	---
Aluminum	3/3	---	---	3
Arsenic	0/3	---	---	---
Barium	3/3	1	2	---
Beryllium	3/3	1	2	---
Chromium	3/3	---	---	3
Cobalt	1/3	1	---	---
Copper	0/3	---	---	---
Manganese	3/3	3	---	---
Mercury	0/3	---	---	---
Nickel	3/3	3	---	---
Selenium	2/2	2	---	---
Vanadium	3/3	---	3	---
Zinc	0/3	---	---	---
Launcher				
High Molecular Weight PAHs	0/12	---	---	---
Aluminum	13/13	---	---	13
Antimony	3/6	3	---	---
Arsenic	0/13	---	---	---
Barium	13/13	10	3	---
Beryllium	13/13	13	---	---
Chromium	13/13	---	---	13
Cobalt	4/13	4	---	---
Copper	0/13	---	---	---
Manganese	13/13	13	---	---
Mercury	1/13	1	---	---
Nickel	9/13	9	---	---
Selenium	8/8	8	---	---
Thallium	1/1	---	1	---
Vanadium	13/13	2	11	---
Zinc	0/13	---	---	---
Drainageway-OffSite-Downstream				
High Molecular Weight PAHs	1/1	1	---	---
Aluminum	1/1	---	---	1
Arsenic	1/1	1	---	---
Barium	1/1	---	1	---
Beryllium	1/1	1	---	---
Chromium	1/1	---	---	1
Cobalt	0/1	---	---	---
Copper	0/1	---	---	---
Manganese	1/1	1	---	---
Mercury	0/1	---	---	---
Nickel	0/1	---	---	---
Vanadium	1/1	---	1	---
Zinc	0/1	---	---	---
Drainageway-OnSite-Upstream				
High Molecular Weight PAHs	1/1	1	---	---
Aluminum	1/1	---	---	1
Arsenic	0/1	---	---	---
Barium	1/1	---	1	---
Beryllium	1/1	1	---	---
Chromium	1/1	---	---	1
Cobalt	0/1	---	---	---
Copper	0/1	---	---	---
Manganese	1/1	1	---	---
Mercury	0/1	---	---	---

Table 6-27
Sample by Sample Phytotoxicity Summary
LO-58
Caribou, Maine

Area/Analyte	FOE	Hazard Quotients		
		>=1 and <10	>=10 and <100	>= 100
Nickel	0/1	---	---	---
Selenium	1/1	1	---	---
Vanadium	1/1	---	1	---
Zinc	0/1	---	---	---
Downgradient OnSite Drainageway				
High Molecular Weight PAHs	1/1	1	---	---
Aluminum	2/2	---	---	2
Antimony	1/1	1	---	---
Arsenic	2/2	2	---	---
Barium	2/2	---	2	---
Beryllium	2/2	2	---	---
Chromium	2/2	---	---	2
Cobalt	0/2	---	---	---
Copper	2/2	2	---	---
Manganese	2/2	2	---	---
Mercury	0/2	---	---	---
Nickel	0/2	---	---	---
Vanadium	2/2	---	2	---
Zinc	0/2	---	---	---

FOE = Frequency of exceeding. Number of detects exceeding benchmark to number of detects.

Note: Primary and duplicate samples evaluated separately.

Table 6-28
Sample by Sample Soil Invertebrate Toxicity Summary
LO-58
Caribou, Maine

Area/Analyte	FOE	Hazard Quotients		
		>=1 and <10	>=10 and <100	>= 100
AMAC				
Acetone	3/3	---	3	---
Carbon disulfide	1/2	1	---	---
High Molecular Weight PAHs	0/3	---	---	---
Aluminum	3/3	---	3	---
Arsenic	3/3	---	3	---
Barium	0/3	---	---	---
Beryllium	0/3	---	---	---
Chromium	3/3	---	---	3
Cobalt	0/3	---	---	---
Copper	0/3	---	---	---
Iron	3/3	---	---	3
Manganese	3/3	3	---	---
Mercury	0/3	---	---	---
Nickel	0/3	---	---	---
Selenium	0/2	---	---	---
Vanadium	3/3	3	---	---
Zinc	0/3	---	---	---
Launcher				
Acetone	13/13	1	12	---
Carbon disulfide	4/4	2	2	---
High Molecular Weight PAHs	0/12	---	---	---
Aluminum	13/13	---	13	---
Antimony	0/6	---	---	---
Arsenic	13/13	---	13	---
Barium	0/13	---	---	---
Beryllium	0/13	---	---	---
Chromium	13/13	---	---	13
Cobalt	0/13	---	---	---
Copper	0/13	---	---	---
Iron	13/13	---	---	13
Manganese	13/13	13	---	---
Mercury	0/13	---	---	---
Nickel	0/13	---	---	---
Selenium	0/8	---	---	---
Vanadium	11/13	11	---	---
Zinc	0/13	---	---	---
Drainageway-OffSite-Downstream				
2-Hexanone	1/1	1	---	---
Acetone	1/1	---	1	---
High Molecular Weight PAHs	0/1	---	---	---
Aluminum	1/1	---	1	---
Arsenic	1/1	---	1	---
Barium	0/1	---	---	---
Beryllium	0/1	---	---	---
Chromium	1/1	---	---	1
Cobalt	0/1	---	---	---
Copper	0/1	---	---	---
Iron	1/1	---	---	1
Manganese	1/1	1	---	---
Mercury	0/1	---	---	---
Nickel	0/1	---	---	---
Vanadium	1/1	1	---	---
Zinc	0/1	---	---	---
Drainageway-OnSite-Upstream				
Acetone	1/1	---	1	---
Carbon disulfide	1/1	1	---	---

Table 6-28
Sample by Sample Soil Invertebrate Toxicity Summary
LO-58
Caribou, Maine

Area/Analyte	FOE	Hazard Quotients		
		>=1 and <10	>=10 and <100	>= 100
High Molecular Weight PAHs	0/1	---	---	---
Aluminum	1/1	---	1	---
Arsenic	1/1	---	1	---
Barium	0/1	---	---	---
Beryllium	0/1	---	---	---
Chromium	1/1	---	---	1
Cobalt	0/1	---	---	---
Copper	0/1	---	---	---
Iron	1/1	---	---	1
Manganese	1/1	1	---	---
Mercury	0/1	---	---	---
Nickel	0/1	---	---	---
Selenium	0/1	---	---	---
Vanadium	1/1	1	---	---
Zinc	1/1	1	---	---
Downgradient OnSite Drainageway				
Acetone	1/1	---	1	---
High Molecular Weight PAHs	0/1	---	---	---
Aluminum	2/2	---	2	---
Antimony	0/1	---	---	---
Arsenic	2/2	---	2	---
Barium	0/2	---	---	---
Beryllium	0/2	---	---	---
Chromium	2/2	---	---	2
Cobalt	0/2	---	---	---
Copper	0/2	---	---	---
Iron	2/2	---	---	2
Manganese	2/2	2	---	---
Mercury	0/2	---	---	---
Nickel	0/2	---	---	---
Vanadium	2/2	2	---	---
Zinc	2/2	2	---	---

FOE = Frequency of exceeding. Number of detects exceeding benchmark to number of detects.

Note: Primary and duplicate samples evaluated separately.

Table 6-29
Hazard Quotients - Song Sparrow - Site
LO-58
Caribou, Maine

	RME									
	NOAEL					LOAEL				
	Plants		Soil			Plants		Soil		
COPEC	HQ	% Contribution	HQ	% Contribution	Total HQ	HQ	% Contribution	HQ	% Contribution	Total HQ
High Molecular Weight PAHs	5.1E-04	36%	9.1E-04	64%	1.4E-03	1.0E-04	36%	1.8E-04	64%	2.8E-04
Aroclor 1260	2.6E-03	17%	1.3E-02	83%	1.5E-02	5.3E-04	17%	2.6E-03	83%	3.1E-03
Aluminum	2.0E-02	0%	1.6E+01	100%	1.6E+01	4.0E-03	0%	3.2E+00	100%	3.2E+00
Antimony	NTV	---	NTV	---	NTV	NTV	---	NTV	---	NTV
Barium	7.2E-02	23%	2.3E-01	77%	3.1E-01	3.6E-02	23%	1.2E-01	77%	1.5E-01
Cadmium	1.0E-01	67%	4.9E-02	33%	1.5E-01	2.5E-02	67%	1.2E-02	33%	3.8E-02
Chromium	5.3E-01	7%	6.6E+00	93%	7.1E+00	9.5E-02	7%	1.2E+00	93%	1.3E+00
Copper	3.8E-01	28%	9.7E-01	72%	1.4E+00	1.3E-01	28%	3.3E-01	72%	4.5E-01
Iron	NTV	---	NTV	---	NTV	NTV	---	NTV	---	NTV
Lead	1.7E+00	12%	1.3E+01	88%	1.4E+01	8.4E-01	12%	6.4E+00	88%	7.2E+00
Mercury	5.1E-02	63%	3.0E-02	37%	8.2E-02	2.6E-02	63%	1.5E-02	37%	4.1E-02
Selenium	3.7E-01	52%	3.5E-01	48%	7.3E-01	1.9E-01	52%	1.8E-01	48%	3.6E-01
Thallium	1.0E-04	0%	1.3E-01	100%	1.3E-01	2.0E-05	0%	2.6E-02	100%	2.6E-02
Vanadium	2.0E-03	1%	2.1E-01	99%	2.1E-01	4.0E-04	1%	4.2E-02	99%	4.3E-02
Zinc	1.4E-01	58%	1.1E-01	42%	2.5E-01	2.9E-02	58%	2.1E-02	42%	5.0E-02

	CTE									
	NOAEL					LOAEL				
	Plants		Soil			Plants		Soil		
COPEC	HQ	% Contribution	HQ	% Contribution	Total HQ	HQ	% Contribution	HQ	% Contribution	Total HQ
High Molecular Weight PAHs	8.4E-05	38%	1.4E-04	62%	2.2E-04	1.7E-05	38%	2.7E-05	62%	4.4E-05
Aroclor 1260	2.6E-03	17%	1.3E-02	83%	1.5E-02	5.3E-04	17%	2.6E-03	83%	3.1E-03
Aluminum	1.8E-02	0%	1.4E+01	100%	1.5E+01	3.7E-03	0%	2.9E+00	100%	2.9E+00
Antimony	NTV	---	NTV	---	NTV	NTV	---	NTV	---	NTV
Barium	6.2E-02	23%	2.0E-01	77%	2.6E-01	3.1E-02	23%	1.0E-01	77%	1.3E-01
Cadmium	7.4E-02	73%	2.8E-02	27%	1.0E-01	1.8E-02	73%	6.9E-03	27%	2.5E-02
Chromium	4.8E-01	7%	5.9E+00	93%	6.4E+00	8.6E-02	7%	1.1E+00	93%	1.2E+00
Copper	3.6E-01	30%	8.2E-01	70%	1.2E+00	1.2E-01	30%	2.7E-01	70%	3.9E-01
Iron	NTV	---	NTV	---	NTV	NTV	---	NTV	---	NTV
Lead	1.6E+00	12%	1.1E+01	88%	1.3E+01	7.8E-01	12%	5.6E+00	88%	6.4E+00
Mercury	3.9E-02	68%	1.9E-02	32%	5.8E-02	2.0E-02	68%	9.3E-03	32%	2.9E-02
Selenium	3.7E-01	52%	3.5E-01	48%	7.3E-01	1.9E-01	52%	1.8E-01	48%	3.6E-01
Thallium	1.0E-04	0%	1.3E-01	100%	1.3E-01	2.0E-05	0%	2.6E-02	100%	2.6E-02
Vanadium	1.9E-03	1%	2.0E-01	99%	2.0E-01	3.7E-04	1%	3.9E-02	99%	4.0E-02
Zinc	1.3E-01	59%	9.2E-02	41%	2.3E-01	2.7E-02	59%	1.8E-02	41%	4.5E-02

Shading indicates HQ >1.0.

NTV = No toxicity value.

Table 6-30
Hazard Quotients - American Robin - Site
LO-58
Caribou, Maine

	RME									
	NOAEL					LOAEL				
	Soil Invertebrates		Soil			Soil Invertebrates		Soil		
COPEC	HQ	% Contribution	HQ	% Contribution	Total HQ	HQ	% Contribution	HQ	% Contribution	Total HQ
High Molecular Weight PAHs	3.6E-03	99%	4.4E-05	1%	3.6E-03	7.1E-04	99%	8.7E-06	1%	7.2E-04
Aroclor 1260	9.9E-02	99%	6.1E-04	1%	1.0E-01	2.0E-02	99%	1.2E-04	1%	2.0E-02
Aluminum	7.8E-01	51%	7.5E-01	49%	1.5E+00	1.6E-01	51%	1.5E-01	49%	3.1E-01
Antimony	NTV	---	NTV	---	NTV	NTV	---	NTV	---	NTV
Barium	2.4E-02	69%	1.1E-02	31%	3.6E-02	1.2E-02	69%	5.6E-03	31%	1.8E-02
Cadmium	5.9E-01	100%	2.4E-03	0%	6.0E-01	1.5E-01	100%	5.9E-04	0%	1.5E-01
Chromium	2.3E+00	88%	3.1E-01	12%	2.6E+00	4.1E-01	88%	5.6E-02	12%	4.7E-01
Copper	5.8E-01	93%	4.7E-02	7%	6.2E-01	1.9E-01	93%	1.6E-02	7%	2.1E-01
Iron	NTV	---	NTV	---	NTV	NTV	---	NTV	---	NTV
Lead	6.5E+00	91%	6.1E-01	9%	7.1E+00	3.2E+00	91%	3.1E-01	9%	3.5E+00
Mercury	7.0E-03	83%	1.5E-03	17%	8.4E-03	3.5E-03	83%	7.3E-04	17%	4.2E-03
Selenium	3.2E-01	95%	1.7E-02	5%	3.3E-01	1.6E-01	95%	8.4E-03	5%	1.7E-01
Thallium	8.9E-02	94%	6.2E-03	6%	9.5E-02	1.8E-02	94%	1.2E-03	6%	1.9E-02
Vanadium	1.0E-02	50%	1.0E-02	50%	2.0E-02	2.0E-03	50%	2.0E-03	50%	4.1E-03
Zinc	4.0E-01	99%	5.0E-03	1%	4.1E-01	8.1E-02	99%	1.0E-03	1%	8.2E-02

	CTE									
	NOAEL					LOAEL				
	Soil Invertebrates		Soil			Soil Invertebrates		Soil		
COPEC	HQ	% Contribution	HQ	% Contribution	Total HQ	HQ	% Contribution	HQ	% Contribution	Total HQ
High Molecular Weight PAHs	5.2E-04	99%	6.5E-06	1%	5.3E-04	1.0E-04	99%	1.3E-06	1%	1.1E-04
Aroclor 1260	9.9E-02	99%	6.1E-04	1%	1.0E-01	2.0E-02	99%	1.2E-04	1%	2.0E-02
Aluminum	7.2E-01	51%	6.9E-01	49%	1.4E+00	1.4E-01	51%	1.4E-01	49%	2.8E-01
Antimony	NTV	---	NTV	---	NTV	NTV	---	NTV	---	NTV
Barium	2.1E-02	69%	9.6E-03	31%	3.1E-02	1.1E-02	69%	4.8E-03	31%	1.5E-02
Cadmium	3.7E-01	100%	1.3E-03	0%	3.8E-01	9.4E-02	100%	3.3E-04	0%	9.4E-02
Chromium	2.1E+00	88%	2.8E-01	12%	2.4E+00	3.7E-01	88%	5.1E-02	12%	4.3E-01
Copper	4.8E-01	93%	3.9E-02	7%	5.2E-01	1.6E-01	93%	1.3E-02	7%	1.7E-01
Iron	NTV	---	NTV	---	NTV	NTV	---	NTV	---	NTV
Lead	5.8E+00	92%	5.4E-01	8%	6.4E+00	2.9E+00	92%	2.7E-01	8%	3.2E+00
Mercury	4.3E-03	83%	8.9E-04	17%	5.2E-03	2.1E-03	83%	4.5E-04	17%	2.6E-03
Selenium	3.2E-01	95%	1.7E-02	5%	3.3E-01	1.6E-01	95%	8.4E-03	5%	1.7E-01
Thallium	8.9E-02	94%	6.2E-03	6%	9.5E-02	1.8E-02	94%	1.2E-03	6%	1.9E-02
Vanadium	9.5E-03	50%	9.4E-03	50%	1.9E-02	1.9E-03	50%	1.9E-03	50%	3.8E-03
Zinc	3.5E-01	99%	4.4E-03	1%	3.6E-01	7.1E-02	99%	8.8E-04	1%	7.1E-02

Shading indicates HQ >1.0.

NTV = No toxicity value.

Table 6-31
Hazard Quotients - Deer Mouse - Site
LO-58
Caribou, Maine

RME										
	NOAEL					LOAEL				
	Plants		Soil			Plants		Soil		
COPEC	HQ	% Contribution	HQ	% Contribution	Total HQ	HQ	% Contribution	HQ	% Contribution	Total HQ
High Molecular Weight PAHs	9.0E-02	71%	3.7E-02	29%	1.3E-01	1.8E-02	71%	7.5E-03	29%	2.5E-02
Aroclor 1260	6.0E-04	47%	6.9E-04	53%	1.3E-03	1.3E-04	47%	1.5E-04	53%	2.8E-04
Aluminum	2.9E-01	1%	5.4E+01	99%	5.4E+01	5.8E-02	1%	1.1E+01	99%	1.1E+01
Antimony	3.8E-02	25%	1.1E-01	75%	1.5E-01	3.8E-03	25%	1.1E-02	75%	1.5E-02
Barium	1.2E-02	56%	9.6E-03	44%	2.2E-02	6.3E-03	56%	4.8E-03	44%	1.1E-02
Cadmium	4.0E-02	90%	4.6E-03	10%	4.4E-02	4.0E-03	90%	4.6E-04	10%	4.4E-03
Chromium	1.7E-02	25%	4.9E-02	75%	6.5E-02	3.3E-03	25%	9.7E-03	75%	1.3E-02
Copper	8.6E-02	62%	5.2E-02	38%	1.4E-01	5.8E-02	62%	3.5E-02	38%	9.2E-02
Iron	1.0E+00	1%	1.2E+02	99%	1.2E+02	1.0E-01	1%	1.2E+01	99%	1.2E+01
Lead	3.0E-02	36%	5.3E-02	64%	8.3E-02	1.6E-02	36%	2.8E-02	64%	4.4E-02
Mercury	1.2E-02	88%	1.6E-03	12%	1.3E-02	2.3E-03	88%	3.2E-04	12%	2.7E-03
Selenium	1.3E+01	82%	2.9E+00	18%	1.6E+01	6.6E+00	82%	1.5E+00	18%	8.0E+00
Thallium	1.2E-03	0%	3.6E-01	100%	3.7E-01	2.4E-04	0%	7.3E-02	100%	7.3E-02
Vanadium	2.8E-03	4%	6.9E-02	96%	7.2E-02	1.4E-03	4%	3.5E-02	96%	3.6E-02
Zinc	2.7E-01	85%	4.6E-02	15%	3.1E-01	1.1E-01	85%	1.8E-02	15%	1.3E-01

CTE										
	NOAEL					LOAEL				
	Plants		Soil			Plants		Soil		
COPEC	HQ	% Contribution	HQ	% Contribution	Total HQ	HQ	% Contribution	HQ	% Contribution	Total HQ
High Molecular Weight PAHs	1.5E-02	72%	5.6E-03	28%	2.0E-02	2.9E-03	72%	1.1E-03	28%	4.0E-03
Aroclor 1260	6.0E-04	47%	6.9E-04	53%	1.3E-03	1.3E-04	47%	1.5E-04	53%	2.8E-04
Aluminum	2.7E-01	1%	4.9E+01	99%	5.0E+01	5.3E-02	1%	9.9E+00	99%	9.9E+00
Antimony	3.8E-02	25%	1.1E-01	75%	1.5E-01	3.8E-03	25%	1.1E-02	75%	1.5E-02
Barium	1.1E-02	56%	8.2E-03	44%	1.9E-02	5.4E-03	56%	4.2E-03	44%	9.5E-03
Cadmium	2.9E-02	92%	2.5E-03	8%	3.1E-02	2.9E-03	92%	2.5E-04	8%	3.1E-03
Chromium	1.5E-02	25%	4.4E-02	75%	5.9E-02	3.0E-03	25%	8.8E-03	75%	1.2E-02
Copper	8.1E-02	65%	4.4E-02	35%	1.2E-01	5.4E-02	65%	2.9E-02	35%	8.3E-02
Iron	9.5E-01	1%	1.1E+02	99%	1.1E+02	9.5E-02	1%	1.1E+01	99%	1.1E+01
Lead	2.8E-02	37%	4.7E-02	63%	7.4E-02	1.5E-02	37%	2.5E-02	63%	3.9E-02
Mercury	8.9E-03	90%	9.9E-04	10%	9.9E-03	1.8E-03	90%	2.0E-04	10%	2.0E-03
Selenium	1.3E+01	82%	2.9E+00	18%	1.6E+01	6.6E+00	82%	1.5E+00	18%	8.0E+00
Thallium	1.2E-03	0%	3.6E-01	100%	3.7E-01	2.4E-04	0%	7.3E-02	100%	7.3E-02
Vanadium	2.6E-03	4%	6.4E-02	96%	6.7E-02	1.3E-03	4%	3.2E-02	96%	3.4E-02
Zinc	2.5E-01	86%	4.0E-02	14%	2.9E-01	1.0E-01	86%	1.6E-02	14%	1.2E-01

Shading indicates HQ >1.0.

NTV = No toxicity value.

Table 6-32
Hazard Quotients - Short-tailed Shrew - Site
LO-58
Caribou, Maine

RME										
	NOAEL					LOAEL				
	Soil Invertebrates		Soil			Soil Invertebrates		Soil		
COPEC	HQ	% Contribution	HQ	% Contribution	Total HQ	HQ	% Contribution	HQ	% Contribution	Total HQ
High Molecular Weight PAHs	9.8E-01	99%	8.5E-03	1%	9.9E-01	2.0E-01	99%	1.7E-03	1%	2.0E-01
Aroclor 1260	3.6E-02	100%	1.6E-04	0%	3.6E-02	7.7E-03	100%	3.3E-05	0%	7.7E-03
Aluminum	1.8E+01	59%	1.2E+01	41%	3.0E+01	3.6E+00	59%	2.4E+00	41%	6.0E+00
Antimony	8.7E-01	97%	2.6E-02	3%	9.0E-01	8.7E-02	97%	2.6E-03	3%	9.0E-02
Barium	6.7E-03	76%	2.2E-03	24%	8.9E-03	3.4E-03	76%	1.1E-03	24%	4.5E-03
Cadmium	3.7E-01	100%	1.0E-03	0%	3.7E-01	3.7E-02	100%	1.0E-04	0%	3.7E-02
Chromium	1.1E-01	91%	1.1E-02	9%	1.3E-01	2.3E-02	91%	2.2E-03	9%	2.5E-02
Copper	2.1E-01	95%	1.2E-02	5%	2.2E-01	1.4E-01	95%	7.9E-03	5%	1.5E-01
Iron	3.4E+01	55%	2.8E+01	45%	6.2E+01	3.4E+00	55%	2.8E+00	45%	6.2E+00
Lead	1.8E-01	94%	1.2E-02	6%	1.9E-01	9.5E-02	94%	6.4E-03	6%	1.0E-01
Mercury	2.5E-03	87%	3.7E-04	13%	2.9E-03	5.0E-04	87%	7.4E-05	13%	5.7E-04
Selenium	1.8E+01	96%	6.6E-01	4%	1.8E+01	8.7E+00	96%	3.3E-01	4%	9.1E+00
Thallium	1.7E+00	95%	8.3E-02	5%	1.8E+00	3.4E-01	95%	1.7E-02	5%	3.5E-01
Vanadium	2.2E-02	59%	1.6E-02	41%	3.8E-02	1.1E-02	59%	7.9E-03	41%	1.9E-02
Zinc	1.2E+00	99%	1.0E-02	1%	1.2E+00	4.7E-01	99%	4.2E-03	1%	4.8E-01

CTE										
	NOAEL					LOAEL				
	Soil Invertebrates		Soil			Soil Invertebrates		Soil		
COPEC	HQ	% Contribution	HQ	% Contribution	Total HQ	HQ	% Contribution	HQ	% Contribution	Total HQ
High Molecular Weight PAHs	1.4E-01	99%	1.3E-03	1%	1.5E-01	2.9E-02	99%	2.5E-04	1%	2.9E-02
Aroclor 1260	3.6E-02	100%	1.6E-04	0%	3.6E-02	7.7E-03	100%	3.3E-05	0%	7.7E-03
Aluminum	1.6E+01	59%	1.1E+01	41%	2.8E+01	3.3E+00	59%	2.2E+00	41%	5.5E+00
Antimony	8.6E-01	97%	2.5E-02	3%	8.9E-01	8.6E-02	97%	2.5E-03	3%	8.9E-02
Barium	5.8E-03	76%	1.9E-03	24%	7.6E-03	2.9E-03	76%	9.4E-04	24%	3.9E-03
Cadmium	2.3E-01	100%	5.8E-04	0%	2.3E-01	2.3E-02	100%	5.8E-05	0%	2.3E-02
Chromium	1.0E-01	91%	1.0E-02	9%	1.1E-01	2.1E-02	91%	2.0E-03	9%	2.3E-02
Copper	1.7E-01	95%	9.9E-03	5%	1.8E-01	1.2E-01	95%	6.6E-03	5%	1.2E-01
Iron	3.2E+01	55%	2.6E+01	45%	5.8E+01	3.2E+00	55%	2.6E+00	45%	5.8E+00
Lead	1.6E-01	94%	1.1E-02	6%	1.7E-01	8.6E-02	94%	5.6E-03	6%	9.1E-02
Mercury	1.5E-03	87%	2.3E-04	13%	1.8E-03	3.1E-04	87%	4.5E-05	13%	3.5E-04
Selenium	1.8E+01	96%	6.6E-01	4%	1.8E+01	8.7E+00	96%	3.3E-01	4%	9.1E+00
Thallium	1.7E+00	95%	8.3E-02	5%	1.8E+00	3.4E-01	95%	1.7E-02	5%	3.5E-01
Vanadium	2.1E-02	59%	1.5E-02	41%	3.5E-02	1.0E-02	59%	7.3E-03	41%	1.8E-02
Zinc	1.0E+00	99%	9.1E-03	1%	1.0E+00	4.1E-01	99%	3.6E-03	1%	4.2E-01

Shading indicates HQ >1.0.

NTV = No toxicity value.

Table 6-33
Summary of Exposure Point Concentrations for COPECs - Background Soil
LO-58
Caribou, Maine

COPEC	Exposure Point Concentration* (mg/kg dw)	
	RME	**CTE**
Benzo(a)anthracene	3.10E-02	2.67E-02
Benzo(a)pyrene	3.60E-02	2.90E-02
Benzo(b)fluoranthene	5.20E-02	4.47E-02
Benzo(e)pyrene	3.25E-02	2.77E-02
Benzo(k)fluoranthene	3.58E-02	3.05E-02
Benzo(g,h,i)perylene	1.63E-02	1.37E-02
Chrysene	4.15E-02	3.63E-02
Dibenzo(a,h)anthracene	7.20E-03	6.03E-03
Indeno(1,2,3-cd)pyrene	2.50E-02	2.13E-02
Perylene	8.45E-03	6.90E-03
Pyrene	6.83E-02	5.85E-02
Aroclor 1260	ND	ND
Aluminum	1.76E+04	1.70E+04
Antimony	8.45E-01	7.47E-01
Barium	6.26E+01	6.10E+01
Cadmium	3.00E-01	2.70E-01
Chromium	3.54E+01	3.42E+01
Copper	9.75E+01	9.01E+01
Iron	3.10E+04	3.01E+04
Lead	3.05E+01	2.80E+01
Mercury	1.58E-01	1.10E-01
Selenium	1.95E+00	1.83E+00
Thallium	ND	ND
Vanadium	3.48E+01	3.39E+01
Zinc	7.66E+01	7.38E+01

RME EPCs are the 75th percentile concentration. CTE EPCs are the average concentration. See Section 6.2.2.1.1 for details regarding EPC development.

mg/kg dw = Milligrams per kilogram dry weight.
ND = Not detected.

Table 6-34
Estimated Daily Intake - Song Sparrow - Background

Caribou, Maine

	Intake (mg/kg bw-day)					
	RME			CTE		
COPEC	Plants	Soil	Total	Plants	Soil	Total
Benzo(a)anthracene	1.52E-03	2.85E-03	4.37E-03	1.39E-03	2.45E-03	3.85E-03
Benzo(a)pyrene	8.96E-04	3.31E-03	4.21E-03	7.26E-04	2.67E-03	3.39E-03
Benzo(b)fluoranthene	2.90E-03	4.78E-03	7.69E-03	2.49E-03	4.11E-03	6.60E-03
Benzo(e)pyrene	1.11E-03	2.99E-03	4.10E-03	9.46E-04	2.55E-03	3.49E-03
Benzo(k)fluoranthene	1.19E-03	3.29E-03	4.48E-03	1.04E-03	2.81E-03	3.84E-03
Benzo(g,h,i)perylene	5.43E-04	1.50E-03	2.04E-03	4.43E-04	1.26E-03	1.70E-03
Chrysene	1.81E-03	3.82E-03	5.63E-03	1.67E-03	3.34E-03	5.02E-03
Dibenzo(a,h)anthracene	1.68E-04	6.62E-04	8.31E-04	1.41E-04	5.55E-04	6.96E-04
Indeno(1,2,3-cd)pyrene	4.95E-04	2.30E-03	2.80E-03	4.22E-04	1.96E-03	2.39E-03
Perylene	2.18E-04	7.77E-04	9.96E-04	1.79E-04	6.35E-04	8.14E-04
Pyrene	8.85E-03	6.28E-03	1.51E-02	7.58E-03	5.38E-03	1.30E-02
High Molecular Weight PAHs	1.97E-02	3.26E-02	5.23E-02	1.70E-02	2.77E-02	4.48E-02
Aluminum	2.06E+00	1.62E+03	1.62E+03	1.99E+00	1.56E+03	1.56E+03
Antimony	6.06E-03	7.77E-02	8.38E-02	5.40E-03	6.87E-02	7.41E-02
Barium	1.76E+00	5.76E+00	7.52E+00	1.71E+00	5.61E+00	7.32E+00
Cadmium	5.80E-02	2.76E-02	8.56E-02	5.48E-02	2.48E-02	7.96E-02
Chromium	2.61E-01	3.25E+00	3.52E+00	2.52E-01	3.14E+00	3.40E+00
Copper	2.13E+00	8.97E+00	1.11E+01	2.07E+00	8.29E+00	1.04E+01
Iron	5.57E+00	2.85E+03	2.85E+03	5.42E+00	2.77E+03	2.78E+03
Lead	3.25E-01	2.81E+00	3.13E+00	3.09E-01	2.57E+00	2.88E+00
Mercury	2.39E-02	1.45E-02	3.84E-02	1.95E-02	1.01E-02	2.96E-02
Selenium	1.91E-01	1.79E-01	3.71E-01	1.79E-01	1.69E-01	3.47E-01
Vanadium	3.04E-02	3.20E+00	3.23E+00	2.96E-02	3.12E+00	3.15E+00
Zinc	9.62E+00	7.04E+00	1.67E+01	9.42E+00	6.79E+00	1.62E+01

CTE = Central tendency exposure.
mg/kg bw-day = Milligrams per kilogram body weight/day.
RME = Reasonable maximum exposure.

Table 6-35
Estimated Daily Intake - American Robin - Background
LO-58
Caribou, Maine

	Intake (mg/kg bw-day)					
	RME			CTE		
COPEC	Soil Invertebrates	Soil	Total	Soil Invertebrates	Soil	Total
Benzo(a)anthracene	5.20E-03	1.36E-04	5.34E-03	4.47E-03	1.17E-04	4.59E-03
Benzo(a)pyrene	4.07E-03	1.58E-04	4.23E-03	3.28E-03	1.28E-04	3.41E-03
Benzo(b)fluoranthene	6.95E-02	2.29E-04	6.98E-02	5.97E-02	1.97E-04	5.99E-02
Benzo(e)pyrene	9.46E-03	1.43E-04	9.60E-03	8.05E-03	1.22E-04	8.18E-03
Benzo(k)fluoranthene	4.82E-03	1.57E-04	4.98E-03	4.11E-03	1.34E-04	4.25E-03
Benzo(g,h,i)perylene	4.96E-03	7.15E-05	5.03E-03	4.18E-03	6.03E-05	4.24E-03
Chrysene	6.22E-03	1.83E-04	6.40E-03	5.44E-03	1.60E-04	5.60E-03
Dibenzo(a,h)anthracene	1.20E-03	3.17E-05	1.23E-03	1.01E-03	2.65E-05	1.03E-03
Indeno(1,2,3-cd)pyrene	2.96E-03	1.10E-04	3.07E-03	2.52E-03	9.39E-05	2.62E-03
Perylene	2.11E-03	3.72E-05	2.15E-03	1.72E-03	3.04E-05	1.75E-03
Pyrene	1.21E-02	3.00E-04	1.24E-02	1.04E-02	2.57E-04	1.07E-02
High Molecular Weight PAHs	1.23E-01	1.56E-03	1.24E-01	1.05E-01	1.33E-03	1.06E-01
Aluminum	7.99E+01	7.74E+01	1.57E+02	7.70E+01	7.47E+01	1.52E+02
Antimony	8.92E-02	3.72E-03	9.30E-02	7.88E-02	3.29E-03	8.21E-02
Barium	6.02E-01	2.75E-01	8.77E-01	5.86E-01	2.68E-01	8.54E-01
Cadmium	3.36E-01	1.32E-03	3.37E-01	3.09E-01	1.19E-03	3.10E-01
Chromium	1.14E+00	1.56E-01	1.30E+00	1.10E+00	1.50E-01	1.25E+00
Copper	5.30E+00	4.29E-01	5.73E+00	4.90E+00	3.96E-01	5.30E+00
Iron	1.18E+02	1.36E+02	2.54E+02	1.14E+02	1.33E+02	2.47E+02
Lead	1.34E+00	1.34E-01	1.47E+00	1.25E+00	1.23E-01	1.37E+00
Mercury	3.33E-03	6.93E-04	4.02E-03	2.32E-03	4.83E-04	2.80E-03
Selenium	1.60E-01	8.58E-03	1.68E-01	1.53E-01	8.07E-03	1.61E-01
Vanadium	1.54E-01	1.53E-01	3.08E-01	1.50E-01	1.49E-01	2.99E-01
Zinc	2.71E+01	3.37E-01	2.74E+01	2.61E+01	3.25E-01	2.64E+01

CTE = Central tendency exposure.
mg/kg bw-day = Milligrams per kilogram body weight/day.
RME = Reasonable maximum exposure.

Table 6-36
Estimated Daily Intake - Deer Mouse - Background
LO-58
Caribou, Maine

	Intake (mg/kg bw-day)					
	RME			CTE		
COPEC	Plants	Soil	Total	Plants	Soil	Total
Benzo(a)anthracene	7.74E-04	3.41E-04	1.11E-03	7.08E-04	2.93E-04	1.00E-03
Benzo(a)pyrene	4.56E-04	3.96E-04	8.52E-04	3.69E-04	3.19E-04	6.88E-04
Benzo(b)fluoranthene	1.47E-03	5.72E-04	2.05E-03	1.27E-03	4.91E-04	1.76E-03
Benzo(e)pyrene	5.65E-04	3.58E-04	9.23E-04	4.81E-04	3.04E-04	7.85E-04
Benzo(k)fluoranthene	6.04E-04	3.93E-04	9.97E-04	5.27E-04	3.36E-04	8.62E-04
Benzo(g,h,i)perylene	2.76E-04	1.79E-04	4.55E-04	2.25E-04	1.51E-04	3.76E-04
Chrysene	9.20E-04	4.57E-04	1.38E-03	8.51E-04	4.00E-04	1.25E-03
Dibenzo(a,h)anthracene	8.56E-05	7.92E-05	1.65E-04	7.18E-05	6.64E-05	1.38E-04
Indeno(1,2,3-cd)pyrene	2.52E-04	2.75E-04	5.27E-04	2.15E-04	2.35E-04	4.49E-04
Perylene	1.11E-04	9.30E-05	2.04E-04	9.10E-05	7.59E-05	1.67E-04
Pyrene	4.50E-03	7.51E-04	5.25E-03	3.85E-03	6.44E-04	4.50E-03
High Molecular Weight PAHs	1.00E-02	3.89E-03	1.39E-02	8.66E-03	3.31E-03	1.20E-02
Aluminum	1.05E+00	1.94E+02	1.95E+02	1.01E+00	1.87E+02	1.88E+02
Antimony	3.08E-03	9.30E-03	1.24E-02	2.74E-03	8.21E-03	1.10E-02
Barium	8.94E-01	6.89E-01	1.58E+00	8.70E-01	6.71E-01	1.54E+00
Cadmium	2.95E-02	3.30E-03	3.28E-02	2.78E-02	2.97E-03	3.08E-02
Chromium	1.33E-01	3.89E-01	5.22E-01	1.28E-01	3.76E-01	5.04E-01
Copper	1.08E+00	1.07E+00	2.16E+00	1.05E+00	9.91E-01	2.04E+00
Iron	2.83E+00	3.40E+02	3.43E+02	2.76E+00	3.31E+02	3.34E+02
Lead	1.65E-01	3.36E-01	5.00E-01	1.57E-01	3.08E-01	4.65E-01
Mercury	1.21E-02	1.73E-03	1.39E-02	9.93E-03	1.21E-03	1.11E-02
Selenium	9.72E-02	2.15E-02	1.19E-01	9.08E-02	2.02E-02	1.11E-01
Vanadium	1.55E-02	3.83E-01	3.99E-01	1.50E-02	3.73E-01	3.88E-01
Zinc	4.89E+00	8.42E-01	5.73E+00	4.79E+00	8.11E-01	5.60E+00

CTE = Central tendency exposure.
mg/kg bw-day = Milligrams per kilogram body weight/day.
RME = Reasonable maximum exposure.

Table 6-37
Estimated Daily Intake - Short-tailed Shrew - Background
LO-58
Caribou, Maine

	Intake (mg/kg bw-day)					
	RME			CTE		
COPEC	Soil Invertebrates	Soil	Total	Soil Invertebrates	Soil	Total
Benzo(a)anthracene	4.18E-03	7.75E-05	4.25E-03	3.59E-03	6.67E-05	3.66E-03
Benzo(a)pyrene	3.27E-03	9.00E-05	3.36E-03	2.63E-03	7.25E-05	2.70E-03
Benzo(b)fluoranthene	5.58E-02	1.30E-04	5.60E-02	4.80E-02	1.12E-04	4.81E-02
Benzo(e)pyrene	7.60E-03	8.13E-05	7.68E-03	6.47E-03	6.92E-05	6.54E-03
Benzo(k)fluoranthene	3.87E-03	8.94E-05	3.96E-03	3.30E-03	7.63E-05	3.38E-03
Benzo(g,h,i)perylene	3.98E-03	4.06E-05	4.02E-03	3.36E-03	3.43E-05	3.39E-03
Chrysene	4.99E-03	1.04E-04	5.09E-03	4.37E-03	9.08E-05	4.46E-03
Dibenzo(a,h)anthracene	9.63E-04	1.80E-05	9.81E-04	8.07E-04	1.51E-05	8.22E-04
Indeno(1,2,3-cd)pyrene	2.38E-03	6.25E-05	2.44E-03	2.03E-03	5.33E-05	2.08E-03
Perylene	1.69E-03	2.11E-05	1.71E-03	1.38E-03	1.73E-05	1.40E-03
Pyrene	9.75E-03	1.71E-04	9.92E-03	8.35E-03	1.46E-04	8.50E-03
High Molecular Weight PAHs	9.85E-02	8.85E-04	9.94E-02	8.43E-02	7.53E-04	8.50E-02
Aluminum	6.42E+01	4.40E+01	1.08E+02	6.19E+01	4.24E+01	1.04E+02
Antimony	7.17E-02	2.11E-03	7.38E-02	6.33E-02	1.87E-03	6.52E-02
Barium	4.83E-01	1.57E-01	6.40E-01	4.70E-01	1.52E-01	6.23E-01
Cadmium	2.70E-01	7.50E-04	2.70E-01	2.48E-01	6.75E-04	2.49E-01
Chromium	9.18E-01	8.84E-02	1.01E+00	8.87E-01	8.55E-02	9.72E-01
Copper	4.26E+00	2.44E-01	4.50E+00	3.93E+00	2.25E-01	4.16E+00
Iron	9.45E+01	7.74E+01	1.72E+02	9.19E+01	7.53E+01	1.67E+02
Lead	1.08E+00	7.63E-02	1.15E+00	1.00E+00	6.99E-02	1.07E+00
Mercury	2.67E-03	3.94E-04	3.06E-03	1.86E-03	2.74E-04	2.13E-03
Selenium	1.28E-01	4.88E-03	1.33E-01	1.23E-01	4.58E-03	1.27E-01
Vanadium	1.24E-01	8.71E-02	2.11E-01	1.21E-01	8.47E-02	2.05E-01
Zinc	2.17E+01	1.91E-01	2.19E+01	2.10E+01	1.84E-01	2.11E+01

CTE = Central tendency exposure.
mg/kg bw-day = Milligrams per kilogram body weight/day.
RME = Reasonable maximum exposure.

Table 6-38
Hazard Quotients - Song Sparrow - Background
LO-58
Caribou, Maine

	RME									
	NOAEL					LOAEL				
	Plants		Soil			Plants		Soil		
COPEC	HQ	% Contribution	HQ	% Contribution	Total HQ	HQ	% Contribution	HQ	% Contribution	Total HQ
High Molecular Weight PAHs	9.3E-05	38%	1.5E-04	62%	2.5E-04	1.9E-05	38%	3.1E-05	62%	5.0E-05
Aluminum	1.9E-02	0%	1.5E+01	100%	1.5E+01	3.7E-03	0%	2.9E+00	100%	2.9E+00
Antimony	NTV	---	NTV	---	NTV	NTV	---	NTV	---	NTV
Barium	8.4E-02	23%	2.8E-01	77%	3.6E-01	4.2E-02	23%	1.4E-01	77%	1.8E-01
Cadmium	9.8E-02	68%	4.7E-02	32%	1.4E-01	2.4E-02	68%	1.2E-02	32%	3.6E-02
Chromium	5.2E-01	7%	6.5E+00	93%	7.0E+00	9.4E-02	7%	1.2E+00	93%	1.3E+00
Copper	5.3E-01	19%	2.2E+00	81%	2.7E+00	1.8E-01	19%	7.4E-01	81%	9.2E-01
Iron	NTV	---	NTV	---	NTV	NTV	---	NTV	---	NTV
Lead	2.0E+00	10%	1.7E+01	90%	1.9E+01	1.0E+00	10%	8.6E+00	90%	9.6E+00
Mercury	5.3E-02	62%	3.2E-02	38%	8.5E-02	2.7E-02	62%	1.6E-02	38%	4.3E-02
Selenium	3.8E-01	52%	3.6E-01	48%	7.4E-01	1.9E-01	52%	1.8E-01	48%	3.7E-01
Vanadium	2.7E-03	1%	2.8E-01	99%	2.8E-01	5.3E-04	1%	5.6E-02	99%	5.7E-02
Zinc	1.5E-01	58%	1.1E-01	42%	2.5E-01	2.9E-02	58%	2.1E-02	42%	5.0E-02

	CTE									
	NOAEL					LOAEL				
	Plants		Soil			Plants		Soil		
COPEC	HQ	% Contribution	HQ	% Contribution	Total HQ	HQ	% Contribution	HQ	% Contribution	Total HQ
High Molecular Weight PAHs	8.1E-05	38%	1.3E-04	62%	2.1E-04	1.6E-05	38%	2.6E-05	62%	4.2E-05
Aluminum	1.8E-02	0%	1.4E+01	100%	1.4E+01	3.6E-03	0%	2.8E+00	100%	2.8E+00
Antimony	NTV	---	NTV	---	NTV	NTV	---	NTV	---	NTV
Barium	8.2E-02	23%	2.7E-01	77%	3.5E-01	4.1E-02	23%	1.3E-01	77%	1.8E-01
Cadmium	9.2E-02	69%	4.2E-02	31%	1.3E-01	2.3E-02	69%	1.0E-02	31%	3.4E-02
Chromium	5.0E-01	7%	6.3E+00	93%	6.8E+00	9.1E-02	7%	1.1E+00	93%	1.2E+00
Copper	5.1E-01	20%	2.0E+00	80%	2.6E+00	1.7E-01	20%	6.8E-01	80%	8.6E-01
Iron	NTV	---	NTV	---	NTV	NTV	---	NTV	---	NTV
Lead	1.9E+00	11%	1.6E+01	89%	1.8E+01	9.5E-01	11%	7.9E+00	89%	8.8E+00
Mercury	4.3E-02	66%	2.2E-02	34%	6.6E-02	2.2E-02	66%	1.1E-02	34%	3.3E-02
Selenium	3.6E-01	51%	3.4E-01	49%	6.9E-01	1.8E-01	51%	1.7E-01	49%	3.5E-01
Vanadium	2.6E-03	1%	2.7E-01	99%	2.8E-01	5.2E-04	1%	5.5E-02	99%	5.5E-02
Zinc	1.4E-01	58%	1.0E-01	42%	2.5E-01	2.9E-02	58%	2.1E-02	42%	4.9E-02

Shading indicates HQ >1.0.

NTV = No toxicity value.

Table 6-39
Hazard Quotients - American Robin - Background
LO-58
Caribou, Maine

	RME									
	NOAEL					LOAEL				
	Soil Invertebrates		Soil			Soil Invertebrates		Soil		
COPEC	**HQ**	**% Contribution**	**HQ**	**% Contribution**	**Total HQ**	**HQ**	**% Contribution**	**HQ**	**% Contribution**	**Total HQ**
High Molecular Weight PAHs	5.8E-04	99%	7.4E-06	1%	5.9E-04	1.2E-04	99%	1.5E-06	1%	1.2E-04
Aluminum	7.3E-01	51%	7.0E-01	49%	1.4E+00	1.5E-01	51%	1.4E-01	49%	2.9E-01
Antimony	NTV	---	NTV	---	NTV	NTV	---	NTV	---	NTV
Barium	2.9E-02	69%	1.3E-02	31%	4.2E-02	1.4E-02	69%	6.6E-03	31%	2.1E-02
Cadmium	5.7E-01	100%	2.2E-03	0%	5.7E-01	1.4E-01	100%	5.6E-04	0%	1.4E-01
Chromium	2.3E+00	88%	3.1E-01	12%	2.6E+00	4.1E-01	88%	5.6E-02	12%	4.7E-01
Copper	1.3E+00	93%	1.1E-01	7%	1.4E+00	4.4E-01	93%	3.5E-02	7%	4.7E-01
Iron	NTV	---	NTV	---	NTV	NTV	---	NTV	---	NTV
Lead	8.2E+00	91%	8.2E-01	9%	9.0E+00	4.1E+00	91%	4.1E-01	9%	4.5E+00
Mercury	7.4E-03	83%	1.5E-03	17%	8.9E-03	3.7E-03	83%	7.7E-04	17%	4.5E-03
Selenium	3.2E-01	95%	1.7E-02	5%	3.4E-01	1.6E-01	95%	8.6E-03	5%	1.7E-01
Vanadium	1.4E-02	50%	1.3E-02	50%	2.7E-02	2.7E-03	50%	2.7E-03	50%	5.4E-03
Zinc	4.1E-01	99%	5.1E-03	1%	4.1E-01	8.2E-02	99%	1.0E-03	1%	8.3E-02

	CTE									
	NOAEL					LOAEL				
	Soil Invertebrates		Soil			Soil Invertebrates		Soil		
COPEC	**HQ**	**% Contribution**	**HQ**	**% Contribution**	**Total HQ**	**HQ**	**% Contribution**	**HQ**	**% Contribution**	**Total HQ**
High Molecular Weight PAHs	5.0E-04	99%	6.3E-06	1%	5.0E-04	9.9E-05	99%	1.3E-06	1%	1.0E-04
Aluminum	7.0E-01	51%	6.8E-01	49%	1.4E+00	1.4E-01	51%	1.4E-01	49%	2.8E-01
Antimony	NTV	---	NTV	---	NTV	NTV	---	NTV	---	NTV
Barium	2.8E-02	69%	1.3E-02	31%	4.1E-02	1.4E-02	69%	6.4E-03	31%	2.1E-02
Cadmium	5.2E-01	100%	2.0E-03	0%	5.2E-01	1.3E-01	100%	5.0E-04	0%	1.3E-01
Chromium	2.2E+00	88%	3.0E-01	12%	2.5E+00	4.0E-01	88%	5.4E-02	12%	4.5E-01
Copper	1.2E+00	93%	9.8E-02	7%	1.3E+00	4.0E-01	93%	3.3E-02	7%	4.4E-01
Iron	NTV	---	NTV	---	NTV	NTV	---	NTV	---	NTV
Lead	7.7E+00	91%	7.5E-01	9%	8.4E+00	3.8E+00	91%	3.8E-01	9%	4.2E+00
Mercury	5.1E-03	83%	1.1E-03	17%	6.2E-03	2.6E-03	83%	5.4E-04	17%	3.1E-03
Selenium	3.1E-01	95%	1.6E-02	5%	3.2E-01	1.5E-01	95%	8.1E-03	5%	1.6E-01
Vanadium	1.3E-02	50%	1.3E-02	50%	2.6E-02	2.6E-03	50%	2.6E-03	50%	5.3E-03
Zinc	3.9E-01	99%	4.9E-03	1%	4.0E-01	7.9E-02	99%	9.8E-04	1%	8.0E-02

Shading indicates HQ >1.0.
NTV = No toxicity value.

Table 6-40
Hazard Quotients - Deer Mouse - Background
LO-58
Caribou, Maine

RME										
	NOAEL					LOAEL				
	Plants		Soil			Plants		Soil		
COPEC	**HQ**	**% Contribution**	**HQ**	**% Contribution**	**Total HQ**	**HQ**	**% Contribution**	**HQ**	**% Contribution**	**Total HQ**
High Molecular Weight PAHs	1.6E-02	72%	6.3E-03	28%	2.3E-02	3.3E-03	72%	1.3E-03	28%	4.5E-03
Aluminum	2.7E-01	1%	5.0E+01	99%	5.0E+01	5.4E-02	1%	1.0E+01	99%	1.0E+01
Antimony	5.2E-02	25%	1.6E-01	75%	2.1E-01	5.2E-03	25%	1.6E-02	75%	2.1E-02
Barium	1.5E-02	56%	1.1E-02	44%	2.6E-02	7.4E-03	56%	5.7E-03	44%	1.3E-02
Cadmium	3.8E-02	90%	4.3E-03	10%	4.3E-02	3.8E-03	90%	4.3E-04	10%	4.3E-03
Chromium	1.6E-02	25%	4.8E-02	75%	6.5E-02	3.3E-03	25%	9.6E-03	75%	1.3E-02
Copper	1.2E-01	50%	1.2E-01	50%	2.4E-01	8.0E-02	50%	7.9E-02	50%	1.6E-01
Iron	9.0E-01	1%	1.1E+02	99%	1.1E+02	9.0E-02	1%	1.1E+01	99%	1.1E+01
Lead	3.5E-02	33%	7.1E-02	67%	1.1E-01	1.9E-02	33%	3.8E-02	67%	5.6E-02
Mercury	1.2E-02	88%	1.7E-03	12%	1.4E-02	2.4E-03	88%	3.4E-04	12%	2.7E-03
Selenium	1.3E+01	82%	3.0E+00	18%	1.6E+01	6.7E+00	82%	1.5E+00	18%	8.2E+00
Vanadium	3.7E-03	4%	9.2E-02	96%	9.6E-02	1.9E-03	4%	4.6E-02	96%	4.8E-02
Zinc	2.7E-01	85%	4.7E-02	15%	3.2E-01	1.1E-01	85%	1.9E-02	15%	1.3E-01

CTE										
	NOAEL					LOAEL				
	Plants		Soil			Plants		Soil		
COPEC	**HQ**	**% Contribution**	**HQ**	**% Contribution**	**Total HQ**	**HQ**	**% Contribution**	**HQ**	**% Contribution**	**Total HQ**
High Molecular Weight PAHs	1.4E-02	72%	5.4E-03	28%	1.9E-02	2.8E-03	72%	1.1E-03	28%	3.9E-03
Aluminum	2.6E-01	1%	4.8E+01	99%	4.9E+01	5.2E-02	1%	9.7E+00	99%	9.7E+00
Antimony	4.7E-02	25%	1.4E-01	75%	1.9E-01	4.7E-03	25%	1.4E-02	75%	1.9E-02
Barium	1.4E-02	56%	1.1E-02	44%	2.5E-02	7.2E-03	56%	5.5E-03	44%	1.3E-02
Cadmium	3.6E-02	90%	3.9E-03	10%	4.0E-02	3.6E-03	90%	3.9E-04	10%	4.0E-03
Chromium	1.6E-02	25%	4.6E-02	75%	6.2E-02	3.2E-03	25%	9.3E-03	75%	1.2E-02
Copper	1.2E-01	51%	1.1E-01	49%	2.2E-01	7.7E-02	51%	7.3E-02	49%	1.5E-01
Iron	8.7E-01	1%	1.1E+02	99%	1.1E+02	8.7E-02	1%	1.1E+01	99%	1.1E+01
Lead	3.3E-02	34%	6.5E-02	66%	9.9E-02	1.8E-02	34%	3.5E-02	66%	5.2E-02
Mercury	9.8E-03	89%	1.2E-03	11%	1.1E-02	2.0E-03	89%	2.4E-04	11%	2.2E-03
Selenium	1.3E+01	82%	2.8E+00	18%	1.5E+01	6.3E+00	82%	1.4E+00	18%	7.7E+00
Vanadium	3.6E-03	4%	9.0E-02	96%	9.3E-02	1.8E-03	4%	4.5E-02	96%	4.7E-02
Zinc	2.6E-01	86%	4.5E-02	14%	3.1E-01	1.1E-01	86%	1.8E-02	14%	1.2E-01

Shading indicates HQ >1.0.

NTV = No toxicity value.

Table 6-41
Hazard Quotients - Short-tailed Shrew - Background
LO-58
Caribou, Maine

	RME									
	NOAEL					LOAEL				
	Soil Invertebrates		Soil			Soil Invertebrates		Soil		
COPEC	HQ	% Contribution	HQ	% Contribution	Total HQ	HQ	% Contribution	HQ	% Contribution	Total HQ
High Molecular Weight PAHs	1.6E-01	99%	1.4E-03	1%	1.6E-01	3.2E-02	99%	2.9E-04	1%	3.2E-02
Aluminum	1.7E+01	59%	1.1E+01	41%	2.8E+01	3.3E+00	59%	2.3E+00	41%	5.6E+00
Antimony	1.2E+00	97%	3.6E-02	3%	1.3E+00	1.2E-01	97%	3.6E-03	3%	1.3E-01
Barium	7.9E-03	76%	2.6E-03	24%	1.0E-02	4.0E-03	76%	1.3E-03	24%	5.3E-03
Cadmium	3.5E-01	100%	9.7E-04	0%	3.5E-01	3.5E-02	100%	9.7E-05	0%	3.5E-02
Chromium	1.1E-01	91%	1.1E-02	9%	1.2E-01	2.3E-02	91%	2.2E-03	9%	2.5E-02
Copper	4.7E-01	95%	2.7E-02	5%	5.0E-01	3.1E-01	95%	1.8E-02	5%	3.3E-01
Iron	3.0E+01	55%	2.5E+01	45%	5.5E+01	3.0E+00	55%	2.5E+00	45%	5.5E+00
Lead	2.3E-01	93%	1.6E-02	7%	2.5E-01	1.2E-01	93%	8.6E-03	7%	1.3E-01
Mercury	2.6E-03	87%	3.9E-04	13%	3.0E-03	5.3E-04	87%	7.8E-05	13%	6.1E-04
Selenium	1.8E+01	96%	6.8E-01	4%	1.9E+01	8.9E+00	96%	3.4E-01	4%	9.2E+00
Vanadium	3.0E-02	59%	2.1E-02	41%	5.1E-02	1.5E-02	59%	1.0E-02	41%	2.5E-02
Zinc	1.2E+00	99%	1.1E-02	1%	1.2E+00	4.8E-01	99%	4.2E-03	1%	4.9E-01

	CTE									
	NOAEL					LOAEL				
	Soil Invertebrates		Soil			Soil Invertebrates		Soil		
COPEC	HQ	% Contribution	HQ	% Contribution	Total HQ	HQ	% Contribution	HQ	% Contribution	Total HQ
High Molecular Weight PAHs	1.4E-01	99%	1.2E-03	1%	1.4E-01	2.7E-02	99%	2.5E-04	1%	2.8E-02
Aluminum	1.6E+01	59%	1.1E+01	41%	2.7E+01	3.2E+00	59%	2.2E+00	41%	5.4E+00
Antimony	1.1E+00	97%	3.2E-02	3%	1.1E+00	1.1E-01	97%	3.2E-03	3%	1.1E-01
Barium	7.7E-03	76%	2.5E-03	24%	1.0E-02	3.9E-03	76%	1.3E-03	24%	5.1E-03
Cadmium	3.2E-01	100%	8.8E-04	0%	3.2E-01	3.2E-02	100%	8.8E-05	0%	3.2E-02
Chromium	1.1E-01	91%	1.1E-02	9%	1.2E-01	2.2E-02	91%	2.1E-03	9%	2.4E-02
Copper	4.3E-01	95%	2.5E-02	5%	4.6E-01	2.9E-01	95%	1.7E-02	5%	3.1E-01
Iron	2.9E+01	55%	2.4E+01	45%	5.3E+01	2.9E+00	55%	2.4E+00	45%	5.3E+00
Lead	2.1E-01	93%	1.5E-02	7%	2.3E-01	1.1E-01	93%	7.9E-03	7%	1.2E-01
Mercury	1.8E-03	87%	2.7E-04	13%	2.1E-03	3.7E-04	87%	5.4E-05	13%	4.2E-04
Selenium	1.7E+01	96%	6.4E-01	4%	1.8E+01	8.5E+00	96%	3.2E-01	4%	8.8E+00
Vanadium	2.9E-02	59%	2.0E-02	41%	4.9E-02	1.5E-02	59%	1.0E-02	41%	2.5E-02
Zinc	1.2E+00	99%	1.0E-02	1%	1.2E+00	4.6E-01	99%	4.1E-03	1%	4.7E-01

Shading indicates HQ >1.0.

NTV = No toxicity value.

Table 6-42
Incremental Risks - Song Sparrow
LO-58
Caribou, Maine

COPEC	RME		CTE	
	NOAEL	LOAEL	NOAEL	LOAEL
High Molecular Weight PAHs	NC	NC	NC	NC
Aroclor 1260	NC	NC	NC	NC
Aluminum	1.1E+00	2.1E-01	3.0E-01	6.1E-02
Antimony	NTV	NTV	NTV	NTV
Barium	NC	NC	NC	NC
Cadmium	NC	NC	NC	NC
Chromium	6.1E-02	1.1E-02	<1	<1
Copper	<1	NC	<1	NC
Iron	NTV	NTV	NTV	NTV
Lead	<1	<1	<1	<1
Mercury	NC	NC	NC	NC
Selenium	NC	NC	NC	NC
Thallium	NC	NC	NC	NC
Vanadium	NC	NC	NC	NC
Zinc	NC	NC	NC	NC

Shading indicates incremental risk >1.0.

<1 = Background HQ greater than site HQ.

NC = Site HQ <1.0; incremental risk not calculated.

NTV = No toxicity value.

Table 6-43
Incremental Risks - American Robin
LO-58
Caribou, Maine

COPEC	RME		CTE	
	NOAEL	LOAEL	NOAEL	LOAEL
High Molecular Weight PAHs	NC	NC	NC	NC
Aroclor 1260	NC	NC	NC	NC
Aluminum	1.0E-01	NC	2.9E-02	NC
Antimony	NTV	NTV	NTV	NTV
Barium	NC	NC	NC	NC
Cadmium	NC	NC	NC	NC
Chromium	2.2E-02	NC	<1	NC
Copper	NC	NC	NC	NC
Iron	NTV	NTV	NTV	NTV
Lead	<1	<1	<1	<1
Mercury	NC	NC	NC	NC
Selenium	NC	NC	NC	NC
Thallium	NC	NC	NC	NC
Vanadium	NC	NC	NC	NC
Zinc	NC	NC	NC	NC

Shading indicates incremental risk >1.0.

<1 = Background HQ greater than site HQ.

NC = Site HQ <1.0; incremental risk not calculated.

NTV = No toxicity value.

Table 6-44
Incremental Risks - Deer Mouse
LO-58
Caribou, Maine

COPEC	RME		CTE	
	NOAEL	LOAEL	NOAEL	LOAEL
High Molecular Weight PAHs	NC	NC	NC	NC
Aroclor 1260	NC	NC	NC	NC
Aluminum	3.6E+00	7.2E-01	1.0E+00	2.1E-01
Antimony	NC	NC	NC	NC
Barium	NC	NC	NC	NC
Cadmium	NC	NC	NC	NC
Chromium	NC	NC	NC	NC
Copper	NC	NC	NC	NC
Iron	1.5E+01	1.5E+00	8.9E+00	8.9E-01
Lead	NC	NC	NC	NC
Mercury	NC	NC	NC	NC
Selenium	<1	<1	7.4E-01	3.7E-01
Thallium	NC	NC	NC	NC
Vanadium	NC	NC	NC	NC
Zinc	NC	NC	NC	NC

Shading indicates incremental risk >1.0.

<1 = Background HQ greater than site HQ.

NC = Site HQ <1.0; incremental risk not calculated.

NTV = No toxicity value.

Table 6-45
Incremental Risks - Short-tailed Shrew
LO-58
Caribou, Maine

COPEC	RME		CTE	
	NOAEL	LOAEL	NOAEL	LOAEL
High Molecular Weight PAHs	NC	NC	NC	NC
Aroclor 1260	NC	NC	NC	NC
Aluminum	2.0E+00	4.0E-01	5.8E-01	1.2E-01
Antimony	NC	NC	NC	NC
Barium	NC	NC	NC	NC
Cadmium	NC	NC	NC	NC
Chromium	NC	NC	NC	NC
Copper	NC	NC	NC	NC
Iron	7.3E+00	7.3E-01	4.5E+00	4.5E-01
Lead	NC	NC	NC	NC
Mercury	NC	NC	NC	NC
Selenium	<1	<1	5.7E-01	2.9E-01
Thallium	1.8E+00	NC	1.8E+00	NC
Vanadium	NC	NC	NC	NC
Zinc	<1	NC	<1	NC

Shading indicates incremental risk >1.0.
<1 = Background HQ greater than site HQ.
NC = Site HQ <1.0; incremental risk not calculated.
NTV = No toxicity value.

Table 6-46

Surface Soil Background Comparisons - Food Chain Modeling Dataset

LO-58

Caribou, Maine

	Site Background	Regional Background[a]	Site Surface Soil		
	Range of Detected Concentrations (mg/kg)	UPL (mg/kg)	Range of Detected Concentrations (mg/kg)	Maximum Exceeds Indicated Background	
Contaminant				Site-Specific	Regional
Aluminum	15000 - 17700	NA	13000 - 25600	Y	---
Antimony	0.55 - 1.1	0.71	0.35 - 0.68	N	N
Arsenic	14 - 22.4	16	4.8 - 24	Y	Y
Barium	57.2 - 65	470	29.2 - 85	Y	N
Beryllium	0.37 - 0.45	2.4	0.50 - 1.4	Y	N
Cadmium	0.21 - 0.37	0.26	0.065 - 0.53	Y	Y
Chromium	26 - 40.3	79	28 - 56.3	Y	N
Cobalt	9.1 - 13.9	15	9.1 - 19.6	Y	Y
Copper	72.1 - 119	23	18.7 - 73.1	N	Y
Iron	27700 - 33100	NA	28400 - 49300	Y	---
Lead	22.9 - 36.3	32	12.9 - 34.2	N	Y
Manganese	655 - 1610	840	464 - 780	N	N
Mercury	0.014 - 0.19	0.123	0.025 - 0.35	Y	Y
Nickel	22 - 29.3	39	32 - 84.6	Y	Y
Selenium	1.6 - 2.1	0.61	0.85 - 2.3	Y	Y
Thallium	ND	0.6	0.49 - 0.49	---	N
Vanadium	30.9 - 37.6	100	16.4 - 30.1	N	N
Zinc	64.4 - 76.6	100	50 - 125	Y	Y

[a] Regional background uppper predictional limits obtained from *Summary Report for Evaluation of Concentrations of Polycyclic Aromatic Hydrocarbons (PAHs) and Metals in Background Soils in Maine* (AMEC, 2012) and *Proposed Revisions the Maine Remedial Action Guidelines* (RAGS) for Sites Contaminated with Hazardous Substances (MEDEP, 2016).

mg/kg = milligrams per kilogram.

UPL = Upper Prediction Limit

Table 6-47
Surface Soil Background Comparisons - Site Upland Dataset
LO-58
Caribou, Maine

	Site Background	Regional Background[a]	AMAC Building Area			Launcher Area		
	Range of Detected Concentrations (mg/kg)	UPL (mg/kg)	Range of Detected Concentrations (mg/kg)	Maximum Exceeds Indicated Background		Range of Detected Concentrations (mg/kg)	Maximum Exceeds Indicated Background	
Contaminant				Site-Specific	Regional		Site-Specific	Regional
Aluminum	15000 - 17700	NA	15700 - 25600	Y	---	13000 - 19000	Y	---
Antimony	0.55 - 1.1	0.71	ND	N	N	0.35 - 0.61	N	N
Arsenic	14 - 22.4	16.4	4.8 - 8.5	N	N	5.7 - 11.1	N	N
Barium	57.2 - 65	469	44 - 62.6	N	N	29.2 - 65.2	N	N
Beryllium	0.37 - 0.45	2.4	0.61 - 1.4	Y	N	0.50 - 0.93	Y	N
Cadmium	0.21 - 0.37	0.26	0.065 - 0.073	N	N	0.069 - 0.43	Y	Y
Chromium	26 - 40.3	79	32 - 56.3	Y	N	28 - 34.9	N	N
Cobalt	9.1 - 13.9	14.9	10.3 - 19.6	Y	Y	9.1 - 13.9	N	N
Copper	72.1 - 119	23	23.3 - 34	N	Y	18.7 - 50.7	N	Y
Iron	27700 - 33100	NA	31000 - 49300	Y	---	28400 - 36500	Y	---
Lead	22.9 - 36.3	32	13.9 - 23.3	N	N	12.9 - 34.2	N	Y
Manganese	655 - 1610	841	486 - 654	N	N	464 - 780	N	N
Mercury	0.014 - 0.19	0.123	0.025 - 0.065	N	N	0.027 - 0.35	Y	Y
Nickel	22 - 29.3	39	38.4 - 84.6	Y	Y	34.6 - 52.1	Y	Y
Selenium	1.6 - 2.1	0.61	0.85 - 1.2	N	Y	0.86 - 2.3	Y	Y
Thallium	ND	0.6	ND	---	Y	0.49 - 0.49	---	N
Vanadium	30.9 - 37.6	103	20.1 - 29.2	N	N	16.4 - 29.1	N	N
Zinc	64.4 - 76.6	101	53.8 - 91.9	Y	N	50 - 79.6	Y	N

[a] Regional background uppper predictional limits obtained from *Summary Report for Evaluation of Concentrations of Polycyclic Aromatic Hydrocarbons* (PAHs) and *Metals in Background Soils* in Maine (AMEC, 2012) and *Proposed Revisions the Maine Remedial Action Guidelines* (RAGS) for Sites Contaminated with Hazardous Substances (MEDEP, 2016).

mg/kg = milligrams per kilogram.

UPL = Upper Prediction Limit

Table 6-48
Surface Soil Background Comparisons - Drainageway Dataset
LO-58
Caribou, Maine

Contaminant	Detected Concentrations (mg/kg)			Maximum Exceeds Background?	
	Upstream	Site	Downstream	Site	Downstream
Aluminum	17300	21100 - 21400	22200	Y	Y
Antimony	6.7	0.68 - 8.3	16.8	Y	Y
Arsenic	16.8	23.8 - 24	18.7	Y	Y
Barium	68.4	83.9 - 85.1	100	Y	Y
Beryllium	0.57	0.61 - 0.62	0.77	Y	Y
Cadmium	0.46	0.5 - 0.53	0.37	Y	N
Chromium	29.6	31.6 - 31.6	33.5	Y	Y
Cobalt	10.7	9.1 - 9.4	9	N	N
Copper	47.4	71.4 - 73.1	66.9	Y	Y
Iron	31500	30200 - 30700	30100	N	N
Lead	29.2	28.9 - 30.1	22.8	Y	N
Manganese	697	512 - 514	898	N	Y
Mercury	0.15	0.22 - 0.23	0.31	Y	Y
Nickel	34.9	32 - 32.9	32	N	N
Selenium	1.3	4.2 - 4.9	9.8	Y	Y
Thallium	2.8	3 - 3.5	3.5	Y	Y
Vanadium	27.6	29.5 - 30.1	28.7	Y	Y
Zinc	132	123 - 125	117	N	N

mg/kg = milligrams per kilogram.

Table 6-49
Site Metals Risks Excluding COPECs with Concentrations Similar to Background
LO-58
Caribou, Maine

Exposure Area	COPEC	Receptor	Scenario or FOE	HQ(s)	Driver Pathway(s)
Soils - Upland and Drainageway[a]	Aluminum	Song Sparrow	RME - NOAEL only	1.1	Soil
		Deer Mouse	RME - NOAEL only	3.6	Soil
		Short-tailed Shrew	RME - NOAEL only	2.0	Soil and Soil Invertebrate
	Iron	Deer Mouse	All but CTE LOAEL	1.5 to 15	Soil
		Short-tailed Shrew	RME and CTE NOAEL	4.5 to 7.3	Soil and Soil Invertebrate
Soils - AMAC Area[b]	Aluminum	Plants	3/3	3,140 to 5,120	NA
		Soil Invertebrates	3/3	26 to 43	NA
	Iron	Soil Invertebrates	3/3	155 to 246	NA
Soils - Launcher Area[b]	Aluminum	Plants	13/13	2,600 to 3,800	NA
		Soil Invertebrates	13/13	22 to 32	NA
	Iron	Soil Invertebrates	13/13	142 to 182	NA
Drainageway - Onsite - Downgradient[b]	Aluminum	Plants	2/2	4,220 to 4,280	NA
		Soil Invertebrates	2/2	35 to 36	NA
	Arsenic	Soil Invertebrates	2/2	95-96	NA
	Barium	Plants	2/2	17	NA
	Chromium	Plants	2/2	1755	NA
		Soil Invertebrates	2/2	158	NA
	Vanadium	Plants	2/2	15	NA
Drainageway - Offsite - Downgradient[b]	Aluminum	Plants	1/1	4,440	NA
		Soil Invertebrates	1/1	37	NA
	Arsenic	Soil Invertebrates	1/1	75	NA
	Barium	Plants	1/1	20	NA
	Chromium	Plants	1/1	1,861	NA
		Soil Invertebrates	1/1	168	NA
	Vanadium	Plants	1/1	14	NA

FOE = Frequency of exceedance.

NA = Not applicable

[a] Incremental HQs.

[b] HQs >10. I.e., Representative of exceeding a LOAEL-based benchmark.

Table 6-50
Summary of Major Uncertainties in the Screening-level Ecological Risk Assessment
LO-58
Caribou, Maine

Assessment Component	Uncertainty Description	Likely Direction of Error	Likely Magnitude of Error
Nature and Extent of Contamination	Samples collected in the drainageway may not be representative of variability given the small number of samples.	Unknown	Probably small
	Background data sets too small for robust statistical comparisons	Unknown	Probably small
Toxicity Assessment	Generic phytotoxicity values do not account for differences in bioavailability due to varying pH or other soil chemistry parameters. However, most studies administer metals to soil dissolved in solution, likely enhancing bioavailability.	Overestimate of risk	Probably small
	Phytotoxicity values are generally based on crop plants. Differences in sensitivities between these and indigenous plants is unknown.	Unknown	Unknown
	Different authors apply different uncertainty factors to plant studies, making the range of benchmarks wide. Generally, the more conservative of the available benchmarks were used.	Overestimate of risk	Moderate
	Soil invertebrate toxicity values are generally based on earthworms and soil microbes. Differences between the species used in the studies and those found on site may result in differing potentials for risk.	Unknown	Unknown
	Toxicity-based literature-derived soil benchmarks are generic but conservative values that do not consider site-specific factors (pH, TOC, etc.) that may affect bioavailability of COPECs in site soils.	Overestimate of risk	Moderate
	The avian and mammalian TRVs for metals were conservative (usually dissolved salts) and not species-specific.	Overestimate of risk	Potentially significant

Table 6-50, continued
Summary of Major Uncertainties in the Screening-level Ecological Risk Assessment
LO-58
Caribou, Maine

Assessment Component	Uncertainty Description	Likely Direction of Error	Likely Magnitude of Error
Exposure Assessment	Some chemicals had project quantitation limits lower than technically feasible; therefore the LOQ too high to determine if the chemicals were present at levels of concern.	Underestimate of risk	Usually small
	Some of the exposure parameters used in food chain modeling (e.g., body weight, ingestion rates) represented average and species-specific values, but were not site-specific.	Unknown	Probably small
	For birds and mammals, ingestion was the only route evaluated.	Underestimate of risk	Small
	Plant concentrations for food chain modeling for some COPECs were estimated using approaches that estimate concentration in the vegetative parts of the plant for all COPECs. Reproductive-based estimators tend to be lower.	Overestimation of risk	Potentially significant
Risk Characterization	HQs were calculated only for individual COPECs, without considering the potential for cumulative risk from multiple COPECs, synergism, or antagonism.	Unknown	Unknown
	Determining population –level effects from HQs is subject to professional judgment.	Unknown	Unknown

Table 6-51
Ecological Risk Summary
LO-58
Caribou, Maine

Analyte	Receptor*	Receptor-specific Discussion	Analyte-specific Discussion	Conclusion
Site Soil				
Acetone	Soil Invertebrates	• Sediment toxicity benchmark used as surrogate as no soil invertebrate benchmark available. • All concentrations exceed the benchmark value. • Site HQs range from 7.5 to 60 and background HQs range from 38 to 65. • Confidence in the acetone toxicity reference value used for soil invertebrates is low. • High HQs are likely a function of conservative benchmark.	Samples for VOC analysis preserved with sodium bisulfite. Certain naturally occurring compounds (humic acids, etc.) will decompose when exposed to the bisulfate solution and form ketones, notably acetone. The amount of acetone formed is extremely matrix dependent, but may be produced in significant concentrations. When using sodium bisulfate as a preservative, the data user must keep this in mind when evaluating the data.	Population-level effects to soil invertebrates from exposure to acetone may exist but background data suggest the risk is not Site related.
Carbon disulfide	Soil Invertebrates	• Sediment toxicity benchmark used as surrogate as no soil invertebrate benchmark available. • Site HQs range from 0.68 to 21. • Confidence in the carbon disulfide toxicity reference value used for soil invertebrates is low. • High HQs are likely a function of conservative benchmark.	Detected in fewer than half of site soil samples.	The risk of population-level effects to soil invertebrates from exposure to carbon disulfide is not ecologically significant.
Aluminum	Plants	• All concentrations exceed the phytotoxicity value. • Site HQs range from 2,600 to 5,120 and background HQs range from 3,000 to 3,540. • The Eco-SSL document indicates that the benchmark used for screening is based on laboratory toxicity testing using an aluminum solution that is added to test soils; therefore the confidence with its use is low. • Comparisons of total aluminum concentrations in soil samples to soluble aluminum-based screening values are deemed by EPA to be inappropriate for reasons discussed in the SLERA uncertainty analysis.	The typical range of aluminum in soils is from 1 percent to 30 percent (10,000 to 300,000 mg Al/kg) with naturally occurring concentrations varying over several orders of magnitude. Site-specific concentrations fall within this range. Potential ecological risks associated with aluminum are identified based on the measured soil pH. Aluminum is identified as a COPC only at sites where the soil pH is less than 5.5. The site-specific pH as measured in investigation-derived	The risk of population-level effects to plants, soil invertebrates, herbivorous birds and mammals, and invertivorous mammals from exposure to aluminum is not ecologically significant.

Table 6-51, continued
Ecological Risk Summary
LO-58
Caribou, Maine

Analyte	Receptor*	Receptor-specific Discussion	Analyte-specific Discussion	Conclusion
Aluminum, cont'd.	Soil Invertebrates	• All concentrations of aluminum in soils exceed the soil invertebrate benchmark value. • Site HQs range from 22 to 43 and background HQs range from 25 to 30. • The Eco-SSL document indicates that the benchmark used for screening is based on laboratory toxicity testing using an aluminum solution that is added to test soils. • Comparisons of total aluminum concentrations in soil samples to soluble aluminum-based screening values are deemed by EPA to be inappropriate for reasons discussed in the SLERA uncertainty analysis.	waste soils was >7.0.	
	Song Sparrow	• Incremental risk RME NOAEL-based HQ = 1.1; all others (i.e., RME LOAEL-based and CTE) <1.0.		
	Deer Mouse	• Incremental risk RME NOAEL-based HQ = 3.6; all others <1.0.		
	Short-tailed Shrew	• Incremental risk RME NOAEL-based HQ = 2.0; all others <1.0.		
Arsenic	Soil Invertebrates	• All concentrations exceed the benchmark value. • Site HQs range from 19 to 96 and background HQs range from 56 to 90. • High HQs are likely a function of conservative benchmark.	Concentrations similar to background.	Population-level effects to soil invertebrates from exposure to arsenic may exist but background data suggest the risk is not Site related..
Barium	Plants	• All concentrations exceed the phytotoxicity value. • Site HQs range from 5.6 to 20 and background HQs range from 11 to 13. • High HQs are likely a function of conservative benchmark.	Concentrations similar to background.	Population-level effects to plants from exposure to barium may exist but background data suggest the risk is not Site related..

Table 6-51, continued
Ecological Risk Summary
LO-58
Caribou, Maine

Analyte	Receptor*	Receptor-specific Discussion	Analyte-specific Discussion	Conclusion
Beryllium	Plants	• All concentrations exceed the phytotoxicity value. Site HQs range from 5 to 14 and background HQs range from 3.7 to 4.5. • High HQs likely a function of conservative benchmark.	Highest concentrations noted around the AMAC building where habitat is disturbed. Concentrations similar to one of two background data sets.	Population-level effects to plants from exposure to beryllium may exist but background data suggest the risk is not Site related..
Chromium	Plants	• All concentrations exceed the phytotoxicity value. • Site HQs range from 1,555to 3,128 and background HQs range from 1,444 to 2,239. • High HQs likely a function of conservative benchmark.	Highest concentrations noted around the AMAC building where habitat is disturbed. Other than the maximum detected concentration, concentrations less than background.	Population-level effects to plants and soil invertebrates from exposure to chromium may exist but background data suggest the risk is not Site related..
	Soil Invertebrates	• All concentrations exceed the benchmark value. • Site HQs range from 140 to 280 and background HQs range from 130 to 200. • High HQs likely a function of conservative benchmark.		
Iron	Soil Invertebrates	• All concentrations exceed the benchmark value. • Site HQs range from 140 to 250 and background HQs range from 140 to 170. • High HQs likely a function of conservative benchmark.	Highest concentration noted around the AMAC building where habitat is disturbed. Other concentrations similar to background. RME incremental risk values for the mammalian receptors are likely conservative as background EPCs based on 75th percentile which are expected to be less than a 95-99% UCL if it were able to be calculated. The typical range of iron concentrations in soils is from 0.2% to 55% (20,000 to 550,000 mg/kg). Site-specific concentrations fall within this range.	Population-level effects to soil invertebrates, herbivorous mammals, and invertivorous mammals from exposure to iron may exist but background data suggest the risk is not Site related..
	Deer Mouse	• Incremental risk exceeds 1.0 for all but the CTE LOAEL-based HQ (range 1.5 to 15). • The TRV has a great deal of uncertainty associated with it as it was based on only one subchronic study with endpoints of questionable ecological significance. The TRV incorporated a UF of 10 to convert from a subchronic to chronic study and the endpoints were heart, liver, and pancreatic effects.		
	Short-tailed Shrew	• Incremental risk NOAEL-based HQs = 7.3 and 4.5 (RME/CTE). • See Iron/Deer Mouse for discussion of TRV conservatism.		
Thallium	Plants	• One available HQ = 49. High HQ likely a function of conservative benchmark.	FOD = 1/15. EPC = maximum detected concentration. Detected concentration similar to	Population-level effects to plants and

Table 6-51, continued
Ecological Risk Summary
LO-58
Caribou, Maine

Analyte	Receptor*	Receptor-specific Discussion	Analyte-specific Discussion	Conclusion
			background.	invertivorous mammals from exposure to thallium may exist but background data suggest the risk is not Site related..
Thallium, cont'd.	Short-tailed Shrew	• Incremental risk NOAEL-based HQs = 1.8. WOE approaches indicate that risk is undetermined under this scenario. The TRV has a great deal of uncertainty associated with it as it was based on an effect dose from one subchronic study the NOAEL-based TRV incorporating a UF of 50.		
Vanadium	Plants	• All concentrations exceed the phytotoxicity value. Site HQs range from 8.2 to 15 and background HQs range from 15 to 19. High HQs likely a function of conservative benchmark.	Concentrations similar to background.	Population-level effects to plants from exposure to vanadium may exist but background data suggest the risk is not Site related..
Drainageway soil				
Acetone	Soil Invertebrates	• All concentrations exceed the benchmark value. • HQs range from 39 to 54. • Confidence in the acetone toxicity reference value used for soil invertebrates is low • High HQs are likely a function of conservative benchmark.	Samples for VOC analysis preserved with sodium bisulfite. Certain naturally occurring compounds (humic acids, etc.) will decompose when exposed to the bisulfate solution and form ketones, notably acetone. The amount of acetone formed is extremely matrix dependent, but may be produced in significant concentrations. When using sodium bisulfate as a preservative, the data user must keep this in mind when evaluating the data.	The risk of population-level effects to soil invertebrates from exposure to acetone in the drainageway soil is not ecologically significant.
Aluminum	Plants	• All concentrations exceed the phytotoxicity value. • Site HQs range from 3,460 to 4,440 and background HQs range from 3,000 to 3,540. • The Eco-SSL document indicates that the benchmark used for screening is based on laboratory toxicity testing using an aluminum solution that is added to test soils; therefore the confidence with its use is low. • Comparisons of total aluminum concentrations in soil samples to soluble aluminum-based screening values are deemed by EPA to be inappropriate for reasons	The typical range of aluminum in soils is from 1 percent to 30 percent (10,000 to 300,000 mg Al/kg) with naturally occurring concentrations varying over several orders of magnitude. Site-specific concentrations fall within this range. Potential ecological risks associated with aluminum are identified based on the measured soil pH. Aluminum is identified as a COPC only at sites where the soil pH is less than 5.5. The site-	Population-level effects to plants and soil invertebrates, from exposure to aluminum in drainageway soil may exist but background data suggest the risk is not Site related..

Table 6-51, continued
Ecological Risk Summary
LO-58
Caribou, Maine

Analyte	Receptor*	Receptor-specific Discussion	Analyte-specific Discussion	Conclusion
		discussed in the SLERA uncertainty analysis .	specific pH as measured in investigation-derived waste soils was >7.0.	
Aluminum, cont'd.	Soil Invertebrates	• All concentrations of aluminum in soils exceed the soil invertebrate benchmark value. • HQs range from 29 to 37 and background HQs range from 25 to 30. • The Eco-SSL document indicates that the benchmark used for screening is based on laboratory toxicity testing using an aluminum solution that is added to test soils. • Comparisons of total aluminum concentrations in soil samples to soluble aluminum-based screening values are deemed by EPA to be inappropriate for reasons discussed in the SLERA uncertainty analysis.		
Arsenic	Soil Invertebrates	• All concentrations exceed the benchmark value. • HQs range from 67 to 95 and background HQs range from 56 to 90. • High HQs are likely a function of conservative benchmark.	Downgradient concentrations (19 to 24 mg/kg) similar to upgradient concentration (17 mg/kg).	Population-level effects to soil invertebrates from exposure to arsenic in drainageway soil may exist but background data suggest the risk is not Site related..
Barium	Plants	• All concentrations exceed the phytotoxicity value. • HQs range from 14 to 20 and background HQs range from 11 to 13. • High HQs are likely a function of conservative benchmark.	Downgradient concentrations (84 to 100 mg/kg) within a factor of 1.5 times the upgradient concentration (69 mg/kg).	Population-level effects to plants from exposure to barium in drainageway soil may exist but background data suggest the risk is not Site related.
Chromium	Plants	• All concentrations exceed the phytotoxicity value. • HQs range from 1,644 to 1,861 and background HQs range from 1,444 to 2,239. • High HQs likely a function of conservative benchmark.	Downgradient concentrations (32 to 34 mg/kg) similar to upstream concentration (30 mg/kg)	Population-level effects to plants and soil invertebrates from exposure to chromium in

Table 6-51, continued
Ecological Risk Summary
LO-58
Caribou, Maine

Analyte	Receptor*	Receptor-specific Discussion	Analyte-specific Discussion	Conclusion
	Soil Invertebrates	• All concentrations exceed the benchmark value. • HQs range from 148 to 168 and background HQs range from 130 to 200. • High HQs likely a function of conservative benchmark.		drainageway soil may exist but background data suggest the risk is not Site related..
Iron	Soil Invertebrates	• All concentrations exceed the benchmark value. • HQs range from 150 to 158 and background HQs range from 140 to 170. • High HQs likely a function of conservative benchmark.	Downgradient concentrations (30,100 to 30,700 mg/kg) similar to upstream concentration (31,400 mg/kg).	Population-level effects to soil invertebrates exposure to iron in drainageway soil may exist but background data suggest the risk is not Site related..
Vanadium	Plants	• All concentrations exceed the phytotoxicity value. Site HQs range from 14 to 15 and background HQs range from 15 to 19. High HQs likely a function of conservative benchmark.	Downgradient concentrations (29-30 mg/kg) similar to upgradient concentration (28 mg/kg).	Population-level effects to plants from exposure to vanadium in drainageway soil may exist but background data suggest the risk is not Site related..

*Receptors listed only those for which potential risks were indicated.
“Ecological significant” indicates that adverse population effects are potentially occurring.

CTE = Central tendency exposure.
EPC = Exposure point concentration.
FOD = Frequency of detection.
HQ = Hazard quotient.
LOAEL = Lowest observed adverse effect level.
NOAEL = No observed adverse effect level.
RME = Reasonable maximum exposure.
TRV = Toxicity reference value.

SECTION 8

TABLES

Table 8-1
Summary of Cancer Risks and Noncancer Hazard Indices
LO-58 Site
Caribou, Maine

Media	Exposure Area	Scenario Timeframe	Receptor	CR>1E-04 or HI>1	Total CRa	Major Contributors to Total CR (Individual CR >1E-06)	Individual COPC CR	Total Noncancer HI	Organ-Specific HI Above 1.0	Major Contributors to Total HI (Individual HI > 1.0)	Individual COPC HQ
Soil	AMAC Building Area	Current	AMAC Staff	No	1.2E-05	Arsenic	3.7E-06	0.12	---	---	---
						Chromium	7.3E-06				
			AMAC Client	No	3.3E-06	Arsenic	1.1E-06	0.12	---	---	---
						Chromium	2.1E-06				
			Site Worker	No	8.5E-06	Arsenic	2.6E-06	0.13	---	---	---
						Chromium	5.3E-06				
	Launcher Area	Current	AMAC Staff	No	7.8E-06	Arsenic	3.7E-06	0.12	---	---	---
						Chromium	4.1E-06				
			AMAC Client	No	2.2E-06	Arsenic	1.1E-06	0.12	---	---	---
						Chromium	1.2E-06				
			Site Worker	No	5.7E-06	Arsenic	2.7E-06	0.12	---	---	---
						Chromium	3.0E-06				
			Trespasser	No	4.6E-07	---	---	0.021	---	---	---
	Entire Site	Future	Age-Adjusted Resident	Yes	1.3E-04	Benzo(a)pyrene	3.9E-06	NE	---	---	---
						Arsenic	7.1E-06				
						Chromium[b]	1.2E-04				
			Adult Resident	No	NE	---	---	0.12	---	---	---
			Child Resident	Yes	NE	---	---	1.2 [c]	---	---	---
			Construction Worker	No	3.2E-07	---	---	0.34	---	---	---
			Commercial/Industrial Worker	No	5.4E-07	---	---	0.011	---	---	---
Groundwater	AMAC Building Area	Current	AMAC Staff	No	7.8E-06	Trichloroethene	1.4E-06	0.18	---	---	---
						Chromium	6.4E-06				
			AMAC Client	No	2.2E-06	Chromium	1.8E-06	0.18	---	---	---
	Entire Site	Future	Age-Adjusted Resident	Yes	3.1E-04	1,1-Biphenyl	2.7E-06	NE	---	---	---
						1-Methylnaphthalene	4.7E-05				
						Benzo(a)pyrene	1.2E-04				
						Dibenzo(a,h)anthracene	7.6E-05				
						Trichloroethene	4.5E-06				
						Chromium[b]	5.9E-05				
			Adult Resident	Yes	NE	---	---	3.2	Nervous system	Manganese	1.9
			Child Resident	Yes	NE	---	---	5.1 [b]	Nervous system	Manganese	3.1
			Commercial/Industrial Worker	No	1.2E-05	1-Methylnaphthalene	5.9E-06	0.98	---	---	---
						Chromium	4.6E-06				

Table 8-1
Summary of Cancer Risks and Noncancer Hazard Indices
LO-58 Site
Caribou, Maine

Media	Exposure Area	Scenario Timeframe	Receptor	CR>1E-04 or HI>1	Total CRa	Major Contributors to Total CR (Individual CR >1E-06)	Individual COPC CR	Total Noncancer HI	Organ-Specific HI Above 1.0	Major Contributors to Total HI (Individual HI > 1.0)	Individual COPC HQ
Indoor Air	**AMAC Building Area**	**Current**	**AMAC Staff**	**No**	**1.1E-05**	**Chloroform**	**3.1E-06**	**0.51**	**---**	**---**	**---**
						Naphthalene	**5.1E-06**				
						Trichloroethene	**1.6E-06**				
			AMAC Client	**No**	**2.2E-06** [b]	**Naphthalene**	**1.0E-06**	**0.35**	**---**	**---**	**---**
		Future	**Adult/Child Resident**	**Yes**	**4.2E-05**	**Benzene**	**1.8E-06**	**2.4**	**Immune System**	**Trichloroethene**	**1.9**
						Chloroform	**1.1E-05**				
						Ethylbenzene	**3.1E-06**				
						Naphthalene	**1.8E-05**				
						Trichloroethene	**8.4E-06**				
			Commercial/Industrial Worker	**No**	**9.1E-06**	**Chloroform**	**2.5E-06**	**0.58**	**---**	**---**	**---**
						Naphthalene	**4.2E-06**				
						Trichloroethene	**1.3E-06**				
Cumulative Risks											
All Media	**AMAC Building Area**	**Current**	**AMAC Staff**	**No**	**3.1E-05**	**See above**		**0.77**	**See above**		
			AMAC Client	**No**	**7.7E-06**			**0.63**			
			Site Worker	**No**	**8.5E-06**			**0.13**			
	Launcher Area	**Current**	**AMAC Staff**	**No**	**7.8E-06**	**See above**		**0.12**	**See above**		
			AMAC Client	**No**	**2.2E-06**			**0.12**			
			Trespasser	**No**	**4.6E-07**			**0.021**			
			Site Worker	**No**	**5.7E-06**			**0.12**			
	Entire Site	**Future**	**Construction Worker**	**No**	**3.2E-07**	**See above**		**0.34**	**See above**		
			Commercial/Industrial Worker	**No**	**2.2E-05**			**1.57**			
			Resident	**Yes**	**4.9E-04**			**8.7**			

Notes:

[a] Note that for conservatism, total chromium results are based on hexavalent chromium toxicity criteria.

[b] Note that although either the total CR exceeded 1E-04 or the THQ exceeded 1.0, based on site detected concentrations falling within the range of site and regional background concentrations, these COPCs are likely not attributable to site-related activities and will not considered for remediation.

[c] Note that although the total CR or the total HI exceeded 1E-06 or 1.0,respectively, none of the individual COPC CRs were greater than 1E-06 or none of the individual HIs were greater than 1.0.

NE	Not Evaluated	🟩	Tota cancer risks are above 1E-04 or Hazard Indices are above 1.
CR	Cancer risk	🟦	Total cancer risks fall in the range of 10^{-6} to 10^{-4}.
HI	Hazard Index		

Table 8-2
Proposed Preliminary Remediation Goals for Groundwater
Former LO-58 NIKE Battery Launch Site
Caribou, Maine

Groundwater							
Contaminant of Concern	**Background (MW-04) (µg/L)**	**Risk-based PRGs; based upon residential drinking water exposure**		**MCL (µg/L)**	**Maine MEG (µg/L)**	**Proposed Numerical PRG (µg/L)**	**Basis for Selection**
		10^{-5} cancer risk-based (µg/L)	**HQ=1 non-cancer hazard-based (µg/L)**				
VOCs							
Trichloroethene	<1	26	4	5	4	5	ARAR – MCL
SVOCs							
1-Methylnaphthalene	<0.019	11	NA	NA	NA	11	1E-05 Excess Cancer Risk
PETROLEUM COMPOUNDS							
C9-C10 Aromatic Hydrocarbons	<10	NA	NA	NA	200	200	TBC – Maine MEG
Metals							
Manganese	<15	NA	434	NA	500	500	TBC – Maine MEG

Notes:

NA – Not Available.
HQ – Hazard Quotient
TBC – To be considered
MCL – Maximum Contaminant Level
Maine MEG – Maine Maximum Exposure Guidelines

Table 8-3
Proposed Preliminary Remediation Goals for Indoor Air
Former LO-58 NIKE Battery Launch Site
Caribou, Maine

Indoor Air						
Contaminant of Concern	Ambient Air ($\mu g/m^3$)	Risk-based PRGs based upon residential scenario		Maine Target Indoor Air Concentrations ($\mu g/m^3$)	Proposed Numerical PRG ($\mu g/m^3$)	Basis for Selection
		10^{-5} cancer risk-based ($\mu g/m^3$)	HQ=1 non-cancer hazard-based ($\mu g/m^3$)			
VOCs						
Chloroform	<0.2	1.1	98	1.1	1.1	$1x10^{-5}$ cancer risk-based
Naphthalene	<1.1	0.7	3	0.7	0.7	$1x10^{-5}$ cancer risk-based
Trichloroethene	<0.21	4.3	2	2.1	2	Non-cancer risk based

Notes:

HQ – Hazard Quotient

SECTION 9

TABLES

Table 9-1
Groundwater Remedial Action Objectives, General Response Actions, Technology Types and Process Options
Former LO-58 NIKE Battery Launch Site
Caribou, Maine
Page 1 of 1

Remedial Action Objectives (from site characterization)	Environmental Media	General Response Action (for all remedial action objectives)	Remedial Technology Types (for general response actions)	Process Options
Protection of Human Health Prevent ingestion of water containing contaminants of concern in excess of MCLs, a cumulative cancer risk (for all contaminants of concern) in excess of 10-4, and cumulative target organ-specific non-cancer risk in excess of 1.0.	Groundwater	No Action	No Action	Not Applicable
		Monitored Natural Attenuation	Physical processes	Advection, dispersion, diffusion, sorption
			Chemical processes	Hydrolysis, oxidation, reductive dechlorinization
			Biological processes	Aerobic biodegradation anaerobic biodegradation
		Limited Action	Long-term monitoring	Groundwater monitoring, drinking water sampling, indoor air monitoring, soil vapor monitoring
			Institutional Controls	Deed restrictions, land use restrictions, zoning changes, local ordinances
		Containment	Vertical Barriers	Slurry walls, sheet pile walls, grout curtains
		Collection, Treatment, and Discharge	Collection/Extraction	Extraction wells or collection trench
			Physical Treatment	Equalization, dewatering, sedimentation, oil-water separation, filtration, reverse osmosis, air stripping, carbon adsorption, metals sorption, distillation, or evaporation
			Chemical Treatment	Ion exchange, enhanced oxidation, pH adjustment, precipitation, flocculation
			Biological Treatment	Aerobic biodegradation or anaerobic biodegradation
			Discharge	Beneficial re-use/surface discharge, discharge to subsurface or surface water, off-site treatment at POTW
		In-situ Treatment of Groundwater	Physical Treatment	Air sparging coupled with vapor extraction, enhanced flushing, or air-sparge barrier
			Thermal Treatment	Steam, conductive, or electrical heating with vapor recovery
			Chemical Treatment	Permeable reactive barrier, chemical oxidation or reduction, or nano particle zero valent iron
			Biological Treatment	Enhanced biodegradation through aerobic or anaerobic processes

Table 9-2
Groundwater Remedial Technology Screening
LO-58
Caribou, Maine
Page 1 of 6

Media	General Response Action	Remedial Technology Type	Process Option	Process Option Description	Effectiveness	Implementability	Relative Cost	Screening Comments
Groundwater	No Action	No Action	Not applicable	No active source remediation conducted. No monitoring conducted.	Low effectiveness. The lack of action will not achieve RAOs.	Simple to implement.	Capital Costs: None O&M Costs: None	Baseline, as required by the NCP. Retained
	Monitored Natural Attenuation	Long-term monitoring	Groundwater Monitoring	No active remedial processes will be taken to address the contamination. Monitoring will be performed to assess whether natural attenuation is occurring. Additional wells may be necessary	Low effectiveness. Provides data to determine if natural attenuation processes are effective. Monitoring network is scalable with area and volume.	Can be readily implemented. Qualified contractors are numerous. Stakeholder approval of the monitoring program is required. Minimal impacts to human health and the environment.	Capital Costs: Low O&M Costs: Low	Necessary to determine trends in groundwater quality. Retained
		Physical Processes	Advection	Advection is the transport of a contaminant due to the bulk movement of groundwater. This is the primary mechanism for contaminant transport.	Medium effectiveness.Appearst to be naturally occurring at the Site. If ongoing source of groundwater contamination is eliminated or isolated, could eventually assist in achieving clean-up goals, given sufficient time. Well demonstrated at many sites.	Easily implemented.	Capital Costs: None O&M Costs: None	Natural process. Retained
			Dispersion	Mechanical dispersion is the heterogeneous flow of a contaminant through aquifer materials caused by variations in aquifer material, pore size, tortuosity in flow paths, and friction in the pore space in bedrock.	Medium effectiveness. Likely to be naturally occurring at the Site. If ongoing source of groundwater contamination is eliminated or isolated, could eventually assist in achieving clean-up goals, given sufficient time. Well demonstrated at many sites.	Easily implemented.	Capital Costs: None O&M Costs: None	Natural process. Retained
			Diffusion	Molecular diffusion occurs when chemicals move from zones of higher concentration to zones of lower concentration.	Low effectiveness. Likely to be naturally occurring at the Site. Diffusion into low permeability material can lengthen time to achieve clean-up goals. Well demonstrated at many sites.	Easily implemented.	Capital Costs: None O&M Costs: None	Natural process. Retained
			Sorption	Sorption is the lessening of a chemical's presence within a groundwater plume due to the affinity of the chemical to aquifer materials. In this process hydrophobic organic chemicals bind to organic carbon particles and are thus removed from the plume.	Medium effectiveness. May be naturally occurring at the Site. If ongoing source of groundwater contamination is eliminated or isolated, could eventually assist in achieving clean-up goals, given sufficient time. Desorption may lengthen time to achieve clean-up goals at some sites. Well demonstrated at many sites.	Easily implemented.	Capital Costs: None O&M Costs: None	Natural process. Retained
		Chemical Processes	Hydrolysis	Hydrolysis is a chemical reaction in which a halogen ion from a chlorinated VOC is substituted with a hydroxyl ion from a water molecule.	Medium effectiveness. May be naturally occurring at the Site. If ongoing source of groundwater contamination is eliminated or isolated, could eventually assist in achieving clean-up goals, given sufficient time. Well demonstrated at many sites.	Easily implemented.	Capital Costs: None O&M Costs: None	Natural process. Retained
			Abiotic Reductive Dechlorination	Degradation of the chlorinated VOC occurs when a chlorine ion is replaced by a hydrogen ion. Examples of abiotic reductive dechlorination include hydrogenolysis and dihaloelimination. In hydrogenolysis, a chlorine ion is replaced by a hydrogen ion. In dihaloelimination, two chlorine ions are replaced, creating a double bond.	Medium effectiveness. May be naturally occurring at the Site. If ongoing source of groundwater contamination is eliminated or isolated, could eventually assist in achieving clean-up goals, given sufficient time. Well demonstrated at many sites.	Easily implemented.	Capital Costs: None O&M Costs: None	Natural process. Retained
		Biological Processes	Aerobic Biodegradation	Aerobic biodegradation refers to the process by which native microorganisms in the subsurface degrade the contaminants within the groundwater in the presence of oxygen.	Medium effectiveness. High dissolved oxygen in groundwater samples (with the exception of MW-05) during the 2012 groundwater sampling round suggests that conditions to support this process are in place at the Site. Process has been demonstrated to be effective for treating Site contaminants.	Easily implemented.	Capital Costs: None O&M Costs: None	Natural process. Retained
			Anaerobic Biodegradation	Anaerobic biodegradation refers to the process by which native microorganisms in the subsurface degrade the contaminants within the groundwater in the absence of oxygen.	Medium effectiveness. Low dissolved oxygen at MW-05 during the 2012 groudnwater sampling round suggests that the conditions to support this projecess are in place in some portions of the Site. Anaerobic degradation (reductive dechlorination) is the primary biological degradation pathway for site-related contaminants (chlorinated VOCs).	Easily implemented.	Capital Costs: None O&M Costs: None	Natural process. Retained
	Limited Action	Institutional Controls	Deed restrictions, Land use restrictions, zoning changes, Town ordinances	No active remedial processes to address the contaminationtake place as part of this process option. Controls can include deed restrictions preventing certain activities on designated properties, land use restrictions, zoning changes or Town ordinances that prevent certain activities within a designated area. May also be used to restrict the future installation of groundwater wells, or require treatment of any groundwater recovered within the site boundaries.	Medium effectiveness. Frequently a component of a remedial alternative. Effective at minimizing risks to human health. Control areas are scalable with contaminated areas/volumes. Effective only if implemented, monitored, and enforced.	Administrative implementation is possible, but will require coordination between Local, State and Federal officials, and property owners. Must be monitored and enforced after implementation.	Capital Costs: Low O&M Costs: Low	Potentially applicable. Retained

Table 9-2
Groundwater Remedial Technology Screening
LO-58
Caribou, Maine
Page 2 of 6

Media	General Response Action	Remedial Technology Type	Process Option	Process Option Description	Effectiveness	Implementability	Relative Cost	Screening Comments
Groundwater (cont.)	Containment	Vertical Barriers	Slurry Wall	A trench is excavated along the perimeter of (or a portion of) the contaminated groundwater plume and is filled with a low-permeability slurry to prevent migration of contaminated groundwater.	Low effectiveness. Groundwater is located within bedrock. Groundwater flow through fractured bedrock can be highly irregular, and is determined by irregular fissures and fractures. Contaminated groundwater would likely circument the wall. Limited impacts to human health and the environment during construction and implementation.	Construction would take place entirely within bedrock, making this technology extremely difficult to implement. Construction would likely require blasting and/or rock drilling.	Capital Costs: High O&M Costs: Low	Potentially limited effectiveness due to bedrock fissures and fractures. Extremely difficult to implement due to depth of bedrock. Eliminated
			Sheet-pile wall	Vertical steel sheet piles are driven into the subsurface (usually to bedrock or an aquitard) along the perimeter (or a portion of) the contaminated groundwater plume to prevent the further migration of contaminated groundwater. Individual sheets are interlocking, and the knuckles are filled with grout or similar low-permeability material, creating an low-permeability or impermeable barrier.	Low effectiveness. Sheet piles are not effective for bedrock applications.	Not implementable. Sheet piles would not withstand the force of being driven into bedrock.	Capital Costs: High O&M Costs: Low	Not effective, not implementable. Eliminated
			Grout Curtain	Grout is injected into bedrock fractures to prevent groundwater migration.	Potentially effective if grout is injected into fractured bedrock. Effectiveness will depend heavily on the accuracy of fracture characterization. Minimal effects on human health and the environment during construction and implementation.	Difficult to inject grout into fracture bedrock. Targetting specific areas of contamination will be extremely difficult. Implemented using common drilling, grout injection and construction techniques. A number of companies can provide this service.	Capital Costs: High O&M Costs: Low	Most effective and implementable barrier technology. Retained
	Collection, Treatment and Discharge	Collection / Extraction	Extraction Wells	Extraction wells are installed to capture groundwater to prevent or minimize contaminant migration. This technology is typically associated with an ex-situ treatment system.	Medium effectiveness. Has been shown to be successful at capturing contaminated groundwater. Capable of being scaled to accommodate a variety of areas/volumes. Minimal impact on human health/environment during construction. Can achieve RAOs, given sufficient time.	Readily available using conventional drilling techniques. Treatment system required to treat recovered groundwater prior to discharge. Numerous companies available to design and construct extraction and treatment systems. Relatively low contaminant concentrations will make this technology relatively easy to implement.	Capital Costs: Medium O&M Costs: Medium-High	Medium effectiveness, readily implementable. Retained
			Extraction Trench	A trench and recovery system would be installed to capture contaminated groundwater for ex-situ treatment. This technology is typically associated with an ex-situ treatment system.	Low effectiveness. Methods used to install trench in bedrock would likley significantly increase fracturing beneath the trench. Typically used to contain and treat overburden groundwater rather than bedrock groundwater.	Implementation in bedrock would be extremely difficult using standard excavation techniques. Treatment system required to treat recovered groundwater prior to discharge.	Capital Costs: High O&M Costs: Medium-High	Low effectiveness. Extremely difficult to implement in bedrock. Eliminated
		Physical Treatment	Equalization	Groundwater extraction flow dampening and/or contaminant concentration variation in a vessel to promote constant discharge rate and water quality. Generally this technology is a pretreatment process incorporated into a treatment train.	Medium effectiveness. Component of a ex-situ treatment train. Effective method for normalizing contaminant concentrations volumes and flows. Minimal impact on human health & environment during construction/implementation. Scalable with anticipated volumes.	Easily implemented. Qualified contractors are numerous.	Capital Costs: Low O&M Costs: Low	Retained
			Dewatering	Mechanical removal of free water from treatment residuals reducing the residuals volume and mass. Generally this technology is post-treatment process for excavated soi, sediment or sludge, incorporated into a treatment train.	Medium effectiveness. Component of a treatment train. Very effective at reducing the mass of solid residuals (sludges, etc.) associated with ex-situ groundwater treatment. Scalable with anticipated volumes.	Easily implemented. Materials and equipment are readily available. Availability of nearby TSDF for treatment waste disposal may be limited.	Capital Costs: Medium O&M Costs: Medium	Retained
			Sedimentation	Gravity separation of suspended solids in a vessel. Generally this technology is a pretreatment process that is incorporated into a treatment train.	Medium effectiveness. Component of a treatment train. Effective in conjunction with flocculation and coagulation to remove suspended solids (including metals) from an aqueous waste stream. Scalable with anticipated volumes.	Easily implemented. Materials and equipment are readily available. Availability of nearby TSDF for treatment waste disposal may be limited.	Capital Costs: Low O&M Costs: Low	Retained
			Oil/Water Separation	Separation of immiscible liquids from water using forces of gravity. Generally this technology is incorporated as part of a treatment train.	High effectiveness. Component of a treatment train. This process option does not treat dissolved contaminants, but is effective at removing non-aqueous phase liquids. Scalable with anticipated volumes.	Easily implemented. Materials and equipment are readily available. Availability of nearby TSDF for treatment waste disposal may be limited.	Capital Costs: Low O&M Costs: Low	Retained

Table 9-2
Groundwater Remedial Technology Screening
LO-58
Caribou, Maine
Page 3 of 6

Media	General Response Action	Remedial Technology Type	Process Option	Process Option Description	Effectiveness	Implementability	Relative Cost	Screening Comments
Groundwater (cont.)	Collection, Treatment, and Discharge (cont.)	Physical Treatment (cont.)	Filtration	Separation of particles from water using entrapment technologies. Typically this is a pre-treatment technology implemented as part of a treatment train.	High effectiveness. Often a critical component of a treatment train. Very effective at capturing suspended solids in an aqueous waste stream. Scalable with anticipated volumes.	Easily implemented. Materials and equipment are readily available. Availability of nearby TSDF for treatment waste disposal may be limited.	Capital Costs: Low O&M Costs: Low	Retained
			Reverse Osmosis	Use of high pressure and membranes to separate dissolved materials from water.	Medium effectiveness. This method has been shown to be effective at treating some Site COCs. Generally most-successful with small volumes. Highly susceptible to inorganic fouling. Anticipated maintenance requirements could limit effectiveness.	Implementable. Offered by numerous specialty contractors.	Capital Costs: Medium O&M Costs: High	Retained
			Air Stripping	Extracted groundwater is sprayed on packing within air stripping columns or discharged to shallow stacked trays. A counter current of air is passed through the water desorbing contaminants into the vapor phase, which are captured and treated subsequently.	Medium effectiveness. Well-demonstrated technology for treating Site COCs. Effectiveness of the process can be limited by high inorganic content in the waste stream. Minimal impact on human health & environment during construction/implementation.	Components of the system are easily obtainable and constructible. Rigorous pre-treatment and ongoing maintenance may be required to keep the system operational.	Capital Costs: Low O&M Costs: Medium	Retained
			Carbon Adsorption	Extracted groundwater is pumped through granular activated carbon causing dissolved contaminants to adsorb onto the carbon. This can also be applied to a contaminated airstream.	Medium effectiveness. Well-demonstrated technology for treating Site COCs. Scalable with anticipated treatment volumes. Minimal impact on human health & environment during construction or implementation.	Easily implemented. Materials and equipment are readily available. Availability of nearby TSDF for treatment waste disposal may be limited.	Capital Costs: Low O&M Costs: Medium	Retained
			Distillation	Vaporization and subsequent condensation of extracted groundwater.	Low effectiveness. This process option is not cost effective at treating waste streams containing dilute mixtures of contaminants.	Readily implementable. Materials required are easily obtained.	Capital Costs: Medium O&M Costs: Medium/High	This process option is not cost effective on the Site contaminants. Eliminated
			Irrigation / Evaporation	Combined treatment and discharge technology that sprays extracted groundwater onto the ground surface to enhance vaporization of contaminants into the atmosphere.	Low effectiveness. Not effective in cold climates. Potential for human health and environmental impacts during implementation.	It is not likely that this treatment technique would be a viable process at the Site. A large expanse of land will be required to manage the waste stream.	Capital Costs: Low O&M Costs: Low	This process option is not implementable throughout the year. Eliminated
		Chemical Treatment	Ion Exchange	Ion exchange removes ions from the aqueous phase by the exchange of cations or anions between the contaminants and the exchange medium. Ion exchange materials may consist of resins made from synthetic organic materials that contain ionic functional groups to which exchangeable ions are attached.	Medium effectiveness. Component of a treatment train. Effective at reducing the inorganic contents in a waste stream prior to additional treatment. Scalable with anticipated volumes.	Materials are available from a variety of vendors. Availability of nearby TSDF for treatment waste disposal may be limited.	Capital Costs: Medium O&M Costs: Medium	Retained
			Enhanced Oxidation	Extracted groundwater is pretreated to decrease turbidity, mixed with a strong oxidizer (such as hydrogen peroxide or ozone), may include exposure to UV light. UV light with oxidizers form free radicals that destroy the organic contaminants.	High effectiveness. Effective at oxidizing some Site COCs. Minimal impact on the environment. Use of hydrogen peroxide or other oxidant with UV light could increase risk to process operators. O&M may pose hazards to workers due to chemicals, UV, and electricity.	This process option is available through several specialty contractors. May require arrangements with local electrical utilities to supply a significant amount of electricity.	Capital Costs: Medium O&M Costs: Medium/High	Retained
			pH Adjustment	Addition of acid or caustic material to recovered groundwater to reduce the solubility of dissolved metals and facilitate their removal. Generally this technology is incorporated as part of a treatment train.	Medium effectiveness. Component of a treatment train. Adjustment of pH has been show to be effective at minimizing inorganics in a waste stream. Scalable with anticipated volumes. Handling of acids/bases could increase the risk to human health during implementation.	This process option is easily implemented using typical installation techniques. Replacement reagents are easily obtained through a variety of chemical vendors.	Capital Costs: Low O&M Costs: Low	Retained
			Flocculation / Precipitation	Amendments are added to the extracted groundwater to neutralize surface charges and promote agglomeration of colloidal particles to enhance settling.	Medium effectiveness. Component of a treatment train. Has been shown to be effective at reducing suspended solids in a waste stream. Scalable with anticipated volumes. Minimal risk to human health and the environment during construction or implementation.	This process option is easily implemented using typical installation techniques. Replacement reagents are easily obtained through a variety of chemical vendors.	Capital Costs: Low O&M Costs: Low	Retained
		Biological Treatment	Aerobic Degradation / Bioreactor	Groundwater is stored in a vessel or pond for treatment. Suspended growth or attached film using aerobic microbes degrade organic matter and chemicals.	Low effectiveness. Process not commonly utilized at environmental cleanups. Minimal effectiveness on treating Site COCs. Requires large treatment reactors and lengthy treatment times.	Implementable using typical construction technologies. Typically requires a moderate to high degree of maintenance. Outdoor reactor would be difficult to maintain in cold climate.	Capital Costs: Medium O&M Costs: Medium	Not effective; limited implementability. Eliminated
			Anaerobic biodegradation	Groundwater is stored in a vessel. Suspended growth or attached film using anaerobic microbes degrade organic matter and chemicals.	Low effectiveness. Would require a large treatment reactor volume. Anaerobic treatment systems can be prone to upsets resulting in reduced treatment efficiency and erratic operation. Not ideal for extended treatment duration.	Implementable using typical construction technologies. Typically requires a moderate to high degree of maintenance.	Capital Costs: Medium O&M Costs: Medium	Questionable effectiveness and implementability. Eliminated

Table 9-2
Groundwater Remedial Technology Screening
LO-58
Caribou, Maine
Page 4 of 6

Media	General Response Action	Remedial Technology Type	Process Option	Process Option Description	Effectiveness	Implementability	Relative Cost	Screening Comments
Groundwater (cont.)	Collection, Treatment, and Discharge (cont.)	Discharge	Beneficial re-use / Surface Discharge	If treated water is of sufficient quality it may be used as an irrigation source.	Medium effectiveness. This method has been used successfully at other sites. Site topography and hydrogeology would limit the effectiveness of this discharge method. Scalable with anticipated treatment volumes, but large areas are required.	Treatment standards are very low, but could be achievable due to relatively low concentration of groundwater contamination. Components available, easily built using typical construction methods. Reuse may include steam generation, landscaping use and manufacturing.	Capital Costs: Medium O&M Costs: Low	Potentially cost effective. Retained
			Direct discharge to surface water	Treated water is discharged to a nearby surface water body.	High effectiveness. Has been used successfully at numerous sites. Discharge limitations are protective of human health and the environment. Scalable with anticipated volumes, but not easily modified once installed.	Unless discharged to drainage ditch adjacent to VFW, difficult to implement. Nearest potentially suitable water body is the Longfellow Brook, which his approximately 0.42 miles away. Would require significant piping.	Capital Costs: High O&M Costs: Low	Retained
			Subsurface discharge	Treated water is injected below ground through a reinjection gallery.	Medium effectiveness. This method has been used successfully at other sites. Contamination above and below the water table may be mobilized.	Discharge standards are very low and must be protective of vapor intrusion into residences. Standards could be achievable due to relatively low concentration of groundwater contamination. Large unsaturated thickness in subsurface will provide ample space to discharge treated water. Easily-obtainable components, and easily constructible using typical construction methods.	Capital Costs: Medium O&M Costs: Medium	Retained
			Off-site treatment POTW	Pre-treated water is discharged to a publicly-owned treatment system.	High effectiveness. This method has been used successfully at numerous other sites. Minimal impact on human health and the environment. Scalable with anticipated volume. Very difficult to modify once installed.	Difficult to implement. Municipal Sewer is not available near the Site. Piping would have to be constructed to convey treated water to the POTW. Approval must be granted by the Superintendent of the Caribou, ME POTW prior to discharging treated wastewater to the POTW.	Capital Costs: High O&M Costs: Low	No existing sewer system for discharge of treated groundwater to POTW. Eliminated
	In-situ Treatment	Physical Treatment	Air-Sparge Wells/Barrier with Vapor Extraction	Wells are installed to pump air into the aquifer to volatilize VOC from groundwater. Air and VOCs are extracted through the vadose zone by an SVE system. The vapors are then directed to a treatment system such as vapor phase carbon adsorption.	Low effectiveness. Groundwater is located deep within bedrock, which will limit effectiveness. Has been shown effective at treating COCs in a saturated environment. Minimal impact on human health/environment during construction or implementation. Scalable with increased treatment volume/area. Effective at treating only volatile contaminants.	Difficult to implement due location of groundwater deep within bedrock. WIll require significant rock drilling. Contaminated knockout water will require management. Irregular bedrock fissures will result in difficulties recovering sparge vapors. Constructed using conventional drilling and construction methods. Sparge/vapor extraction system available through many vendors.	Capital Costs: High O&M Costs: Medium	Very difficult to implement. Limited effectiveness. Eliminated
			Circulating Wells/Vapor Extraction	Air is injected into a double screened well, lifting the water in the well and forcing it out the upper screen. Simultaneously, additional water is drawn in the lower screen. Once in the well, some of the VOCs in the contaminated groundwater are transferred from the dissolved phase to the vapor phase by air bubbles. The contaminated air rises in the well to the water surface where vapors are drawn off and treated by an SVE system.	Low effectiveness. Small area of influence within bedrock wells would require a large number of wells in the plume area. Projects have shown successful treatment of some Site COCs using this method. Minimal damage to human health or environmental receptors. Scalable with anticipated volumes and areas. Effective at treating only volatile contaminants.	Constructible using conventional drilling and wells installation techniques. Specialized down hole equipment necessary.	Capital Costs: High O&M Costs: Medium	Difficult to implement in bedrock groundwater application. Eliminated
		Thermal Treatment	Steam heating and vapor recovery	Forces steam into the aquifer to vaporize organic chemicals. The vaporized chemicals are recovered using an SVE system, which are treated in a vapor-phase carbon treatment system and discharged into the air.	Low effectiveness. Cold groundwater entering treatment zone would cause decline in subsurface temperature, reducing VOC extraction. Large impacted area and thickness of unsaturated zone will result in high energy requirements. Potential short-term impacts to onsite receptors involving exposure to high temperatures and high pressure, high temperature contaminated fluids. Limited technical feasibility due to the presense of contaminated groundwater deep within bedrock. Only effective at treating only volatile contaminants.	This process option is offered by a limited number of vendors. Difficult to implement if groundwater is located within bedrock. Specialty equipment and personnel are required. Availability of nearby TSDF for treatment waste disposal may be limited.	Capital Costs: High O&M Costs: High	Limited effectiveness, and difficult to implement due to presense of groundwater deep within bedrock. Eliminated.

Table 9-2
Groundwater Remedial Technology Screening
LO-58
Caribou, Maine
Page 5 of 6

Media	General Response Action	Remedial Technology Type	Process Option	Process Option Description	Effectiveness	Implementability	Relative Cost	Screening Comments
Groundwater (cont.)	In-situ Treatment (cont.)	Thermal Treatment (cont.)	Conductive or electrical resistance heating and vapor recovery	Heating elements or electrodes installed within the contaminated zones are electrified and slowly heat the soil and groundwater, and volatilized VOCs and vapor are captured in SVE system, condensed, and treated prior to discharge.	Low effectiveness. This technology is not effective in bedrock applications. Cold groundwater entering the treatment zone would cause decline in subsurface temberature, thus reducing VOC extraction. Only effective at treating only volatile contaminants.	Implementation of this technology would require extense bedrock drilling. TSDFs are available to receive captured VOCs. Availability of nearby TSDF for treatment waste disposal may be limited.	Capital Costs: High O&M Costs: High	Limited effectiveness, and difficult to implement due to presense of groundwater deep within bedrock. Eliminated.
			Vitrification	Aquifer materials are heated to high temperatures, forming a glass, thereby destroying the VOCs. Offgases need to be captured, condensed, and treated before discharging to the ambient air.	Low effectiveness. Process option is not well demonstrated due to implementation problems in the past associated with recovery/control of extremely hot gases. Potential for destructive interactions with underground utilities. Short-term impacts to receptors include potentially high gas temperatures, extensive period needed to cool down treatment zone.	There are no current vendors that market this process option. Difficult to implement in bedrock applications. Specialty equipment and personnel are required. Availability of nearby TSDF for treatment waste disposal may be limited.	Capital Costs: High O&M Costs: High	Vitrification not well demonstrated at full-scale, difficult to implement due to presence of bedrock, no current vendor for process option. Eliminated
		Chemical Treatment	Permeable reactive barrier	A trench is excavated or borings are advanced and a reactants are introduced into the contaminated zone across the flow path of a contaminant plume, allowing the water portion of the plume to passively move through the reactant. These barriers allow the passage of water while destroying contaminants by employing such agents as zero-valent metals, chelators (ligands selected for their specificity for a given metal), sorbents, microbes, biomass, and others.	Medium effectiveness for some COCs. Less effective for in bedrock. Irregular fissures and cracks would allow contaminated groundwater to pass around barrier.	Construction of a permeable reactive barrier within bedrock would be extremely difficult to implement. Rock drilling or blasting would be required to construct reactive zone.	Capital Costs: High O&M Costs: Medium	Low effectiveness, difficult to implement due to presense of groundwater within bedrock. Eliminated
			Chemical Oxidation	Vertical or horizontal wells are drilled into the saturated zone for the purpose of injecting a specified chemical oxidant into the subsurface. The contaminants are destroyed or converted to less-toxic substances through a series of oxidation reactions.	Medium effectiveness. Groundwater flow pathways through fractured bedrock may limit the ability of injections to reach contaminants. Potential hazards to workers during implementation. This process option has been shown to be effective in treating Site organic COCs. Effectiveness of treating manganese using this method is not known.	Injection of chemicals into bedrock may be difficult to implement. Additionally, Maine DEP and USACE are aware of the concerns surrounding injection of reagents into an active drinking water aquifer. Oxidant quantities that can be stored on site may be limited by U.S. Dept. of Homeland Security. Back-diffusion of contaminants from rock matrix may limit success. Several specialty contractors offer in-situ chemical injection services. Materials are easily obtainable from suppliers.	Capital Costs: Medium O&M Costs: Low	Medium effectiveness. Retained
			Chemical Reduction	Wells or injection points are advanced into the subsurface to inject reducing substances such as a zero-valent iron solution into the subsurface. Contaminants are destroyed by reduction reactions, which also promote natural reductive dechlorination in the subsurface.	Medium effectiveness. Groundwater flow pathways through fractured bedrock may limit the ability of injections to reach contaminants. This process option has been shown to be effective in treating Site organic COCs. Scalable to any treatment area or volume. Enhances biological activity in the subsurface. Minimally-invasive injection strategy. Has been demonstrated to be effective at a number of sites. Effectiveness of treating manganese using this method is not known.	Injection of chemicals into bedrock may be difficult to implement. Back-diffusion of contaminants from rock matrix may limit success. Additionally, Maine DEP and USACE are aware of the concerns surrounding injection of reagents into an active drinking water aquifer. Several specialty contractors offer the reagents and injection services. Reductant quantities that can be stored on site may be limited by U.S. Dept. of Homeland Security.	Capital Costs: Medium O&M Costs: Low	Medium effectiveness. Retained
			Nano-particle zero-valent iron	Wells are drilled into the saturated zone for the purpose of injecting a nano-scale slurry containing zero-valent iron into the subsurface. The iron in the fluid causes reductive dechlorination, and also serves to enhance any natural reductive dechlorination processes.	Medium effectiveness. Groundwater flow pathways through fractured bedrock may limit the ability of injections to reach contaminants. Few project have selected this remedy. Has been shown to be successful in a limited number of full-scale applications. Effectiveness of treating manganese using this method is not known.	Injection of slurry into bedrock may be difficult to implement. Very specialized technology with few specialty contractors available.	Capital Costs: Medium O&M Costs: Low	Medium effectiveness. Eliminated

Table 9-2
Groundwater Remedial Technology Screening
LO-58
Caribou, Maine
Page 6 of 6

Media	General Response Action	Remedial Technology Type	Process Option	Process Option Description	Effectiveness	Implementability	Relative Cost	Screening Comments
		Biological Treatment	Enhanced biodegradation-aerobic	Injections are performed to stimulate or supplement the on-going in-place aerobic natural attenuation processes. Wells are drilled into the saturated zone to deploy biostimulants, carbon sources, nutrients, and possibly inject of naturally-occurring or bio-engineered bacterium into the subsurface.	Medium effectiveness. Could eventually achieve clean-up goals, given sufficient time. Anaerobic conditions in some portions of the Site would limit effectiveness. Process has been demonstrated to be effective for treating Site organic COCs. May be effective at reducing the presence of manganese	Injection of biostimulants into bedrock would be difficult to implement. Several specialty contractors offer the reagents and injection services. Additionally, Maine DEP and USACE are aware of the concerns surrounding injection of reagents into an active drinking water aquifer.	Capital Costs: Medium O&M Costs: Medium	Medium effectiveness. Retained
Groundwater (cont.)	In-situ Treatment (cont.)	Biological Treatment (cont.)	Enhanced biodegradation-anaerobic	Injections are performed to stimulate or supplement potential on-going in-place anaerobic natural attenuation processes. Wells are drilled into the saturated zone to deploy biostimulants, carbon sources, nutrients, and possibly inject of naturally-occurring or bio-engineered bacterium into the subsurface.	High effectiveness. Primary degradation pathway for some Site contaminants (reductive dechlorination). Geochemical conditions may enhance the dissolution of manganese into the aquifer.	Injection of biostimulants into bedrock would be difficult to implement. Several specialty contractors offer the reagents and injection services.	Capital Costs: Medium O&M Costs: Medium	Medium effectiveness. Retained

Notes:

- The process technologies cited above will likely require some level of bench-scale testing, field-scale pilot testing, and design prior to full-scale implementation.

▨ General Response Action, Remedial Technology Type, or Process Option is Eliminated from Further Consideration

Table 9-3
Indoor Air Remedial Action Objectives, General Response Actions, Technology Types and Process Options
LO-58 Nike Battery and Launcher
Caribou, Maine
Page 1 of 1

Remedial Action Objectives (from site characterization)	Environmental Media	General Response Action (for all remedial action objectives)	Remedial Technology Types (for general response actions)	Process Options
Protection of Human Health Prevent exposure to indoor air contaminants of concern in excess of preliminary remediation goals that pose cumulative cancer risk greater than 1×10-4 (for contaminants of concern) or organ-specific excess non-carcinogenic risks greater than HI of 1.0.	Indoor Air	No Action	No Action	Not Applicable
		Monitored Natural Attenuation	Physical processes	Dispersion, diffusion, and sorption
			Chemical processes	Reductive dechlorination
			Biological processes	Aerobic biodegradation, anaerobic biodegradation
		Limited Action	Long-term monitoring	Indoor air monitoring and soil vapor monitoring
			Institutional Controls	Deed restrictions, land use restrictions, zoning changes, local ordinances
		Barriers	Soil Vapor Barriers	Rigid membranes, spray-applied membranes, sealing underground utility penetrations/cracks/sumps
		Soil Vapor Collection, Treatment, and Discharge	Passive Venting	Subslab venting, interior venting
			Pressurization	Building pressurization/HVAC modification, block wall pressurization, subslab pressurization
			Active Collection/Extraction	Subslab depressurization, tile drain depressurization, block wall depressurization, sub-membrane depressurization
			Physical Treatment	Carbon adsorption, zeolite adsorption
			Chemical Treatment	Photo catalytic oxidation
			Biological Treatment	Aerobic biodegradation or anaerobic biodegradation
			Discharge	Venting

Table 9-4
Soil Gas Remedial Technology Screening Groundwater
LO-58
Caribou, Maine

Media	General Response Action	Remedial Technology Type	Process Option	Process Option Description	Effectiveness	Implementability	Relative Cost	Screening Comments
Soil Vapor and Indoor Air	No Action	No Action	Not applicable	No active source remediation conducted. No monitoring conducted.	The lack of action will not achieve RAOs.	Simple to implement.	Capital Costs: None O&M Costs: None	Baseline, as required by the NCP. Retained.
	Monitored Natural Attenuation	Physical Processes	Dispersion	Mechanical dispersion is the heterogeneous flow of a contaminant through aquifer materials caused by variations in pore size, tortuosity in flow paths and friction in the pore throats between soil particles.	Difficult to accurately evaluate effectiveness. Process dependent on decrease of contaminants in groundwater.	Easy to implement.	Capital Costs: Low O&M Costs: Low	Not effective in attenuating soil gas without contaminant decrease in groundwater. Eliminated.
			Diffusion	Molecular diffusion occurs when chemicals move from zones of higher concentration to zones of lower concentration.	Difficult to accurately evaluate effectiveness. Process dependent on decrease of contaminants in groundwater.	Easy to implement.	Capital Costs: Low O&M Costs: Low	Not effective in attenuating soil gas without contaminant decrease in groundwater. Eliminated.
			Sorption	Sorption is the lessening of a chemical's presence within the vadose zone due to the affinity of the chemical to vadose zone soils. In this process hydrophobic organic chemicals bind to organic carbon or clay particles which prevents the chemicals from being released to the air.	Difficult to accurately evaluate effectiveness. Process dependent on decrease of contaminants in groundwater.	Easy to implement.	Capital Costs: Low O&M Costs: Low	Not effective in attenuating soil gas without contaminant decrease in groundwater. Eliminated.
		Chemical Processes	Abiotic Reductive Dechlorination	Examples of this type of chemical reaction are hydrogenolysis and dihaloelimination. In hydrogenolysis, a chlorine ion is replaced by a hydrogen ion. In dihaloelimination, two chlorine ions are replaced, creating a double bond.	Difficult to accurately evaluate effectiveness. Process dependent on decrease of contaminants in groundwater.	Easy to implement.	Capital Costs: Low O&M Costs: Low	Not effective in attenuating soil gas without contaminant decrease in groundwater. Eliminated.
		Biological Processes	Aerobic Biodegradation	Aerobic biodegradation refers to the process by which native microorganisms in the subsurface degrade the contaminants within the vadose zone in the presence of oxygen.	Not well demonstrated for COCs in soil gas. Process dependent on decrease of contaminants in groundwater.	Easy to implement.	Capital Costs: Low O&M Costs: Low	Not effective in attenuating soil gas without contaminant decrease in groundwater. Eliminated.
			Anaerobic Biodegradation	Anaerobic biodegradation refers to the process by which native microorganisms in the subsurface degrade the contaminants within the vadose zone in the absence of oxygen.	Not well demonstrated for soil gas. Difficult to accurately evaluate effectiveness. Process dependent on decrease of contaminants in groundwater.	Easy to implement.	Capital Costs: Low O&M Costs: Low	Not effective in attenuating soil gas without contaminant decrease in groundwater. Eliminated.
	Limited Action	Long-term monitoring	Indoor air, soil vapor and groundwater monitoring	No active remedial processes will be taken to address the contamination. Indoor air, soil vapor, and groundwater samples will be collected to monitor the plume and vapor intrusion status for changes in conditions or concentrations.	Frequently a component of a remedial alternative. Provides data to determine if remedial actions are effective. Monitoring network is scalable with area and volume. No impact to human health and the environment.	Easily implemented. Qualified contractors are numerous. Stakeholder approval of the monitoring program is required.	Capital Costs: Low O&M Costs: Low	Potentially applicable. Retained.
		Institutional Controls	Deed restrictions, Land use restrictions, Town ordinances	No active remedial processes will be taken to address the contamination. These controls can include deed restrictions preventing residential use without appropriate engineering controls on designated portions of the property, land use restrictions, or Town ordinances that prevent certain activities within a designated area.	Frequently a component of a remedial alternative. Effective at minimizing risks to human health. Control areas are scalable with contaminated areas/volumes. Effective only if implemented, monitored, and enforced.	Administrative implementation is possible, but will require coordination between Local, State and Federal officials, and property owners. Must be monitored and enforced after implementation.	Capital Costs: Low O&M Costs: Low	Potentially applicable. Retained.
	Barrier	Soil Vapor Barriers	Rigid Membranes	Membrane sheets are installed beneath new construction to prevent advective and diffusive migration of VOC vapors into buildings. All membrane seams are sealed and utility penetrations are constructed to eliminate vapor migration pathways. QA/QC processes are utilized to ensure soil gas entry routes are eliminated.	Demonstrated effective for vapor migration control. Not commonly used for residential applications. Effective for new construction only.	Process option is available through specialty subcontractors. Most cost effective for large commercial/industrial sites and new construction. Sealing utility penetrations can be time consuming. Third party QA/QC inspection services available. No residual handling required.	Capital Costs: Medium O&M Costs: Low	Not applicable for existing structures addressed by this Feasibility Study Eliminated.
			Spray Applied Membranes	Membrane material is spray applied to area of concern. It is not necessary to seal seams between membrane sheets and utility penetrations are more easily managed. QA/QC processes are utilized to ensure gas entry routes are eliminated.	Demonstrated effective for vapor migration control. Field applied and as a result may not be uniformly applied and may be less effective than rigid membranes. Better suited for new construction than existing buildings.	More easily implemented than rigid membranes. Specialty subcontractors available to install. Applicable for some existing construction. QA/QC testing available. No residual handling required.	Capital Costs: Medium O&M Costs: Low	May be combined with other technologies to create a Remedial Alternative at some locations. Retained
			Sealing Vapor Entryways	Caulking or other flexible material used to seal soil vapor migration pathways into structures.	Only applicable to accessible locations. Unlikely to address all possible entryways. Effective in new structures, limited effectiveness in existing structures.	Easily constructible using conventional methods with a large number of available subcontractors. Easily applicable to existing structures. No residual handling required.	Capital Costs: Low O&M Costs: Low	May be combined with other technologies to create a Remedial Alternative. Retained

Table 9-4
Soil Gas Remedial Technology Screening Groundwater
LO-58
Caribou, Maine

Media	General Response Action	Remedial Technology Type	Process Option	Process Option Description	Effectiveness	Implementability	Relative Cost	Screening Comments
	Soil Vapor Collection, Treatment, and Discharge	Passive Venting	Sub-slab Venting	Mitigates soil vapor intrusion by creating a preferential pathway for vapors to migrate to the exterior of a structure. Usually consists of perforated PVC piping in a permeable bedding material. Can be used in conjunction with membranes. Relies on atmospheric pressure changes to remove soil gas.	May not reliably mitigate soil vapor intrusion during a variety of weather conditions, occupant activities and/or appliance usage. Difficult to assure effectiveness in existing structures. Most effective in new structures.	Easy to implement for new construction. More difficult to implement for existing construction. Will not be implemented on existing structures that will be addressed by this Feasibility Study. Subcontractors readily available. No residual handling required.	Capital Costs: Low O&M Costs: Low	Uncertain effectiveness for existing structures addressed by this Feasibility Study. Eliminated.
Soil Vapor and Indoor Air (cont.)	Soil Vapor Collection, Treatment, and Discharge (cont.)	Passive Venting (cont.)	Interior Venting	Increase the amount of air exchange with the outdoors and enhance dilution of indoor contaminants. Heat exchangers can be used to reduce heating/air conditioning costs.	Demonstrated effective for dilution of VOC contamination in indoor air. Can be effective in both new and existing structures.	The incremental cost of heating or air conditioning makes this process option cost prohibitive over the long term. Easy to implement. No residual handling required.	Capital Costs: Low/Medium O&M Costs: High	Operation is cost prohibitive as a long term alternative. Eliminated.
		Pressurization	Building Pressurization/HVAC Modification	Modify or supplement existing HVAC systems to create positive pressure in the lower level of the structure to mitigate vapor intrusion. Positive pressure must be consistently maintained to prevent advective flow of soil gas into the structure.	Most effective as an interim measure. Long-term operation of HVAC system is likely to damage equipment. Could be effective in new structures, not effective for existing structures. More effective in warm climates where winter heating is not necessary.	Requires specialized HVAC subcontractor and equipment modification to implement. Not implementable with all HVAC systems. No residual handling required.	Capital Costs: Medium O&M Costs: Medium	Not effective as long term solution. Not applicable to baseboard heating system at Site. Eliminated.
			Sub-slab Pressurization	Mitigates soil vapor intrusion by using a fan to create positive pressure below the building slab. The positive pressure below the building slab creates a barrier to soil gas. May be appropriate when sub-slab material is too permeable to allow depressurization.	Demonstrated effective for vapor migration control. Effectiveness is dependent on the extent to which the pressurization system can influence the entire floor area of concern. If pressurization system is limited in areal extent, effectiveness would be limited.	Difficult to implement beneath front room floor. Specialty subcontractors are available to install this equipment. May cause disruption if implemented in existing construction. More easily implemented in new construction.	Capital Costs: Medium O&M Costs: Medium	Not effective for Site structure. Eliminated.
		Active Collection / Extraction	Active Sub-slab Depressurization	Mitigate soil vapor intrusion by creating a negative pressure beneath a structure. Removes soil VOC vapors by advective flow of soil vapor from beneath structures. May require horizontal extraction points beneath structure's foundation.	Demonstrated effective for vapor migration control. Effective mitigation requires depressurization beneath the slab that is strong enough to overcome depressurizations within the building caused by appliances, bathroom fans, stove vents, occupant activities, weather effects etc. Effective for both new and existing structures.	Not implementable in areas with high water tables. Specialty subcontractors are available to install this equipment. Presence of sumps or major utility penetrations in the basement may cause short circuiting. May cause problems with back drafting of combustion appliances.	Capital Costs: Medium O&M Costs: Medium	May be included as part of a remedial alternative treatment train. Retained.
			Active Sub-Membrane Depressurization	Used in buildings with dirt floor basements. Includes an impermeable membrane with soil vapor extraction points installed vertically through the membrane.	If properly designed and installed, this process option is effective in intercepting soil vapors. Proper sealing of membrane to perimeter walls and membrane seam sealing is critical in effectiveness. Membranes must be protected from physical damage and puncturing by overlying material that is compatible with the membrane. Effective for existing structures with dirt basements, not likely to be effective for new structures.	Difficult to implement in areas with high water tables. Specialty subcontractors are available to install this equipment. May cause problems with back drafting of combustion appliances.	Capital Costs: Medium O&M Costs: Medium	Not effective for existing structures. Basement not present in building. Eliminated
		Physical Treatment	Carbon Adsorption	Extracted soil vapor is discharged through granular activated carbon causing contaminants to sorb onto the carbon.	Well-demonstrated technology for treating Site COCs. Scalable with anticipated treatment volumes.	Readily implementable. Replacement carbon and replacement parts are easily obtainable. TSDF available to received spent carbon.	Capital Costs: Low O&M Costs: Medium/High	May be included as part of a remedial alternative treatment train.
			Zeolite Adsorption	Extracted soil vapor is discharged through zeolites causing contaminants to sorb onto the carbon.	Well-demonstrated technology for treating Site COCs. Scalable with anticipated treatment volumes.	Readily implementable. Replacement zeolite and replacement parts are easily obtainable. TSDF available to receive spent zeolite.	Capital Costs: Low O&M Costs: Medium/High	Potentially applicable. If soil gas treatment is required prior to venting, O&M costs will vary with contaminant loading and the effectiveness of pretreatment steps. Retained.

Table 9-4
Soil Gas Remedial Technology Screening Groundwater
LO-58
Caribou, Maine

Media	General Response Action	Remedial Technology Type	Process Option	Process Option Description	Effectiveness	Implementability	Relative Cost	Screening Comments
Soil Vapor and Indoor Air (cont.)	Soil Vapor Collection, Treatment, and Discharge (cont.)	Chemical Treatment	Photo-Catalytic Oxidation	The photocatalytic oxidation of high levels of CVOCs in gas phase has been demonstrated using a specially designed photoreactor that includes a titanium catalyst. Treatment efficiency was strongly affected by the presence of water in the air stream. Treatment efficiencies are highest at room temperature, low initial contaminant concentrations, low flow rates and high light intensities.	May be effective in treating COCs. Commercial units are available utilizing this technology but their efficiencies with the anticipated vapor stream would have to be pilot tested and would be expected to vary with ambient conditions.	Not readily implementable. Some commercial units available.	Capital Costs: Medium O&M Costs: Medium/High	Not a demonstrated technology. Eliminated.
		Biological Treatment	Aerobic Biodegradation	Soil vapor is discharged to a vessel for treatment. Attached film aerobic microbes degrade organic matter and chemicals.	Process not commonly utilized as part of an environmental remediation treatment train. Minimal effectiveness on treating Site COCs. May require large treatment reactors.	Implementable using typical construction technologies. Typically requires a moderate to high degree of maintenance. System mat be prone to upsets resulting in reduced effectiveness.	Capital Costs: Medium O&M Costs: Medium	Not effective; limited implementability. Eliminated.
			Anaerobic Biodegradation	Soil vapor is discharged to a vessel for treatment. Attached film anaerobic microbes degrade organic matter and chemicals.	Process not commonly utilized as part of an environmental remediation treatment train. Minimal effectiveness on treating Site COCs. May require large treatment reactors.	Implementable using typical construction technologies. Typically requires a moderate to high degree of maintenance. System mat be prone to upsets resulting in reduced effectiveness.	Capital Costs: Medium O&M Costs: Medium	Questionable effectiveness and implementability. Eliminated.
		Discharge	Venting	Treated or untreated soil vapor is vented to the atmosphere.	Has been successfully used at numerous sites. Discharge limitations are protective of human health and the environment. Scalable with anticipated volumes.	Implementable using widely available construction methods.	Capital Costs: Medium O&M Costs: Low	Potentially applicable. Retained.

Notes:

- The process technologies cited above will likely require some level of bench-scale testing, field-scale pilot testing, and design prior to full-scale implementation.

▨ General Response Action, Remedial Technology Type, or Process Option is eliminated

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SECTION 11

TABLES

Table 11-1
Detailed Analysis of Groundwater Remedial Alternatives
LO-58
Caribou, Maine

Detailed Analysis Criteria		**Alternative GW1** **No Action**	**Alternative GW2** **Continued POE System Operation, Institutional Controls, LTM**	**Alternative GW3** **Shut Down POE System; Reroute Drinking Water Supply Line, Institutional Controls, LTM**	**Alternative GW4** **In-Situ Treatment; Reroute Drinking Water Supply Line, Institutional Controls, LTM**	**Alternative GW5** **Groundwater Extraction, Treatment, Discharge, Reroute Drinking Water Supply Line, Institutional Controls, LTM**
Overall Protection of Human Health and the Environment	Human health protection	No reduction in risk in the near term. Reduction of risk in the long term will occur gradually. No monitoring is included to evaluate contaminated plume status. No mechanisms in place to prevent improper use or exposure to groundwater contaminants.	The continued operation of the POE system will slowly transfer contaminant mass from the groundwater onto treatment media. Operation of this system is protective of human health under current conditions. Institutional controls will limit potential future exposure to groundwater contaminants by restricting its use as a residential potable supply. Long-term monitoring will allow evaluation of migration of the groundwater contamination.	Connecting the AMAC building to the supply well DW-02 located outside of the VFW Building (similar to what was in-place prior to 1996) is protective of human health under current conditions, and future users of that building. Institutional controls will limit potential future exposure to groundwater contaminants by restricting its use as a residential potable supply. Long-term monitoring will allow evaluation of migration of the groundwater contamination.	Connecting the AMAC building to the supply well DW-02 located outside of the VFW Building (similar to what was in-place prior to 1996) is protective of human health under current conditions, and future users of that building. Institutional controls will limit potential future exposure to groundwater contaminants by restricting its use as a residential potable supply until drinking water standards are met.. Long-term monitoring will evaluate effectiveness of treatment and allow evaluation of migration of the groundwater contamination.	Connecting the AMAC building to the supply well DW-02 located outside of the VFW Building (similar to what was in-place prior to 1996) is protective of human health under current conditions, and future users of that building. Institutional controls will limit potential future exposure to groundwater contaminants by restricting its use as a residential potable supply. Long-term monitoring will allow evaluation of the effectiveness of hydraulic controls, attenuation of groundwater concentrations and migration of the groundwater contamination..
	Protection of the environment	No mechanisms in place to evaluate contaminated plume status. Groundwater quality will not be restored in the near term, but will improve very gradually through source area dissolution and natural attenuation of groundwater.	Groundwater quality will not be restored in the near term, but will improve very gradually through a combination of low-volume extraction and treatment, and natural attenuation. Long-term monitoring will allow evaluation of migration of the groundwater contamination.	Groundwater quality will not be restored in the near term, but will improve very gradually through natural attenuation. Long-term monitoring will allow evaluation of migration of the groundwater contamination.	In-situ treatments can destroy chlorinated VOCs in the groundwater, and may shorten the estimated time to achieve aquifer restoration. Long-term monitoring will evaluate effectiveness of treatment and allow evaluation of migration of the groundwater contamination..	Groundwater extraction and treatment will remove chlorinated VOCs from groundwater, and may shorten the estimated time to achieve aquifer restoration. Long-term monitoring will allow evaluation of the effectiveness of hydraulic controls, attenuation of groundwater concentrations and migration of the groundwater contamination..
Compliance with ARARs	Chemical-Specific ARARs	See Table 10-3 for chemical-specific ARARs. Will not meet drinking water standards.	Operation of the in-place POE system, implementation of institutional controls, and long-term monitoring will partially comply with the PRGs by preventing current and future exposure to contaminants above PRGs. See Table 10-3 for chemical-specific ARARs.	Connecting the current drinking water supply to the drinking water supply DW-02, implementation of institutional controls, and long-term monitoring will partially comply with the PRGs by preventing current and future exposure to COCs above PRGs. See Table 10-3 for chemical-specific ARARs.	Reduction of COC concentrations in bedrock groundwater to below PRGs by in-situ treatment will comply with this ARAR. Additionally, connecting the current drinking water supply to DW-02, implementation of institutional controls, and long-term monitoring (as needed) will comply with the PRGs by preventing current and future exposure to COCs above PRGs. Manganese may remain present in the aquifer after treatment. See Table 10-3 for chemical-specific ARARs.	Reduction of COC concentrations in bedrock groundwater to below PRGs through extraction and treatment will comply with this ARAR. Additionally, connecting the current drinking water supply to DW-22, implementation of institutional controls, and long-term monitoring (as needed) will comply with the PRGs by preventing current and future exposure to COCs above PRGs. See Table 10-3 for chemical-specific ARARs.
	Location-Specific ARARs	There are no location-specific ARARs for Alternative GW-01.	There are no location-specific ARARs for Alternative GW-02.	There are no location-specific ARARs for Alternative GW-03.	There are no location-specific ARARs for Alternative GW-04.	There are no location-specific ARARs for Alternative GW-05.
	Action-Specific ARARs	There are no action-specific ARARs for Alternative GW-01.	Action-specific ARARs will be met. See Table 10-3 for action-specific ARARs.	Action-specific ARARs will be met. See Table 10-3 for action-specific ARARs.	Action-specific ARARs will be met. See Table 10-3 for action-specific ARARs.	Action-specific ARARs will be met. See Table 10-3 for action-specific ARARs.
Long-Term Effectiveness & Permanence	Magnitude of residual risk	Residual risks will remain at the Site. Current groundwater cancer and non-cancer risks are 7.1 E-6 (for worker scenario) and HI of 0.18, respectively. Risks will slowly decrease over time. This alternative does not eliminate any risk in the short term. Risk in the long term will gradually be diminished through natural attenuation. The residual risk will remain largely unchanged for a long period of time. The residual risk is primarily related to future use of DW-1 as a water supply well.	Residual risks will remain at the Site. Current groundwater cancer and non-cancer risks are 7.1 E-6 (for worker scenario) and HI of 0.18, respectively. Risks will slowly decrease over time. While the time required to extract and attenuate the contaminated groundwater is long, the potential risks from exposure to contaminated groundwater (i.e., use as potable supply) will be reduced through continued operation of the POE system and through institutional controls. Institutional controls preventing usage of untreated groundwater for drinking purposes will reduce possible future human health risk. Long-term monitoring and Five-Year Reviews will be required because contaminants will remain at the Site at levels that will not allow unrestricted use.	Residual risks will remain at the Site. Current groundwater cancer and non-cancer risks are 7.1 E-6 (for worker scenario) and HI of 0.18, respectively. Risks will slowly decrease over time. While the time required to attenuate the contaminated groundwater is long, the potential risks from exposure to contaminated groundwater (i.e., use as potable supply) will be reduced through rerouting the current drinking water system to supply well DW-2, and through institutional controls. Institutional controls preventing usage of untreated groundwater for drinking purposes will reduce possible future human health risk. Long-term monitoring and Five-Year Reviews will be required because contaminants will remain at the Site at levels that will not allow unrestricted use.	The in-situ treatment of groundwater contamination may eliminate the groundwater contamination to such a degree that residual risks may be minimal. During implementation, rerouting the current drinking water system to supply well DW-2 will be necessary. This will also assist in reducing risk to human health to users of the AMAC building. Institutional controls may be required shortly after remedial implementation to prevent usage of untreated groundwater for drinking purposes; however, if treatment is successful, institutional controls may not be necessary in the long-term. Long-term monitoring and Five-Year Reviews will be required until such time as contaminants remaining at the Site at levels that allow unrestricted use. Manganese may remain present in the aquifer after in-situ treatment.	Residual risks will remain at the Site. Current groundwater cancer and non-cancer risks will decrease over time at a rate faster than GW1, GW2 or GW3. Extraction and treatment of groundwater may eliminate the groundwater contamination to such a degree that residual risks may be minimal. During implementation, rerouting the current drinking water system to supply well DW-2 will be necessary. This will also assist in reducing risk to human health to users of the AMAC building. Institutional controls may be required shortly after remedial implementation to prevent usage of untreated groundwater for drinking purposes; however, if treatment is successful, institutional controls may not be necessary in the long-term. Long-term monitoring and Five-Year Reviews will be required until such time as contaminants remaining at the Site at levels that disallow unrestricted use.

Table 11-1
Detailed Analysis of Groundwater Remedial Alternatives
LO-58
Caribou, Maine

Detailed Analysis Criteria		Alternative GW1 No Action	Alternative GW2 Continued POE System Operation, Institutional Controls, LTM	Alternative GW3 Shut Down POE System; Reroute Drinking Water Supply Line, Institutional Controls, LTM	Alternative GW4 In-Situ Treatment; Reroute Drinking Water Supply Line, Institutional Controls, LTM	Alternative GW5 Groundwater Extraction, Treatment, Discharge, Reroute Drinking Water Supply Line, Institutional Controls, LTM
	Adequacy and reliability of controls	No controls are in place to prevent improper use or exposure to groundwater.	The existing POE treatment system has been reliable in treating the contaminated groundwater. If properly operated and maintained, the system will continue to reduce the risks from exposure to contaminated groundwater. If properly implemented, monitored, and enforced, institutional controls preventing usage of untreated groundwater for drinking purposes, and periodic reviews of site conditions, may be reliable in decreasing potential exposures to contaminated groundwater. Long-term monitoring will consist of standard groundwater sampling and analysis methods, which are reliable and readily available.	The AMAC building will be provided with a new potable water source, and will therefore not be exposed to contaminated groundwater. Sampling of DW-2 will be required in order to ensure that contamination does not migrate into this supply well. If properly implemented, monitored, and enforced, institutional controls and periodic reviews of site conditions and land use may be reliable in decreasing exposure to contaminated groundwater until safe levels are reached.	Connecting the AMAC building to the supply well DW-2 located outside of the VFW Building will prevent users in the current scenario from exposure to contaminated groundwater. In-situ groundwater treatment of fractured bedrock groundwater is less reliable than treatment within overburden aquifers. The reliability of treatment will depend greatly on the location of contamination sources at the Site. If properly implemented, monitored, and enforced, institutional controls and periodic reviews of site conditions and land use may be reliable in decreasing exposure to contaminated groundwater until safe levels are reached.	Groundwater extraction and treatment are well established remediation and hydraulic containment measures that are capable of achieving remediation goals in the long-term. Treatment methods have been applied at other sites with similar contaminants; reliability of treatment is expected to be high. Long-term O&M or management is required because an active extraction and treatment system will remain in operation until contaminants in the aquifer diminish to PRGs. As the extraction and treatment system ages, damaged or worn components will need to be replaced. In-ground residuals are not expected and should not require additional control measures. If properly implemented, monitored, and enforced, institutional controls and periodic reviews of site conditions and land use may be reliable in decreasing exposure to contaminated groundwater until safe levels are reached.
Reduction of Toxicity, Mobility, & Volume Through Treatment	Treatment process used & materials treated	No treatment of groundwater is proposed, which will not satisfy the statutory preference for treatment. Groundwater contamination will gradually decrease through natural attenuation.	No treatment of groundwater is proposed, which will not satisfy the statutory preference for treatment. Groundwater contamination will gradually decrease through natural attenuation.	No treatment of groundwater is proposed, which will not satisfy the statutory preference for treatment. Groundwater contamination will gradually decrease through natural attenuation.	Active in-situ treatment will satisfy statutory preference to treat contaminated groundwater. Bench- and pilot-scale tests will be required to select appropriate reagents and treatment regime. Pre-design investigations may be needed to better delineate treatment area. Manganese may not be amenable to treatment via in-situ methods.	Active treatment process using groundwater extraction and ex-situ GAC adsorption will satisfy statutory preference for treatment of contaminated groundwater. Pre-design investigation may be needed to better delineate treatment area.
	Amount of hazardous materials removed or treated	Although there is no treatment, through natural attenuation processes, the estimated 220 Kg of VOCs and petroleum hydrocarbons (215 Kg sorbed to the unsaturated soil and 20 Kg in bedrock) will gradually degrade and become mineralized.	Although there is no treatment, through natural attenuation processes, the estimated 220 Kg of VOCs and petroleum hydrocarbons (215 Kg sorbed to the unsaturated soil and 20 Kg in bedrock) will gradually degrade and become mineralized.	Although there is no treatment, through natural attenuation processes, the estimated 220 Kg of VOCs and petroleum hydrocarbons (215 Kg sorbed to the unsaturated soil and 20 Kg in bedrock) will gradually degrade and become mineralized.	GW-4's in-situ treatment will destroy an estimated 20 Kg of VOCs in the bedrock and treat an estimated 3,900,000 gallons of contaminated groundwater.	Groundwater extraction and treatment will remove an estimated 20 Kg of VOCs from the bedrock groundwater. Petroleum hydrocarbons would also be removed and addressed in the treatment system. Approximately 3,900,000 gallons of bedrock groundwater are anticipated, per flush volume.
	Degree of expected reductions in toxicity, mobility, and volume	No reduction of mass, toxicity, mobility, or volume through treatment will occur. However, contaminant mass will gradually be depleted through natural attenuation. Under natural reductive dechlorination processes, vinyl chloride (VC), a degradation daughter product, which is more toxic and mobile, may accumulate. However, VC does not appear to be being produced at significant levels because, due to the age of the release if VC were being generated, it would be expected that VC would be detected in soil vapor.	No reduction of mass. toxicity, mobility, or volume through treatment will occur. Under natural reductive dechlorination processes, vinyl chloride (VC), a degradation daughter product, which is more toxic and mobile, may accumulate. However, VC does not appear to be being produced at significant levels because, due to the age of the release if VC were being generated, it would be expected that VC would be detected in soil vapor.	No reduction of mass. toxicity, mobility, or volume through treatment will occur. However, contaminant mass will gradually be depleted through natural attenuation. Under natural reductive dechlorination processes, vinyl chloride (VC), a degradation daughter product, which is more toxic and mobile, may accumulate. However, VC does not appear to be being produced at significant levels because, due to the age of the release if VC were being generated, it would be expected that VC would be detected in soil vapor.	Mass, toxicity, mobility, and volume of contamination within the bedrock aquifer will be decreased through treatment. Groundwater VOC concentrations may attain PRGs, MEGs, and risk-based PRGs in the short term, based on the effectiveness of treatment. If treatment is unable to attain cleanup goals, natural attenuation of the bedrock groundwater plume VOCs will occur more slowly, and will attain PRGs, MEGs, and risk-based PRGs in the long term. Manganese may remain present in the aquifer after treatment.	Groundwater extraction and treatment will decrease VOCs mass, toxicity, mobility, and volume as VOCs are removed from the bedrock through flushing until PRGs, or risk-based PRGs are attained. An estimated 5 Kg of VOCs per flush volume will be removed by this alternative.
	Degree to which the treatment is reversible	Natural attenuation of VOCs in groundwater is irreversible.	Natural attenuation of VOCs in groundwater is irreversible.	Natural attenuation of VOCs in groundwater is irreversible.	In-situ chemical oxidation, reduction, and/or biodegradation, as well as natural attenuation are irreversible.	Groundwater extraction and treatment are irreversible. VOCs will be removed permanently from the bedrock aquifer under this alternative.

Table 11-1
Detailed Analysis of Groundwater Remedial Alternatives
LO-58
Caribou, Maine
Page 3 of 5

Detailed Analysis Criteria		**Alternative GW1 No Action**	**Alternative GW2 Continued POE System Operation, Institutional Controls, LTM**	**Alternative GW3 Shut Down POE System; Reroute Drinking Water Supply Line, Institutional Controls, LTM**	**Alternative GW4 In-Situ Treatment; Reroute Drinking Water Supply Line, Institutional Controls, LTM**	**Alternative GW5 Groundwater Extraction, Treatment, Discharge, Reroute Drinking Water Supply Line, Institutional Controls, LTM**
	Type/quantity of residuals remaining after treatment	While there is no active treatment, natural attenuation processes will, in the very long term, result in the gradual mineralization of VOCs to only non-hazardous chemicals such as ethene, oxygen, carbon dioxide, chlorides, and hydrogen.	While there is no active treatment, natural attenuation processes will, in the very long term, result in the gradual mineralization of VOCs to only non-hazardous chemicals such as ethene, oxygen, carbon dioxide, chlorides, and hydrogen.	While there is no active treatment, natural attenuation processes will, in the very long term, result in the gradual mineralization of VOCs to only non-hazardous chemicals such as ethene, oxygen, carbon dioxide, chlorides, and hydrogen.	The residuals vary with selected reagents and could include inorganic salts and products of incomplete VOCs destruction. Complete degradation of VOCs will leave primarily non-hazardous and non-toxic residuals such as ethene, ethane, oxygen, carbon dioxide, hydrogen, and chlorides, and iron complexes (oxides, carbonates, sulfides). Residual VOCs will be present in the aquifer after treatment at or below PRGs will represent 1 E-05 or lower risk cancer risk, if groundwater is used as a potable supply. Manganese may remain present in the aquifer after treatment	Treatment residuals will include spent activated carbon (~250 pounds annually) and remaining contamination below PRGs. Residual VOCs in the aquifer present at or below PRGs will represent 1 E-05 or lower risk cancer risk, if groundwater is used as a potable supply.
Short-Term Effectiveness	Protection of community during remedial actions	Because there will no remedial actions, there will be no risks to the community.	The continued operation of the POE treatment system, and implementation of institutional controls and long-term monitoring will pose no additional risks to the community.	Connecting the AMAC building to the supply well DW-02 will require relatively shallow trenching within the driveway to the AMAC building, as well as minor electrical and plumbing work. This will not pose any additional risks to the community. Implementation of institutional controls and long term monitoring will pose no risk to the community.	Engineering and administrative controls pertaining to the storage and injection of treatment reagents will be implemented. Communication and coordination with local, State, and Federal officials, as needed, regarding the storage and injection of treatment reagents will help ensure safety of the community. Risks to the community during implementation are low because treatment reactions occur in the subsurface and there is substantial distance between the treatment area and residences. There are some risks associated with the storage of oxidants on-site during treatment, since oxidants can be reactive. Injection of treatment reagents into the active drinking water aquifer will be evaluated during the pre-design investigations. On-going treatment monitoring will evaluate protectiveness. Institutional controls will minimize potential exposure to contaminated bedrock groundwater until safe levels are achieved.	Risks to the community for extraction and treatment of groundwater are expected to be minimal and are associated with the discharge of treated water on-site, and off-site transport and disposal spent carbon . Institutional controls will minimize potential exposure to contaminated groundwater until safe levels are achieved.
	Protection of workers during remedial actions	Because there will no remedial actions, there will be no risks to workers.	Operations involved with the continued operation of the POE treatment system, such as removing and exchanging carbon filtration systems, as well as the long-term groundwater sampling program, will pose minimal risks to site workers. Implementation of proper field health and safety procedures and use of appropriate personal protective equipment will be protective of workers during these operations.	Implementation of proper field health and safety procedures and use of appropriate personal protective equipment during installation of the new supply line, installation of new groundwater monitoring wells, and the long-term groundwater sampling program will be protective of workers during these operations.	Protection of on-site workers can be achieved through advance planning and implementation of a comprehensive field health and safety program for pressurized injections of treatment reagents and operation of heavy equipment. In-situ reagents may be hazardous and can be reactive in certain situations (i.e., in the presence of moisture and organic matter). Other reagents are typically food-grade materials, which pose no risk to workers. Other risks are similar to those of a groundwater sampling program, which are minimal.	Protection of on-site workers can be achieved through advance planning and implementation of a comprehensive field health and safety program for construction and the operation and maintenance of the extraction and treatment system. The worker risks for this alternative are typical for construction and environmental sampling and are expected to be low. For groundwater sampling, risks to workers are minimal.
	Environmental impacts	Without any active remediation or construction activities, there are no short-term impacts to the environment.	Minimal impact to the environment is expected during installation of new groundwater monitoring wells, and during the long term groundwater sampling program. No impacts are expected as a result of continued POE treatment or institutional controls.	Short term impacts to the environment may include the potential for construction debris or runoff from the work site to enter the surrounding areas. Proper construction housekeeping and pollution/runoff prevention protocols will limit the potential for these impacts. Minimal impact to the environment is expected during installation of new groundwater monitoring wells, and during the long term groundwater sampling program.	Subsurface geochemical conditions may be changed during remediation for a number of years, but should eventually return to natural conditions. Minimal impact to the environment is expected during installation of new groundwater monitoring wells, and during the long term groundwater sampling program.	Aggressive pumping of extraction wells could dewater some surrounding areas. However, this impact is expected to be minimal. Impacts associated with construction of the extraction and treatment system are minimal. Minimal impact to the environment is expected during installation of new groundwater monitoring wells, and during the long term groundwater sampling program.
	Time until remedial action objectives are achieved	Approximately 90 years until RAOs are achieved in bedrock groundwater through natural attenuation processes.	Approximately 90 years until RAOs are achieved in bedrock groundwater through natural attenuation processes.	Because this alternative will shut down DW-1 dissolution rates will be the same as Alternative GW1. Approximately 90 years until RAOs are achieved in bedrock groundwater through natural attenuation processes.	It is assumed that the treatment would require two mobilizations over a two year period.	Significantly increased pumping rates will significantly increase the rate of dissolution of TCE source material. Approximately 52 years until RAOs are achieved in bedrock groundwater.

Table 11-1
Detailed Analysis of Groundwater Remedial Alternatives
LO-58
Caribou, Maine

Detailed Analysis Criteria		Alternative GW1 No Action	Alternative GW2 Continued POE System Operation, Institutional Controls, LTM	Alternative GW3 Shut Down POE System; Reroute Drinking Water Supply Line, Institutional Controls, LTM	Alternative GW4 In-Situ Treatment; Reroute Drinking Water Supply Line, Institutional Controls, LTM	Alternative GW5 Groundwater Extraction, Treatment, Discharge, Reroute Drinking Water Supply Line, Institutional Controls, LTM
Implementability	Ability to construct and operate the technology	This alternative does not include construction.	Construction activities will consist of monitoring well installation. There are no difficulties anticipated with this activity. Drilling will likely require coring through bedrock. Continued operation of the POE treatment system is readily implementable. Electrical costs, annual or semiannual carbon replacement, and miscellaneous repairs are anticipated.	Standard construction techniques will be utilized during installation of the new supply line. Standard drilling techniques will be utilized during installation of the new groundwater monitoring wells. Drilling will likely require coring through bedrock.	Standard construction techniques will be utilized during installation of the new supply line. Standard drilling techniques will be utilized during installation of the new groundwater monitoring wells and injection wells. Bedrock drilling will be required.	Extraction and treatment system will be built using standard construction and installation techniques. Additional monitoring wells will be installed using standard drilling techniques. Bedrock drilling will be required. Some groundwater treatment system experience will be required to operate and maintain the extraction pump and carbon treatment unit, but should not pose any problem for implementation.
	Reliability of the technology	No technology is implemented, therefore no reliability can be examined.	Some natural attenuation is ongoing at the site. However, safe levels will not be attained for a long period of time. Institutional controls are only reliable if implemented, monitored, and enforced.	The AMAC building was connected to the supply well DW-02 located outside of the VFM Building prior to 1996, when the supply line from DW-02 reportedly froze and burst. In order to provide the AMAC building with a reliable potable water source, steps much be taken during construction operation of the new supply line to protect it from damage. Institutional controls are only reliable if implemented, monitored, and enforced.	Previous applications of in-situ treatment within bedrock aquifers have achieved varying levels of success. Irregular cracks, fissures and geomorphology within the bedrock matrix make location and treatment of contaminants extremely difficult. Adequate PDIs are necessary to insure the data collected provides the information necessary to select an appropriate reactant as well as to identify appropriate locations for injection wells.	Extraction well and treatment system are susceptible to organic and inorganic fouling. Proper design, implantation and O&M can result in effective capture and treatment of contaminated groundwater. Hydraulic capture of contaminated groundwater in a fractured bedrock environment may be difficult due to complex groundwater flowpaths.
	Ease of undertaking additional remedial actions, if necessary	Additional remedial actions will be readily implementable.	Some types of remedial actions, such as in-situ chemical or physical treatment, may cause DW-1 to be unusable for a period of time. In this scenario, a new potable water supply would need to be provided to the AMAC building	Additional remedial actions will be readily implementable.	Some reactants limit possible future use of alternate reactants, for example, If oxidation is chosen as the treatment reagent, creating a highly oxidized aquifer could inhibit or prevent future in-situ reduction or biological treatment. Conversely, if reduction is chosen as the treatment method, creating a highly reduced aquifer could inhibit future in-situ oxidation or biological treatment. Over time, site conditions will return to normal through natural processes.	Additional remedial actions can easily be implemented or facilitated by modification of the operation of the extraction and treatment system.
	Ability to monitor effectiveness of the remedy	No monitoring is included in this alternative.	Evaluating natural attenuation can be readily implemented using standard groundwater sampling and analysis methods. Effectiveness of institutional controls can be monitored.	Evaluating natural attenuation can be readily implemented using standard groundwater sampling and analysis methods. Effectiveness of institutional controls can be monitored.	Monitoring the progress of the treatment and the overall success of treatment can be accomplished through collection and analysis of groundwater samples from the existing monitoring well network, as well as a series of treatment evaluation monitoring wells installed prior to treatment application. Effectiveness of institutional controls can be monitored.	Monitoring the progress of the extraction and treatment can be accomplished through collection and analysis of groundwater samples from the monitoring well network. Effectiveness of institutional controls can be monitored.
	Ability to obtain approvals from other agencies	None required.	The continued operation of the POE system will not require approval from other agencies. Implementing institutional controls and long-term monitoring is administratively feasible, but may require approval from other agencies such as the city of Caribou and the state of Maine. Agreement on the specific requirements to be included in the institutional controls will be required.	Installation of the new supply line may require an approval/permit from the City of Caribou. Implementing institutional controls and long-term monitoring is administratively feasible, but may require approval from other agencies such as the City of Caribou and the State of Maine. Agreement on the specific requirements to be included in the institutional controls will be required.	Installation of the new supply line may require an approval/permit from the City of Caribou. In-situ treatment is administratively feasible. All work will be conducted onsite, so permits will be not required. The substantive requirements for underground injection control will need to be met. Agreement on the specific conditions to be included in the institutional controls will be required.	Groundwater extraction and treatment is administratively feasible. All work will be conducted onsite, so permits will be not required. The discharge of treated water to a subsurface infiltration gallery will not require a permit. Agreement on the specific conditions to be included in the institutional controls will be required.
Implementability (cont'd)	Coordination with other agencies	Coordination with other agencies will not be required.	Implementation and recording of institutional controls will require some coordination. One or more parties will need to be designated with the long-term monitoring responsibilities.	Implementation and recording of institutional controls will require some coordination. One or more parties will need to be designated with the long-term monitoring responsibilities.	Coordination and communication to the extent necessary will be maintained prior to and during the remedial action to minimize potential problems or delays. Implementation and recording of institutional controls will require some coordination. One or more parties will need to be designated with the long-term monitoring responsibilities.	Coordination and communication to the extent necessary will be maintained prior to and during the remedial action to minimize potential problems or delays. Implementation and recording of institutional controls will require some coordination. One or more parties will need to be designated with the long-term monitoring responsibilities.
	Availability of off-site treatment, storage, and disposal services and capacity	No disposal activities are associated with this alternative.	Treatment vendors are readily available to dispose of, and replace carbon filtration systems. Investigation derived wastes from groundwater sampling may require disposal off-site TSDFs, which are readily available.	Investigation derived wastes from groundwater sampling may require disposal off-site TSDFs, which are readily available.	This alternative does not produce treatment residuals. Investigation derived wastes from sampling may require disposal off-site TSDFs, which are readily available.	Off-site treatment/disposal of treatment spent activated carbon will be required at TSDFs, which are readily available. Investigation derived wastes from sampling may require disposal off-site TSDFs.

Table 11-1
Detailed Analysis of Groundwater Remedial Alternatives
LO-58
Caribou, Maine

Detailed Analysis Criteria		Alternative GW1 No Action	Alternative GW2 Continued POE System Operation, Institutional Controls, LTM	Alternative GW3 Shut Down POE System; Reroute Drinking Water Supply Line, Institutional Controls, LTM	Alternative GW4 In-Situ Treatment; Reroute Drinking Water Supply Line, Institutional Controls, LTM	Alternative GW5 Groundwater Extraction, Treatment, Discharge, Reroute Drinking Water Supply Line, Institutional Controls, LTM
	Availability of necessary equipment and specialists	None required.	Treatment vendors are readily available to provide carbon filtration systems. Environmental services firms that perform sampling and analysis, equipment, and materials are readily available for long-term monitoring. Experienced regulators and attorneys are available to develop the institutional controls.	The equipment required for the installation of the new supply line and new groundwater monitoring wells is readily available. Environmental services firms that perform sampling and analysis, equipment, and materials are readily available for long-term monitoring. Experienced regulators and attorneys are available to develop the institutional controls.	In-situ chemical treatment services, while specialized, are available from a number of vendors. A smaller number of vendors can provide combined chemical and biodegradation treatment. Equipment, personnel, and materials needed to implement this alternative are available. In some cases, sufficient lead time may be required to ensure adequate supply of reagents. Environmental services firms that perform sampling and analysis, equipment, and materials are readily available for long-term monitoring. Experienced regulators and attorneys are available to develop the institutional controls.	Groundwater extraction and treatment services are readily available through a number of firms. Equipment, personnel, and materials needed to implement this alternative are readily available. Environmental services firms that perform sampling and analysis, equipment, and materials are readily available for long-term monitoring. Experienced regulators and attorneys are available to develop the institutional controls.
	Availability of prospective technologies	None required.	All elements of the alternative are widely available.	All elements of the alternative are widely available.	Full-scale applications of this type have been implemented at other sites. Several vendors are available and the remediation can be competitively bid.	Groundwater extraction and treatment technologies are relatively standardized and has been widely applied full-scale at numerous sites. Multiple firms can implement this alternative and provide competitive bids.
Cost	Capital	$0	$4,380	$56,125	$891,504	$284,223
	O&M (PV)	$0	$565,258	$505,806	$505,806	$574,794
	Total Cost	$0	$569,638	$561,931	$1,397,310	$859,017

Table 11-2
Detailed Analysis of Vapor Intrusion Remedial Alternatives
LO-58
Caribou, Maine
Page 1 of 2

Detailed Analysis Criteria		Alternative VI1 No Action	Alternative VI2 Institutional Controls	Alternative VI3 Active Subslab Vapor Mitigation	Alternative VI4 Vapor Barrier, Institutional Controls
Overall Protection of Human Health and the Environment	Human health protection	No reduction in risk in the near term. Reduction of risk in the long term will occur gradually as contaminants attenuate. No monitoring is included to evaluate status of soil vapor. No mechanisms in place to prevent conversion of existing structures for residential use, or the construction of new residential structures.	No excess risk is presented by current property uses. Institutional controls will limit potential future residential exposure to soil vapors by restricting its use to non-residential uses or implementation of engineering controls.	Although no excess risk is associated with the current use of the building, without treatment, future residential users of the building may potentially be exposed to elevated risk. Extraction and treatment of soil vapors will prevent the vapors from entering the structure, and is therefore protective of human health. Institutional controls will limit exposure to soil vapor in potential future residential use scenarios.	Although no excess risk is associated with the current use of the building, without the installation of engineering controls, future residential users of the building may be exposed to elevated risk. The barrier will limit soil vapors intrusion into the structure, and is therefore protective of human health. Institutional controls will limit exposure to soil vapor in potential future residential use scenarios.
	Protection of the environment	No monitoring is included to evaluate status of soil vapor.	No monitoring is included to evaluate status of soil vapor; however, no excess risk to environmental receptors is currently documented.	No monitoring is included to evaluate status of soil vapor; however, no excess risk to environmental receptors is currently documented.	No monitoring is included to evaluate status of soil vapor; however, no excess risk to environmental receptors is currently documented.
Compliance with ARARs	Chemical-Specific ARARs	No promulgated standards available; To-Be-Considered values are presented. Refer to Table 10-4 for details.	No promulgated standards available; To-Be-Considered values are presented. Refer to Table 10-4 for details.	No promulgated standards available; To-Be-Considered values are presented. Refer to Table 10-4 for details.	No promulgated standards available; To-Be-Considered values are presented. Refer to Table 10-4 for details.
	Location-Specific ARARs	There are no location-specific ARARs for Alternative VI1.	There are no location-specific ARARs for Alternative VI2.	There are no location-specific ARARs for Alternative VI3.	There are no location-specific ARARs for Alternative VI4.
	Action-Specific ARARs	There are no action-specific ARARs for Alternative VI1.	Action-specific ARARs associated with this alternative will be complied with (Refer to Table 10-	Action-specific ARARs associated with this alternative will be complied with (Refer to Table 10-4).	Action-specific ARARs associated with this alternative will be complied with (Refer to Table 10-4).
Long-Term Effectiveness & Permanence	Magnitude of residual risk	This alternative does not eliminate any risk in the short term. Risk in the long term will gradually be diminished through natural attenuation. The residual risk will remain largely unchanged for a long period of time. The residual risk is primarily related to possible future residential use. Five-Year Reviews will be required because contaminants will remain at the Site at levels that will not allow unrestricted use.	Exposures associated with current property use do not contribute to elevated risks. Institutional controls preventing usage of the property for residential use without engineering controls will reduce possible future human health risk. Five-Year Reviews will be required because contaminants will remain at the Site at levels that will not allow unrestricted use.	Exposures associated with current property use do not contribute to elevated risks. Soil vapor extraction from beneath the AMAC Building, coupled with institutional controls preventing usage of the property for residential use without engineering controls and will reduce possible future human health risk. Five-Year Reviews will be required because contaminants will remain at the Site at levels that will not allow unrestricted use.	Exposures associated with current property use do not contribute to elevated risks. This alternative does not include treatment or removal of contaminants from the environment. The barrier prevents contaminants from entering the AMAC Building. Institutional controls preventing usage of the property for residential use without engineering controls and will reduce possible future human health risk. Five-Year Reviews will be required because contaminants will remain at the Site at levels that will not allow unrestricted use.
	Adequacy and reliability of controls	No controls are in place to prevent exposure to soil vapor.	If properly implemented, monitored, and enforced, institutional controls and periodic reviews of site conditions, may be reliable in decreasing potential exposures to users of the property.	Soil vapor removal systems are a proven technologies. Monitoring conducted after system installation will evaluate adequacy of controls. If properly implemented, monitored, and enforced, institutional controls and periodic reviews of site conditions, may be reliable in decreasing potential exposures to users of the property.	Vapor barrier systems are a proven treatment technology. Quality control procedures utilized during installation will demonstrate effectiveness of barrier. If properly implemented, monitored, and enforced, institutional controls and periodic reviews of site conditions, may be reliable in decreasing potential exposures to users of the property.
Reduction of Toxicity, Mobility, & Volume Through	Treatment process used & materials treated	No treatment of soil vapor or indoor air is proposed, which does not satisfy the statutory preference for treatment.	No treatment of environmental media is proposed, which does not satisfy the statutory preference for treatment.	Soil vapor extraction will remove contaminants from the soil vapor beneath the AMAC Building.	No treatment of environmental media is proposed, which does not satisfy the statutory preference for treatment.
	Amount of hazardous materials removed or treated	No soil vapor treatment is proposed as part of this alternative.	No soil vapor treatment is proposed as part of this alternative.	The mass of VOC contaminated soils estimated to be adjacent to the AMAC building is 0.05 kg. Because mass removal from source materials is not a design objective of the VI system and the identified contamination is more than 4 feet below the ground surface, it is unlikely that this material will be removed by the VI system.	No treatment of environmental media is proposed.
	Degree of expected reductions in toxicity, mobility, and volume	No reduction of mass, toxicity, mobility, or volume through treatment will occur.	No reduction of mass, toxicity, mobility, or volume through treatment will occur.	Extraction of contaminated soil vapor will limit the mobility of the contaminants, preventing their entrance into the AMAC Building. Contaminated soil volume would be reduced to a limited degree.	No reduction of mass, toxicity, mobility, or volume through treatment will occur.
Reduction of Toxicity, Mobility, & Volume Through Treatment (cont'd)	Degree to which the treatment is reversible	No soil vapor treatment is proposed as part of this alternative.	No soil vapor treatment is proposed as part of this alternative. This alternative does not inhibit performance of additional remedial actions.	Extraction of contaminated soil vapor is irreversible; however, this technology does not inhibit performance of additional remedial actions.	No soil vapor treatment is proposed as part of this alternative. This alternative does not inhibit performance of additional remedial actions; however, it may limit response actions beneath the building that would potentially damage the vapor barrier.
	Type/quantity of residuals remaining after treatment	No soil vapor treatment is proposed as part of this alternative.	No soil vapor treatment is proposed as part of this alternative.	Extracted soil vapor will be discharged to the atmosphere.	No soil vapor treatment is proposed as part of this alternative.
Short-Term Effectiveness	Protection of community during remedial actions	Because there will not be any construction activities, there will be no risks to the community.	Because there will not be any construction activities, there will be no risks to the community.	Installation, operation, and maintenance associated with this alternative will take place immediately adjacent to the building. Access to construction activities would be limited during system installation.	This alternative includes standard demolition and construction activities. Minimal risks to the community may include dust and nuisance noise. These risks may be mitigated through the use of dust suppressants and coordinated work schedules. Access to the building during construction activities would be limited during construction activities and barrier installation.
	Protection of workers during remedial actions	Because there will not be any construction activities, there will be no risks to workers.	Because there will not be any construction activities, there will be no risks to workers.	Implementation of proper field health and safety procedures and use of appropriate personal protective equipment and controls during installation, operations, and maintenance of the remedy will be protective of workers.	Implementation of proper field health and safety procedures and use of appropriate personal protective equipment and controls during installation, operations, and maintenance of the remedy will be protective of workers.
	Environmental impacts	Without any active remediation or construction activities, there are no short-term impacts to the environment.	Without any active remediation or construction activities, there are no short-term impacts to the environment.	Short term impacts to the environment may include the potential for construction debris or runoff from the work site to enter the surrounding areas. Proper construction housekeeping and pollution/runoff prevention protocols will limit the potential for these impacts.	Short term impacts to the environment may include the potential for construction debris or runoff from the work site to enter the surrounding areas. Proper construction housekeeping and pollution/runoff prevention protocols will limit the potential for these impacts.
	Time until remedial action objectives are achieved	Based on attenuation due to vapor diffusion, the half life of the observed contamination in soil is approximately 300 years.	Based on attenuation due to vapor diffusion, the half life of the observed contamination in soil is approximately 300 years.	RAOs will be achieved upon completion of installation and initiation of operation of the treatment system	RAOs will be achieved upon completion of installation of barrier.

Table 11-2
Detailed Analysis of Vapor Intrusion Remedial Alternatives
LO-58
Caribou, Maine
Page 2 of 2

Detailed Analysis Criteria		**Alternative VI1** **No Action**	**Alternative VI2** **Institutional Controls**	**Alternative VI3** **Active Subslab Vapor Mitigation**	**Alternative VI4** **Vapor Barrier, Institutional Controls**
Implementability	Ability to construct and operate the technology	This alternative does not include construction.	This alternative does not include construction.	Horizontal drilling techniques will be utilized during installation of the vapor extraction system. This is a specialty construction technique, but numerous vendors are available.	This alternative includes standard demolition and construction activities. Installation of barrier is conducted by specialty contractors but numerous contractors are readily available. No operations are necessary once the barrier is installed.
	Reliability of the technology	No technology is implemented.	No technology is implemented.	Soil vapor extraction is a proven technology for protecting populations against vapor intrusion risk. Institutional controls are only reliable if implemented, monitored, and enforced.	Soil vapor barriers are a reliable method for preventing soil vapors from entering a building. Quality control procedures utilized during installation will demonstrate reliability of barrier Institutional controls are only reliable if implemented, monitored, and enforced.
	Ease of undertaking additional remedial actions, if necessary	Additional remedial actions will be readily implementable.	Additional remedial actions will be readily implementable.	Additional remedial actions will be readily implementable; however, care must be taken to avoid damage to the installed vapor extraction wells.	Additional remedial actions will be readily implementable; however, care must be taken to avoid damage to the installed barrier.
	Ability to monitor effectiveness of the remedy	No monitoring is included in this alternative.	As this alternative involves purely administrative controls, monitoring of the effectiveness of this alternative may be performed at any point.	Evaluating natural attenuation can be readily implemented using standard indoor air sampling and analysis methods. Effectiveness of institutional controls can be monitored.	Evaluating natural attenuation can be readily implemented using standard indoor air sampling and analysis methods. Effectiveness of institutional controls can be monitored.
	Ability to obtain approvals from other agencies	None required.	Implementing institutional controls is administratively feasible, but may require approval from other agencies such as the city of Caribou and the state of Maine. Agreement on the specific requirements to be included in the institutional controls will be required.	Implementation of the vapor extraction may require the approval of local authorities. Implementing institutional controls is administratively feasible, but may require approval from other agencies such as the city of Caribou and the state of Maine. Agreement on the specific requirements to be included in the institutional controls will be required.	Demolition/installation of the vapor barrier may require the approval local authorities. Implementing institutional controls is administratively feasible, but may require approval from other agencies such as the city of Caribou and the state of Maine. Agreement on the specific requirements to be included in the institutional controls will be required.
Implementability	Coordination with other agencies	Coordination with other agencies will not be required.	Implementation and recording of institutional controls will require some coordination.	Implementation and recording of institutional controls will require some coordination.	Implementation and recording of institutional controls will require some coordination. As this alternative involves work within the AMAC building, close coordination with the AMAC business will be required to implement this alternative.
	Availability of off-site treatment, storage, and disposal services and capacity	No disposal activities are associated with this alternative.	No disposal activities are associated with this alternative.	It is not anticipated that any remediation waste will be generated as part of this alternative. Limited amounts of standard construction debris would be generated during installation activities.	Standard disposal practices and options associated with demolition and construction debris (including possible asbestos containing materials) are readily available.
	Availability of necessary equipment and specialists	None required.	Experienced regulators and attorneys are available to develop the institutional controls.	The equipment required for the installation and operation of the extraction system is available. Horizontal drilling and standard construction techniques will be necessary.	Both conventional and specialized equipment and contractors will be required to implement this alternative. The specialized equipment and contractors are available.
	Availability of prospective technologies	None required.	Elements of the alternative are widely available.	All elements of the alternative are widely available.	Demolition technologies are widely available. The vapor barrier installation technologies require specialized equipment and contractors; however such expertise is readily available. The professional expertise needed to implement the institutional controls is readily available.
Cost	Capital	$0	$18,225	$119,194	$142,522
	O&M (PV)	$0	$255,830	$247,373	$337,647
	Total Cost	$0	$274,055	$366,567	$480,169

Table 11-3
Detailed ARAR and TBC Analysis – Groundwater Treatment Alternatives
Former LO-58 NIKE Battery Launch Site
Caribou, Maine

Regulatory Authority	Requirement	Status	Requirement Synopsis and Applicability/Relevance	Actions Taken to Attain/Comply with ARAR				
				Alternative GW-01 No Action	Alternative GW-02 Continued POE System Operation, Institutional Controls, LTM	Alternative GW-03 Shut Down POE System; Reroute Drinking Water Supply Line, Institutional Controls, LTM	Alternative GW-04 In-Situ Treatment; Reroute Drinking Water Supply Line, Institutional Controls, LTM	Alternative GW-05 Groundwater Extraction, Treatment, Discharge, Reroute Drinking Water Supply Line, Institutional Controls, LTM
STATE	Underground Injection Control Program 06-096 CMR Chapter 543	Applicable	These regulations outline minimum program and performance standards to underground injection programs. Only the substantive portions of these requirements will be incorporated into the remedial action.	No action on the site will trigger compliance with this regulation.	No action associated with this alternative will trigger compliance with this regulation.	No action associated with this alternative will trigger compliance with this regulation.	Injection of groundwater treatment reagents into the subsurface may be authorized when applied as a means of treatment of groundwater contamination. The substantive portions of this regulation will be complied with prior to injection. It is recognized that injection of in-situ treatment reagents into an active drinking water aquifer comes with a degree of risk; however, the bench and pilot investigations will be performed to minimize this risk to the extent practicable.	Infiltration of treated groundwater into the subsurface will be performed in accordance with this regulation.
STATE	Maine Solid Waste Management Rules 06-096 CMR Chapter 400	Applicable	These rules establish performance standards for the treatment, disposal, and/or storage of media contaminated with non-hazardous waste. The substantive portions of these rules would apply to any non-hazardous wastes generated during remedial actions.	No action on the site will trigger compliance with this regulation.	Continued operation of the point of entry treatment system will generate granulated activated carbon remediation waste. Additionally, long-term monitoring will likely generate purge groundwater for disposal. If the wastestream is hazardous, then it will comply with RCRA as described above. However, non-hazardous wastestreams will be managed in accordance with this EPA policy.	Long-term monitoring will likely generate purge groundwater for disposal. If this waste is hazardous, it will be managed in accordance with RCRA as described above. However, non-hazardous wastestreams will be managed in accordance with this EPA policy	Long-term monitoring will likely generate purge groundwater for disposal. If this waste is hazardous, it will be managed in accordance with RCRA as described above. However, non-hazardous wastestreams will be managed in accordance with this EPA policy	Conversion of the point of entry treatment system into an extraction and treatment system will generate granulated activated carbon remediation waste. Additionally, long-term monitoring will likely generate purge groundwater for disposal. If the wastestream is hazardous, then it will comply with RCRA as described above. However, non-hazardous wastestreams will be managed in accordance with this EPA policy.
STATE	Maine Hazardous Waste 06-096 CMR, Chapters 850 & 851	Applicable	The substantive portions of these regulations contain requirements for generators of hazardous waste and the generator hazardous waste characterization process.	No action on the site will trigger compliance with this regulation.	Continued operation of the point of entry treatment system will generate granulated activated carbon remediation waste. Additionally, long-term monitoring will likely generate purge groundwater for disposal. Either of these wastestreams may be hazardous waste and therefore trigger this regulation.	Long-term monitoring will likely generate purge groundwater for disposal. This wastestream may be hazardous waste and therefore trigger this regulation.	Long-term monitoring will likely generate purge groundwater for disposal. This wastestream may be hazardous waste and therefore trigger this regulation.	Conversion of the point of entry treatment system into an extraction and treatment system will generate granulated activated carbon remediation waste. Additionally, long-term monitoring will likely generate purge groundwater for disposal. Either of these wastestreams may be hazardous waste and therefore trigger this regulation.

Table 11-3
Detailed ARAR and TBC Analysis – Groundwater Treatment Alternatives
Former LO-58 NIKE Battery Launch Site
Caribou, Maine

Regulatory Authority	Requirement	Status	Requirement Synopsis and Applicability/Relevance	Actions Taken to Attain/Comply with ARAR				
				Alternative GW-01 No Action	**Alternative GW-02 Continued POE System Operation, Institutional Controls, LTM**	**Alternative GW-03 Shut Down POE System; Reroute Drinking Water Supply Line, Institutional Controls, LTM**	**Alternative GW-04 In-Situ Treatment; Reroute Drinking Water Supply Line, Institutional Controls, LTM**	**Alternative GW-05 Groundwater Extraction, Treatment, Discharge, Reroute Drinking Water Supply Line, Institutional Controls, LTM**
STATE	Maine Center for Disease Control and Prevention Maximum Exposure Guidelines (MEGs) for Drinking Water (February 2, 2011)	To Be Considered	The Maine Center for Disease Control and Prevention (MECDC) Environmental and Occupational Health Program (EOHP) develops MEGs to assist risk managers, homeowners and others in making decisions regarding the suitability for human consumption of drinking water contaminated by chemicals. These guidelines represent the MECDC's most recent recommendations for concentrations of chemical contaminants in drinking water below which there is minimal risk of a deleterious health effect resulting from long-term ingestion of contaminated water.	These guidelines were considered in developing preliminary remedial goals.	These guidelines were considered in developing preliminary remedial goals.	These guidelines were considered in developing preliminary remedial goals.	These guidelines were considered in developing preliminary remedial goals.	These guidelines were considered in developing preliminary remedial goals.
STATE	Vapor Intrusion Evaluation Guidance (MEDEP, November 14, 2010)	To Be Considered	This State of Maine guidance document establishes investigation procedures to determine if contaminants have volatilized from contaminated soil or water into indoor air and associated risk-based evaluation guidance.	This guidance was consulted in performance of the human health risk evaluations	This guidance was consulted in performance of the human health risk evaluations	This guidance was consulted in performance of the human health risk evaluations	This guidance was consulted in performance of the human health risk evaluations	This guidance was consulted in performance of the human health risk evaluations
STATE	Remediation Guidelines for Petroleum Contaminated Sites in Maine (November 20, 2009)	To Be Considered	These risk based guidelines apply to the investigation and clean-up of petroleum contaminated sites. This document supersedes the MEDEP's "Procedural Guidelines for Establishing and Implementing Action Levels and Remediation Goals for the Remediation of Oil Contaminated Soil and Ground Water in Maine" (December 5, 2008), which are based on gasoline range organics (GRO) and diesel range organics (DRO). The new, 2009 guidelines utilize a Volatile Petroleum Hydrocarbon (VPH) and Extractible Petroleum Hydrocarbon (EPH) approach.	These guidelines were considered in developing preliminary remedial goals.	These guidelines were considered in developing preliminary remedial goals.	These guidelines were considered in developing preliminary remedial goals.	These guidelines were considered in developing preliminary remedial goals.	These guidelines were considered in developing preliminary remedial goals.
ACTION SPECIFIC								
FEDERAL	Generation of Investigation Derived Waste (EPA 9345.3-03 FS, January 1992)	To be Considered	Management of investigation–derived waste (IDW) must ensure protection of human health and the environment.	No action on the site will trigger compliance with this regulation.	Continued operation of the point of entry treatment system will generate granulated activated carbon remediation waste. Additionally, long-term monitoring will likely generate purge groundwater for disposal. If the wastestream is hazardous, then it will comply with RCRA as described above. However, non-hazardous wastestreams will be managed in accordance with this EPA policy.	Long-term monitoring will likely generate purge groundwater for disposal. If this waste is hazardous, it will be managed in accordance with Maine's hazardous waste rules. However, non-hazardous wastestreams will be managed in accordance with this EPA policy	Long-term monitoring will likely generate purge groundwater for disposal. If this waste is hazardous, it will be managed in accordance with RCRA as described above. However, non-hazardous wastestreams will be managed in accordance with this EPA policy	Conversion of the point of entry treatment system into an extraction and treatment system will generate granulated activated carbon remediation waste. Additionally, long-term monitoring will likely generate purge groundwater for disposal. If the wastestream is hazardous, then it will comply with Maine's hazardous waste rules. However, non-hazardous wastestreams will be managed in accordance with this EPA policy.

Table 11-3
Detailed ARAR and TBC Analysis – Groundwater Treatment Alternatives
Former LO-58 NIKE Battery Launch Site
Caribou, Maine

Regulatory Authority	Requirement	Status	Requirement Synopsis and Applicability/Relevance	Actions Taken to Attain/Comply with ARAR				
				Alternative GW-01 No Action	**Alternative GW-02 Continued POE System Operation, Institutional Controls, LTM**	**Alternative GW-03 Shut Down POE System; Reroute Drinking Water Supply Line, Institutional Controls, LTM**	**Alternative GW-04 In-Situ Treatment; Reroute Drinking Water Supply Line, Institutional Controls, LTM**	**Alternative GW-05 Groundwater Extraction, Treatment, Discharge, Reroute Drinking Water Supply Line, Institutional Controls, LTM**
CHEMICAL SPECIFIC								
FEDERAL	National Primary Drinking Water regulations (40 C.F.R. Part 141, Subpart B & G)	Relevant & Appropriate	These regulations establish Maximum Contaminant Levels (MCLs) for common organic and inorganic contaminants applicable to public drinking water supplies. MCLs are relevant and appropriate cleanup standards for aquifers and surface water bodies that are current or potential drinking water sources.	No actions taken to attain the MCLs. This alternative will not comply with this ARAR.	Operation of the in-place POE system, implementation of institutional controls, and long-term monitoring will partially comply with the MCLs by preventing current and future exposure to contaminants above MCLs.	Connecting the current drinking water supply to the drinking water supply DW-02, implementation of institutional controls, and long-term monitoring will partially comply with the MCLs by preventing current and future exposure to CoCs above MCLs.	Reduction of CoC concentrations in bedrock groundwater to below MCLs by in-situ treatment will comply with this ARAR. Additionally, connecting the current drinking water supply to DW-02, implementation of institutional controls, and long-term monitoring (as needed) will comply with the MCLs by preventing current and future exposure to CoCs above MCLs.	Reduction of CoC concentrations in bedrock groundwater to below MCLs through extraction and treatment will comply with this ARAR. Additionally, connecting the current drinking water supply to DW-02, implementation of institutional controls, and long-term monitoring (as needed) will comply with the MCLs by preventing current and future exposure to CoCs above MCLs.
FEDERAL	2011 Edition of the Drinking Water Standards and Health Advisories (EPA 820-R-11-002, January 2011)	To Be Considered	Drinking Water Standards and Health Advisories Tables are revised periodically by EPA's Office of Water in order to update Reference Dose and Cancer values so that they are consistent with the most current Agency assessments of chemical contaminants that may occur in drinking water and to introduce new Health Advisories. These values were considered during the human health risk evaluation.	No actions taken to attain the HAs. This alternative will not comply with this ARAR.	Operation of the in-place POE system, implementation of institutional controls, and long-term monitoring will partially comply with the HAs by preventing current and future exposure to contaminants above HAs.	Connecting the current drinking water supply to the drinking water supply DW-02, implementation of institutional controls, and long-term monitoring will partially comply with the HAs by preventing current and future exposure to CoCs above these values.	Reduction of CoC concentrations in bedrock groundwater to below MCLs by in-situ treatment will comply with this ARAR. Additionally, connecting the current drinking water supply to DW-02, implementation of institutional controls, and long-term monitoring (as needed) will comply with the MCLs by preventing current and future exposure to CoCs above these values.	Reduction of CoC concentrations in bedrock groundwater to below MCLs through extraction and treatment will comply with this ARAR. Additionally, connecting the current drinking water supply to DW-02, implementation of institutional controls, and long-term monitoring (as needed) will comply with the MCLs by preventing current and future exposure to CoCs above these values.
FEDERAL	OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (EPA 530-D-02-004, November 2002)	To Be Considered	This EPA guidance establishes a methodology for assessing potential indoor air risks to human health that may result from vapor intrusion. This guidance was considered in completing the remedial investigation and human health risk evaluations.	This guidance was consulted in performance of the human health risk evaluations	This guidance was consulted in performance of the human health risk evaluations	This guidance was consulted in performance of the human health risk evaluations	This guidance was consulted in performance of the human health risk evaluations	This guidance was consulted in performance of the human health risk evaluations

Table 11-4
Detailed ARAR and TBC Analysis - Soil Vapor Intrusion
Former LO-58 NIKE Battery Launch Site
Caribou, Maine

Regulatory Authority	**Requirement**	**Status**	**Requirement Synopsis and Applicability/Relevance**	**Actions Taken to Attain/Comply with ARAR**			
				Alternative VI1 No Action	**Alternative VI2 Institutional Controls**	**Alternative VI3 Vapor Removal and Treatment, Institutional Controls**	**Alternative VI4 Vapor Barrier, Institutional Controls**
CHEMICAL SPECIFIC							
FEDERAL	OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (EPA 530-D-02-004, November 2002)	To Be Considered	This EPA guidance establishes a methodology for assessing potential indoor air risks to human health that may result from vapor intrusion. This guidance was considered in completing the remedial investigation and human health risk evaluations.	This guidance was consulted in performance of the human health risk evaluations	This guidance was consulted in performance of the human health risk evaluations	This guidance was consulted in performance of the human health risk evaluations	This guidance was consulted in performance of the human health risk evaluations
STATE	Vapor Intrusion Evaluation Guidance (MEDEP, November 14, 2010)	To Be Considered	This State of Maine guidance document establishes investigation procedures to determine if contaminants have volatilized from contaminated soil or water into indoor air and associated risk-based evaluation guidance.	This guidance was consulted in performance of the human health risk evaluations	This guidance was consulted in performance of the human health risk evaluations	This guidance was consulted in performance of the human health risk evaluations	This guidance was consulted in performance of the human health risk evaluations
STATE	Maine Bureau of Heath Ambient Air Guidelines (April 2004) Updated in 2010	To Be Considered	The Maine Bureau of Health's (BOH) Environmental Health Unit develops Ambient Air Guidelines (AAGs) to assist risk managers and the public in making decisions regarding the potential human health hazards associated with chemicals in air. AAGs are not promulgated by rule making and therefore are not issued as legally enforceable ambient air "standards." Rather, AAGs represent the Bureau's most recent recommendations for chemical concentrations in ambient air, below which there is minimal risk of a deleterious health effect resulting from long-term inhalation exposure. Note that the Major and Minor Source Air Emission License Regulation (06-096 CMR Chapter 115) does not apply to insignificant sources of hazardous air pollutants (which active discharge of soil vapors would be considered).	No action associated with this alternative will require evaluation against these guidelines.	No action associated with this alternative will require evaluation against these guidelines.	The effluent generated by the soil vapor removal will be discharged in accordance with these guidelines.	No action associated with this alternative will require evaluation against these guidelines.

SECTION 12

TABLES

Table 12-1
Comparative Analysis of Alternatives Summary
LO-58
Caribou, Maine

	Protection of Human Health & Environment	Compliance with ARARs	Long-Term Effectiveness & Permanence	Reduction of Toxicity, Mobility, & Volume Through Treatment	Short-Term Effectiveness	Implementability	Total Present Value Cost	Time to Achieve Residential PRGs/RAOs (Cancer Risk = 10^{-5})
Groundwater Alternatives								
GW1 - No Action [Groundwater]	☒	☒	☒	☒	☒	☑	$0	90 yrs
GW2 - Continued POE System Operation, Institutional Controls, LTM	☑	○	○	○	☑	☑	$569,638	90 yrs
GW3 - Shut Down POE System; Reroute Drinking Water Supply Line, Institutional Controls, LTM	☑	○	☑	☒	☑	☑	$561,931	90 yrs
GW4 - In-Situ Treatment; Install Drinking Water Supply Line, Institutional Controls, LTM	☑	○	○	○	☑	○	$1,397,310	2 yrs
GW-05 - Groundwater Extraction, Treatment, Discharge, Install Drinking Water Supply Line, Institutional Controls, LTM	☑	☑	☑	☑	☑	☑	$859,017	52 yrs
Vapor Intrusion Alternatives								
VI1 - No Action [Vapor Intrusion]	☒	☑	☒	☒	☒	☑	$0	>300 yrs
VI2 - Institutional Controls	☑	☑	☑	☒	☑	☑	$274,055	>300 yrs
VI3 - Vapor Removal and Treatment, Institutional Controls	☑	☑	☑	☑	☑	☑	$363,367	Immediately upon completion of installation
VI4 - Vapor Barrier, Institutional Controls	☑	☑	☑	☒	☑	☑	$480,169	Immediately upon completion of installation

Legend

☒	Does not meet criterion
○	Partially meets criterion
☑	Meets criterion
○*	Meets criterion when paired with VI2

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APPENDICES

APPENDIX A

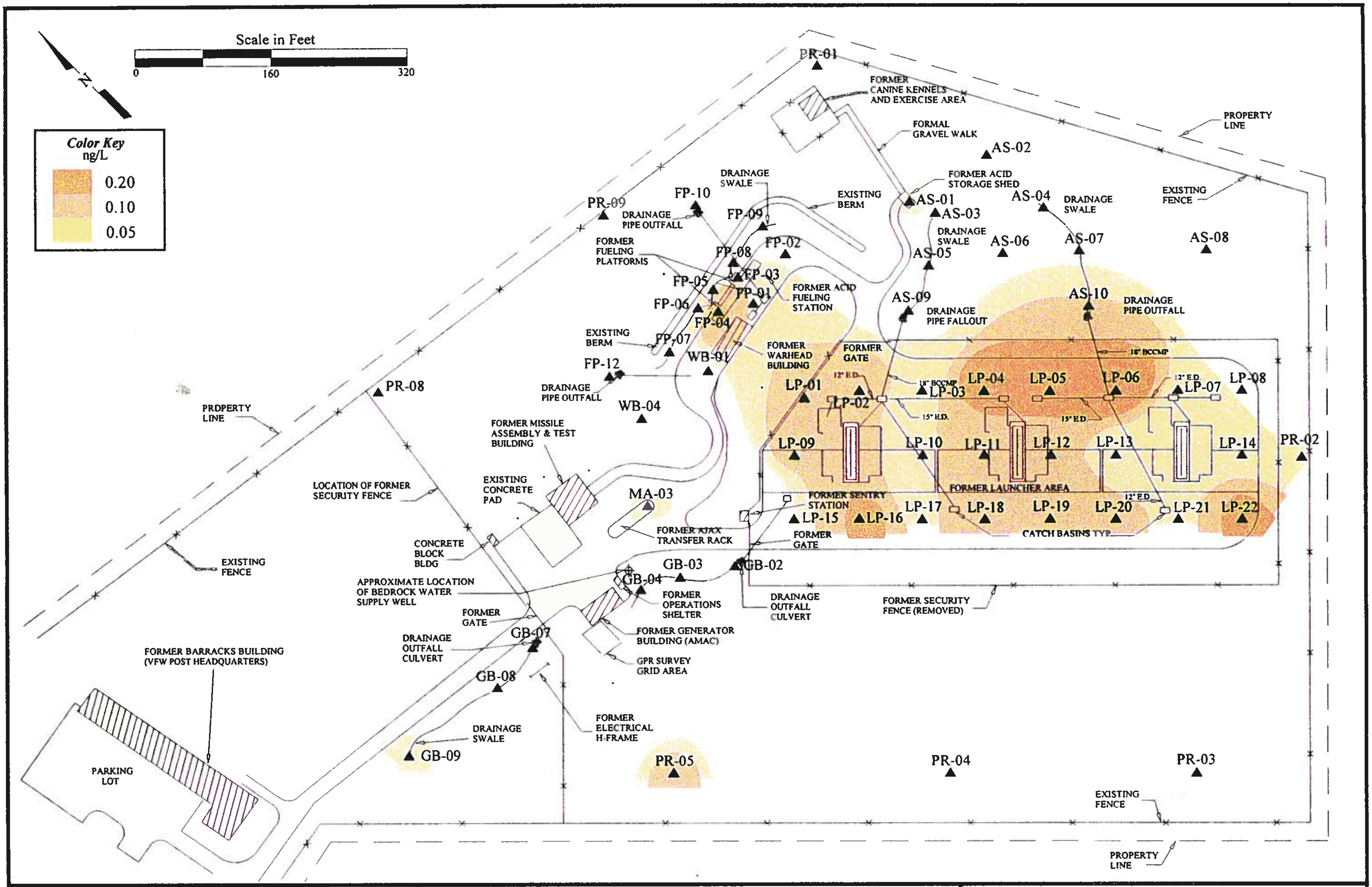
ANALYTICAL DATA

APPENDIX A.1

HISTORICAL DATA

Table A.1-1
Number of VOC Detections by Compound in Soil Gas Samples - June/July 1999
LO-58
Carobou, Maine

Compound	Number of Detections	Range of Concentrations (ng/L)
Toluene	39	0.02 - 0.15
Xylenes (total)	18	0.01 - 0.15
Benzene	15	0.02 - 0.03
Tetrachloroethene	6	0.01 J - 0.04
1,2,4-Trimethylbenzene	6	0.03 - 0.06
Chloromethane	3	0.09 - 0.15
1,3,5-Trimethylbenzene	2	0.02 - 0.02
Ethylbenzene	2	0.02 - 0.02
Trichloroethene	2	0.01 J - 0.02
Naphthalene	1	0.05 - 0.05



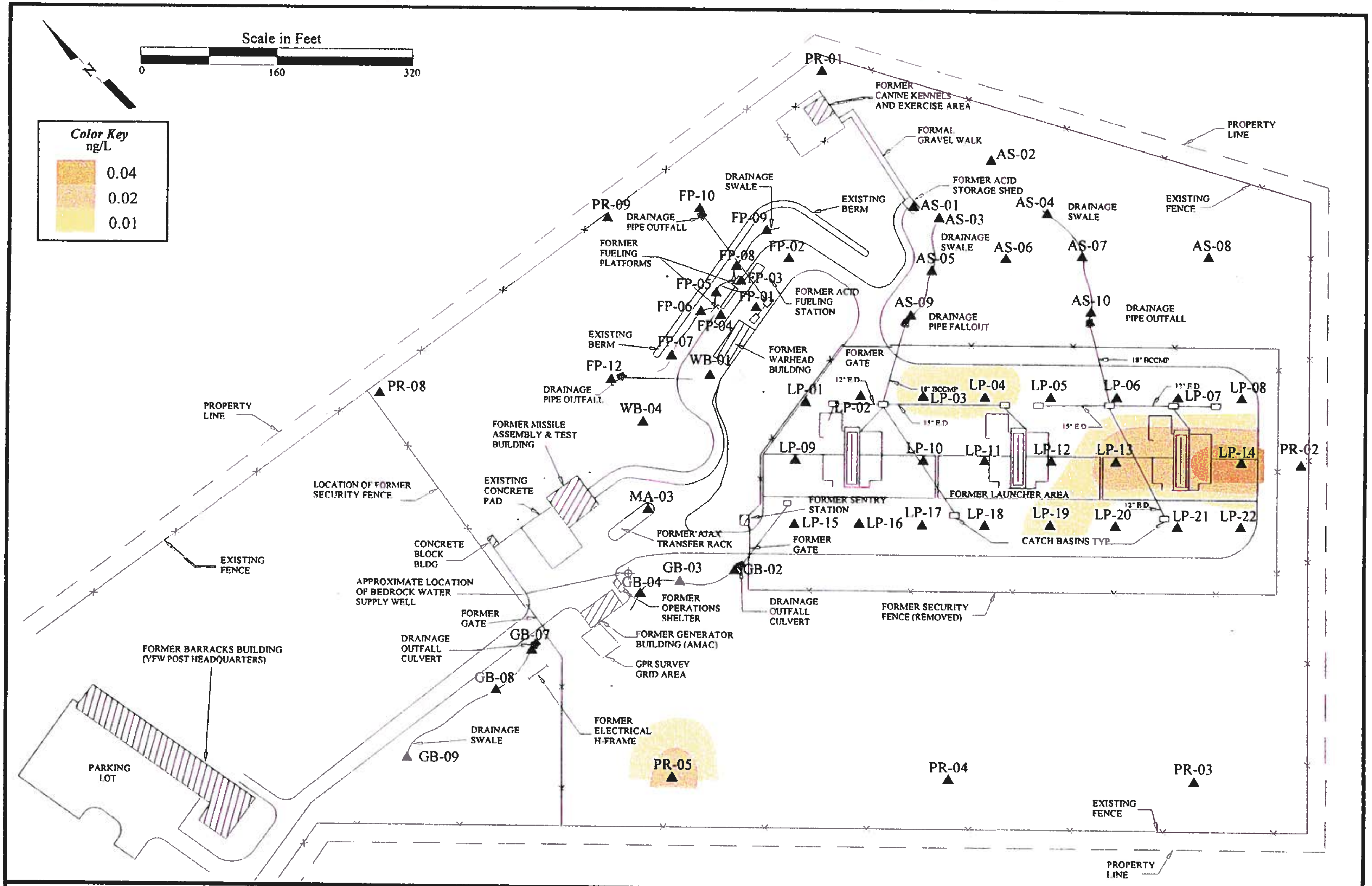
BEACON
ENVIRONMENTAL SERVICES

PR-05 ▲ EMFLUX Sample Point Location

Notes: Sixteen sample locations were omitted (see Section 3).
The reported quantitation level for Total BTEX is 0.01 ng/L.

Figure 4-2
Total BTEX

Nike Missile Site
Caribou, ME



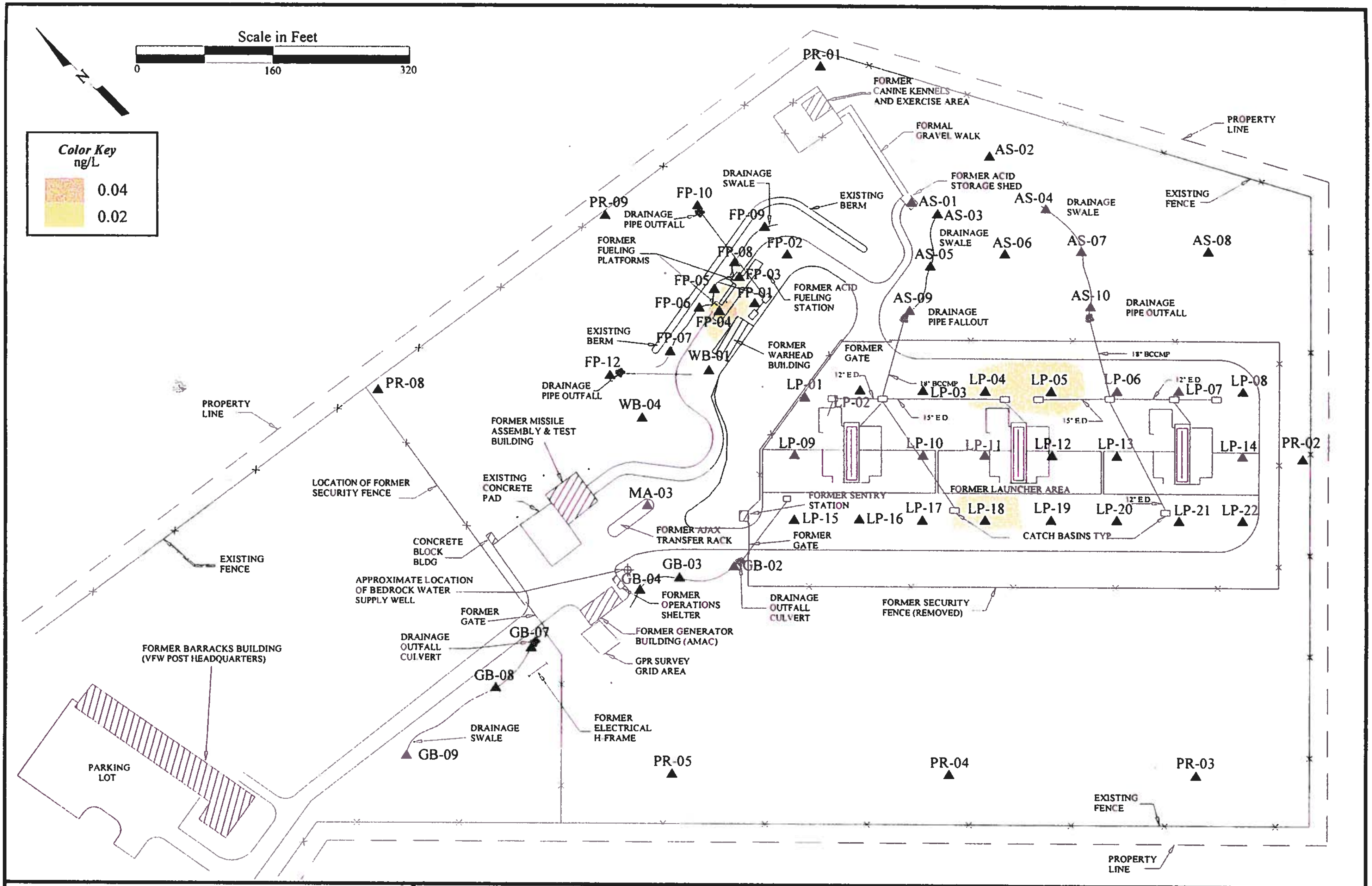
BEACON
ENVIRONMENTAL SERVICES

PR-05
▲ EMFLUX Sample Point Location

Note: Sixteen sample locations were omitted (see Section 3).

Figure 4-3
Tetrachloroethene

Nike Missile Site
Caribou, ME



BEACON
ENVIRONMENTAL SERVICES

PR-05
▲ EMFLUX Sample Point Location

Note: Sixteen sample locations were omitted (see Section 3).

Figure 4-4
1,2,4-Trimethylbenzene

Nike Missile Site
Caribou, ME

Table A.1-2
Soil Sample Analytical Results - October 1999 - VOCs
LO-58
Caribou, ME

Compound (µg/kg)	**MEDEP Remedial Action Guideline**	**SB-01**	**SB-04**	**SB-04 Dup**	**SB-09**	**SB-10**	**SB-11**	**SB-13**	**SB-16**	**SB-20**	**SB-21**	**SB-22**	**SB-27**	**SB-29**
1,1,1,2-Tetrachloroethane	660,000	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,1,1-Trichloroethane	260,000	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,1,2,2-Tetrachloroethane	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,1,2-Trichloroethane	3,000	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,1-Dichloroethane	645,000	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,1-Dichloroethene	200	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,1-Dichloropropene	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,2,3-Trichlorobenzene	--	10 U	11.4 U	8.9 U	7.2 U	7 U	9.8 U	7.8 U	7 U	7.5 U	6.5 U	9.2 U	8.3 U	8.1 U
1,2,3-Trichloropropane	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,2,4-Trichlorobenzene	540,000	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,2,4-Trimethylbenzene	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,2-Dibromo-3-Chloropropane	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,2-Dibromoethane	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,2-Dichlorobenzene	2,670,000	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,2-Dichloroethane	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,2-Dichloropropane	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,3,5-Trimethylbenzene	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,3-Dichlorobenzene	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,3-Dichloropropane	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
1,4-Dichlorobenzene	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
2,2-Dichloropropane	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
2-Butanone	10,000,000	40 U	45.4 U	35.6 U	28.7 U	27.9 U	39.4 U	31.1 U	28.1 U	29.9 U	25.9 U	36.9 U	33.1 U	32.2 U
2-Chlorotoluene	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
2-Hexanone	--	25 U	28.4 U	22.2 U	17.9 U	17.4 U	24.6 U	19.5 U	17.5 U	18.7 U	16.2 U	23 U	20.7 U	20.1 U
4-Chlorotoluene	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
4-Methyl-2-Pentanone	--	25 U	28.4 U	22.2 U	17.9 U	17.4 U	24.6 U	19.5 U	17.5 U	18.7 U	16.2 U	23 U	20.7 U	20.1 U
Acetone	475,000	55.1	26.7 J	24.7 J	6.8 J	23 J	18.3 J	8.3 J	9.7 J	19.3 J	25.9 U	31.6 J	24 J	30
Benzene	5,000	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Bromobenzene	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Bromochloromethane	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Bromodichloromethane	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Bromoform	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Bromomethane	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Carbon Tetrachloride	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Chlorobenzene	310,000	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Chloroethane	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Chloroform	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Chloromethane	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U

Table A.1-2
Soil Sample Analytical Results - October 1999 - VOCs
LO-58
Caribou, ME

Compound (µg/kg)	**MEDEP Remedial Action Guideline**	**SB-01**	**SB-04**	**SB-04 Dup**	**SB-09**	**SB-10**	**SB-11**	**SB-13**	**SB-16**	**SB-20**	**SB-21**	**SB-22**	**SB-27**	**SB-29**
cis-1,2-Dichloroethene	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
cis-1,3-Dichloropropene	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Dibromochloromethane	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Dibromomethane	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Dichlorodifluoromethane	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Ethylbenzene	1,670,000	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Hexachlorobutadiene	--	10 U	11.4 U	8.9 U	7.2 U	7 U	9.8 U	7.8 U	7 U	7.5 U	6.5 U	9.2 U	8.3 U	8.1 U
Isopropylbenzene	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Methyl tert-Butyl Ether (MTBE)	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Methylene Chloride	13,000	5 U	4.3 JTB	1.1 JTB	1.5 JTB	2.1 JTB	3.7 JTB	1.6 JTB	1.5 JTB	2.8 JTB	1.6 JTB	2.2 JTB	2.8 JTB	2 JTB
n-Butylbenzene	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
n-Propylbenzene	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Naphthalene	245,000	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
sec-Butylbenzene	--	10 U	11.4 U	8.9 U	7.2 U	7 U	9.8 U	7.8 U	7 U	7.5 U	6.5 U	9.2 U	8.3 U	8.1 U
Styrene	--	10 U	11.4 U	8.9 U	7.2 U	7 U	9.8 U	7.8 U	7 U	7.5 U	6.5 U	9.2 U	8.3 U	8.1 U
tert-Butylbenzene	--	10 U	11.4 U	8.9 U	7.2 U	7 U	9.8 U	7.8 U	7 U	7.5 U	6.5 U	9.2 U	8.3 U	8.1 U
Tetrachloroethene	3,000	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Tetrahydrofuran	--	10 U	11.4 U	8.9 U	7.2 U	7 U	9.8 U	7.8 U	7 U	7.5 U	6.5 U	9.2 U	8.3 U	8.1 U
Toluene	2,390,000	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
trans-1,2-Dichloroethene	135,000	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
trans-1,3-Dichloropropene	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Trichloroethene	19,000	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	1.1 J	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Trichlorofluoromethane	--	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Vinyl Acetate	--	10 U	11.4 U	8.9 U	7.2 U	7 U	9.8 U	7.8 U	7 U	7.5 U	6.5 U	9.2 U	8.3 U	8.1 U
Vinyl Chloride	40	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Xylene O	10,000,000 (total)	5 U	5.7 U	4.4 U	3.6 U	3.5 U	4.9 U	3.9 U	3.5 U	3.7 U	3.2 U	4.6 U	4.1 U	4 U
Xylene P,M	10,000,000 (total)	10 U	11.4 U	8.9 U	7.2 U	7 U	9.8 U	7.8 U	7 U	7.5 U	6.5 U	9.2 U	8.3 U	8.1 U

Notes:

U = Not detected above associated Method Reporting Limit (MRL).

J = Reported below MRL; Estimated value.

TB = Methylene chloride was deteted in the trip blank; Therefore, all results in the samples for MeCl$_2$ which are below the action level (4.8 x 5 = 24.0) have been qualified as "TB."

-- = Value not listed in MEDEP Remedial Action Guidelines, Revised 6/1/98.

Table A.1-2
Soil Sample Analytical Results - October 1999 - VOCs
LO-58
Caribou, ME

Compound (µg/kg)	MEDEP Remedial Action Guideline	SB-29 Dup	SB-34	SB-37	SB-39	TB-01	TB-02
1,1,1,2-Tetrachloroethane	660,000	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,1,1-Trichloroethane	260,000	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,1,2,2-Tetrachloroethane	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,1,2-Trichloroethane	3,000	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,1-Dichloroethane	645,000	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,1-Dichloroethene	200	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,1-Dichloropropene	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,2,3-Trichlorobenzene	--	9 U	8.1 U	9.3 U	8.5 U	10 U	10 U
1,2,3-Trichloropropane	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,2,4-Trichlorobenzene	540,000	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,2,4-Trimethylbenzene	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,2-Dibromo-3-Chloropropane	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,2-Dibromoethane	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,2-Dichlorobenzene	2,670,000	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,2-Dichloroethane	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,2-Dichloropropane	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,3,5-Trimethylbenzene	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,3-Dichlorobenzene	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,3-Dichloropropane	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
1,4-Dichlorobenzene	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
2,2-Dichloropropane	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
2-Butanone	10,000,000	36.1 U	32.5 U	37.1 U	33.9 U	40 U	40 U
2-Chlorotoluene	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
2-Hexanone	--	22.6 U	20.3 U	23.2 U	21.2 U	25 U	25 U
4-Chlorotoluene	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
4-Methyl-2-Pentanone	--	22.6 U	20.3 U	23.2 U	21.2 U	25 U	25 U
Acetone	475,000	40	47.6	19.4 J	30	40 U	40 U
Benzene	5,000	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Bromobenzene	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Bromochloromethane	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Bromodichloromethane	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Bromoform	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Bromomethane	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Carbon Tetrachloride	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Chlorobenzene	310,000	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Chloroethane	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Chloroform	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Chloromethane	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U

Table A.1-2
Soil Sample Analytical Results - October 1999 - VOCs
LO-58
Caribou, ME

Compound (µg/kg)	MEDEP Remedial Action Guideline	SB-29 Dup	SB-34	SB-37	SB-39	TB-01	TB-02
cis-1,2-Dichloroethene	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
cis-1,3-Dichloropropene	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Dibromochloromethane	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Dibromomethane	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Dichlorodifluoromethane	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Ethylbenzene	1,670,000	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Hexachlorobutadiene	--	9 U	8.1 U	9.3 U	8.5 U	10 U	10 U
Isopropylbenzene	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Methyl tert-Butyl Ether (MTBE)	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Methylene Chloride	13,000	2.5 JTB	1.9 JTB	2.4 JTB	2.4 JTB	4.8 J	1.7 J
n-Butylbenzene	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
n-Propylbenzene	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Naphthalene	245,000	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
sec-Butylbenzene	--	9 U	8.1 U	9.3 U	8.5 U	10 U	10 U
Styrene	--	9 U	8.1 U	9.3 U	8.5 U	10 U	10 U
tert-Butylbenzene	--	9 U	8.1 U	9.3 U	8.5 U	10 U	10 U
Tetrachloroethene	3,000	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Tetrahydrofuran	--	9 U	8.1 U	9.3 U	8.5 U	10 U	10 U
Toluene	2,390,000	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
trans-1,2-Dichloroethene	135,000	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
trans-1,3-Dichloropropene	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Trichloroethene	19,000	4.5 U	9	4.6 U	4.2 U	5 U	5 U
Trichlorofluoromethane	--	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Vinyl Acetate	--	9 U	8.1 U	9.3 U	8.5 U	10 U	10 U
Vinyl Chloride	40	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Xylene O	10,000,000 (total)	4.5 U	4.1 U	4.6 U	4.2 U	5 U	5 U
Xylene P,M	10,000,000 (total)	9 U	8.1 U	9.3 U	8.5 U	10 U	10 U

Notes:

U = Not detected above associated Method Reporting Limit (MRL).

J = Reported below MRL; Estimated value.

TB = Methylene chloride was deteted in the trip blank; Therefore, all results in the samples for $MeCl_2$ which are below the action level (4.8 x 5 = 24.0) have been qualified as "TB."

-- = Value not listed in MEDEP Remedial Action Guidelines, Revised 6/1/98.

Table A.1-3
Soil Sample Analytical Results - October 1999 - DRO/GRO
LO-58
Caribou, ME

Compound (mg/kg)	**MEDEP Remedial Action Guideline**	**SB-01**	**SB-04**	**QC-02**	**SB-09**	**SB-10**	**SB-11**	**SB-13**	**SB-16**	**SB-20**	**SB-21**	**SB-22**	**SB-27**	**SB-29**
TPH - Gasoline Range Organics (GRO)	5	1.9 U	2.2 U	2.5 U	1.7 U	1.4 U	2.2 U	1.4 U	1.4 U	1.3 U	1.5 U	2.1 U	1.2 U	1.6 U
TPH - Diesel Range Organics (DRO)	10	8 UJ	8 J	8 UJ	10 J	10 U	8 UJ	**36**	9 U	10 U	7 UJ	7 UJ	6 UJ	7 UJ

Notes:
TPH = Total Petroleum Hydrocarbons
GRO = Gasoline Range Organics
DRO = Diesel Range Organics

U = Not detected above associated Method Reporting Limit (MRL).
J = Reported below MRL; Estimated value.
UJ = Nondetect qualified as estimated due to result below MRL.
BOLD value indicates that the concentration is above MEDEP Remedial Action Guideline (6/1/98).
-- = Trip Blanks were not submitted for analysis of TPH-DRO.

Table A.1-3
Soil Sample Analytical Results - October 1999 - DRO/GRO
LO-58
Caribou, ME

Compound (mg/kg)	MEDEP Remedial Action Guideline	QC-01	SB-34	SB-37	SB-39	TB-01	TB-02
TPH - Gasoline Range Organics (GRO)	5	1.9 U	1.7 U	1.9 U	1.8 U	2 U	2 U
TPH - Diesel Range Organics (DRO)	10	8 UJ	8 UJ	8 UJ	7 UJ	--	--

Notes:

TPH = Total Petroleum Hydrocarbons
GRO = Gasoline Range Organics
DRO = Diesel Range Organics

U = Not detected above associated Method Reporting Limit (MRL).
J = Reported below MRL; Estimated value.
UJ = Nondetect qualified as estimated due to result below MRL.
BOLD value indicates that the concentration is above MEDEP Remedial Action Guideline (6/1/98).
-- = Trip Blanks were not submitted for analysis of TPH-DRO.

Table A.1-4
Soil Sample Analytical Results - October 2000 to May 2001 - VOCs and DRO/GRO
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	SB-41 (0-4 ft)	SB-42 (0-4 ft)	SB-43 (0-4 ft)	SB-44 (0-4 ft)	SB-44 Dup (0-4 ft)	SB-45 (0-4 ft)	SB-46 (0-4 ft)	SB-47 (0-4 ft)	SB-48 (0-4 ft)	SB-49 (0-4 ft)	SB-49 Dup (0-4 ft)	SB-50 (0-4 ft)	SB-51 (0-4 ft)	SB-52 (0-4 ft)	SB-53 (0-4 ft)	SB-54 (0-4 ft)
Volatile Organic Compounds (VOCs) (µg/kg)																	
1,1,1-Trichloroethane	2,000	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
1,1,2-Trichloroethane	20	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
1,1,1,2-Tetrachlorothane	660,000	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
1,1,2,2-Tetrachloroethane	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
1,1-Dichloroethane	23,000	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
1,1-Dichloroethene	60	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
1,2-Dichloroethane	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
cis-1,2-Dichloroethene	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
trans-1,2-Dichloroethene	700	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
1,2-Dichloropropane	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
1,3-Dichloropropane	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
2,2-Dichloropropane	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
1,1-Dichloropropene	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
cis-1,3-Dichloropropene	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
trans-1,3-Dichloropropene	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
2-Butanone	10,000,000	12	8 U	13	12 U	8 U	15	10 U	8 U	11 U	26 J	14 UJ	7 U	9 U	9 U	9 U	14
2-Hexanone	--	2 U	8 U	9 U	12 U	8 U	8 U	10 U	8 U	11 U	13 U	14 U	7 U	9 U	9 U	9 U	8 U
Acetone	16,000	146	8 U	113	72 TB	26 TB	238	60 TB	66 TB	53 TB	210 J	87 JTB	7 U	21	26 TB	30 TB	71 TB
Benzene	30	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
Bromochloromethane	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
Bromodichloromethane	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
Bromobenzene	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
Bromoform	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
Bromomethane	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
n-Butylbenzene	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
sec-Butylbenzene	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
tert-Butylbenzene	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
Carbon Disulfide	--	1 J	2 U	3	2 U	2 U	2 U	2 U	3	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
Carbon Tetrachloride	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
Chlorobenzene	1,000	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
Chloroethane	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
Chloroform	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
Chloromethane	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
2-Chlorotoluene	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
4-Chlorotoluene	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
Dibromochloromethane	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
1,2-Dibromo-3-chloropropane	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
1,2-Dibromoethane(EDB)	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
Dibromomethane	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
1,2-Dichlorobenzene	17,000	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
1,3-Dichlorobenzene	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
1,4-Dichlorobenzene	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
Dichlorodifluoromethane	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U
Ethylbenzene	13,000	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	3 U	3 U	1 U	2 U	2 U	2 U	2 U

Table A.1-4
Soil Sample Analytical Results - October 2000 to May 2001 - VOCs and DRO/GRO
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	SB-41 (0-4 ft)	SB-42 (0-4 ft)	SB-43 (0-4 ft)	SB-44 (0-4 ft)	SB-44 Dup (0-4 ft)	SB-45 (0-4 ft)	SB-46 (0-4 ft)	SB-47 (0-4 ft)	SB-48 (0-4 ft)	SB-49 (0-4 ft)	SB-49 Dup (0-4 ft)	SB-50 (0-4 ft)	SB-51 (0-4 ft)	SB-52 (0-4 ft)	SB-53 (0-4 ft)	SB-54 (0-4 ft)
Hexachlorobutadiene	--	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
Isopropylbenzene	--	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
p-Isopropyltoluene	--	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
Methylene Chloride	20	*6* U	*4* U	*4* U	*6* U	*4* U	*4* U	*5* U	*4* U	*5* U	*6* U	*7* U	*4* U	*4* U	*5* U	*5* U	*4* U
4-Methyl-2-pentanone	--	*11* U	*8* U	*9* U	*12* U	*8* U	*8* U	*10* U	*8* U	*11* U	*13* U	*14* U	*7* U	*9* U	*9* U	*9* U	*8* U
MTBE	--	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
Naphthalene	84,000	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
n-Propylbenzene	--	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
Styrene	--	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
Tetrachloroethene	60	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
Tetrahydrofuran	--	*11* U	*8* U	*9* U	*12* U	*8* U	*8* U	*10* U	*8* U	*11* U	*13* U	*14* U	*7* U	*9* U	*9* U	*9* U	*8* U
Toluene	12,000	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
1,3,5-Trichlorobenzene	--	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
1,2,4-Trichlorobenzene	5,000	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
Trichloroethene	60	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
Trichlorofluoromethane	--	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
1,2,3-Trichloropropane	--	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
1,2,4-Trimethylbenzene	--	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
1,3,5-Trimethylbenzene	--	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
Vinyl Acetate	--	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
Vinyl Chloride	10	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
o-Xylene	--	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
m,p-Xylene	--	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*2* U	*3* U	*3* U	*1* U	*2* U	*2* U	*2* U	*2* U
Total Petroleum Hydrocarbons (TPH) (mg/kg)																	
TPH-DRO	10	*6* U	*6* U	*6* U	*6* U	*6* U	*11*	*7* U	*6* U	*6* U	*6* U	*6* U	*6* U	*6* U	*6* U	*6* U	*24*
TPH-GRO	5	*1.3* U	*1.1* U	*1* U	*1.2* U	*1.5* U	*1.1* U	*1.5* U	*1.3* U	*1.1* U	*1* U	*1.3* U	*1.1* U	*1* U	*0.9* U	*1.2* U	*1.1* U

*For soil VOCs, Regulatory Criteria values are "Remedial Action Guidelines (RAGs) - Groundwater Guideline" (MEDEP May 20, 1997). For those compounds where a groundwater Guideline value was not applicable (i.e., 1,1,1,2-tetrachloroethane and 2-butanone), the "Direct Contact Guideline" was substituted.
-- = No published "Direct Contact Guideline" or RAG exists for this compound.
U = Not detected at associated reporting limit.

J/UJ = Estimated due to field duplicate criteria not being met.
Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEDEP RAG.
Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEDEP RAG.

Table A.1-4
Soil Sample Analytical Results - October 2000 to May 2001 - VOCs and DRO/GRO
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	SB-55 (0-4 ft)	SB-56 (0-4 ft)
Volatile Organic Compounds (VOCs) (µg/kg)			
1,1,1-Trichloroethane	2,000	*1* U	*2* U
1,1,2-Trichloroethane	20	*1* U	*2* U
1,1,1,2-Tetrachlorothane	660,000	*1* U	*2* U
1,1,2,2-Tetrachloroethane	--	*1* U	*2* U
1,1-Dichloroethane	23,000	*1* U	*2* U
1,1-Dichloroethene	60	*1* U	*2* U
1,2-Dichloroethane	--	*1* U	*2* U
cis-1,2-Dichloroethene	--	*1* U	*2* U
trans-1,2-Dichloroethene	700	*1* U	*2* U
1,2-Dichloropropane	--	*1* U	*2* U
1,3-Dichloropropane	--	*1* U	*2* U
2,2-Dichloropropane	--	*1* U	*2* U
1,1-Dichloropropene	--	*1* U	*2* U
cis-1,3-Dichloropropene	--	*1* U	*2* U
trans-1,3-Dichloropropene	--	*1* U	*2* U
2-Butanone	10,000,000	*7* U	*10* U
2-Hexanone	--	*7* U	*10* U
Acetone	16,000	*36* TB	*10* U
Benzene	30	*1* U	*2* U
Bromochloromethane	--	*1* U	*2* U
Bromodichloromethane	--	*1* U	*2* U
Bromobenzene	--	*1* U	*2* U
Bromoform	--	*1* U	*2* U
Bromomethane	--	*1* U	*2* U
n-Butylbenzene	--	*1* U	*2* U
sec-Butylbenzene	--	*1* U	*2* U
tert-Butylbenzene	--	*1* U	*2* U
Carbon Disulfide	--	*1*	*13*
Carbon Tetrachloride	--	*1* U	*2* U
Chlorobenzene	1,000	*1* U	*2* U
Chloroethane	--	*1* U	*2* U
Chloroform	--	*1* U	*2* U
Chloromethane	--	*1* U	*2* U
2-Chlorotoluene	--	*1* U	*2* U
4-Chlorotoluene	--	*1* U	*2* U
Dibromochloromethane	--	*1* U	*2* U
1,2-Dibromo-3-chloropropane	--	*1* U	*2* U
1,2-Dibromoethane(EDB)	--	*1* U	*2* U
Dibromomethane	--	*1* U	*2* U
1,2-Dichlorobenzene	17,000	*1* U	*2* U
1,3-Dichlorobenzene	--	*1* U	*2* U
1,4-Dichlorobenzene	--	*1* U	*2* U
Dichlorodifluoromethane	--	*1* U	*2* U
Ethylbenzene	13,000	*1* U	*2* U

Table A.1-4
Soil Sample Analytical Results - October 2000 to May 2001 - VOCs and DRO/GRO
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	**SB-55 (0-4 ft)**	**SB-56 (0-4 ft)**
Hexachlorobutadiene	--	*1* U	*2* U
Isopropylbenzene	--	*1* U	*2* U
p-Isopropyltoluene	--	*1* U	*2* U
Methylene Chloride	20	*4* U	*5* U
4-Methyl-2-pentanone	--	*7* U	*10* U
MTBE	--	*1* U	*2* U
Naphthalene	84,000	*1* U	*2* U
n-Propylbenzene	--	*1* U	*2* U
Styrene	--	*1* U	*2* U
Tetrachloroethene	60	*1* U	*2* U
Tetrahydrofuran	--	*7* U	*10* U
Toluene	12,000	*1* U	*2* U
1,3,5-Trichlorobenzene	--	*1* U	*2* U
1,2,4-Trichlorobenzene	5,000	*1* U	*2* U
Trichloroethene	60	*1* U	*2* U
Trichlorofluoromethane	--	*1* U	*2* U
1,2,3-Trichloropropane	--	*1* U	*2* U
1,2,4-Trimethylbenzene	--	*1* U	*2* U
1,3,5-Trimethylbenzene	--	*1* U	*2* U
Vinyl Acetate	--	*1* U	*2* U
Vinyl Chloride	10	*1* U	*2* U
o-Xylene	--	*1* U	*2* U
m,p-Xylene	--	*1* U	*2* U
Total Petroleum Hydrocarbons (TPH) (mg/kg)			
TPH-DRO	10	*133*	*6* U
TPH-GRO	5	*0.8* U	*1.4* U

*For soil VOCs, Regulatory Criteria values are "Remedial Action Guidelines (RAGs) - Groundwater Guideline" (MEDEP May 20, 1997). For those compounds where a groundwater Guideline value was not applicable (i.e., 1,1,1,2-tetrachloroethane and 2-butanone), the "Direct Contact Guideline" was substituted.
-- = No published "Direct Contact Guideline" or RAG exists for this compound.
U = Not detected at associated reporting limit.

J/UJ = Estimated due to field duplicate criteria not being met.
Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEDEP RAG.
Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEDEP RAG.

Table A.1-5
Groundwater Sample Analytical Results - October 2000 to May 2004 - VOCs and DRO/GRO - MW-01
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	MW-01 10/26/2000	5/16/2001	12/5/2002	4/23/2003	9/19/2003	5/11/2004
Volatile Organic Compounds (VOCs) (µg/L)							
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	13	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	1,440	5 U	NA	NA	5 U	5 U	NA
2-Hexanone	--	5 U	NA	NA	5 U	5 U	5 U
Acetone	700	5 U	NA	NA	5 U	5 U	5 U
Benzene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	44	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Disulfide	--	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	57	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.2	0.5 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dibromoethane (EDB)	0.004	0.5 U	0.02 U	0.005 U	0.005 U	0.005 U	0.005 U
Dibromomethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	63	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	60	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table A.1-5
Groundwater Sample Analytical Results - October 2000 to May 2004 - VOCs and DRO/GRO - MW-01
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	MW-01					
		10/26/2000	**5/16/2001**	**12/5/2002**	**4/23/2003**	**9/19/2003**	**5/11/2004**
1,4-Dichlorobenzene	21	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	47	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Methyl-2-pentanone	--	5 U	NA	NA	NA	NA	NA
MTBE	35	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	14	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrahydrofuran	70	5 U	NA	NA	2.5 U	2.5 U	2.5 U
Toluene	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trichlorobenzene	40	0.5 U	NA	NA	0.5 U	0.5 U	NA
1,2,4-Trichlorobenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	2,100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.05	0.5 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2,4-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	--	0.5 U	NA	NA	NA	NA	NA
o-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.15	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Petroleum Hydrocarbons (TPH) (mg/L)							
TPH-DRO	0.05	0.05 U	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U
TPH-GRO	0.05	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U

*For groundwater VOCs, Regulatory Criteria values are the "Maximum Exposure Guidelines (MEGs) for Drinking Water" (MEDEP), 1992) or EPA Maximum Contaminant Level (MCL), whichever is less.
-- = No published MEG exists for compound
U = Not detected at associated reporting limit.
J = Concentration is estimated
UJ = DRO non-detect results are estimated due to low surrogate recovery.
Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEG.
Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEG.

Table A.1-6
Groundwater Sample Analytical Results - October 2000 to May 2004 - VOCs and DRO/GRO - MW-02
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	**MW-02**					
		10/26/2000	**5/15/2001**	**12/5/2002**	**4/22/2003**	**9/19/2003**	**5/11/2004**
Volatile Organic Compounds (VOCs) (µg/L)							
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	13	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	1,440	5 U	NA	NA	5 U	5 U	NA
2-Hexanone	--	5 U	NA	NA	5 U	5 U	5 U
Acetone	700	5 U	NA	NA	5 U	5 U	5 U
Benzene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	44	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Disulfide	--	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	57	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.2	0.5 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dibromoethane (EDB)	0.004	0.5 U	0.02 U	0.005 U	0.005 U	0.005 U	0.005 U
Dibromomethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	63	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	60	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table A.1-6
Groundwater Sample Analytical Results - October 2000 to May 2004 - VOCs and DRO/GRO - MW-02
LO-58
Caribou, ME

	MEDEP Remedial	MW-02					
	Action Guideline*	10/26/2000	5/15/2001	12/5/2002	4/22/2003	9/19/2003	5/11/2004
1,4-Dichlorobenzene	21	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	47	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Methyl-2-pentanone	--	5 U	NA	NA	NA	NA	NA
MTBE	35	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	14	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrahydrofuran	70	5 U	NA	NA	2.5 U	2.5 U	2.5 U
Toluene	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trichlorobenzene	40	0.5 U	NA	NA	0.5 U	0.5 U	NA
1,2,4-Trichlorobenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	2,100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.05	0.5 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2,4-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	--	0.5 U	NA	NA	NA	NA	NA
o-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.15	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Petroleum Hydrocarbons (TPH) (mg/L)							
TPH-DRO	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
TPH-GRO	0.05	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U

*For groundwater VOCs, Regulatory Criteria values are the "Maximum Exposure Guidelines (MEGs) for Drinking Water" (MEDEP), 1992) or EPA Maximum Contaminant Level (MCL), whichever is less.
-- = No published MEG exists for compound
U = Not detected at associated reporting limit.
J = Concentration is estimated
UJ = DRO non-detect results are estimated due to low surrogate recovery.
Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEG.
Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEG.

Table A.1-7
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-03
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	**MW-03**										
		10/26/2000	**5/15/2001**	**12/5/2002**	**4/23/2003**	**9/18/2003**	**5/11/2004**	**9/30/2004**	**4/25/2005**	**9/14/2005**	**5/23/2006**	**5/23/2007**
Volatile Organic Compounds (VOCs) (µg/L)												
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	13	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	*0.79*	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	1,440	5 U	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA
2-Hexanone	--	5 U	NA	NA	5 U	5 U	5 U	NA	NA	NA	NA	NA
Acetone	700	5 U	NA	NA	5 U	5 U	5 U	NA	NA	NA	NA	NA
Benzene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	44	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Disulfide	--	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	57	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.2	0.5 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U
1,2-Dibromoethane (EDB)	0.004	0.5 U	0.02 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Dibromomethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	63	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	60	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	21	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table A.1-7
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-03
LO-58
Caribou, ME

	MEDEP Remedial						**MW-03**					
	Action Guideline*	**10/26/2000**	**5/15/2001**	**12/5/2002**	**4/23/2003**	**9/18/2003**	**5/11/2004**	**9/30/2004**	**4/25/2005**	**9/14/2005**	**5/23/2006**	**5/23/2007**
Isopropylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	47	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Methyl-2-pentanone	--	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MTBE	35	0.5 U	*0.46* J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	14	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrahydrofuran	70	5 U	NA	NA	2.5 U	2.5 U	2.5 U	2.5 U	*10*	2.5 U	2.5 U	2.5 U
Toluene	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trichlorobenzene	40	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	0.5 U	0.5 U	0.5 U	*0.76*	0.5 U	0.5 U	*0.29* J	*1.1*	0.5 U	*0.45* J	0.5 U
Trichlorofluoromethane	2,100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.05	0.5 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	--	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.15	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Petroleum Hydrocarbons (TPH) (mg/L)												
TPH-DRO	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
TPH-GRO	0.05	0.01 U	***0.068***	0.01 U	0.01 U	0.01 U	*0.01*	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
EPH (µg/L)												
C11-C22 Aromatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C19-C36 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C9-C18 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VPH (µg/L)												
C5-C8 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C9-C10 Aromatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C9-C12 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

*For groundwater VOCs, Regulatory Criteria values are the "Maximum Exposure Guidelines (MEGs) for Drinking Water" (MEDEP), 1992) or EPA Maximum Contaminant Level (MCL), whichever is less.
-- = No published MEG exists for compound
U = Not detected at associated reporting limit.
J = Concentration is estimated
UJ = DRO non-detect results are estimated due to low surrogate recovery.
Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEG.

Table A.1-7
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-03
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	MW-03 10/26/2000	5/15/2001	12/5/2002	4/23/2003	9/18/2003	5/11/2004	9/30/2004	4/25/2005	9/14/2005	5/23/2006	5/23/2007

Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEG.

Table A.1-7
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-03
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	MW-03									
		10/25/2007	4/30/2008	10/29/2008	5/1/2009	10/31/2009	5/26/2010	11/10/2010	5/24/2011	11/15/2011	5/22/2012
Volatile Organic Compounds (VOCs) (µg/L)											
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	13	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	1,440	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	700	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	44	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Disulfide	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	57	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	0.2	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dibromoethane (EDB)	0.004	0.005 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibromomethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	63	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	60	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	21	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table A.1-7
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-03
LO-58
Caribou, ME

	MEDEP Remedial	MW-03									
	Action Guideline*	10/25/2007	4/30/2008	10/29/2008	5/1/2009	10/31/2009	5/26/2010	11/10/2010	5/24/2011	11/15/2011	5/22/2012
Isopropylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	47	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
4-Methyl-2-pentanone	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MTBE	35	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
Naphthalene	14	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrahydrofuran	70	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
Toluene	1,000	0.5 U	0.5 U	*0.3* J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trichlorobenzene	40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	0.5 U	0.5 U	*0.8*	0.5 U	*0.4* J	0.5 U	*0.34* J	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	2,100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.05	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.01 U	0.01 U	0.01 U
1,2,4-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	10,000 (total)	0.5 U	0.5 U	*0.3* J	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	1 U
Vinyl Chloride	0.15	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Petroleum Hydrocarbons (TPH) (mg/L)											
TPH-DRO	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA	NA
TPH-GRO	0.05	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 UJ	NA	NA	NA	NA
EPH (µg/L)											
C11-C22 Aromatic Hydrocarbons		NA	NA	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U
C19-C36 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U
C9-C18 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U
VPH (µg/L)											
C5-C8 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
C9-C10 Aromatic Hydrocarbons		NA	NA	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
C9-C12 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U

*For groundwater VOCs, Regulatory Criteria values are the "Maximum Exposure Guidelines (MEGs) for Drinking Water" (MEDEP), 1992) or EPA Maximum Contaminant Level (MCL), whichever is less.

-- = No published MEG exists for compound

U = Not detected at associated reporting limit.

J = Concentration is estimated

UJ = DRO non-detect results are estimated due to low surrogate recovery.

Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEG.

Table A.1-7
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-03
LO-58
Caribou, ME

		MW-03									
	MEDEP Remedial Action Guideline*	**10/25/2007**	**4/30/2008**	**10/29/2008**	**5/1/2009**	**10/31/2009**	**5/26/2010**	**11/10/2010**	**5/24/2011**	**11/15/2011**	**5/22/2012**

Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEG.

Table A.1-8
Groundwater Sample Analytical Results - October 2000 to May 2004 - VOCs and DRO/GRO - MW-04
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	MW-04					
		10/26/2000	5/15/2001	12/5/2002	4/22/2003	9/19/2003	5/11/2004
Volatile Organic Compounds (VOCs) (µg/L)							
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	13	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	1,440	5 U	NA	NA	5 U	5 U	NA
2-Hexanone	--	5 U	NA	NA	5 U	5 U	5 U
Acetone	700	5 U	NA	NA	5 U	5 U	5 U
Benzene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	44	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Disulfide	--	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	57	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.2	0.5 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dibromoethane (EDB)	0.004	0.5 U	0.02 U	0.005 U	0.005 U	0.005 U	0.005 U
Dibromomethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	63	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	60	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table A.1-8
Groundwater Sample Analytical Results - October 2000 to May 2004 - VOCs and DRO/GRO - MW-04
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	MW-04					
		10/26/2000	5/15/2001	12/5/2002	4/22/2003	9/19/2003	5/11/2004
1,4-Dichlorobenzene	21	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	47	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Methyl-2-pentanone	--	5 U	NA	NA	NA	NA	NA
MTBE	35	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	14	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrahydrofuran	70	5 U	NA	NA	2.5 U	2.5 U	2.5 U
Toluene	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trichlorobenzene	40	0.5 U	NA	NA	0.5 U	0.5 U	NA
1,2,4-Trichlorobenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	2,100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.05	0.5 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2,4-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	--	0.5 U	NA	NA	NA	NA	NA
o-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.15	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Petroleum Hydrocarbons (TPH) (mg/L)							
TPH-DRO	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
TPH-GRO	0.05	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U

*For groundwater VOCs, Regulatory Criteria values are the "Maximum Exposure Guidelines (MEGs) for Drinking Water" (MEDEP), 1992) or EPA Maximum Contaminant Level (MCL), whichever is less.
-- = No published MEG exists for compound
U = Not detected at associated reporting limit.
J = Concentration is estimated
UJ = DRO non-detect results are estimated due to low surrogate recovery.
Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEG.
Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEG.

Table A.1-9
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-05
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	**MW-05**												
		10/26/2000	**5/16/2001**	**12/5/2002**	**4/22/2003**	**9/18/2003**	**5/11/2004**	**9/30/2004**	**4/25/2005**	**9/14/2005**	**5/23/2006**	**10/24/2006**	**5/24/2007**	**10/25/2007**
Volatile Organic Compounds (VOCs) (µg/L)														
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	13	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	1,440	5 U	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	5 U	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	700	5 U	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	44	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	--	3.7	2.5	3.6	1.7	3	2.5	3	1.2	2.9	1.3	2.5	1.2	3
tert-Butylbenzene	--	1.9	1.2	1.9	1	1.5	1.3	1.4	0.62	1.5	0.71	1.5	0.7	1.7
Carbon Disulfide	--	0.5 U	NA	NA	0.44 J	0.44 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	57	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.2	0.5 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dibromoethane (EDB)	0.004	0.5 U	0.02 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.006 U	0.005 U	0.005 U	0.005 U	0.005 U
Dibromomethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	63	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	60	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	21	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	70	*0.82*	0.5 U	*0.36* J	*0.29* J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table A.1-9
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-05
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	**MW-05**												
		10/26/2000	**5/16/2001**	**12/5/2002**	**4/22/2003**	**9/18/2003**	**5/11/2004**	**9/30/2004**	**4/25/2005**	**9/14/2005**	**5/23/2006**	**10/24/2006**	**5/24/2007**	**10/25/2007**
Isopropylbenzene	--	2.1	0.65	1.3	0.63	0.88	0.79	5.1	0.5	0.69	0.5 J	0.7	0.5	1.7
p-Isopropyltoluene	70	*2.4*	*1*	*1.4*	*0.3* J	*1.2*	*0.9*	*1.4*	*0.28* J	*1.4*	*0.33* J	*0.3* J	*0.4* J	*1.2*
Methylene Chloride	47	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Methyl-2-pentanone	--	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MTBE	35	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	14	*6.1*	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	*1*
n-Propylbenzene	--	1.8	0.81	1.3	0.56	1	0.87	0.92	0.47 J	0.79	0.51	0.5	0.5	1.4
Styrene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrahydrofuran	70	5 U	NA	NA	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Toluene	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trichlorobenzene	40	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	0.5 U	*0.36* J	*0.48* J	*0.38* J	*0.47* J	*0.41* J	*0.44* J	*0.27* J	*0.38* J	*0.34* J	*0.3* J	*0.3* J	*0.4* J
Trichlorofluoromethane	2,100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.05	0.5 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	--	8.5	0.6	2.7	0.67	0.93 J2	0.58	1.1	1.1	0.98	0.66	1.4	0.5 U	0.5 U
1,3,5-Trimethylbenzene	--	1.3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.4 J	5.6
Vinyl Acetate	--	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	*0.6*
m,p-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.15	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Petroleum Hydrocarbons (TPH) (mg/L)														
TPH-DRO	0.05	***0.57***	***0.3***	***0.41***	***0.2***	***0.17***	***0.15***	0.05 U	***0.46***	***0.33***	***0.16***	***0.28*** J1	***0.15***	***0.31***
TPH-GRO	0.05	***0.32***	***0.15***	***0.25***	***0.1***	***0.27***	***0.17***	***0.26***	***0.06***	***0.17*** J1	***0.09***	***0.13***	***0.11***	***0.28***
EPH (µg/L)														
C11-C22 Aromatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C19-C36 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C9-C18 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VPH (µg/L)														
C5-C8 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C9-C10 Aromatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C9-C12 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

*For groundwater VOCs, Regulatory Criteria values are the "Maximum Exposure Guidelines (MEGs) for Drinking Water" (MEDEP), 1992) or EPA Maximum Contaminant Level (MCL), whichever is less.

-- = No published MEG exists for compound

U = Not detected at associated reporting limit.

J = Concentration is estimated

UJ = DRO non-detect results are estimated due to low surrogate recovery.

Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEG.

Table A.1-9
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-05
LO-58
Caribou, ME

	MEDEP Remedial	MW-05												
	Action Guideline*	**10/26/2000**	**5/16/2001**	**12/5/2002**	**4/22/2003**	**9/18/2003**	**5/11/2004**	**9/30/2004**	**4/25/2005**	**9/14/2005**	**5/23/2006**	**10/24/2006**	**5/24/2007**	**10/25/2007**

Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEG.

Table A.1-9
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-05
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	MW-05								
		4/30/2008	10/29/2008	5/1/2009	10/31/2009	5/26/2010	11/1/2010	5/24/2011	11/15/2011	5/22/2012
Volatile Organic Compounds (VOCs) (µg/L)										
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	13	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	1,440	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	700	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	44	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	--	0.5 U	0.3 J	0.4 J	1.2	0.3 J	0.27 J	0.26 J	1.4	1.2
tert-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.8	0.5 U	0.5 U	0.5 U	0.73	0.5
Carbon Disulfide	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	57	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	0.2	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dibromoethane (EDB)	0.004	0.005 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibromomethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	63	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	60	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	21	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table A.1-9
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-05
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	**MW-05** **4/30/2008**	**10/29/2008**	**5/1/2009**	**10/31/2009**	**5/26/2010**	**11/1/2010**	**5/24/2011**	**11/15/2011**	**5/22/2012**
Isopropylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.17 J	0.21 J
p-Isopropyltoluene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	*0.27* J	*0.42* J
Methylene Chloride	47	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
4-Methyl-2-pentanone	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
MTBE	35	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
Naphthalene	14	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 J	0.28 J
Styrene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrahydrofuran	70	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA	NA	NA
Toluene	1,000	0.5 U	*0.4* J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trichlorobenzene	40	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	*0.4* J	*0.4* J	*0.4* J	*0.3* J	*0.3* J	0.5 U	*0.34* J	*0.36* J	*0.29* J
Trichlorofluoromethane	2,100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.05	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.01 U	0.01 U	0.01 U
1,2,4-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.12 J	0.15 J
1,3,5-Trimethylbenzene	--	0.5 U	0.3 J	0.5 U	0.3 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	10,000 (total)	0.5 U	*0.4* J	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	1 U
Vinyl Chloride	0.15	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Petroleum Hydrocarbons (TPH) (mg/L)										
TPH-DRO	0.05	0.05 U	0.05 U	0.05 U	***0.06***	0.05 U	NA	NA	NA	NA
TPH-GRO	0.05	0.01 U	*0.026*	*0.032*	*0.03* j	0.01 UJ	NA	NA	NA	NA
EPH (µg/L)										
C11-C22 Aromatic Hydrocarbons		NA	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U
C19-C36 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U
C9-C18 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U
VPH (µg/L)										
C5-C8 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
C9-C10 Aromatic Hydrocarbons		NA	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	***0.05***
C9-C12 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	0.05 U	***0.07***	***0.08***	***0.07*** J

*For groundwater VOCs, Regulatory Criteria values are the "Maximum Exposure Guidelines (MEGs) for Drinking Water" (MEDEP), 1992) or EPA Maximum Contaminant Level (MCL), whichever is less.

-- = No published MEG exists for compound

U = Not detected at associated reporting limit.

J = Concentration is estimated

UJ = DRO non-detect results are estimated due to low surrogate recovery.

Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEG.

Table A.1-9
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-05
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	MW-05								
		4/30/2008	10/29/2008	5/1/2009	10/31/2009	5/26/2010	11/1/2010	5/24/2011	11/15/2011	5/22/2012

Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEG.

Table A.1-10
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-05 DUP
LO-58
Caribou, ME

	MEDEP Remedial							MW-05 Dup						
	Action Guideline*	10/26/2000	5/16/2001	12/5/2002	4/22/2003	9/18/2003	5/11/2004	9/30/2004	4/25/2005	9/14/2005	5/23/2006	10/24/2006	5/24/2007	10/25/2007
Volatile Organic Compounds (VOCs) (µg/L)														
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	13	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	1,440	5 U	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	5 U	NA	NA	5 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA
Acetone	700	5 U	NA	NA	5 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA
Benzene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	44	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	--	3.9	2.5	3.6	1.7	2.9	2.4	3	1.3	2.9	1.3	2.5	1.3	3.1
tert-Butylbenzene	--	2.1	1.2	1.8	1.1	1.4	1.3	1.4	0.68	1.5	0.76	1.6	0.7	1.7
Carbon Disulfide	--	0.5 U	NA	NA	0.44 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	57	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.2	0.5 U	0.02 U	0.5 U	0.02 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane (EDB)	0.004	0.5 U	0.02 U	0.5 U	0.005 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromomethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	63	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	60	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	21	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	70	*0.73*	0.5 U	*0.36* J	*0.3* J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	*0.5*
Hexachlorobutadiene	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table A.1-10
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-05 DUP
LO-58
Caribou, ME

	MEDEP Remedial	**MW-05 Dup**												
	Action Guideline*	**10/26/2000**	**5/16/2001**	**12/5/2002**	**4/22/2003**	**9/18/2003**	**5/11/2004**	**9/30/2004**	**4/25/2005**	**9/14/2005**	**5/23/2006**	**10/24/2006**	**5/24/2007**	**10/25/2007**
Isopropylbenzene	--	2.1	0.69	1.3	0.68	0.86	0.79	0.76	0.56	0.72	0.53	0.7	0.5 1.7	0.5 U
p-Isopropyltoluene	70	*2.6*	*1.1*	*1.4*	*0.32* J	*1.2*	*0.82*	*1.4*	*0.32* J	*1.4*	*0.34* J	*0.3* J	*0.4* J	*1.2*
Methylene Chloride	47	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Methyl-2-pentanone	--	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MTBE	35	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	14	*5.8*	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	*0.9*
n-Propylbenzene	--	2	0.86	1.3	0.57	0.99	0.82	0.9	0.52	0.82	0.52	0.5	0.5 1.4	0.5 U
Styrene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrahydrofuran	70	5 U	NA	NA	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Toluene	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trichlorobenzene	40	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	0.5 U	*0.38* J	*0.5*	*0.39* J	*0.47* J	*0.38* J	*0.42* J	*0.28* J	*0.37* J	*0.33* J	*0.3* J	*0.3* J	*0.3* J
Trichlorofluoromethane	2,100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.05	0.5 U	0.02 U	0.5 U	0.02 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	--	8.4	0.64	2.6	0.7	0.62 J2	0.44 J	1.1	1.1	1	0.67	1.3	0.4 J	5.4
1,3,5-Trimethylbenzene	--	1.2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.6
Vinyl Acetate	--	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.15	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Petroleum Hydrocarbons (TPH) (mg/L)														
TPH-DRO	0.05	***0.57***	***0.29***	***0.39***	***0.19***	***0.23***	***0.16***	***0.24***	***0.39***	***0.32***	***0.16***	***0.3*** J1	***0.16***	***0.34***
TPH-GRO	0.05	***0.31***	***0.17***	***0.26***	***0.1***	***0.25***	***0.15***	***0.24***	***0.06***	***0.25*** J1	***0.1***	***0.12***	***0.11***	***0.27***
EPH (µg/L)														
C11-C22 Aromatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C19-C36 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C9-C18 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VPH (µg/L)														
C5-C8 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C9-C10 Aromatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C9-C12 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

*For groundwater VOCs, Regulatory Criteria values are the "Maximum Exposure Guidelines (MEGs) for Drinking Water" (MEDEP), 1992) or EPA Maximum Contaminant Level (MCL), whichever is less.

-- = No published MEG exists for compound

U = Not detected at associated reporting limit.

J = Concentration is estimated

UJ = DRO non-detect results are estimated due to low surrogate recovery.

Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEG.

Table A.1-10
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-05 DUP
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	MW-05 Dup												
		10/26/2000	5/16/2001	12/5/2002	4/22/2003	9/18/2003	5/11/2004	9/30/2004	4/25/2005	9/14/2005	5/23/2006	10/24/2006	5/24/2007	10/25/2007

Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEG.

Table A.1-10
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-05 DUP
LO-58
Caribou, ME

	MEDEP Remedial					MW-05 Dup				
	Action Guideline*	4/30/2008	10/29/2008	5/1/2009	10/31/2009	5/26/2010	11/1/2010	5/24/2011	11/15/2011	5/22/2012
Volatile Organic Compounds (VOCs) (µg/L)										
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	13	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	1,440	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	700	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	44	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	--	0.5 U	0.4 J	0.4 J	1.2	0.3 J	0.27 J	0.32 J	1.4	1.1
tert-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.8	0.5 U	0.5 U	0.5 U	0.74	0.46 J
Carbon Disulfide	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	57	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	0.2	0.5 U	0.1 U	0.1 U	0.1 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dibromoethane (EDB)	0.004	0.5 U	0.1 U	0.1 U	0.1 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibromomethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	63	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	60	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	21	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table A.1-10
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-05 DUP
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	MW-05 Dup								
		4/30/2008	**10/29/2008**	**5/1/2009**	**10/31/2009**	**5/26/2010**	**11/1/2010**	**5/24/2011**	**11/15/2011**	**5/22/2012**
Isopropylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.16 J	0.24 J
p-Isopropyltoluene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	*0.28* J	*0.4* J
Methylene Chloride	47	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U
4-Methyl-2-pentanone	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
MTBE	35	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA
Naphthalene	14	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	0.2 J	0.27 J
Styrene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrahydrofuran	70	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA	NA	NA
Toluene	1,000	0.5 U	*0.3* J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trichlorobenzene	40	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	*0.4* J	*0.3* J	*0.4* J	*0.3* J	*0.3* J	*0.32* J	*0.33* J	*0.36* J	*0.32* J
Trichlorofluoromethane	2,100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.05	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2,4-Trimethylbenzene	--	0.5 U	0.3 J	0.5 U	0.3 J	0.5 U	0.5 U	0.5 U	0.12 J	0.17 J
1,3,5-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	10,000 (total)	0.5 U	*0.4* J	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	1 U
Vinyl Chloride	0.15	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Petroleum Hydrocarbons (TPH) (mg/L)										
TPH-DRO	0.05	0.05 U	0.05 U	0.05 U	***0.07***	0.05 U	NA	NA	NA	NA
TPH-GRO	0.05	0.01 U	*0.03*	*0.03*	*0.03* J	0.01 UJ	NA	NA	NA	NA
EPH (µg/L)										
C11-C22 Aromatic Hydrocarbons		NA	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U
C19-C36 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U
C9-C18 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U
VPH (µg/L)										
C5-C8 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
C9-C10 Aromatic Hydrocarbons		NA	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U
C9-C12 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	0.05 U	***0.06***	***0.08***	***0.12*** J

*For groundwater VOCs, Regulatory Criteria values are the "Maximum Exposure Guidelines (MEGs) for Drinking Water" (MEDEP), 1992) or EPA Maximum Contaminant Level (MCL), whichever is less.

-- = No published MEG exists for compound

U = Not detected at associated reporting limit.

J = Concentration is estimated

UJ = DRO non-detect results are estimated due to low surrogate recovery.

Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEG.

Table A.1-10
Groundwater Sample Analytical Results - October 2000 to May 2012 - VOCs, DRO/GRO, EPH/VPH - MW-05 DUP
LO-58
Caribou, ME

	MEDEP Remedial	MW-05 Dup								
	Action Guideline*	4/30/2008	10/29/2008	5/1/2009	10/31/2009	5/26/2010	11/1/2010	5/24/2011	11/15/2011	5/22/2012

Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEG.

Table A.1-11
Drinking Water Sample Analytical Results - October 2000 to April 2008 - VOCs and DRO/GRO - DW-01 (AMAC)
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	**DW-01 (AMAC)**													
		10/26/2000	**5/15/2001**	**12/5/2002**	**4/22/2003**	**9/18/2003**	**5/11/2004**	**9/30/2004**	**4/25/2005**	**9/14/2005**	**5/23/2006**	**10/24/2006**	**5/23/2007**	**10/24/2007**	**4/30/2008**
Volatile Organic Compounds (VOCs) (µg/L)															
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	13	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	*2.8*	*2*	*1.2*	0.5 U	0.5 U	*1.4*	*1.8*	*0.43* J	*2.5*	*0.65*	*0.5*	*0.8*	*3.2*	0.5 U
trans-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	*2.9*	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	1,440	5 U	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	5 U	NA	NA	5 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	700	5 U	NA	NA	5 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	*1.2*	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	44	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Disulfide	--	0.5 U	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	57	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	*24*	*0.99*	*3.2*	*0.7*	0.5 U	*0.3* J	0.5 U
Chloromethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.2	0.5 U	0.5 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dibromoethane (EDB)	0.004	0.5 U	0.5 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.006 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Dibromomethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	63	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	60	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	21	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table A.1-11
Drinking Water Sample Analytical Results - October 2000 to April 2008 - VOCs and DRO/GRO - DW-01 (AMAC)
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	**DW-01 (AMAC)**													
		10/26/2000	**5/15/2001**	**12/5/2002**	**4/22/2003**	**9/18/2003**	**5/11/2004**	**9/30/2004**	**4/25/2005**	**9/14/2005**	**5/23/2006**	**10/24/2006**	**5/23/2007**	**10/24/2007**	**4/30/2008**
Isopropylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	47	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Methyl-2-pentanone	--	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MTBE	35	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	14	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrahydrofuran	70	5 U	NA	NA	NA	NA	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trichlorobenzene	40	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	***5.7***	*4.5*	***6***	*1.2*	***5.8***	***5.8***	***5.5***	*3.5*	*4.3*	*4*	*4*	*4.5*	***8.4***	*1.2*
Trichlorofluoromethane	2,100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.05	0.5 U	0.5 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	--	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	*0.7*
m,p-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.15	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Petroleum Hydrocarbons (TPH) (mg/L)															
TPH-DRO	0.05	0.05 U	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
TPH-GRO	0.05	NS	NS	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 UJ	0.01 UJ	0.01 U	0.01 U

*For groundwater VOCs, Regulatory Criteria values are the "Maximum Exposure Guidelines (MEGs) for Drinking Water" (MEDEP), 1992) or EPA Maximum Contaminant Level (MCL), whichever is less.

-- = No published MEG exists for compound

U = Not detected at associated reporting limit.

J = Concentration is estimated

UJ = DRO non-detect results are estimated due to low surrogate recovery.

Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEG.

Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEG.

Table A.1-12
Drinking Water Sample Analytical Results - October 2000 to April 2008 - VOCs, DRO/GRO, and EPH/VPH - DW-01 Water Supply (AMAC)
LO-58
Caribou, ME

		DW-01 AMAC Water Supply									
	MEDEP Remedial Action Guideline*	**Pre-filter 10/29/2008**	**Pre-filter 5/1/2009**	**Pre-filter 10/30/2009**	**Between-filters 10/30/2009**	**Post-filter 10/30/2009**	**Pre-filter 1/12/2010**	**Between-filters 1/12/2010**	**Post-filter 1/12/2010**	**Pre-filter 5/26/2010**	**Between-filters 5/26/2010**
Volatile Organic Compounds (VOCs) (µg/L)											
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	13	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	0.5 U	*1*	*0.6*	0.5 U	0.5 U	*1.7*	0.5 U	0.5 U	*1.2* J	0.5 U
trans-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	44	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Disulfide	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	57	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.2	0.01 U	0.01 U	0.01 U	NS	NS	NS	NS	NS	0.01 U	NS
1,2-Dibromoethane (EDB)	0.004	0.01 U	0.01 U	0.01 U	NS	NS	NS	NS	NS	0.01 U	NS
Dibromomethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	63	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	60	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	21	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table A.1-12
Drinking Water Sample Analytical Results - October 2000 to April 2008 - VOCs, DRO/GRO, and EPH/VPH - DW-01 Water Supply (AMAC)
LO-58
Caribou, ME

		DW-01 AMAC Water Supply									
	MEDEP Remedial Action Guideline*	**Pre-filter 10/29/2008**	**Pre-filter 5/1/2009**	**Pre-filter 10/30/2009**	**Between-filters 10/30/2009**	**Post-filter 10/30/2009**	**Pre-filter 1/12/2010**	**Between-filters 1/12/2010**	**Post-filter 1/12/2010**	**Pre-filter 5/26/2010**	**Between-filters 5/26/2010**
Methylene Chloride	47	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ
MTBE	35	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	14	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrahydrofuran	70	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Toluene	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	*2*	*4.4*	*4.4* J	0.5 U	0.5 U	*4.6*	0.5 U	0.5 U	*3.8* J	0.5 U
Trichlorofluoromethane	2,100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.05	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.15	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Petroleum Hydrocarbons (TPH) (mg/L)											
TPH-DRO	0.05	0.05 U	0.05 U	0.05 U	NS	NS	NS	NS	NS	0.05 U	NS
TPH-GRO	0.05	0.01 U	0.01 U	0.01 U	NS	NS	NS	NS	NS	0.01 U	NS
EPH (µg/L)											
C11-C22 Aromatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C19-C36 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C9-C18 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VPH (µg/L)											
C5-C8 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C9-C10 Aromatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C9-C12 Aliphatic Hydrocarbons		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

*For groundwater VOCs, Regulatory Criteria values are the "Maximum Exposure Guidelines (MEGs) for Drinking Water" (MEDEP), 1992) or EPA Maximum Contaminant Level (MCL), whichever is less.
-- = No published MEG exists for compound
U = Not detected at associated reporting limit.
J = Concentration is estimated
UJ = DRO non-detect results are estimated due to low surrogate recovery.
Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEG.
Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEG.

Table A.1-12
Drinking Water Sample Analytical Results - October 2000 to April 2008 - VOCs, DRO/GRO, and EPH/VPH - DW-01 Water Supply (AMAC)
LO-58
Caribou, ME

		DW-01 AMAC Water Supply										
	MEDEP Remedial Action Guideline*	**Post-filter 5/26/2010**	**Pre-filter 7/26/2010**	**Between-filters 7/26/2010**	**Post-filter 7/26/2010**	**Pre-Filter 11/2/2010**	**Pre-Filter 2/9/2011**	**Pre-Filter 5/24/2011**	**Pre-Filter 8/30/2011**	**Pre-Filter 11/15/2011**	**Pre-Filter 2/14/2012**	**Pre-Filter 5/22/2012**
Volatile Organic Compounds (VOCs) (µg/L)												
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	*0.12* J	0.5 U
1,1,2-Trichloroethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	13	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	0.5 U	*1.3*	0.5 U	0.5 U	*0.68*	*2.6*	*0.86*	*0.18* J	*1.4*	*4.8* J	*0.8*
trans-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	44	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Disulfide	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	57	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	*0.37* J	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	4	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	0.2	NS	NS	NS	NS	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dibromoethane (EDB)	0.004	NS	NS	NS	NS	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibromomethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	63	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	60	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	21	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table A.1-12
Drinking Water Sample Analytical Results - October 2000 to April 2008 - VOCs, DRO/GRO, and EPH/VPH - DW-01 Water Supply (AMAC)
LO-58
Caribou, ME

		DW-01 AMAC Water Supply										
	MEDEP Remedial Action Guideline*	**Post-filter 5/26/2010**	**Pre-filter 7/26/2010**	**Between-filters 7/26/2010**	**Post-filter 7/26/2010**	**Pre-Filter 11/2/2010**	**Pre-Filter 2/9/2011**	**Pre-Filter 5/24/2011**	**Pre-Filter 8/30/2011**	**Pre-Filter 11/15/2011**	**Pre-Filter 2/14/2012**	**Pre-Filter 5/22/2012**
Methylene Chloride	47	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
MTBE	35	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA
Naphthalene	14	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrahydrofuran	70	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA	NA	NA	NA	NA	NA
Toluene	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	0.5 U	***6.6***	0.5 U	0.5 U	*4.6*	***5.3***	*4.3*	*2*	*4.8*	***5.8***	*3.7*
Trichlorofluoromethane	2,100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.05	0.5 U	0.5 U	0.5 U	0.5 U	0.01 U	0.5 U	0.01 U	0.5 U	0.01 U	0.5 U	0.01 U
1,2,4-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	0.15	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Petroleum Hydrocarbons (TPH) (mg/L)												
TPH-DRO	0.05	NS	NS	NS	NS	NA	NA	NA	NA	NA	NA	NA
TPH-GRO	0.05	NS	NS	NS	NS	NA	NA	NA	NA	NA	NA	NA
EPH (µg/L)												
C11-C22 Aromatic Hydrocarbons		NA	NA	NA	NA	0.1 U	0.1 U	0.1 U		0.1 U		0.1 U
C19-C36 Aliphatic Hydrocarbons		NA	NA	NA	NA	0.1 U	0.1 U	0.1 U		0.1 U		0.1 U
C9-C18 Aliphatic Hydrocarbons		NA	NA	NA	NA	0.1 U	0.1 U	0.1 U		0.1 U		0.1 U
VPH (µg/L)												
C5-C8 Aliphatic Hydrocarbons		NA	NA	NA	NA	0.05 U	0.05 U	0.05 U		0.05 U		0.05 U
C9-C10 Aromatic Hydrocarbons		NA	NA	NA	NA	0.05 U	0.05 U	0.05 U		0.05 U		0.05 U
C9-C12 Aliphatic Hydrocarbons		NA	NA	NA	NA	0.05 U	0.05 U	0.05 U		0.05 U		0.05 U

*For groundwater VOCs, Regulatory Criteria values are the "Maximum Exposure Guidelines (MEGs) for Drinking Water" (MEDEP), 1992) or EPA Maximum Contaminant Level (MCL), whichever is less.
-- = No published MEG exists for compound
U = Not detected at associated reporting limit.
J = Concentration is estimated
UJ = DRO non-detect results are estimated due to low surrogate recovery.
Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEG.
Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEG.

Table A.1-13
Drinking Water Sample Analytical Results - October 2000 to April 2008 - VOCs and EPH/VPH - DW-01 Water Supply Dup (AMAC)
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	DW-01 AMAC Water Supply Pre-Filter Dup			
		2/9/2011	**8/30/2011**	**2/14/2012**	**8/8/2012**
Volatile Organic Compounds (VOCs) (µg/L)					
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	3	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	13	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1.8	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.6	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	*2.6*	*0.19* J	*4.8* J	*5.7*
trans-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	5	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	10	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	6	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	44	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	10	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Disulfide	--	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	3	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	--	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	57	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	3	0.5 U	*0.63*	0.5 U	0.5 U
2-Chlorotoluene	140	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	100	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	4	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.2	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dibromoethane (EDB)	0.004	0.01 U	0.01 U	0.01 U	0.01 U
Dibromomethane	--	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	63	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	60	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	21	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1000	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	70	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	1	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	70	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	47	0.5 U	0.5 U	0.5 U	0.5 U

Table A.1-13
Drinking Water Sample Analytical Results - October 2000 to April 2008 - VOCs and EPH/VPH - DW-01 Water Supply Dup (AMAC)
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	**DW-01 AMAC Water Supply Pre-Filter Dup**			
		2/9/2011	**8/30/2011**	**2/14/2012**	**8/8/2012**
Volatile Organic Compounds (VOCs) (µg/L)					
MTBE	35	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	14	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	5	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	1000	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	70	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	***5.2***	*2*	***5.9***	***6.9***
Trichlorofluoromethane	2100	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.05	0.5 U	0.5 U	0.5 U	0.01 U
1,2,4-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U
o-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	10,000 (total)	1 U	1 U	1 U	1 U
Vinyl Chloride	0.15	0.5 U	0.5 U	0.5 U	0.5 U
EPH (µg/L)					
C11-C22 Aromatic Hydrocarbons		0.1 U			0.1 U
C19-C36 Aliphatic Hydrocarbons		0.1 U			0.1 U
C9-C18 Aliphatic Hydrocarbons		0.1 U			0.1 U
VPH (µg/L)					
C5-C8 Aliphatic Hydrocarbons		0.05 U			0.05 U
C9-C10 Aromatic Hydrocarbons		0.05 U			0.05 U
C9-C12 Aliphatic Hydrocarbons		0.05 U			0.05 U

*For groundwater VOCs, Regulatory Criteria values are the "Maximum Exposure Guidelines (MEGs) for Drinking Water" (MEDEP), 1992) or EPA Maximum Contaminant Level (MCL), whichever is less.

-- = No published MEG exists for compound.

U = Not detected at associated reporting limit.

J = Concentration is estimated.

Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEG.

Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEG.

Table A.1-14
Drinking Water Sample Analytical Results - October 2000 to May 2010 - VOCs and DRO/GRO - DW-01 (AMAC)
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	DW-02 (VFW)												
		10/26/2000	5/15/2001	12/5/2002	4/23/2003	9/18/2003	5/11/2004	9/30/2004	4/25/2005	9/14/2005	5/23/2006	10/24/2006	5/24/2007	10/24/2007
Volatile Organic Compounds (VOCs) (µg/L)														
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	13	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	1,440	5 U	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	5 U	NA	NA	5 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA
Acetone	700	5 U	NA	NA	5 U	5 U	5 U	NA	NA	NA	NA	NA	NA	NA
Benzene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	44	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Disulfide	--	0.5 U	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	57	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.2	0.5 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dibromoethane (EDB)	0.004	0.5 U	0.02 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	***0.01***	0.006 U	0.005 U	0.01 U	0.01 U	0.01 U
Dibromomethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	63	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	60	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	21	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	*0.26* J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table A.1-14
Drinking Water Sample Analytical Results - October 2000 to May 2010 - VOCs and DRO/GRO - DW-01 (AMAC)
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	DW-02 (VFW)												
		10/26/2000	5/15/2001	12/5/2002	4/23/2003	9/18/2003	5/11/2004	9/30/2004	4/25/2005	9/14/2005	5/23/2006	10/24/2006	5/24/2007	10/24/2007
Isopropylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	47	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Methyl-2-pentanone	--	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MTBE	35	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	14	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrahydrofuran	70	5 U	NA	NA	NA	NA	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Toluene	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trichlorobenzene	40	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	2,100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.05	0.5 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	--	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.15	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Petroleum Hydrocarbons (TPH) (mg/L)														
TPH-DRO	0.05	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
TPH-GRO	0.05	NS	NS	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	*0.01*	0.01 U

*For groundwater VOCs, Regulatory Criteria values are the "Maximum Exposure Guidelines (MEGs) for Drinking Water" (MEDEP), 1992) or EPA Maximum Contaminant Level (MCL), whichever is less.

-- = No published MEG exists for compound

U = Not detected at associated reporting limit.

J = Concentration is estimated

UJ = DRO non-detect results are estimated due to low surrogate recovery.

Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEG.

Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEG.

Table A.1-14
Drinking Water Sample Analytical Results - October 2000 to May 2010 - VOCs and DRO/GRO - DW-01 (AMAC)
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	DW-02 (VFW)				
		4/30/2008	10/29/2008	5/1/2009	10/30/2009	5/26/2010
Volatile Organic Compounds (VOCs) (µg/L)						
1,1,1-Trichloroethane	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	13	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1.8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	1,440	NA	NA	NA	NA	NA
2-Hexanone	--	NA	NA	NA	NA	NA
Acetone	700	NA	NA	NA	NA	NA
Benzene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	44	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Disulfide	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	57	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	140	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.2	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dibromoethane (EDB)	0.004	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibromomethane	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	63	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	60	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	21	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table A.1-14
Drinking Water Sample Analytical Results - October 2000 to May 2010 - VOCs and DRO/GRO - DW-01 (AMAC)
LO-58
Caribou, ME

	MEDEP Remedial Action Guideline*	DW-02 (VFW)				
		4/30/2008	10/29/2008	5/1/2009	10/30/2009	5/26/2010
Isopropylbenzene	--	0.5 U	0.3 J	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	47	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
4-Methyl-2-pentanone	--	NA	NA	NA	NA	NA
MTBE	35	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	14	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrahydrofuran	70	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Toluene	1,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trichlorobenzene	40	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	70	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	2,100	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.05	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	--	NA	NA	NA	NA	NA
o-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	10,000 (total)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	0.15	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Petroleum Hydrocarbons (TPH) (mg/L)						
TPH-DRO	0.05	0.05 U	0.05 U	0.05 U	*0.05*	0.05 U
TPH-GRO	0.05	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 UJ

*For groundwater VOCs, Regulatory Criteria values are the "Maximum Exposure Guidelines (MEGs) for Drinking Water" (MEDEP), 1992) or EPA Maximum Contaminant Level (MCL), whichever is less.

-- = No published MEG exists for compound

U = Not detected at associated reporting limit.

J = Concentration is estimated

UJ = DRO non-detect results are estimated due to low surrogate recovery.

Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEG.

Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEG.

Table A.1-15
Summary of Drinking Water Well Wire-Line Straddle Packer Sampling Analytical Results
LO-58
Caribou, ME

Well	Maine Maximum Exposure Guideline (µg/L)	EPA Maximum Contaminant Limit (µg/L)	DW-1					
Sample ID			**LS58DW1-0508-29**	**LS58DW1-0508-24**	**LS58DW1-0508-24E**	**LS58DW1-0508-41**	**LS58DW1-0508-51**	**LS58DW1-0508-56**
Date			**5/20/2008**	**5/20/2008**		**5/19/2008**	**5/19/2008**	**5/18/2008**
Depth Interval (ft bgs)			**(water) 24.98 to 33.15**	**33.75 to 38.5**		**41.2 to 51.9**	**51.0 to 58.1 (bottom)**	**56.6 to 58.1 (bottom)**
Volatile Organic Compounds[a] (µg/L)								
Benzene	6	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	70	NE	*0.52*	0.5 U	0.5 U	*0.24* J	0.5 U	*0.34* J
cis-1,2-Dichloroethylene	70	70	0.5 U	*0.44* J	*0.45* J	*1.2*	*0.96*	*0.52*
Trichloroethylene	32*	5	*1.8*	*2.5*	*2.5*	*3.4*	*3.1*	*2*
Toluene	1,400	1,000	*120* D	*25*	*22*	*12*	0.5 U	*22*
1,2-Ethylene Dibromide, 1,2-Dibromo-3-Chloropropane, and 1,2,3-Trichloropropane[b] (µg/L)								
No analytes detected.								
Gasoline Range Organics[c] (µg/L)								
Gasoline Range Organics	50	NE	***156***	*24*	*23*	*14*	10 U	*27*
Diesel Range Organics[d] (µg/L)								
Diesel Range Organics	50	NE	50 U	50 U	50 U	***51*** J1	50 U	***350*** J1

Table A.1-15
Summary of Drinking Water Well Wire-Line Straddle Packer Sampling Analytical Results
LO-58
Caribou, ME

Well	Maine Maximum Exposure Guideline (µg/L)	EPA Maximum Contaminant Limit (µg/L)	DW-2					
Sample ID			**LS58DW2-0508-16**	**LS58DW2-0508-28.5**	**LS58DW2-0508-37**	**LS58DW2-0508-94.5**	**LS58DW2-0508-189**	**LS58DW2-0508-256**
Date			**5/16/2008**	**5/16/2008**	39585	**5/17/2008**	**5/17/2008**	**5/17/2008**
Depth Interval (ft bgs)			**16.0 to 20.2**	**28.5 to 32.5**	37.0 to 41.7	**94.5 to 98.5**	**187.9 to 192.2**	**265 to 284.0 (bottom)**
Volatile Organic Compounds[a] (µg/L)								
Benzene	6	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	70	NE	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethylene	70	70	0.5 U	0.5 U	0.5 U	0.5 U	*0.23* J	0.5 U
Trichloroethylene	32*	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	1,400	1,000	*2.4*	0.5 U	0.5 U	*5.5*	2.3 U1	0.79 U1
1,2-Ethylene Dibromide, 1,2-Dibromo-3-Chloropropane, and 1,2,3-Trichloropropane[b] (µg/L)								
No analytes detected.								
Gasoline Range Organics[c] (µg/L)								
Gasoline Range Organics	50	NE	10 U	10 U	10 U	10 U	10 U	10 U
Diesel Range Organics[d] (µg/L)								
Diesel Range Organics	50	NE	***1050***	50 U	50 U	50 U	50 U	***80*** J

[a] EPA Method 524.2.

[b] EPA Method 504.1.

[c] Maine Health and Environmental Testing Laboratory Method 4.1.17.

[d] Maine Health and Environmental Testing Laboratory Method 4.1.25.

Notes:

NE = Standard not established.
µg/L = Micrograms per liter (parts per billion).
ft bgs = Feet below ground surface.
Values shown in *italics* indicate that the compound was detected, but at a concentration below its respective MEG.
Values shown in **BOLD** indicate that the compound was detected at a concentration that exceeds its MEG.
D = Result from dilution analysis.
J = Quantitation approximate.
J1 = Diesel range organics quantitation approximate due to detection in rinsate blank.
U = Substance not detected at the listed detection limit.
U1 = Toluene qualified as not detected due to detection in rinsate blank.
* = Although the Maine MEG is 32 µg/L, the action level used by the State of Maine is one-half the EPA MCL, 2.5 µg/L.

APPENDIX A.2

RI/FS DATA

Table A.2-1
Air Data
LO-58
Caribou, Maine

							Sample Point ID	LO58-AA01-042212		LO58-IA01-042212		LO58-IA02-042212		LO58-IA-Dup-01	
							Sample Description	Ambient Air		Indoor Air #1		Indoor Air #2		Indoor Air #2 Dup	
							Sample Date	4/22/2012		4/22/2012		4/22/2012		4/22/2012	
				Screening Toxicity Value (µg/m3)											
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**									
Benzene	71432	MADEP-APH	µg/m3	0.36	c	1.6	c	0.64	U	**0.66**		0.64	U	0.64	U
Butadiene	106990	MADEP-APH	µg/m3	0.094	c	0.41	c	0.44	U	0.44	U	0.44	U	0.44	U
C5-C8 Aliphatics (adjusted)	DEP2038	MADEP-APH	µg/m3	630		2600		32	U	150		200		190	
C9-C10 Aromatics	DEP2039	MADEP-APH	µg/m3	52		220		32	U	6.1	J	24	J	6	J
C9-C12 Aliphatics (adjusted)	DEP2040	MADEP-APH	µg/m3	210		880		18		120		130		110	
Ethylbenzene	100414	MADEP-APH	µg/m3	1.1	c	4.9	c	0.87	U	**3.4**		0.87	U	0.87	U
Methyl tert-butyl ether	1634044	MADEP-APH	µg/m3	11	c	47	c	0.72	U	4.4		0.72	U	0.72	U
m-Xylene & p-Xylene	179601231	MADEP-APH	µg/m3	10	n	44	n	0.87	U	2.2		0.87	U	1.3	
Naphthalene	91203	MADEP-APH	µg/m3	0.083	c	0.36	c	1.1	U	**1.1**		1.1	U	1.1	U
o-Xylene	95476	MADEP-APH	µg/m3	10	n	44	n	0.87	U	2.3		0.87	UJ	2.1	J
Toluene	108883	MADEP-APH	µg/m3	520	n	2200	n	0.75	U	3.4		3.1		3.3	
1,1,1-Trichloroethane	71556	TO15	µg/m3	520	n	2200	n	0.055	U	0.060		0.082	U	0.082	U
1,1,2,2-Tetrachloroethane	79345	TO15	µg/m3	0.048	c	0.21	c	0.069	U	0.069	U	0.103	U	0.103	U
1,1,2-Trichloroethane	79005	TO15	µg/m3	0.021	n	0.088	n	0.055	U	0.055	U	0.082	U	0.082	U
1,1-Dichloroethane	75343	TO15	µg/m3	1.8	c	7.7	c	0.040	U	0.040	U	0.061	U	0.061	U
1,1-Dichloroethene	75354	TO15	µg/m3	21	n	88	n	0.040	U	0.040	U	0.059	U	0.059	U
1,2,4-Trichlorobenzene	120821	TO15	µg/m3	0.21	n	0.88	n								
1,2,4-Trimethylbenzene	95636	TO15	µg/m3	0.73	n	3.1	n								
1,2-Dibromoethane	106934	TO15	µg/m3	0.0047	c	0.02	c	0.077	U	0.077	U	0.115	U	0.115	U
1,2-Dichlorobenzene	95501	TO15	µg/m3	21	n	88	n								
1,2-Dichloroethane	107062	TO15	µg/m3	0.11	c	0.47	c	0.081	U	0.105		0.121	U	0.121	U
1,2-Dichloroethene, Total	540590	TO15	µg/m3	NBA		NBA		0.040	U	0.040	U	0.059	U	0.059	U
1,2-Dichloropropane	78875	TO15	µg/m3	0.28	c	1.2	c	0.092	U	0.092	U	0.139	U	0.139	U
1,3,5-Trimethylbenzene	108678	TO15	µg/m3	NBA		NBA		0.098	U	0.098	U	0.147	U	0.147	U
1,3-Dichlorobenzene	541731	TO15	µg/m3	NBA		NBA									
1,4-Dichlorobenzene	106467	TO15	µg/m3	0.26	c	1.1	c								
1,4-Dioxane	123911	TO15	µg/m3	0.56	c	2.5	c								
2,2,4-Trimethylpentane	540841	TO15	µg/m3	NBA		NBA		0.061		0.047	U	0.084		0.079	

Table A.2-1
Air Data
LO-58
Caribou, Maine

							Sample Point ID	LO58-AA01-042212		LO58-IA01-042212		LO58-IA02-042212		LO58-IA-Dup-01	
							Sample Description	Ambient Air		Indoor Air #1		Indoor Air #2		Indoor Air #2 Dup	
							Sample Date	4/22/2012		4/22/2012		4/22/2012		4/22/2012	
				Screening Toxicity Value (µg/m3)											
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]									
Methyl Ethyl Ketone	78933	TO15	µg/m3	520	n	2200	n								
2-Chlorotoluene	95498	TO15	µg/m3	NBA		NBA									
Methyl Butyl Ketone	591786	TO15	µg/m3	3.1	n	13	n								
Isopropyl alcohol	67630	TO15	µg/m3	21	n	88	n								
4-Ethyltoluene	622968	TO15	µg/m3	NBA		NBA		0.049	U	0.084	J	0.074	U	0.088	J
4-Isopropyltoluene	99876	TO15	µg/m3	NBA		NBA									
methyl isobutyl ketone	108101	TO15	µg/m3	310	n	1300	n								
Acetone	67641	TO15	µg/m3	3200	n	14000	n								
3-Chloropropene	107051	TO15	µg/m3	0.1	n	0.44	n	0.063	U	0.063	U	0.094	U	0.094	U
Benzene	71432	TO15	µg/m3	0.36	c	1.6	c	0.211		0.211		0.249		0.227	
Benzyl chloride	100447	TO15	µg/m3	0.057	c	0.25	c								
Bromodichloromethane	75274	TO15	µg/m3	0.076	c	0.33	c	0.067	U	0.067	U	0.100	U	0.100	U
Bromoethene(Vinyl Bromide)	593602	TO15	µg/m3	0.088	c	0.38	c	0.087	U	0.087	U	0.131	U	0.131	U
Bromoform	75252	TO15	µg/m3	2.6	c	11	c	0.103	U	0.103	U	0.155	U	0.155	U
Bromomethane	74839	TO15	µg/m3	0.52	n	2.2	n	0.078	U	0.078	U	0.116	U	0.116	U
Butadiene	106990	TO15	µg/m3	0.094	c	0.41	c	0.044	U	0.044	U	0.066	U	0.066	U
Carbon disulfide	75150	TO15	µg/m3	73	n	310	n								
Carbon tetrachloride	56235	TO15	µg/m3	0.47	c	2	c	0.446		0.377		0.440		0.384	
Chlorobenzene	108907	TO15	µg/m3	5.2	n	22	n								
Dibromochloromethane	124481	TO15	µg/m3	NBA		NBA		0.085	U	0.085	U	0.128	U	0.128	U
Chloroethane	75003	TO15	µg/m3	1000	n	4400	n	0.053	U	0.053	U	0.079	U	0.079	U
Chloroform	67663	TO15	µg/m3	0.12	c	0.53	c	0.054		**0.634**		**1.318**	J	**0.732**	J
Chloromethane	74873	TO15	µg/m3	9.4	n	39	n								
cis-1,2-Dichloroethene	156592	TO15	µg/m3	NBA		NBA		0.040	U	0.040	U	0.059	U	0.059	U
cis-1,3-Dichloropropene	10061015	TO15	µg/m3	NBA		NBA		0.045	U	0.045	U	0.068	U	0.068	U
Cyclohexane	110827	TO15	µg/m3	630	n	2600	n	0.034	U	0.055		0.096		0.072	
Dichlorodifluoromethane	75718	TO15	µg/m3	10	n	44	n	2.175		2.126		2.472		2.126	
Ethylbenzene	100414	TO15	µg/m3	1.1	c	4.9	c	0.065		0.234		0.256		0.286	

Table A.2-1
Air Data
LO-58
Caribou, Maine

							Sample Point ID	**LO58-AA01-042212**		**LO58-IA01-042212**		**LO58-IA02-042212**		**LO58-IA-Dup-01**	
							Sample Description	**Ambient Air**		**Indoor Air #1**		**Indoor Air #2**		**Indoor Air #2 Dup**	
							Sample Date	**4/22/2012**		**4/22/2012**		**4/22/2012**		**4/22/2012**	
				Screening Toxicity Value (µg/m3)											
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]									
Freon TF	76131	TO15	µg/m3	3100	n	13000	n								
1,2-Dichlorotetrafluoroethane	76142	TO15	µg/m3	NBA		NBA		0.070	U	0.070	U	0.105	U	0.105	U
Freon 22	75456	TO15	µg/m3	5200	n	22000	n								
Hexachlorobutadiene	87683	TO15	µg/m3	0.13	c	0.56	c								
Cumene	98828	TO15	µg/m3	42	n	180	n								
m-Xylene & p-Xylene	179601231	TO15	µg/m3	10	n	44	n	0.100		0.694		0.694		0.738	
Methyl methacrylate	80626	TO15	µg/m3	73	n	310	n								
Methyl tert-butyl ether	1634044	TO15	µg/m3	11	c	47	c	0.036	U	0.036	U	0.054	U	0.054	U
Methylene Chloride	75092	TO15	µg/m3	63	n	260	n	0.347	U	0.417		0.833		0.521	U
Naphthalene	91203	TO15	µg/m3	0.083	c	0.36	c								
n-Butane	106978	TO15	µg/m3	NBA		NBA									
n-Butylbenzene	104518	TO15	µg/m3	NBA		NBA									
n-Heptane	142825	TO15	µg/m3	NBA		NBA		0.119		1.229		1.598		1.434	
n-Hexane	110543	TO15	µg/m3	73	n	310	n	0.141		0.201		0.271		0.247	
n-Propylbenzene	103651	TO15	µg/m3	100	n	440	n								
o-Xylene	95476	TO15	µg/m3	10	n	44	n	0.043	U	0.304		0.286		0.326	
sec-Butylbenzene	135988	TO15	µg/m3	NBA		NBA									
Styrene	100425	TO15	µg/m3	100	n	440	n								
tert-Butyl alcohol	75650	TO15	µg/m3	NBA		NBA									
tert-Butylbenzene	98066	TO15	µg/m3	NBA		NBA									
Tetrachloroethene	127184	TO15	µg/m3	4.2	n	18	n	0.068	U	0.068	U	0.400	J	0.102	UJ
Tetrahydrofuran	109999	TO15	µg/m3	210	n	880	n								
Toluene	108883	TO15	µg/m3	520	n	2200	n	0.241		1.281		1.394		1.318	
trans-1,2-Dichloroethene	156605	TO15	µg/m3	NBA		NBA		0.040	U	0.040	U	0.059	U	0.059	U
trans-1,3-Dichloropropene	10061026	TO15	µg/m3	NBA		NBA		0.045	U	0.045	U	0.068	U	0.068	U
Trichloroethene	79016	TO15	µg/m3	0.21	n	0.88	n	0.054	U	**2.578**		**3.975**		**3.330**	
Trichlorofluoromethane	75694	TO15	µg/m3	NBA		NBA		1.067		5.616		7.301		6.178	

Table A.2-1
Air Data
LO-58
Caribou, Maine

							Sample Point ID	LO58-AA01-042212		LO58-IA01-042212		LO58-IA02-042212		LO58-IA-Dup-01	
							Sample Description	Ambient Air		Indoor Air #1		Indoor Air #2		Indoor Air #2 Dup	
							Sample Date	4/22/2012		4/22/2012		4/22/2012		4/22/2012	
				Screening Toxicity Value (µg/m3)											
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]									
Vinyl chloride	75014	TO15	µg/m3	0.17	c	2.8	c	0.051	U	0.051	U	0.077	U	0.077	U
Xylene (total)	1330207	TO15	µg/m3	10	n	44	n	0.130		0.998		0.955		1.085	

Note: Laboratory provided electronic data for ppb v/v only. Conversions to µg/m3 may not match laboratory reports exactly due to differences in molecular weights and rounding. Also note precision only to two significant figures.

[a] Regional Screening Level (RSL) Residential Air Table (May 2016).

[b] Regional Screening Level (RSL) Industrial Air Table (May 2016).

Bold values indicate exceedance of residential RSL.

Highlghted values indicate exceedance of industrial RSL.

µg/m3 = Micrograms per cubic meter.

C = Cancer based, target risk equals 1E-06.

J = Result is an approximate value.

NBA = No benchmark available.

N = Noncancer based, target hazard quotient equals 0.1.

U = Not Detected.

Table A.2-1
Air Data
LO-58
Caribou, Maine

Sample Point ID								LO58-SV01-042212		LO58-SV02-042212		LO58-SV-Dup-01		LO58-BK01-100712	
Sample Description								Sub-Slab #1		Sub-Slab #2		Sub-Slab #2 Dup		Ambient Air	
Sample Date								4/22/2012		4/22/2012		4/22/2012		10/7/2012	
				Screening Toxicity Value (µg/m3)											
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]									
Benzene	71432	MADEP-APH	µg/m3	0.36	c	1.6	c	0.64	U	0.64	U	0.64	U	0.64	U
Butadiene	106990	MADEP-APH	µg/m3	0.094	c	0.41	c	0.44	U	0.44	U	0.44	U	0.44	U
C5-C8 Aliphatics (adjusted)	DEP2038	MADEP-APH	µg/m3	630		2600		**740**		**700**		550		13	
C9-C10 Aromatics	DEP2039	MADEP-APH	µg/m3	52		220		37		37		51		5	U
C9-C12 Aliphatics (adjusted)	DEP2040	MADEP-APH	µg/m3	210		880		**430**		**920**		**1100**		7.1	U
Ethylbenzene	100414	MADEP-APH	µg/m3	1.1	c	4.9	c	**3.5**		**3.8**		**3.8**		0.87	U
Methyl tert-butyl ether	1634044	MADEP-APH	µg/m3	11	c	47	c	0.72	U	4.7		4.6		0.72	U
m-Xylene & p-Xylene	179601231	MADEP-APH	µg/m3	10	n	44	n	5.7		8.7		7.8		0.87	U
Naphthalene	91203	MADEP-APH	µg/m3	0.083	c	0.36	c	**1.1**		**1.3**		**1.2**		1.1	U
o-Xylene	95476	MADEP-APH	µg/m3	10	n	44	n	3.1		4.2		3.8		0.87	U
Toluene	108883	MADEP-APH	µg/m3	520	n	2200	n	5.1		6.4		8.5		0.75	U
1,1,1-Trichloroethane	71556	TO15	µg/m3	520	n	2200	n	1.091	U	0.218	J	1.091	U	0.218	U
1,1,2,2-Tetrachloroethane	79345	TO15	µg/m3	0.048	c	0.21	c	1.372	U	1.372	U	1.372	U	0.274	U
1,1,2-Trichloroethane	79005	TO15	µg/m3	0.021	n	0.088	n	1.091	U	1.091	U	1.091	U	0.218	U
1,1-Dichloroethane	75343	TO15	µg/m3	1.8	c	7.7	c	0.809	U	0.809	U	0.809	U	0.162	U
1,1-Dichloroethene	75354	TO15	µg/m3	21	n	88	n	0.793	U	0.793	U	0.793	U	0.159	U
1,2,4-Trichlorobenzene	120821	TO15	µg/m3	0.21	n	0.88	n	3.709	U	3.709	U	3.709	U		
1,2,4-Trimethylbenzene	95636	TO15	µg/m3	0.73	n	3.1	n	**1.622**		**2.261**		**1.720**			
1,2-Dibromoethane	106934	TO15	µg/m3	0.0047	c	0.02	c	1.536	U	1.536	U	1.536	U	0.307	U
1,2-Dichlorobenzene	95501	TO15	µg/m3	21	n	88	n	1.202	U	1.202	U	1.202	U		
1,2-Dichloroethane	107062	TO15	µg/m3	0.11	c	0.47	c	0.809	U	0.809	U	0.809	U	0.324	U
1,2-Dichloroethene, Total	540590	TO15	µg/m3	NBA		NBA		0.793	U	0.793	U	0.793	U	0.159	U
1,2-Dichloropropane	78875	TO15	µg/m3	0.28	c	1.2	c	0.924	U	0.924	U	0.924	U	0.370	U
1,3,5-Trimethylbenzene	108678	TO15	µg/m3	NBA		NBA		0.442	J	0.541	J	0.477	J	0.393	U
1,3-Dichlorobenzene	541731	TO15	µg/m3	NBA		NBA		0.529	J	0.781	J	0.511	J		
1,4-Dichlorobenzene	106467	TO15	µg/m3	0.26	c	1.1	c	1.202	U	1.202	U	1.202	U		
1,4-Dioxane	123911	TO15	µg/m3	0.56	c	2.5	c	18.011	U	18.011	U	18.011	U		
2,2,4-Trimethylpentane	540841	TO15	µg/m3	NBA		NBA		0.934	U	0.934	U	0.233	J	0.187	U

Table A.2-1
Air Data
LO-58
Caribou, Maine

Sample Point ID								LO58-SV01-042212		LO58-SV02-042212		LO58-SV-Dup-01		LO58-BK01-100712	
Sample Description								Sub-Slab #1		Sub-Slab #2		Sub-Slab #2 Dup		Ambient Air	
Sample Date								4/22/2012		4/22/2012		4/22/2012		10/7/2012	
Screening Toxicity Value (µg/m3)															
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]									
Methyl Ethyl Ketone	78933	TO15	µg/m3	520	n	2200	n	3.833		3.538		3.243			
2-Chlorotoluene	95498	TO15	µg/m3	NBA		NBA		1.035	U	1.035	U	1.035	U		
Methyl Butyl Ketone	591786	TO15	µg/m3	3.1	n	13	n	2.047	U	2.047	U	2.047	U		
Isopropyl alcohol	67630	TO15	µg/m3	21	n	88	n	**737.122**	J	**638.839**	J	**515.985**	J		
4-Ethyltoluene	622968	TO15	µg/m3	NBA		NBA		0.423	J	0.477	J	0.413	J	0.197	U
4-Isopropyltoluene	99876	TO15	µg/m3	NBA		NBA		0.477	J	0.532	J	0.433	J		
methyl isobutyl ketone	108101	TO15	µg/m3	310	n	1300	n	2.047	U	2.047	U	2.047	U		
Acetone	67641	TO15	µg/m3	3200	n	14000	n	26.119		26.119		26.119			
3-Chloropropene	107051	TO15	µg/m3	0.1	n	0.44	n	1.564	U	1.564	U	1.564	U	0.250	U
Benzene	71432	TO15	µg/m3	0.36	c	1.6	c	0.262	J	**0.447**	J	**0.447**	J	0.144	
Benzyl chloride	100447	TO15	µg/m3	0.057	c	0.25	c	1.035	U	1.035	U	1.035	U		
Bromodichloromethane	75274	TO15	µg/m3	0.076	c	0.33	c	1.340	U	**0.556**	J	**0.455**	J	0.268	U
Bromoethene(Vinyl Bromide)	593602	TO15	µg/m3	0.088	c	0.38	c	0.874	U	0.874	U	0.874	U	0.350	U
Bromoform	75252	TO15	µg/m3	2.6	c	11	c	2.066	U	2.066	U	2.066	U	0.413	U
Bromomethane	74839	TO15	µg/m3	0.52	n	2.2	n	0.776	U	0.776	U	0.776	U	0.311	U
Butadiene	106990	TO15	µg/m3	0.094	c	0.41	c	0.442	U	0.442	U	0.442	U	0.177	U
Carbon disulfide	75150	TO15	µg/m3	73	n	310	n	0.373	J	0.809	J	0.685	J		
Carbon tetrachloride	56235	TO15	µg/m3	0.47	c	2	c	0.440	J	**0.547**	J	**0.535**	J	**0.528**	
Chlorobenzene	108907	TO15	µg/m3	5.2	n	22	n	0.920	U	0.920	U	0.920	U		
Dibromochloromethane	124481	TO15	µg/m3	NBA		NBA		1.703	U	1.703	U	1.703	U	0.341	U
Chloroethane	75003	TO15	µg/m3	1000	n	4400	n	1.319	U	1.319	U	1.319	U	0.211	U
Chloroform	67663	TO15	µg/m3	0.12	c	0.53	c	**0.537**	J	**63.448**		**48.806**		0.195	U
Chloromethane	74873	TO15	µg/m3	9.4	n	39	n	1.032		1.032	U	0.475	J		
cis-1,2-Dichloroethene	156592	TO15	µg/m3	NBA		NBA		0.793	U	0.793	U	0.793	U	0.159	U
cis-1,3-Dichloropropene	10061015	TO15	µg/m3	NBA		NBA		0.907	U	0.907	U	0.907	U	0.181	U
Cyclohexane	110827	TO15	µg/m3	630	n	2600	n	0.688	U	0.688	U	0.378	J	0.138	U
Dichlorodifluoromethane	75718	TO15	µg/m3	10	n	44	n	2.323	J	2.966		2.916		3.905	
Ethylbenzene	100414	TO15	µg/m3	1.1	c	4.9	c	**1.129**		**1.693**		**1.346**		0.174	U

Table A.2-1
Air Data
LO-58
Caribou, Maine

Sample Point ID								LO58-SV01-042212		LO58-SV02-042212		LO58-SV-Dup-01		LO58-BK01-100712	
Sample Description								Sub-Slab #1		Sub-Slab #2		Sub-Slab #2 Dup		Ambient Air	
Sample Date								4/22/2012		4/22/2012		4/22/2012		10/7/2012	
				Screening Toxicity Value (µg/m3)											
Analyte	CAS Number	Method	Units	Residential[a]		Industrial[b]									
Freon TF	76131	TO15	µg/m3	3100	n	13000	n	0.398	J	0.498	J	0.536	J		
1,2-Dichlorotetrafluoroethane	76142	TO15	µg/m3	NBA		NBA		1.398	U	1.398	U	1.398	U	0.280	U
Freon 22	75456	TO15	µg/m3	5200	n	22000	n	0.742	J	0.848	J	0.813	J		
Hexachlorobutadiene	87683	TO15	µg/m3	0.13	c	0.56	c	2.132	U	2.132	U	2.132	U		
Cumene	98828	TO15	µg/m3	42	n	180	n	0.983	U	0.541	J	0.457	J		
m-Xylene & p-Xylene	179601231	TO15	µg/m3	10	n	44	n	3.863		6.076		5.208		0.347	U
Methyl methacrylate	80626	TO15	µg/m3	73	n	310	n	2.047	U	2.047	U	2.047	U		
Methyl tert-butyl ether	1634044	TO15	µg/m3	11	c	47	c	0.721	U	1.261		1.081		0.144	U
Methylene Chloride	75092	TO15	µg/m3	63	n	260	n	0.556	J	0.382	J	3.819		1.389	U
Naphthalene	91203	TO15	µg/m3	0.083	c	0.36	c	**0.524**	J	**0.681**	J	2.620	U		
n-Butane	106978	TO15	µg/m3	NBA		NBA		1.188	U	1.188	U	0.927	J		
n-Butylbenzene	104518	TO15	µg/m3	NBA		NBA		1.097	U	1.097	U	1.097	U		
n-Heptane	142825	TO15	µg/m3	NBA		NBA		1.434		0.901	J	2.335	J	0.164	U
n-Hexane	110543	TO15	µg/m3	73	n	310	n	0.236	J	0.349	J	0.493	J	0.282	U
n-Propylbenzene	103651	TO15	µg/m3	100	n	440	n	0.290	J	0.418	J	0.251	J		
o-Xylene	95476	TO15	µg/m3	10	n	44	n	1.432		3.342		2.648		0.174	U
sec-Butylbenzene	135988	TO15	µg/m3	NBA		NBA		1.097	U	1.097	U	1.097	U		
Styrene	100425	TO15	µg/m3	100	n	440	n	0.426	J	0.596	J	0.511	J		
tert-Butyl alcohol	75650	TO15	µg/m3	NBA		NBA		1.091	J	15.151	U	15.151	U		
tert-Butylbenzene	98066	TO15	µg/m3	NBA		NBA		1.097	U	1.097	U	1.097	U		
Tetrachloroethene	127184	TO15	µg/m3	4.2	n	18	n	1.356	U	1.356	UJ	0.231	J	0.271	U
Tetrahydrofuran	109999	TO15	µg/m3	210	n	880	n	0.973	J	14.740	U	14.740	U		
Toluene	108883	TO15	µg/m3	520	n	2200	n	4.144		5.650		7.534		0.192	
trans-1,2-Dichloroethene	156605	TO15	µg/m3	NBA		NBA		0.793	U	0.793	U	0.793	U	0.159	U
trans-1,3-Dichloropropene	10061026	TO15	µg/m3	NBA		NBA		0.907	U	0.907	U	0.907	U	0.181	U
Trichloroethene	79016	TO15	µg/m3	0.21	n	0.88	n	**1.397**		**6.983**	J	**4.996**	J	0.215	U
Trichlorofluoromethane	75694	TO15	µg/m3	NBA		NBA		7.863		15.725		14.040		1.573	

Table A.2-1
Air Data
LO-58
Caribou, Maine

							Sample Point ID	LO58-SV01-042212		LO58-SV02-042212		LO58-SV-Dup-01		LO58-BK01-100712	
							Sample Description	Sub-Slab #1		Sub-Slab #2		Sub-Slab #2 Dup		Ambient Air	
							Sample Date	4/22/2012		4/22/2012		4/22/2012		10/7/2012	
				Screening Toxicity Value (µg/m3)											
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]									
Vinyl chloride	75014	TO15	µg/m3	0.17	c	2.8	c	0.511	U	0.511	U	0.511	U	0.204	U
Xylene (total)	1330207	TO15	µg/m3	10	n	44	n	5.209		9.549		7.813		0.174	U

Note: Laboratory provided electronic data for ppb v/v only. Conversions to µg/m3 may not match laboratory reports exactly due to differences in molecular weights and rounding. Also note precision only to two significant figures.

[a] Regional Screening Level (RSL) Residential Air Table (May 2016).

[b] Regional Screening Level (RSL) Industrial Air Table (May 2016).

Bold values indicate exceedance of residential RSL.

Highlghted values indicate exceedance of industrial RSL.

µg/m3 = Micrograms per cubic meter.

C = Cancer based, target risk equals 1E-06.

J = Result is an approximate value.

NBA = No benchmark available.

NC = Noncancer based, target hazard quotient equals 0.1.

U = Not Detected.

Table A.2-1
Air Data
LO-58
Caribou, Maine

							Sample Point ID	LO58-IA01-100712		LO58-IA02-100712		LO58-IA-Dup-01		LO58-SV01-100712	
							Sample Description	Indoor Air #1		Indoor Air #2		Indoor Air #2 Dup		Sub-Slab #1	
							Sample Date	10/7/2012		10/7/2012		10/7/2012		10/7/2012	
				Screening Toxicity Value (µg/m3)											
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]									
Benzene	71432	MADEP-APH	µg/m3	0.36	c	1.6	c	0.64	U	0.64	U	0.64	U	0.64	U
Butadiene	106990	MADEP-APH	µg/m3	0.094	c	0.41	c	0.44	U	0.44	U	0.44	U	0.44	U
C5-C8 Aliphatics (adjusted)	DEP2038	MADEP-APH	µg/m3	630		2600		170		190		200		560	
C9-C10 Aromatics	DEP2039	MADEP-APH	µg/m3	52		220		5	U	5	U	5	U	24	
C9-C12 Aliphatics (adjusted)	DEP2040	MADEP-APH	µg/m3	210		880		37		75	J	98	J	**390**	
Ethylbenzene	100414	MADEP-APH	µg/m3	1.1	c	4.9	c	0.87	U	0.87	U	0.87	U	**1.5**	
Methyl tert-butyl ether	1634044	MADEP-APH	µg/m3	11	c	47	c	0.72	U	0.72	U	0.72	U	0.72	U
m-Xylene & p-Xylene	179601231	MADEP-APH	µg/m3	10	n	44	n	0.87	U	0.87	U	0.87	U	5	
Naphthalene	91203	MADEP-APH	µg/m3	0.083	c	0.36	c	1.1	U	**1.4**		**1.5**		**1.7**	
o-Xylene	95476	MADEP-APH	µg/m3	10	n	44	n	0.87	U	0.87	U	0.87	U	2.4	
Toluene	108883	MADEP-APH	µg/m3	520	n	2200	n	2.7		2.7		3		2.9	
1,1,1-Trichloroethane	71556	TO15	µg/m3	520	n	2200	n	0.218	U	0.218	U	0.218	U	10.908	U
1,1,2,2-Tetrachloroethane	79345	TO15	µg/m3	0.048	c	0.21	c	0.274	U	0.274	U	0.274	U	13.724	U
1,1,2-Trichloroethane	79005	TO15	µg/m3	0.021	n	0.088	n	0.218	U	0.218	U	0.218	U	10.908	U
1,1-Dichloroethane	75343	TO15	µg/m3	1.8	c	7.7	c	0.162	U	0.162	U	0.162	U	8.092	U
1,1-Dichloroethene	75354	TO15	µg/m3	21	n	88	n	0.159	U	0.159	U	0.159	U	7.926	U
1,2,4-Trichlorobenzene	120821	TO15	µg/m3	0.21	n	0.88	n							37.091	U
1,2,4-Trimethylbenzene	95636	TO15	µg/m3	0.73	n	3.1	n							9.828	U
1,2-Dibromoethane	106934	TO15	µg/m3	0.0047	c	0.02	c	0.307	U	0.307	U	0.307	U	15.361	U
1,2-Dichlorobenzene	95501	TO15	µg/m3	21	n	88	n							12.020	U
1,2-Dichloroethane	107062	TO15	µg/m3	0.11	c	0.47	c	0.324	U	0.324	U	0.324	U	8.092	U
1,2-Dichloroethene, Total	540590	TO15	µg/m3	NBA		NBA		0.159	U	0.159	U	0.159	U	7.926	U
1,2-Dichloropropane	78875	TO15	µg/m3	0.28	c	1.2	c	0.370	U	0.370	U	0.370	U	9.239	U
1,3,5-Trimethylbenzene	108678	TO15	µg/m3	NBA		NBA		0.393	U	0.393	U	0.393	U	9.828	U
1,3-Dichlorobenzene	541731	TO15	µg/m3	NBA		NBA								12.020	U
1,4-Dichlorobenzene	106467	TO15	µg/m3	0.26	c	1.1	c							12.020	U
1,4-Dioxane	123911	TO15	µg/m3	0.56	c	2.5	c							180.110	U
2,2,4-Trimethylpentane	540841	TO15	µg/m3	NBA		NBA		0.187	U	0.187	U	0.187	U	9.339	U

Table A.2-1
Air Data
LO-58
Caribou, Maine

Sample Point ID								LO58-IA01-100712		LO58-IA02-100712		LO58-IA-Dup-01		LO58-SV01-100712	
Sample Description								Indoor Air #1		Indoor Air #2		Indoor Air #2 Dup		Sub-Slab #1	
Sample Date								10/7/2012		10/7/2012		10/7/2012		10/7/2012	
				Screening Toxicity Value (µg/m3)											
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**									
Methyl Ethyl Ketone	78933	TO15	µg/m3	520	n	2200	n							14.740	U
2-Chlorotoluene	95498	TO15	µg/m3	NBA		NBA								10.351	U
Methyl Butyl Ketone	591786	TO15	µg/m3	3.1	n	13	n							20.474	U
Isopropyl alcohol	67630	TO15	µg/m3	21	n	88	n							**761.693**	
4-Ethyltoluene	622968	TO15	µg/m3	NBA		NBA		0.197	U	0.197	U	0.197	U	9.827	U
4-Isopropyltoluene	99876	TO15	µg/m3	NBA		NBA								10.975	U
methyl isobutyl ketone	108101	TO15	µg/m3	310	n	1300	n							20.474	U
Acetone	67641	TO15	µg/m3	3200	n	14000	n							94.980	J
3-Chloropropene	107051	TO15	µg/m3	0.1	n	0.44	n	0.250	U	0.250	U	0.250	U	15.644	U
Benzene	71432	TO15	µg/m3	0.36	c	1.6	c	0.246		0.255		0.236		6.387	U
Benzyl chloride	100447	TO15	µg/m3	0.057	c	0.25	c							10.351	U
Bromodichloromethane	75274	TO15	µg/m3	0.076	c	0.33	c	0.268	U	0.268	U	0.268	U	13.396	U
Bromoethene(Vinyl Bromide)	593602	TO15	µg/m3	0.088	c	0.38	c	0.350	U	0.350	U	0.350	U	8.745	U
Bromoform	75252	TO15	µg/m3	2.6	c	11	c	0.413	U	0.413	U	0.413	U	20.665	U
Bromomethane	74839	TO15	µg/m3	0.52	n	2.2	n	0.311	U	0.311	U	0.311	U	7.763	U
Butadiene	106990	TO15	µg/m3	0.094	c	0.41	c	0.177	U	0.177	U	0.177	U	4.423	U
Carbon disulfide	75150	TO15	µg/m3	73	n	310	n							2.863	J
Carbon tetrachloride	56235	TO15	µg/m3	0.47	c	2	c	0.428		0.434		0.421		12.577	U
Chlorobenzene	108907	TO15	µg/m3	5.2	n	22	n							9.204	U
Dibromochloromethane	124481	TO15	µg/m3	NBA		NBA		0.341	U	0.341	U	0.341	U	17.030	U
Chloroethane	75003	TO15	µg/m3	1000	n	4400	n	0.211	U	0.211	U	0.211	U	13.189	U
Chloroform	67663	TO15	µg/m3	0.12	c	0.53	c	**0.205**		**0.205**		**0.210**		9.761	U
Chloromethane	74873	TO15	µg/m3	9.4	n	39	n							10.321	U
cis-1,2-Dichloroethene	156592	TO15	µg/m3	NBA		NBA		0.159	U	0.159	U	0.159	U	7.926	U
cis-1,3-Dichloropropene	10061015	TO15	µg/m3	NBA		NBA		0.181	U	0.181	U	0.181	U	9.074	U
Cyclohexane	110827	TO15	µg/m3	630	n	2600	n	0.138	U	0.138	U	0.138	U	6.881	U
Dichlorodifluoromethane	75718	TO15	µg/m3	10	n	44	n	3.806		3.757		3.757		4.548	J
Ethylbenzene	100414	TO15	µg/m3	1.1	c	4.9	c	0.360		0.347		0.339		**1.259**	J

Table A.2-1
Air Data
LO-58
Caribou, Maine

							Sample Point ID	LO58-IA01-100712		LO58-IA02-100712		LO58-IA-Dup-01		LO58-SV01-100712	
							Sample Description	Indoor Air #1		Indoor Air #2		Indoor Air #2 Dup		Sub-Slab #1	
							Sample Date	10/7/2012		10/7/2012		10/7/2012		10/7/2012	
				Screening Toxicity Value (µg/m3)											
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]									
Freon TF	76131	TO15	µg/m3	3100	n	13000	n							15.321	U
1,2-Dichlorotetrafluoroethane	76142	TO15	µg/m3	NBA		NBA		0.280	U	0.280	U	0.280	U	13.975	U
Freon 22	75456	TO15	µg/m3	5200	n	22000	n							17.676	U
Hexachlorobutadiene	87683	TO15	µg/m3	0.13	c	0.56	c							21.321	U
Cumene	98828	TO15	µg/m3	42	n	180	n							9.828	U
m-Xylene & p-Xylene	179601231	TO15	µg/m3	10	n	44	n	0.955		0.911		0.911		3.429	J
Methyl methacrylate	80626	TO15	µg/m3	73	n	310	n							20.466	U
Methyl tert-butyl ether	1634044	TO15	µg/m3	11	c	47	c	0.144	U	0.144	U	0.144	U	7.208	U
Methylene Chloride	75092	TO15	µg/m3	63	n	260	n	3.125		3.299		2.778		2.396	J
Naphthalene	91203	TO15	µg/m3	0.083	c	0.36	c							26.202	U
n-Butane	106978	TO15	µg/m3	NBA		NBA								11.881	U
n-Butylbenzene	104518	TO15	µg/m3	NBA		NBA								10.975	U
n-Heptane	142825	TO15	µg/m3	NBA		NBA		1.024		0.860		0.819		8.193	U
n-Hexane	110543	TO15	µg/m3	73	n	310	n	0.321		0.289		0.282	U	7.046	U
n-Propylbenzene	103651	TO15	µg/m3	100	n	440	n							9.828	U
o-Xylene	95476	TO15	µg/m3	10	n	44	n	0.477		0.352		0.386		1.302	J
sec-Butylbenzene	135988	TO15	µg/m3	NBA		NBA								10.975	U
Styrene	100425	TO15	µg/m3	100	n	440	n							8.516	U
tert-Butyl alcohol	75650	TO15	µg/m3	NBA		NBA								151.513	U
tert-Butylbenzene	98066	TO15	µg/m3	NBA		NBA								10.975	U
Tetrachloroethene	127184	TO15	µg/m3	4.2	n	18	n	2.780		2.644		2.644		13.559	U
Tetrahydrofuran	109999	TO15	µg/m3	210	n	880	n							147.404	U
Toluene	108883	TO15	µg/m3	520	n	2200	n	1.846		1.733		1.657		3.051	J
trans-1,2-Dichloroethene	156605	TO15	µg/m3	NBA		NBA		0.159	U	0.159	U	0.159	U	7.926	U
trans-1,3-Dichloropropene	10061026	TO15	µg/m3	NBA		NBA		0.181	U	0.181	U	0.181	U	9.074	U
Trichloroethene	79016	TO15	µg/m3	0.21	n	0.88	n	**3.223**		**3.223**		**3.492**		**2.578**	J
Trichlorofluoromethane	75694	TO15	µg/m3	NBA		NBA		12.917		12.355		12.355		106.706	

Table A.2-1
Air Data
LO-58
Caribou, Maine

							Sample Point ID	LO58-IA01-100712		LO58-IA02-100712		LO58-IA-Dup-01		LO58-SV01-100712	
							Sample Description	Indoor Air #1		Indoor Air #2		Indoor Air #2 Dup		Sub-Slab #1	
							Sample Date	10/7/2012		10/7/2012		10/7/2012		10/7/2012	
				Screening Toxicity Value (µg/m3)											
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**									
Vinyl chloride	75014	TO15	µg/m3	0.17	c	2.8	c	0.204	U	0.204	U	0.204	U	5.110	U
Xylene (total)	1330207	TO15	µg/m3	10	n	44	n	1.432		1.302		1.302		4.775	J

Note: Laboratory provided electronic data for ppb v/v only. Conversions to µg/m3 may not match laboratory reports exactly due to differences in molecular weights and rounding. Also note precision only to two significant figures.

[a] Regional Screening Level (RSL) Residential Air Table (May 2016).

[b] Regional Screening Level (RSL) Industrial Air Table (May 2016).

Bold values indicate exceedance of residential RSL.

Highlghted values indicate exceedance of industrial RSL.

µg/m3 = Micrograms per cubic meter.

C = Cancer based, target risk equals 1E-06.

J = Result is an approximate value.

NBA = No benchmark available.

NC = Noncancer based, target hazard quotient equals 0.1.

U = Not Detected.

Table A.2-1
Air Data
LO-58
Caribou, Maine

							Sample Point ID	LO58-SV02-100712		LO58-SV-Dup-01	
							Sample Description	Sub-Slab #2		Sub-Slab #2 Dup	
							Sample Date	10/7/2012		10/7/2012	
				Screening Toxicity Value (µg/m3)							
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]					
Benzene	71432	MADEP-APH	µg/m3	0.36	c	1.6	c	0.64	U	0.64	U
Butadiene	106990	MADEP-APH	µg/m3	0.094	c	0.41	c	0.44	U	0.44	U
C5-C8 Aliphatics (adjusted)	DEP2038	MADEP-APH	µg/m3	630		2600		130	J	240	J
C9-C10 Aromatics	DEP2039	MADEP-APH	µg/m3	52		220		24		25	
C9-C12 Aliphatics (adjusted)	DEP2040	MADEP-APH	µg/m3	210		880		190	J	**270**	J
Ethylbenzene	100414	MADEP-APH	µg/m3	1.1	c	4.9	c	**2**		**2**	
Methyl tert-butyl ether	1634044	MADEP-APH	µg/m3	11	c	47	c	0.72	U	0.72	U
m-Xylene & p-Xylene	179601231	MADEP-APH	µg/m3	10	n	44	n	5.9		5.5	
Naphthalene	91203	MADEP-APH	µg/m3	0.083	c	0.36	c	**1.2**		**1.4**	
o-Xylene	95476	MADEP-APH	µg/m3	10	n	44	n	2.7		2.7	
Toluene	108883	MADEP-APH	µg/m3	520	n	2200	n	2.1		2.6	
1,1,1-Trichloroethane	71556	TO15	µg/m3	520	n	2200	n	0.245	J	0.251	J
1,1,2,2-Tetrachloroethane	79345	TO15	µg/m3	0.048	c	0.21	c	1.372	U	1.372	U
1,1,2-Trichloroethane	79005	TO15	µg/m3	0.021	n	0.088	n	1.091	U	1.091	U
1,1-Dichloroethane	75343	TO15	µg/m3	1.8	c	7.7	c	0.809	U	0.809	U
1,1-Dichloroethene	75354	TO15	µg/m3	21	n	88	n	0.793	U	0.793	U
1,2,4-Trichlorobenzene	120821	TO15	µg/m3	0.21	n	0.88	n	3.709	U	3.709	U
1,2,4-Trimethylbenzene	95636	TO15	µg/m3	0.73	n	3.1	n	**3.145**		**3.194**	
1,2-Dibromoethane	106934	TO15	µg/m3	0.0047	c	0.02	c	1.536	U	1.536	U
1,2-Dichlorobenzene	95501	TO15	µg/m3	21	n	88	n	1.202	U	1.202	U
1,2-Dichloroethane	107062	TO15	µg/m3	0.11	c	0.47	c	0.809	U	0.809	U
1,2-Dichloroethene, Total	540590	TO15	µg/m3	NBA		NBA		0.793	U	0.793	U
1,2-Dichloropropane	78875	TO15	µg/m3	0.28	c	1.2	c	0.924	U	0.924	U
1,3,5-Trimethylbenzene	108678	TO15	µg/m3	NBA		NBA		0.835	J	0.786	J
1,3-Dichlorobenzene	541731	TO15	µg/m3	NBA		NBA		1.863		2.524	
1,4-Dichlorobenzene	106467	TO15	µg/m3	0.26	c	1.1	c	**0.367**	J	1.202	U
1,4-Dioxane	123911	TO15	µg/m3	0.56	c	2.5	c	18.011	U	**0.648**	J
2,2,4-Trimethylpentane	540841	TO15	µg/m3	NBA		NBA		0.934	U	0.934	U

Table A.2-1
Air Data
LO-58
Caribou, Maine

						Sample Point ID		**LO58-SV02-100712**		**LO58-SV-Dup-01**	
						Sample Description		**Sub-Slab #2**		**Sub-Slab #2 Dup**	
						Sample Date		**10/7/2012**		**10/7/2012**	
				Screening Toxicity Value (µg/m3)							
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]					
Methyl Ethyl Ketone	78933	TO15	µg/m3	520	n	2200	n	2.123		4.127	
2-Chlorotoluene	95498	TO15	µg/m3	NBA		NBA		1.035	U	1.035	U
Methyl Butyl Ketone	591786	TO15	µg/m3	3.1	n	13	n	0.278	J	0.860	J
Isopropyl alcohol	67630	TO15	µg/m3	21	n	88	n	**44.227**		**51.599**	
4-Ethyltoluene	622968	TO15	µg/m3	NBA		NBA		0.884	J	0.934	J
4-Isopropyltoluene	99876	TO15	µg/m3	NBA		NBA		1.536		0.538	J
methyl isobutyl ketone	108101	TO15	µg/m3	310	n	1300	n	0.737	J	1.024	J
Acetone	67641	TO15	µg/m3	3200	n	14000	n	16.384		26.119	
3-Chloropropene	107051	TO15	µg/m3	0.1	n	0.44	n	1.564	U	1.564	U
Benzene	71432	TO15	µg/m3	0.36	c	1.6	c	0.185	J	0.144	J
Benzyl chloride	100447	TO15	µg/m3	0.057	c	0.25	c	1.035	U	1.035	U
Bromodichloromethane	75274	TO15	µg/m3	0.076	c	0.33	c	1.340	U	1.340	U
Bromoethene(Vinyl Bromide)	593602	TO15	µg/m3	0.088	c	0.38	c	0.874	U	0.874	U
Bromoform	75252	TO15	µg/m3	2.6	c	11	c	2.066	U	2.066	U
Bromomethane	74839	TO15	µg/m3	0.52	n	2.2	n	0.776	U	0.776	U
Butadiene	106990	TO15	µg/m3	0.094	c	0.41	c	0.442	U	0.442	U
Carbon disulfide	75150	TO15	µg/m3	73	n	310	n	29.257	J	2.739	J
Carbon tetrachloride	56235	TO15	µg/m3	0.47	c	2	c	0.390	J	0.377	J
Chlorobenzene	108907	TO15	µg/m3	5.2	n	22	n	0.920	U	0.920	U
Dibromochloromethane	124481	TO15	µg/m3	NBA		NBA		1.703	U	1.703	U
Chloroethane	75003	TO15	µg/m3	1000	n	4400	n	1.319	U	1.319	U
Chloroform	67663	TO15	µg/m3	0.12	c	0.53	c	**8.785**		**9.273**	
Chloromethane	74873	TO15	µg/m3	9.4	n	39	n	0.227	J	0.268	J
cis-1,2-Dichloroethene	156592	TO15	µg/m3	NBA		NBA		0.793	U	0.793	U
cis-1,3-Dichloropropene	10061015	TO15	µg/m3	NBA		NBA		0.907	U	0.907	U
Cyclohexane	110827	TO15	µg/m3	630	n	2600	n	0.237	J	0.688	U
Dichlorodifluoromethane	75718	TO15	µg/m3	10	n	44	n	3.262		2.818	
Ethylbenzene	100414	TO15	µg/m3	1.1	c	4.9	c	**1.563**		**1.302**	

Table A.2-1
Air Data
LO-58
Caribou, Maine

							Sample Point ID	LO58-SV02-100712		LO58-SV-Dup-01	
							Sample Description	Sub-Slab #2		Sub-Slab #2 Dup	
							Sample Date	10/7/2012		10/7/2012	
				Screening Toxicity Value (µg/m3)							
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**					
Freon TF	76131	TO15	µg/m3	3100	n	13000	n	0.621	J	0.598	J
1,2-Dichlorotetrafluoroethane	76142	TO15	µg/m3	NBA		NBA		1.398	U	1.398	U
Freon 22	75456	TO15	µg/m3	5200	n	22000	n	0.813	J	0.778	J
Hexachlorobutadiene	87683	TO15	µg/m3	0.13	c	0.56	c	2.132	U	2.132	U
Cumene	98828	TO15	µg/m3	42	n	180	n	0.835	J	0.162	J
m-Xylene & p-Xylene	179601231	TO15	µg/m3	10	n	44	n	4.774		3.950	
Methyl methacrylate	80626	TO15	µg/m3	73	n	310	n	0.372	J	0.450	J
Methyl tert-butyl ether	1634044	TO15	µg/m3	11	c	47	c	0.721	U	0.721	U
Methylene Chloride	75092	TO15	µg/m3	63	n	260	n	1.736	U	1.736	U
Naphthalene	91203	TO15	µg/m3	0.083	c	0.36	c	**0.472**	J	**0.524**	J
n-Butane	106978	TO15	µg/m3	NBA		NBA		1.354		1.188	U
n-Butylbenzene	104518	TO15	µg/m3	NBA		NBA		0.384	J	0.433	J
n-Heptane	142825	TO15	µg/m3	NBA		NBA		0.266	J	0.274	J
n-Hexane	110543	TO15	µg/m3	73	n	310	n	0.222	J	0.229	J
n-Propylbenzene	103651	TO15	µg/m3	100	n	440	n	0.541	J	0.590	J
o-Xylene	95476	TO15	µg/m3	10	n	44	n	1.953		1.649	
sec-Butylbenzene	135988	TO15	µg/m3	NBA		NBA		1.097	U	1.097	U
Styrene	100425	TO15	µg/m3	100	n	440	n	0.396	J	1.277	J
tert-Butyl alcohol	75650	TO15	µg/m3	NBA		NBA		0.261	J	0.758	J
tert-Butylbenzene	98066	TO15	µg/m3	NBA		NBA		1.097	U	1.097	U
Tetrachloroethene	127184	TO15	µg/m3	4.2	n	18	n	1.695		2.102	
Tetrahydrofuran	109999	TO15	µg/m3	210	n	880	n	0.501	J	1.297	J
Toluene	108883	TO15	µg/m3	520	n	2200	n	1.883		1.883	
trans-1,2-Dichloroethene	156605	TO15	µg/m3	NBA		NBA		0.793	U	0.793	U
trans-1,3-Dichloropropene	10061026	TO15	µg/m3	NBA		NBA		0.907	U	0.907	U
Trichloroethene	79016	TO15	µg/m3	0.21	n	0.88	n	**6.446**		**6.983**	
Trichlorofluoromethane	75694	TO15	µg/m3	NBA		NBA		30.327		32.012	

Table A.2-1
Air Data
LO-58
Caribou, Maine

							Sample Point ID	LO58-SV02-100712		LO58-SV-Dup-01	
							Sample Description	Sub-Slab #2		Sub-Slab #2 Dup	
							Sample Date	10/7/2012		10/7/2012	
				Screening Toxicity Value (μg/m3)							
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**					
Vinyl chloride	75014	TO15	μg/m3	0.17	c	2.8	c	0.511	U	0.511	U
Xylene (total)	1330207	TO15	μg/m3	10	n	44	n	6.511		5.643	

Note: Laboratory provided electronic data for ppb v/v only. Conversions to μg/m3 may not match laboratory reports exactly due to differences in molecular weights and rounding. Also note precision only to two significant figures.

[a] Regional Screening Level (RSL) Residential Air Table (May 2016).

[b] Regional Screening Level (RSL) Industrial Air Table (May 2016).

Bold values indicate exceedance of residential RSL.

Highlghted values indicate exceedance of industrial RSL.

μg/m3 = Micrograms per cubic meter.

C = Cancer based, target risk equals 1E-06.

J = Result is an approximate value.

NBA = No benchmark available.

NC = Noncancer based, target hazard quotient equals 0.1.

U = Not Detected.

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-DW01-100512		LO58-DUP-01		LO58-DW02-100512		LO58-DW03-100312		LO58-DW04-100812	
				Sample Description		Drinking Water		DUP OF DW01		Drinking Water		Drinking Water		Drinking Water	
				Sample Date		10/5/2012		10/5/2012		10/5/2012		10/3/2012		10/8/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value**^{a}											
C9-C18 Aliphatic Hydrocarbons	EPH2	MADEP EPH	µg/L	NBA		200	U	200	U	200	U	202	U	200	U
C11-C22 Aromatic Hydrocarbons	EPH4	MADEP EPH	µg/L	NBA		150	U	150	U	150	U	152	U	150	U
C19-C36 Aliphatic Hydrocarbons	EPH3	MADEP EPH	µg/L	NBA		200	U	200	U	200	U	202	U	200	U
Unadjusted C11-C22 Aromatics	EPH1	MADEP EPH	µg/L	NBA		150	U	150	U	150	U	152	U	150	U
C5-C8 Aliphatics Hydrocarbons	VPH3	MADEP VPH	µg/L	NBA		50	U	50	U	50	U	50	U	50	U
C9-C10 Aromatic Hydrocarbons	VPH5	MADEP VPH	µg/L	NBA		15		14		10	U	10	U	10	U
C9-C12 Aliphatic Hydrocarbons	VPH4	MADEP VPH	µg/L	NBA		50	U	50	U	50	U	50	U	50	U
Unadjusted C5-C8 Aliphatics	VPH1	MADEP VPH	µg/L	NBA		50	U	50	U	50	U	50	U	50	U
Unadjusted C9-C12 Aliphatics	VPH2	MADEP VPH	µg/L	NBA		50	U	50	U	50	U	50	U	50	U
Aluminum	7429905	6010C	µg/L	2000	n	992		784		200	U	200	U	200	U
Antimony	7440360	6010C	µg/L	0.78	n	60	U	60	U	60	U	60	U	60	U
Arsenic	7440382	6010C	µg/L	0.052	c	10	U	10	U	10	U	10	U	10	U
Barium	7440393	6010C	µg/L	380	n	51.3	J	50.6	J	53	J	43.5	J	40.9	J
Beryllium	7440417	6010C	µg/L	2.5	n	5	U	5	U	5	U	5	U	5	U
Cadmium	7440439	6010C	µg/L	0.92	n	5	U	5	U	5	U	5	U	5	U
Calcium	7440702	6010C	µg/L	NBA		93200		93000		92600		79800		77800	
Chromium	7440473	6010C	µg/L	0.035	c	**2.4**	J	**2.1**	J	10	U	10	U	**1.2**	J
Cobalt	7440484	6010C	µg/L	0.6	n	50	U	50	U	50	U	50	U	50	U
Copper	7440508	6010C	µg/L	80	n	62.3		45.6		45		11.9	J	27.9	
Iron	7439896	6010C	µg/L	1400	n	1280		965		200	U	200	U	200	U
Lead	7439921	6010C	µg/L	15		11.5		12.6		10	U	10	U	10	U
Magnesium	7439954	6010C	µg/L	NBA		7090		7120		10100		12900		12900	
Manganese	7439965	6010C	µg/L	43	n	**67**		42.6		15	U	15	U	15	U
Nickel	7440020	6010C	µg/L	39	n	2.6	J	3	J	40	U	40	U	40	U
Potassium	7440097	6010C	µg/L	NBA		1370	J	1320	J	2130	J	676	J	1210	J
Selenium	7782492	6010C	µg/L	10	n	35	U	35	U	35	U	35	U	35	U
Silver	7440224	6010C	µg/L	9.4	n	10	U	10	U	10	U	10	U	10	U
Sodium	7440235	6010C	µg/L	NBA		12100		12300		23700		5790		8100	

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-DW01-100512		LO58-DUP-01		LO58-DW02-100512		LO58-DW03-100312		LO58-DW04-100812	
				Sample Description		Drinking Water		DUP OF DW01		Drinking Water		Drinking Water		Drinking Water	
				Sample Date		10/5/2012		10/5/2012		10/5/2012		10/3/2012		10/8/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value[a]**											
Thallium	7440280	6010C	µg/L	0.02	n	25	U	25	U	25	U	25	U	25	U
Vanadium	7440622	6010C	µg/L	8.6	n	1.6	J	1.6	J	50	U	50	U	50	U
Zinc	7440666	6010C	µg/L	600	n	37.9		46.7		10	J	39.7		13.9	J
Mercury	7439976	7470A	µg/L	0.063	n	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
PCB-1016	12674112	8082A	µg/L	0.14	n	0.47	U	0.48	U	0.49	U	0.48	U	0.47	U
PCB-1221	11104282	8082A	µg/L	0.0047	c	0.47	U	0.48	U	0.49	U	0.48	U	0.47	U
PCB-1232	11141165	8082A	µg/L	0.0047	c	0.47	U	0.48	U	0.49	U	0.48	U	0.47	U
PCB-1242	53469219	8082A	µg/L	0.0078	c	0.47	U	0.48	U	0.49	U	0.48	U	0.47	U
PCB-1248	12672296	8082A	µg/L	0.0078	c	0.47	U	0.48	U	0.49	U	0.48	U	0.47	U
PCB-1254	11097691	8082A	µg/L	0.0078	c	0.47	U	0.48	U	0.49	U	0.48	U	0.47	U
PCB-1260	11096825	8082A	µg/L	0.0078	c	0.47	U	0.48	U	0.49	U	0.48	U	0.47	U
PCB-1262	37324235	8082A	µg/L	NBA		0.47	U	0.48	U	0.49	U	0.48	U	0.47	U
PCB-1268	11100144	8082A	µg/L	NBA		0.47	U	0.48	U	0.49	U	0.48	U	0.47	U
1,1,1,2-Tetrachloroethane	630206	8260B	µg/L	0.57	c	1	U	1	U	1	U	1	U	1	U
1,1,1-Trichloroethane	71556	8260B	µg/L	800	n	1	U	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	79345	8260B	µg/L	0.076	c	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	79005	8260B	µg/L	0.041	n	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethane	75343	8260B	µg/L	2.8	c	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethene	75354	8260B	µg/L	28	n	1	U	1	U	1	U	1	U	1	U
1,1-Dichloropropene	563586	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	1	U
1,2,3-Trichlorobenzene	87616	8260B	µg/L	0.7	n	1	U	1	U	1	U	1	U	1	U
1,2,3-Trichloropropane	96184	8260B	µg/L	0.00075	c	1	U	1	U	1	U	1	U	1	U
1,2,4-Trichlorobenzene	120821	8260B	µg/L	0.4	n	1	U	1	U	1	U	1	U	1	U
1,2,4-Trimethylbenzene	95636	8260B	µg/L	1.5	n	1	U	1	U	1	U	1	U	1	U
1,2-Dibromo-3-Chloropropane	96128	8260B	µg/L	0.00033	c	1	U	1	U	1	U	1	U	1	U
1,2-Dibromoethane	106934	8260B	µg/L	0.0075	c	1	U	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	95501	8260B	µg/L	30	n	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethane	107062	8260B	µg/L	0.17	c	1	U	1	U	1	U	1	U	1	U

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

					Sample Point ID	LO58-DW01-100512		LO58-DUP-01		LO58-DW02-100512		LO58-DW03-100312		LO58-DW04-100812	
					Sample Description	Drinking Water		DUP OF DW01		Drinking Water		Drinking Water		Drinking Water	
					Sample Date	10/5/2012		10/5/2012		10/5/2012		10/3/2012		10/8/2012	
Analyte	CAS Number	Method	Units	Screening Toxicity Value[a]											
1,2-Dichloroethene, Total	540590	8260B	µg/L	NBA		8.6		9.2		1	U	1	U	1	U
1,2-Dichloropropane	78875	8260B	µg/L	0.44	c	1	U	1	U	1	U	1	U	1	U
1,3,5-Trimethylbenzene	108678	8260B	µg/L	12	n	1	U	1	U	1	U	1	U	1	U
1,3-Dichlorobenzene	541731	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	1	U
1,3-Dichloropropane	142289	8260B	µg/L	37	n	1	U	1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	106467	8260B	µg/L	0.48	c	1	U	1	U	1	U	1	U	1	U
1,4-Dioxane	123911	8260B	µg/L	0.46	c	50	U	50	U	50	U	50	U	50	U
2,2-Dichloropropane	594207	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	1	U
2-Butanone	78933	8260B	µg/L	560	n	5	U	5	U	5	U	5	U	5	U
2-Chloroethyl vinyl ether	110758	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	1	U
2-Chlorotoluene	95498	8260B	µg/L	24	n	1	U	1	U	1	U	1	U	1	U
2-Hexanone	591786	8260B	µg/L	3.8	n	5	U	5	U	5	U	5	U	5	U
4-Isopropyltoluene	99876	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	1	U
4-Methyl-2-pentanone	108101	8260B	µg/L	630	n	5	U	5	U	5	U	5	U	5	U
Acetone	67641	8260B	µg/L	1400	n	5	U	5	U	5	U	5	U	5	U
Benzene	71432	8260B	µg/L	0.46	c	1	U	1	U	1	U	1	U	1	U
Bromobenzene	108861	8260B	µg/L	6.2	n	1	U	1	U	1	U	1	U	1	U
Bromochloromethane	74975	8260B	µg/L	8.3	n	1	U	1	U	1	U	1	U	1	U
Bromodichloromethane	75274	8260B	µg/L	0.13	c	1	U	1	U	1	U	1	U	1	U
Bromoform	75252	8260B	µg/L	3.3	c	1	U	1	U	1	U	1	U	1	U
Bromomethane	74839	8260B	µg/L	0.75	n	1	U	1	U	1	U	1	U	1	U
Carbon disulfide	75150	8260B	µg/L	81	n	1	U	1	U	1	U	1	U	1	U
Carbon tetrachloride	56235	8260B	µg/L	0.46	c	1	U	1	U	1	U	1	U	1	U
Chlorobenzene	108907	8260B	µg/L	7.8	n	1	U	1	U	1	U	1	U	1	U
Dibromochloromethane	124481	8260B	µg/L	0.87	c	1	U	1	U	1	U	1	U	1	U
Chloroethane	75003	8260B	µg/L	2100	n	1	U	1	U	1	U	1	U	1	U
Chloroform	67663	8260B	µg/L	0.22	c	1	U	1	U	1	U	1	U	1	U
Chloromethane	74873	8260B	µg/L	19	n	1	U	1	U	1	U	1	U	1	U

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-DW01-100512		LO58-DUP-01		LO58-DW02-100512		LO58-DW03-100312		LO58-DW04-100812	
				Sample Description		Drinking Water		DUP OF DW01		Drinking Water		Drinking Water		Drinking Water	
				Sample Date		10/5/2012		10/5/2012		10/5/2012		10/3/2012		10/8/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value**^{a}											
cis-1,2-Dichloroethene	156592	8260B	µg/L	3.6	n	**8.6**		**9.2**		1	U	1	U	1	U
cis-1,3-Dichloropropene	10061015	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	1	U
Cyclohexane	110827	8260B	µg/L	1300	n	1	U	1	U	1	U	1	U	1	U
Dibromomethane	74953	8260B	µg/L	0.83	n	1	U	1	U	1	U	1	U	1	U
Dichlorodifluoromethane	75718	8260B	µg/L	20	n	1	U	1	U	1	U	1	U	1	U
Ethylbenzene	100414	8260B	µg/L	1.5	c	1	U	1	U	1	U	1	U	1	U
Freon TF	76131	8260B	µg/L	5500	n	1	U	1	U	1	U	1	U	1	U
Hexachlorobutadiene	87683	8260B	µg/L	0.14	c	1	U	1	U	1	U	1	U	1	U
Methyl iodide	74884	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	1	U
Isobutyl alcohol	78831	8260B	µg/L	590	n	50	U	50	U	50	U	50	U	50	U
Isopropylbenzene	98828	8260B	µg/L	45	n	1	U	1	U	1	U	1	U	1	U
m&p-Xylene	179601231	8260B	µg/L	19	n	1	U	1	U	1	U	1	U	1	U
Methyl acetate	79209	8260B	µg/L	2000	n	1	U	1	U	1	U	1	U	1	U
Methylcyclohexane	108872	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	1	U
Methyl t-butyl ether	1634044	8260B	µg/L	14	c	1	U	1	U	1	U	1	U	1	U
Methylene Chloride	75092	8260B	µg/L	11	n	1	U	1	U	1	U	1	U	1	U
Naphthalene	91203	8260B	µg/L	0.17	c	**0.32**	J	**0.4**	J	1	U	1	U	1	U
n-Butylbenzene	104518	8260B	µg/L	100	n	1	U	1	U	1	U	1	U	1	U
n-Propylbenzene	103651	8260B	µg/L	66	n	1	U	1	U	1	U	1	U	1	U
o-Xylene	95476	8260B	µg/L	19	n	1	U	1	U	1	U	1	U	1	U
4-Chlorotoluene	106434	8260B	µg/L	25	n	1	U	1	U	1	U	1	U	1	U
sec-Butylbenzene	135988	8260B	µg/L	200	n	0.49	J	0.51	J	1	U	1	U	1	U
Styrene	100425	8260B	µg/L	120	n	1	U	1	U	1	U	1	U	1	U
tert-Butylbenzene	98066	8260B	µg/L	69	n	1	U	1	U	1	U	1	U	1	U
Tetrachloroethene	127184	8260B	µg/L	4.1	n	1	U	1	U	1	U	1	U	1	U
Tetrahydrofuran	109999	8260B	µg/L	340	n	14	U	14	U	14	U	14	U	14	U
Toluene	108883	8260B	µg/L	110	n	1	U	1	U	1	U	1	U	1	U
trans-1,2-Dichloroethene	156605	8260B	µg/L	36	n	1	U	1	U	1	U	1	U	1	U

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

				Sample Point ID		**LO58-DW01-100512**		**LO58-DUP-01**		**LO58-DW02-100512**		**LO58-DW03-100312**		**LO58-DW04-100812**	
				Sample Description		**Drinking Water**		**DUP OF DW01**		**Drinking Water**		**Drinking Water**		**Drinking Water**	
				Sample Date		**10/5/2012**		**10/5/2012**		**10/5/2012**		**10/3/2012**		**10/8/2012**	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value**[a]											
trans-1,3-Dichloropropene	10061026	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	1	U
Trichloroethene	79016	8260B	µg/L	0.28	n	**7.1**		**7.4**		1	U	1	U	1	U
Trichlorofluoromethane	75694	8260B	µg/L	520	n	1	U	1	U	1	U	1	U	1	U
Vinyl acetate	108054	8260B	µg/L	41	n	1	UJ	1	UJ	1	U	1	U	1	UJ
Vinyl chloride	75014	8260B	µg/L	0.019	c	1	U	1	U	1	U	1	U	1	U
Xylenes, Total	1330207	8260B	µg/L	19	n	1	U	1	U	1	U	1	U	1	U
1,1'-Biphenyl	92524	8270C PAH	µg/L	0.083	n	**0.15**	J	**0.099**	J	0.019	U	0.019	U	0.05	
1-Methylnaphthalene	90120	8270C PAH	µg/L	1.1	c	0.37		0.31		0.019	U	0.019	U	0.012	J
1-Methylphenanthrene	832699	8270C PAH	µg/L	NBA		0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
2,3,5-Trimethylnaphthalene	2245387	8270C PAH	µg/L	NBA		0.06		0.051		0.019	U	0.019	U	0.019	U
2,6-Dimethylnaphthalene	581420	8270C PAH	µg/L	NBA		0.11	J	0.08	J	0.019	U	0.019	U	0.019	U
2-Methylnaphthalene	91576	8270C PAH	µg/L	3.6	n	0.017	J	0.014	J	0.019	U	0.019	U	0.019	U
Acenaphthene	83329	8270C PAH	µg/L	53	n	0.13		0.12		0.019	U	0.019	U	0.019	U
Acenaphthylene	208968	8270C PAH	µg/L	53	n	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
Anthracene	120127	8270C PAH	µg/L	180	n	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
Benzo[a]anthracene	56553	8270C PAH	µg/L	0.012	c	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
Benzo[a]pyrene	50328	8270C PAH	µg/L	0.0034	c	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
Benzo[b]fluoranthene	205992	8270C PAH	µg/L	0.034	c	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
Benzo[e]pyrene	192972	8270C PAH	µg/L	NBA		0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
Benzo[g,h,i]perylene	191242	8270C PAH	µg/L	0.17	c	0.019	U	0.019	U	0.019	U	0.0054	J	0.019	U
Benzo[k]fluoranthene	207089	8270C PAH	µg/L	0.34	c	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
Chrysene	218019	8270C PAH	µg/L	3.4	c	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
Dibenz(a,h)anthracene	53703	8270C PAH	µg/L	0.0034	c	0.019	U	0.019	U	0.019	U	**0.0049**	J	0.019	U
Dibenzothiophene	132650	8270C PAH	µg/L	6.5	n	0.044		0.037		0.019	U	0.019	U	0.019	U
Fluoranthene	206440	8270C PAH	µg/L	80	n	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
Fluorene	86737	8270C PAH	µg/L	29	n	0.17		0.15		0.019	U	0.019	U	0.019	U
Indeno[1,2,3-cd]pyrene	193395	8270C PAH	µg/L	0.034	c	0.019	U	0.019	U	0.019	U	0.0066	J	0.019	U
Naphthalene	91203	8270C PAH	µg/L	0.17	c	0.045		0.042		0.019	U	0.019	U	0.0067	J

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-DW01-100512		LO58-DUP-01		LO58-DW02-100512		LO58-DW03-100312		LO58-DW04-100812	
				Sample Description		Drinking Water		DUP OF DW01		Drinking Water		Drinking Water		Drinking Water	
				Sample Date		10/5/2012		10/5/2012		10/5/2012		10/3/2012		10/8/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value[a]**											
Perylene	198550	8270C PAH	µg/L	NBA		0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
Phenanthrene	85018	8270C PAH	µg/L	180	n	0.02		0.015	J	0.019	U	0.019	U	0.019	U
Pyrene	129000	8270C PAH	µg/L	12	n	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
1,1'-Biphenyl	92524	8270D	µg/L	0.083	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
1,2,4,5-Tetrachlorobenzene	95943	8270D	µg/L	0.17	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
1,2,4-Trichlorobenzene	120821	8270D	µg/L	0.4	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
1,2-Dichlorobenzene	95501	8270D	µg/L	30	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
1,3-Dichlorobenzene	541731	8270D	µg/L	NBA		9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
1,4-Dichlorobenzene	106467	8270D	µg/L	0.48	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
1-Methylnaphthalene	90120	8270D	µg/L	1.1	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
2,3,4,6-Tetrachlorophenol	58902	8270D	µg/L	24	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
2,4,5-Trichlorophenol	95954	8270D	µg/L	120	n	24	U	24	U	24	U	24	U	24	U
2,4,6-Trichlorophenol	88062	8270D	µg/L	1.2	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
2,4-Dichlorophenol	120832	8270D	µg/L	4.6	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
2,4-Dimethylphenol	105679	8270D	µg/L	36	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
2,4-Dinitrophenol	51285	8270D	µg/L	3.9	n	24	U	24	U	24	U	24	U	24	U
2,4-Dinitrotoluene	121142	8270D	µg/L	0.24	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
2,6-Dichlorophenol	87650	8270D	µg/L	NBA		9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
2,6-Dinitrotoluene	606202	8270D	µg/L	0.049	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
2-Chloronaphthalene	91587	8270D	µg/L	75	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
2-Chlorophenol	95578	8270D	µg/L	9.1	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
2-Methylnaphthalene	91576	8270D	µg/L	3.6	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
2-Methylphenol	95487	8270D	µg/L	93	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
2-Nitroaniline	88744	8270D	µg/L	19	n	24	U	24	U	24	U	24	U	24	U
2-Nitrophenol	88755	8270D	µg/L	NBA		9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
3 & 4 Methylphenol	15831104	8270D	µg/L	NBA		9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
3,3'-Dichlorobenzidine	91941	8270D	µg/L	0.13	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
3-Nitroaniline	99092	8270D	µg/L	NBA		24	U	24	U	24	U	24	U	24	U

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-DW01-100512		LO58-DUP-01		LO58-DW02-100512		LO58-DW03-100312		LO58-DW04-100812	
				Sample Description		Drinking Water		DUP OF DW01		Drinking Water		Drinking Water		Drinking Water	
				Sample Date		10/5/2012		10/5/2012		10/5/2012		10/3/2012		10/8/2012	
Analyte	CAS Number	Method	Units	Screening Toxicity Value[a]											
4,6-Dinitro-2-methylphenol	534521	8270D	µg/L	0.15	n	24	U	24	U	24	U	24	U	24	U
4-Bromophenyl phenyl ether	101553	8270D	µg/L	NBA		9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
4-Chloro-3-methylphenol	59507	8270D	µg/L	140	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
4-Chloroaniline	106478	8270D	µg/L	0.37	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
4-Chlorophenyl phenyl ether	7005723	8270D	µg/L	NBA		9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
4-Nitroaniline	100016	8270D	µg/L	3.8	c	24	U	24	U	24	U	24	U	24	U
4-Nitrophenol	100027	8270D	µg/L	NBA		24	U	24	U	24	U	24	UJ	24	U
Acenaphthene	83329	8270D	µg/L	53	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Acenaphthylene	208968	8270D	µg/L	53	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Acetophenone	98862	8270D	µg/L	190	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Aniline	62533	8270D	µg/L	13	c	24	U	24	U	24	U	24	U	24	U
Anthracene	120127	8270D	µg/L	180	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Atrazine	1912249	8270D	µg/L	0.3	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Azobenzene	103333	8270D	µg/L	0.12	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Benzaldehyde	100527	8270D	µg/L	19	c	24	U	24	U	24	U	24	U	24	U
Benzidine	92875	8270D	µg/L	0.00011	c		R		R		R		R		R
Benzo[a]anthracene	56553	8270D	µg/L	0.012	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Benzo[a]pyrene	50328	8270D	µg/L	0.0034	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Benzo[b]fluoranthene	205992	8270D	µg/L	0.034	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Benzo[e]pyrene	192972	8270D	µg/L	NBA		9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Benzo[g,h,i]perylene	191242	8270D	µg/L	0.17	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Benzo[k]fluoranthene	207089	8270D	µg/L	0.34	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Benzoic acid	65850	8270D	µg/L	7500	n		R		R	100	U	100	U		R
Benzyl alcohol	100516	8270D	µg/L	200	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Bis(2-chloroethoxy)methane	111911	8270D	µg/L	5.9	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Bis(2-chloroethyl)ether	111444	8270D	µg/L	0.014	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
2,2'-oxybis[1-chloropropane]	108601	8270D	µg/L	71	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Bis(2-ethylhexyl) phthalate	117817	8270D	µg/L	5.6	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-DW01-100512		LO58-DUP-01		LO58-DW02-100512		LO58-DW03-100312		LO58-DW04-100812	
				Sample Description		Drinking Water		DUP OF DW01		Drinking Water		Drinking Water		Drinking Water	
				Sample Date		10/5/2012		10/5/2012		10/5/2012		10/3/2012		10/8/2012	
Analyte	CAS Number	Method	Units	Screening Toxicity Value[a]											
Butyl benzyl phthalate	85687	8270D	µg/L	16	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Caprolactam	105602	8270D	µg/L	990	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Carbazole	86748	8270D	µg/L	NBA		9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Chrysene	218019	8270D	µg/L	3.4	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Dibenz(a,h)anthracene	53703	8270D	µg/L	0.0034	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Dibenzofuran	132649	8270D	µg/L	0.79	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Diethyl phthalate	84662	8270D	µg/L	1500	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Dimethyl phthalate	131113	8270D	µg/L	NBA		9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Di-n-butyl phthalate	84742	8270D	µg/L	90	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Di-n-octyl phthalate	117840	8270D	µg/L	20	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Fluoranthene	206440	8270D	µg/L	80	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Fluorene	86737	8270D	µg/L	29	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Hexachlorobenzene	118741	8270D	µg/L	0.0098	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Hexachlorobutadiene	87683	8270D	µg/L	0.14	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Hexachlorocyclopentadiene	77474	8270D	µg/L	0.041	n	9.5	U	9.5	U	9.5	UJ	9.5	U	9.4	U
Hexachloroethane	67721	8270D	µg/L	0.33	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Indeno[1,2,3-cd]pyrene	193395	8270D	µg/L	0.034	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Isophorone	78591	8270D	µg/L	78	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Naphthalene	91203	8270D	µg/L	0.17	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Nitrobenzene	98953	8270D	µg/L	0.14	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
N-Nitrosodimethylamine	62759	8270D	µg/L	0.00011	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
N-Nitrosodi-n-propylamine	621647	8270D	µg/L	0.011	c	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
N-Nitrosodiphenylamine	86306	8270D	µg/L	12	c	11	U	11	U	11	U	11	U	11	U
Pentachlorophenol	87865	8270D	µg/L	0.041	c	24	U	24	U	24	U	24	U	24	U
Perylene	198550	8270D	µg/L	NBA		9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Phenanthrene	85018	8270D	µg/L	180	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Phenol	108952	8270D	µg/L	580	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Pyrene	129000	8270D	µg/L	12	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

					Sample Point ID	LO58-DW01-100512		LO58-DUP-01		LO58-DW02-100512		LO58-DW03-100312		LO58-DW04-100812	
					Sample Description	Drinking Water		DUP OF DW01		Drinking Water		Drinking Water		Drinking Water	
					Sample Date	10/5/2012		10/5/2012		10/5/2012		10/3/2012		10/8/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value[a]**											
Pyridine	110861	8270D	µg/L	2	n	9.5	U	9.5	U	9.5	U	9.5	U	9.4	U
Nitrate as N	14797558	9056 N	mg/L	3200	n	1.5		1.5		8.2		9.5		8.3	
Nitrite as N	14797650	9056 N	mg/L	200	n	0.11	J	0.095	J	0.5	U	0.5	U	0.5	U
1,1-Dimethylhydrazine	57147	Hydrazines	µg/L	0.00042	n	10	U	10	U	10	U	10	U	10	U
Hydrazine	302012	Hydrazines	µg/L	0.0011	c	5	U	5	U	5	U	5	U	5	U
Monomethyl Hydrazine	60344	Hydrazines	µg/L	0.0042	n	10	U	10	U	10	U	10	U	10	U

[a] Regional Screening Level (RSL) Residential Tapwater Table (May 2016).

Bold values indicate exceedance of residential RSL.

µg/L = Micrograms per liter.

C = Cancer based, target risk equals 1E-06.

J = Result is <RL but >=MDL and the concentration is an approximate value.

mg/L = Milligrams per liter.

NBA = No benchmark available.

N = Noncancer based, target hazard quotient equals 0.1.

R = Rejected; result not valid due to quality control failure.

U = Not detected.

UJ = Not detected. SQL is <RL but >=MDL and the SQL is an approximate value.

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-DW-TB01		LO58-DW-TB02	
				Sample Description		Trip Blank		Trip Blank	
				Sample Date		10/7/2012		10/7/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value[a]**					
C9-C18 Aliphatic Hydrocarbons	EPH2	MADEP EPH	µg/L	NBA					
C11-C22 Aromatic Hydrocarbons	EPH4	MADEP EPH	µg/L	NBA					
C19-C36 Aliphatic Hydrocarbons	EPH3	MADEP EPH	µg/L	NBA					
Unadjusted C11-C22 Aromatics	EPH1	MADEP EPH	µg/L	NBA					
C5-C8 Aliphatics Hydrocarbons	VPH3	MADEP VPH	µg/L	NBA					
C9-C10 Aromatic Hydrocarbons	VPH5	MADEP VPH	µg/L	NBA					
C9-C12 Aliphatic Hydrocarbons	VPH4	MADEP VPH	µg/L	NBA					
Unadjusted C5-C8 Aliphatics	VPH1	MADEP VPH	µg/L	NBA					
Unadjusted C9-C12 Aliphatics	VPH2	MADEP VPH	µg/L	NBA					
Aluminum	7429905	6010C	µg/L	2000	n				
Antimony	7440360	6010C	µg/L	0.78	n				
Arsenic	7440382	6010C	µg/L	0.052	c				
Barium	7440393	6010C	µg/L	380	n				
Beryllium	7440417	6010C	µg/L	2.5	n				
Cadmium	7440439	6010C	µg/L	0.92	n				
Calcium	7440702	6010C	µg/L	NBA					
Chromium	7440473	6010C	µg/L	0.035	c				
Cobalt	7440484	6010C	µg/L	0.6	n				
Copper	7440508	6010C	µg/L	80	n				
Iron	7439896	6010C	µg/L	1400	n				
Lead	7439921	6010C	µg/L	15					
Magnesium	7439954	6010C	µg/L	NBA					
Manganese	7439965	6010C	µg/L	43	n				
Nickel	7440020	6010C	µg/L	39	n				
Potassium	7440097	6010C	µg/L	NBA					
Selenium	7782492	6010C	µg/L	10	n				
Silver	7440224	6010C	µg/L	9.4	n				
Sodium	7440235	6010C	µg/L	NBA					

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-DW-TB01		LO58-DW-TB02	
				Sample Description		Trip Blank		Trip Blank	
				Sample Date		10/7/2012		10/7/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value[a]**					
Thallium	7440280	6010C	µg/L	0.02	n				
Vanadium	7440622	6010C	µg/L	8.6	n				
Zinc	7440666	6010C	µg/L	600	n				
Mercury	7439976	7470A	µg/L	0.063	n				
PCB-1016	12674112	8082A	µg/L	0.14	n				
PCB-1221	11104282	8082A	µg/L	0.0047	c				
PCB-1232	11141165	8082A	µg/L	0.0047	c				
PCB-1242	53469219	8082A	µg/L	0.0078	c				
PCB-1248	12672296	8082A	µg/L	0.0078	c				
PCB-1254	11097691	8082A	µg/L	0.0078	c				
PCB-1260	11096825	8082A	µg/L	0.0078	c				
PCB-1262	37324235	8082A	µg/L	NBA					
PCB-1268	11100144	8082A	µg/L	NBA					
1,1,1,2-Tetrachloroethane	630206	8260B	µg/L	0.57	c	1	U	1	U
1,1,1-Trichloroethane	71556	8260B	µg/L	800	n	1	U	1	U
1,1,2,2-Tetrachloroethane	79345	8260B	µg/L	0.076	c	1	U	1	U
1,1,2-Trichloroethane	79005	8260B	µg/L	0.041	n	1	U	1	U
1,1-Dichloroethane	75343	8260B	µg/L	2.8	c	1	U	1	U
1,1-Dichloroethene	75354	8260B	µg/L	28	n	1	U	1	U
1,1-Dichloropropene	563586	8260B	µg/L	NBA		1	U	1	U
1,2,3-Trichlorobenzene	87616	8260B	µg/L	0.7	n	1	U	1	U
1,2,3-Trichloropropane	96184	8260B	µg/L	0.00075	c	1	U	1	U
1,2,4-Trichlorobenzene	120821	8260B	µg/L	0.4	n	1	U	1	U
1,2,4-Trimethylbenzene	95636	8260B	µg/L	1.5	n	1	U	1	U
1,2-Dibromo-3-Chloropropane	96128	8260B	µg/L	0.00033	c	1	U	1	U
1,2-Dibromoethane	106934	8260B	µg/L	0.0075	c	1	U	1	U
1,2-Dichlorobenzene	95501	8260B	µg/L	30	n	1	U	1	U
1,2-Dichloroethane	107062	8260B	µg/L	0.17	c	1	U	1	U

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

					Sample Point ID	LO58-DW-TB01		LO58-DW-TB02	
					Sample Description	Trip Blank		Trip Blank	
					Sample Date	10/7/2012		10/7/2012	
Analyte	CAS Number	Method	Units	Screening Toxicity Value[a]					
1,2-Dichloroethene, Total	540590	8260B	µg/L	NBA		1	U	1	U
1,2-Dichloropropane	78875	8260B	µg/L	0.44	c	1	U	1	U
1,3,5-Trimethylbenzene	108678	8260B	µg/L	12	n	1	U	1	U
1,3-Dichlorobenzene	541731	8260B	µg/L	NBA		1	U	1	U
1,3-Dichloropropane	142289	8260B	µg/L	37	n	1	U	1	U
1,4-Dichlorobenzene	106467	8260B	µg/L	0.48	c	1	U	1	U
1,4-Dioxane	123911	8260B	µg/L	0.46	c	50	U	50	U
2,2-Dichloropropane	594207	8260B	µg/L	NBA		1	U	1	U
2-Butanone	78933	8260B	µg/L	560	n	5	U	5	U
2-Chloroethyl vinyl ether	110758	8260B	µg/L	NBA		1	U	1	U
2-Chlorotoluene	95498	8260B	µg/L	24	n	1	U	1	U
2-Hexanone	591786	8260B	µg/L	3.8	n	5	U	5	U
4-Isopropyltoluene	99876	8260B	µg/L	NBA		1	U	1	U
4-Methyl-2-pentanone	108101	8260B	µg/L	630	n	5	U	5	U
Acetone	67641	8260B	µg/L	1400	n	1.7	J	1.9	J
Benzene	71432	8260B	µg/L	0.46	c	1	U	1	U
Bromobenzene	108861	8260B	µg/L	6.2	n	1	U	1	U
Bromochloromethane	74975	8260B	µg/L	8.3	n	1	U	1	U
Bromodichloromethane	75274	8260B	µg/L	0.13	c	1	U	1	U
Bromoform	75252	8260B	µg/L	3.3	c	1	U	1	U
Bromomethane	74839	8260B	µg/L	0.75	n	1	U	1	U
Carbon disulfide	75150	8260B	µg/L	81	n	1	U	1	U
Carbon tetrachloride	56235	8260B	µg/L	0.46	c	1	U	1	U
Chlorobenzene	108907	8260B	µg/L	7.8	n	1	U	1	U
Dibromochloromethane	124481	8260B	µg/L	0.87	c	1	U	1	U
Chloroethane	75003	8260B	µg/L	2100	n	1	U	1	U
Chloroform	67663	8260B	µg/L	0.22	c	1	U	1	U
Chloromethane	74873	8260B	µg/L	19	n	1	U	1	U

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-DW-TB01		LO58-DW-TB02	
				Sample Description		Trip Blank		Trip Blank	
				Sample Date		10/7/2012		10/7/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value[a]**					
cis-1,2-Dichloroethene	156592	8260B	µg/L	3.6	n	1	U	1	U
cis-1,3-Dichloropropene	10061015	8260B	µg/L	NBA		1	U	1	U
Cyclohexane	110827	8260B	µg/L	1300	n	1	U	1	U
Dibromomethane	74953	8260B	µg/L	0.83	n	1	U	1	U
Dichlorodifluoromethane	75718	8260B	µg/L	20	n	1	U	1	U
Ethylbenzene	100414	8260B	µg/L	1.5	c	1	U	1	U
Freon TF	76131	8260B	µg/L	5500	n	1	U	1	U
Hexachlorobutadiene	87683	8260B	µg/L	0.14	c	1	U	1	U
Methyl iodide	74884	8260B	µg/L	NBA		1	U	1	U
Isobutyl alcohol	78831	8260B	µg/L	590	n	50	U	50	U
Isopropylbenzene	98828	8260B	µg/L	45	n	1	U	1	U
m&p-Xylene	179601231	8260B	µg/L	19	n	1	U	1	U
Methyl acetate	79209	8260B	µg/L	2000	n	1	U	1	U
Methylcyclohexane	108872	8260B	µg/L	NBA		1	U	1	U
Methyl t-butyl ether	1634044	8260B	µg/L	14	c	1	U	1	U
Methylene Chloride	75092	8260B	µg/L	11	n	1	J	1	U
Naphthalene	91203	8260B	µg/L	0.17	c	1	U	1	U
n-Butylbenzene	104518	8260B	µg/L	100	n	1	U	1	U
n-Propylbenzene	103651	8260B	µg/L	66	n	1	U	1	U
o-Xylene	95476	8260B	µg/L	19	n	1	U	1	U
4-Chlorotoluene	106434	8260B	µg/L	25	n	1	U	1	U
sec-Butylbenzene	135988	8260B	µg/L	200	n	1	U	1	U
Styrene	100425	8260B	µg/L	120	n	1	U	1	U
tert-Butylbenzene	98066	8260B	µg/L	69	n	1	U	1	U
Tetrachloroethene	127184	8260B	µg/L	4.1	n	1	U	1	U
Tetrahydrofuran	109999	8260B	µg/L	340	n	14	U	14	U
Toluene	108883	8260B	µg/L	110	n	1	U	1	U
trans-1,2-Dichloroethene	156605	8260B	µg/L	36	n	1	U	1	U

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-DW-TB01		LO58-DW-TB02	
				Sample Description		Trip Blank		Trip Blank	
				Sample Date		10/7/2012		10/7/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value[a]**					
trans-1,3-Dichloropropene	10061026	8260B	µg/L	NBA		1	U	1	U
Trichloroethene	79016	8260B	µg/L	0.28	n	1	U	1	U
Trichlorofluoromethane	75694	8260B	µg/L	520	n	1	U	1	U
Vinyl acetate	108054	8260B	µg/L	41	n	1	U	1	UJ
Vinyl chloride	75014	8260B	µg/L	0.019	c	1	U	1	U
Xylenes, Total	1330207	8260B	µg/L	19	n	1	U	1	U
1,1'-Biphenyl	92524	8270C PAH	µg/L	0.083	n				
1-Methylnaphthalene	90120	8270C PAH	µg/L	1.1	c				
1-Methylphenanthrene	832699	8270C PAH	µg/L	NBA					
2,3,5-Trimethylnaphthalene	2245387	8270C PAH	µg/L	NBA					
2,6-Dimethylnaphthalene	581420	8270C PAH	µg/L	NBA					
2-Methylnaphthalene	91576	8270C PAH	µg/L	3.6	n				
Acenaphthene	83329	8270C PAH	µg/L	53	n				
Acenaphthylene	208968	8270C PAH	µg/L	53	n				
Anthracene	120127	8270C PAH	µg/L	180	n				
Benzo[a]anthracene	56553	8270C PAH	µg/L	0.012	c				
Benzo[a]pyrene	50328	8270C PAH	µg/L	0.0034	c				
Benzo[b]fluoranthene	205992	8270C PAH	µg/L	0.034	c				
Benzo[e]pyrene	192972	8270C PAH	µg/L	NBA					
Benzo[g,h,i]perylene	191242	8270C PAH	µg/L	0.17	c				
Benzo[k]fluoranthene	207089	8270C PAH	µg/L	0.34	c				
Chrysene	218019	8270C PAH	µg/L	3.4	c				
Dibenz(a,h)anthracene	53703	8270C PAH	µg/L	0.0034	c				
Dibenzothiophene	132650	8270C PAH	µg/L	6.5	n				
Fluoranthene	206440	8270C PAH	µg/L	80	n				
Fluorene	86737	8270C PAH	µg/L	29	n				
Indeno[1,2,3-cd]pyrene	193395	8270C PAH	µg/L	0.034	c				
Naphthalene	91203	8270C PAH	µg/L	0.17	c				

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-DW-TB01		LO58-DW-TB02	
				Sample Description		Trip Blank		Trip Blank	
				Sample Date		10/7/2012		10/7/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value[a]**					
Perylene	198550	8270C PAH	µg/L	NBA					
Phenanthrene	85018	8270C PAH	µg/L	180	n				
Pyrene	129000	8270C PAH	µg/L	12	n				
1,1'-Biphenyl	92524	8270D	µg/L	0.083	n				
1,2,4,5-Tetrachlorobenzene	95943	8270D	µg/L	0.17	n				
1,2,4-Trichlorobenzene	120821	8270D	µg/L	0.4	n				
1,2-Dichlorobenzene	95501	8270D	µg/L	30	n				
1,3-Dichlorobenzene	541731	8270D	µg/L	NBA					
1,4-Dichlorobenzene	106467	8270D	µg/L	0.48	c				
1-Methylnaphthalene	90120	8270D	µg/L	1.1	c				
2,3,4,6-Tetrachlorophenol	58902	8270D	µg/L	24	n				
2,4,5-Trichlorophenol	95954	8270D	µg/L	120	n				
2,4,6-Trichlorophenol	88062	8270D	µg/L	1.2	n				
2,4-Dichlorophenol	120832	8270D	µg/L	4.6	n				
2,4-Dimethylphenol	105679	8270D	µg/L	36	n				
2,4-Dinitrophenol	51285	8270D	µg/L	3.9	n				
2,4-Dinitrotoluene	121142	8270D	µg/L	0.24	c				
2,6-Dichlorophenol	87650	8270D	µg/L	NBA					
2,6-Dinitrotoluene	606202	8270D	µg/L	0.049	c				
2-Chloronaphthalene	91587	8270D	µg/L	75	n				
2-Chlorophenol	95578	8270D	µg/L	9.1	n				
2-Methylnaphthalene	91576	8270D	µg/L	3.6	n				
2-Methylphenol	95487	8270D	µg/L	93	n				
2-Nitroaniline	88744	8270D	µg/L	19	n				
2-Nitrophenol	88755	8270D	µg/L	NBA					
3 & 4 Methylphenol	15831104	8270D	µg/L	NBA					
3,3'-Dichlorobenzidine	91941	8270D	µg/L	0.13	c				
3-Nitroaniline	99092	8270D	µg/L	NBA					

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

					Sample Point ID	LO58-DW-TB01		LO58-DW-TB02	
					Sample Description	Trip Blank		Trip Blank	
					Sample Date	10/7/2012		10/7/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value**[a]					
4,6-Dinitro-2-methylphenol	534521	8270D	µg/L	0.15	n				
4-Bromophenyl phenyl ether	101553	8270D	µg/L	NBA					
4-Chloro-3-methylphenol	59507	8270D	µg/L	140	n				
4-Chloroaniline	106478	8270D	µg/L	0.37	c				
4-Chlorophenyl phenyl ether	7005723	8270D	µg/L	NBA					
4-Nitroaniline	100016	8270D	µg/L	3.8	c				
4-Nitrophenol	100027	8270D	µg/L	NBA					
Acenaphthene	83329	8270D	µg/L	53	n				
Acenaphthylene	208968	8270D	µg/L	53	n				
Acetophenone	98862	8270D	µg/L	190	n				
Aniline	62533	8270D	µg/L	13	c				
Anthracene	120127	8270D	µg/L	180	n				
Atrazine	1912249	8270D	µg/L	0.3	c				
Azobenzene	103333	8270D	µg/L	0.12	c				
Benzaldehyde	100527	8270D	µg/L	19	c				
Benzidine	92875	8270D	µg/L	0.00011	c				
Benzo[a]anthracene	56553	8270D	µg/L	0.012	c				
Benzo[a]pyrene	50328	8270D	µg/L	0.0034	c				
Benzo[b]fluoranthene	205992	8270D	µg/L	0.034	c				
Benzo[e]pyrene	192972	8270D	µg/L	NBA					
Benzo[g,h,i]perylene	191242	8270D	µg/L	0.17	c				
Benzo[k]fluoranthene	207089	8270D	µg/L	0.34	c				
Benzoic acid	65850	8270D	µg/L	7500	n				
Benzyl alcohol	100516	8270D	µg/L	200	n				
Bis(2-chloroethoxy)methane	111911	8270D	µg/L	5.9	n				
Bis(2-chloroethyl)ether	111444	8270D	µg/L	0.014	c				
2,2'-oxybis[1-chloropropane]	108601	8270D	µg/L	71	n				
Bis(2-ethylhexyl) phthalate	117817	8270D	µg/L	5.6	c				

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-DW-TB01		LO58-DW-TB02	
				Sample Description		Trip Blank		Trip Blank	
				Sample Date		10/7/2012		10/7/2012	
Analyte	CAS Number	Method	Units	Screening Toxicity Value^{a}					
Butyl benzyl phthalate	85687	8270D	µg/L	16	c				
Caprolactam	105602	8270D	µg/L	990	n				
Carbazole	86748	8270D	µg/L	NBA					
Chrysene	218019	8270D	µg/L	3.4	c				
Dibenz(a,h)anthracene	53703	8270D	µg/L	0.0034	c				
Dibenzofuran	132649	8270D	µg/L	0.79	n				
Diethyl phthalate	84662	8270D	µg/L	1500	n				
Dimethyl phthalate	131113	8270D	µg/L	NBA					
Di-n-butyl phthalate	84742	8270D	µg/L	90	n				
Di-n-octyl phthalate	117840	8270D	µg/L	20	n				
Fluoranthene	206440	8270D	µg/L	80	n				
Fluorene	86737	8270D	µg/L	29	n				
Hexachlorobenzene	118741	8270D	µg/L	0.0098	c				
Hexachlorobutadiene	87683	8270D	µg/L	0.14	c				
Hexachlorocyclopentadiene	77474	8270D	µg/L	0.041	n				
Hexachloroethane	67721	8270D	µg/L	0.33	c				
Indeno[1,2,3-cd]pyrene	193395	8270D	µg/L	0.034	c				
Isophorone	78591	8270D	µg/L	78	c				
Naphthalene	91203	8270D	µg/L	0.17	c				
Nitrobenzene	98953	8270D	µg/L	0.14	c				
N-Nitrosodimethylamine	62759	8270D	µg/L	0.00011	c				
N-Nitrosodi-n-propylamine	621647	8270D	µg/L	0.011	c				
N-Nitrosodiphenylamine	86306	8270D	µg/L	12	c				
Pentachlorophenol	87865	8270D	µg/L	0.041	c				
Perylene	198550	8270D	µg/L	NBA					
Phenanthrene	85018	8270D	µg/L	180	n				
Phenol	108952	8270D	µg/L	580	n				
Pyrene	129000	8270D	µg/L	12	n				

Table A.2-2
Drinking Water Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-DW-TB01		LO58-DW-TB02	
				Sample Description		Trip Blank		Trip Blank	
				Sample Date		10/7/2012		10/7/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value[a]**					
Pyridine	110861	8270D	µg/L	2	n				
Nitrate as N	14797558	9056 N	mg/L	3200	n				
Nitrite as N	14797650	9056 N	mg/L	200	n				
1,1-Dimethylhydrazine	57147	Hydrazines	µg/L	0.00042	n				
Hydrazine	302012	Hydrazines	µg/L	0.0011	c				
Monomethyl Hydrazine	60344	Hydrazines	µg/L	0.0042	n				

[a] Regional Screening Level (RSL) Residential Tapwater Table (May 2016).

Bold values indicate exceedance of residential RSL.

µg/L = Micrograms per liter.

C = Cancer based, target risk equals 1E-06.

J = Result is <RL but >=MDL and the concentration is an approximate value.

mg/L = Milligrams per liter.

NBA = No benchmark available.

N = Noncancer based, target hazard quotient equals 0.1.

R = Rejected; result not valid due to quality control failure.

U = Not detected.

UJ = Not detected. SQL is <RL but >=MDL and the SQL is an approximate value.

Table A.2-3
Monitoring Well Data
LO-58
Caribou, Maine

					Sample Point ID	LO58-MW01-100512		LO58-MW02-100312		LO58-MW03-100312		LO58-MW04-100412		LO58-MW05-100812	
					Sample Description	Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well	
					Sample Date	10/6/2012		10/4/2012		10/4/2012		10/5/2012		10/9/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value[a]**											
C9-C18 Aliphatic Hydrocarbons	EPH2	MADEP EPH	µg/L	NBA		200	U	200	U	200	U	200	U	200	U
C11-C22 Aromatic Hydrocarbons	EPH4	MADEP EPH	µg/L	NBA		150	U	150	U	150	U	150	U	215	
C19-C36 Aliphatic Hydrocarbons	EPH3	MADEP EPH	µg/L	NBA		200	U	200	U	200	U	200	U	200	U
Unadjusted C11-C22 Aromatics	EPH1	MADEP EPH	µg/L	NBA		150	U	150	U	150	U	150	U	259	
C5-C8 Aliphatics Hydrocarbons	VPH3	MADEP VPH	µg/L	NBA		50	U	50	U	50	U	50	U	28	J
C9-C10 Aromatic Hydrocarbons	VPH5	MADEP VPH	µg/L	NBA		10	U	10	U	10	U	10	U	467	
C9-C12 Aliphatic Hydrocarbons	VPH4	MADEP VPH	µg/L	NBA		50	U	50	U	50	U	50	U	261	
Unadjusted C5-C8 Aliphatics	VPH1	MADEP VPH	µg/L	NBA		50	U	50	U	50	U	50	U	50	U
Unadjusted C9-C12 Aliphatics	VPH2	MADEP VPH	µg/L	NBA		50	U	50	U	50	U	50	U	50	U
Aluminum	7429905	6010C	µg/L	2000	n	836		200	U	255		200	U	139	J
Antimony	7440360	6010C	µg/L	0.78	n	60	U	60	U	60	U	60	U	60	U
Arsenic	7440382	6010C	µg/L	0.052	c	10	U	10	U	10	U	10	U	10	U
Barium	7440393	6010C	µg/L	380	n	42	J	46.5	J	38.5	J	51.2	J	74.4	J
Beryllium	7440417	6010C	µg/L	2.5	n	5	U	5	U	5	U	5	U	5	U
Cadmium	7440439	6010C	µg/L	0.92	n	5	U	5	U	5	U	5	U	**1**	J
Calcium	7440702	6010C	µg/L	NBA		66400		75700		74100		80200		106000	
Chromium	7440473	6010C	µg/L	0.035	c	**1.5**	J	10	U	10	U	10	U	10	U
Cobalt	7440484	6010C	µg/L	0.6	n	50	U	50	U	50	U	50	U	**4.8**	J
Copper	7440508	6010C	µg/L	80	n	25	U	25	U	25	U	25	U	25	U
Iron	7439896	6010C	µg/L	1400	n	901		200	U	200	U	200	U	1040	
Lead	7439921	6010C	µg/L	15		10	U	10	U	10	U	10	U	10	U
Magnesium	7439954	6010C	µg/L	NBA		8000		7530		7640		7080		14000	
Manganese	7439965	6010C	µg/L	43	n	16.4		15	U	15	U	15	U	**1290**	
Nickel	7440020	6010C	µg/L	39	n	40	U	40	U	40	U	40	U	40	U
Potassium	7440097	6010C	µg/L	NBA		879	J	1220	J	933	J	1330	J	749	J
Selenium	7782492	6010C	µg/L	10	n	35	U	35	U	35	U	35	U	35	U
Silver	7440224	6010C	µg/L	9.4	n	10	U	10	U	10	U	10	U	10	U
Sodium	7440235	6010C	µg/L	NBA		2750	J	6760		7430		8070		5930	
Thallium	7440280	6010C	µg/L	0.02	n	25	U	25	U	25	U	25	U	25	U
Vanadium	7440622	6010C	µg/L	8.6	n	1.5	J	50	U	50	U	50	U	50	U
Zinc	7440666	6010C	µg/L	600	n	19.1	J	20	U	20	U	20	U	26.1	

Table A.2-3
Monitoring Well Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-MW01-100512		LO58-MW02-100312		LO58-MW03-100312		LO58-MW04-100412		LO58-MW05-100812	
				Sample Description		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well	
				Sample Date		10/6/2012		10/4/2012		10/4/2012		10/5/2012		10/9/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value**[a]											
Mercury	7439976	7470A	µg/L	0.063	n	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
PCB-1016	12674112	8082A	µg/L	0.14	n	0.49	U	0.5	U	0.47	U	0.52	U	0.48	U
PCB-1221	11104282	8082A	µg/L	0.0047	c	0.49	U	0.5	U	0.47	U	0.52	U	0.48	U
PCB-1232	11141165	8082A	µg/L	0.0047	c	0.49	U	0.5	U	0.47	U	0.52	U	0.48	U
PCB-1242	53469219	8082A	µg/L	0.0078	c	0.49	U	0.5	U	0.47	U	0.52	U	0.48	U
PCB-1248	12672296	8082A	µg/L	0.0078	c	0.49	U	0.5	U	0.47	U	0.52	U	0.48	U
PCB-1254	11097691	8082A	µg/L	0.0078	c	0.49	U	0.5	U	0.47	U	0.52	U	0.48	U
PCB-1260	11096825	8082A	µg/L	0.0078	c	0.49	U	0.5	U	0.47	U	0.52	U	0.48	U
PCB-1262	37324235	8082A	µg/L	NBA		0.49	U	0.5	U	0.47	U	0.52	U	0.48	U
PCB-1268	11100144	8082A	µg/L	NBA		0.49	U	0.5	U	0.47	U	0.52	U	0.48	U
1,1,1,2-Tetrachloroethane	630206	8260B	µg/L	0.57	c	1	U	1	U	1	U	1	U	1	U
1,1,1-Trichloroethane	71556	8260B	µg/L	800	n	1	U	1	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	79345	8260B	µg/L	0.076	c	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichloroethane	79005	8260B	µg/L	0.041	n	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethane	75343	8260B	µg/L	2.8	c	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethene	75354	8260B	µg/L	28	n	1	U	1	U	1	U	1	U	1	U
1,1-Dichloropropene	563586	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	1	U
1,2,3-Trichlorobenzene	87616	8260B	µg/L	0.7	n	1	U	1	U	1	U	1	U	1	U
1,2,3-Trichloropropane	96184	8260B	µg/L	0.00075	c	1	U	1	U	1	U	1	U	1	U
1,2,4-Trichlorobenzene	120821	8260B	µg/L	0.4	n	1	U	1	U	1	U	1	U	1	U
1,2,4-Trimethylbenzene	95636	8260B	µg/L	1.5	n	1	U	1	U	1	U	1	U	**28**	
1,2-Dibromo-3-Chloropropane	96128	8260B	µg/L	0.00033	c	1	U	1	U	1	U	1	U	1	U
1,2-Dibromoethane	106934	8260B	µg/L	0.0075	c	1	U	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	95501	8260B	µg/L	30	n	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethane	107062	8260B	µg/L	0.17	c	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethene, Total	540590	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	1	U
1,2-Dichloropropane	78875	8260B	µg/L	0.44	c	1	U	1	U	1	U	1	U	1	U
1,3,5-Trimethylbenzene	108678	8260B	µg/L	12	n	1	U	1	U	1	U	1	U	1.2	
1,3-Dichlorobenzene	541731	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	1	U
1,3-Dichloropropane	142289	8260B	µg/L	37	n	1	U	1	U	1	U	1	U	1	U
1,4-Dichlorobenzene	106467	8260B	µg/L	0.48	c	1	U	1	U	1	U	1	U	1	U

Table A.2-3
Monitoring Well Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-MW01-100512		LO58-MW02-100312		LO58-MW03-100312		LO58-MW04-100412		LO58-MW05-100812	
				Sample Description		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well	
				Sample Date		10/6/2012		10/4/2012		10/4/2012		10/5/2012		10/9/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value[a]**											
1,4-Dioxane	123911	8260B	µg/L	0.46	c	50	U	50	U	50	U	50	U	50	U
2,2-Dichloropropane	594207	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	1	U
2-Butanone	78933	8260B	µg/L	560	n	5	U	5	U	5	U	5	U	5	U
2-Chloroethyl vinyl ether	110758	8260B	µg/L	NBA		1	U	1	U	1	U		R	1	U
2-Chlorotoluene	95498	8260B	µg/L	24	n	1	U	1	U	1	U	1	U	1	U
2-Hexanone	591786	8260B	µg/L	3.8	n	5	U	5	U	5	U	5	U	5	U
4-Isopropyltoluene	99876	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	3.9	
4-Methyl-2-pentanone	108101	8260B	µg/L	630	n	5	U	5	U	5	U	5	U	5	U
Acetone	67641	8260B	µg/L	1400	n	5	U	5	U	5	U	5	U	5	U
Benzene	71432	8260B	µg/L	0.46	c	1	U	1	U	1	U	1	U	1	U
Bromobenzene	108861	8260B	µg/L	6.2	n	1	U	1	U	1	U	1	U	1	U
Bromochloromethane	74975	8260B	µg/L	8.3	n	1	U	1	U	1	U	1	U	1	U
Bromodichloromethane	75274	8260B	µg/L	0.13	c	1	U	1	U	1	U	1	U	1	U
Bromoform	75252	8260B	µg/L	3.3	c	1	U	1	U	1	U	1	U	1	U
Bromomethane	74839	8260B	µg/L	0.75	n	1	U	1	U	1	U	1	U	1	U
Carbon disulfide	75150	8260B	µg/L	81	n	1	U	1	U	1	U	1	U	1	U
Carbon tetrachloride	56235	8260B	µg/L	0.46	c	1	U	1	U	1	U	1	U	1	U
Chlorobenzene	108907	8260B	µg/L	7.8	n	1	U	1	U	1	U	1	U	1	U
Dibromochloromethane	124481	8260B	µg/L	0.87	c	1	U	1	U	1	U	1	U	1	U
Chloroethane	75003	8260B	µg/L	2100	n	1	U	1	U	1	U	1	U	1	U
Chloroform	67663	8260B	µg/L	0.22	c	1	U	1	U	1	U	1	U	1	U
Chloromethane	74873	8260B	µg/L	19	n	1	U	1	U	1	U	1	U	1	U
cis-1,2-Dichloroethene	156592	8260B	µg/L	3.6	n	1	U	1	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	10061015	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	1	U
Cyclohexane	110827	8260B	µg/L	1300	n	1	U	1	U	1	U	1	U	1	U
Dibromomethane	74953	8260B	µg/L	0.83	n	1	U	1	U	1	U	1	U	1	U
Dichlorodifluoromethane	75718	8260B	µg/L	20	n	1	U	1	U	1	U	1	U	1	U
Ethylbenzene	100414	8260B	µg/L	1.5	c	1	U	1	U	1	U	1	U	1.4	
Freon TF	76131	8260B	µg/L	5500	n	1	U	1	U	1	U	1	U	1	U
Hexachlorobutadiene	87683	8260B	µg/L	0.14	c	1	U	1	U	1	U	1	U	1	U
Methyl iodide	74884	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	1	U

Table A.2-3
Monitoring Well Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-MW01-100512		LO58-MW02-100312		LO58-MW03-100312		LO58-MW04-100412		LO58-MW05-100812	
				Sample Description		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well	
				Sample Date		10/6/2012		10/4/2012		10/4/2012		10/5/2012		10/9/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value**^{a}											
Isobutyl alcohol	78831	8260B	µg/L	590	n	50	U	50	U	50	U	50	U	50	U
Isopropylbenzene	98828	8260B	µg/L	45	n	1	U	1	U	1	U	1	U	4.3	
m&p-Xylene	179601231	8260B	µg/L	19	n	1	U	1	U	1	U	1	U	0.44	J
Methyl acetate	79209	8260B	µg/L	2000	n	1	U	1	U	1	U	1	UJ	1	U
Methylcyclohexane	108872	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	1	U
Methyl t-butyl ether	1634044	8260B	µg/L	14	c	1	U	1	U	1	U	1	U	1	U
Methylene Chloride	75092	8260B	µg/L	11	n	1	U	1	U	1	U	1	U	1	U
Naphthalene	91203	8260B	µg/L	0.17	c	1	U	1	U	1	U	1	U	**12**	
n-Butylbenzene	104518	8260B	µg/L	100	n	1	U	1	U	1	U	1	U	1	U
n-Propylbenzene	103651	8260B	µg/L	66	n	1	U	1	U	1	U	1	U	4.5	
o-Xylene	95476	8260B	µg/L	19	n	1	U	1	U	1	U	1	U	0.21	J
4-Chlorotoluene	106434	8260B	µg/L	25	n	1	U	1	U	1	U	1	U	1	U
sec-Butylbenzene	135988	8260B	µg/L	200	n	1	U	1	U	1	U	1	U	5.7	
Styrene	100425	8260B	µg/L	120	n	1	U	1	U	1	U	1	U	1	U
tert-Butylbenzene	98066	8260B	µg/L	69	n	1	U	1	U	1	U	1	U	2.5	
Tetrachloroethene	127184	8260B	µg/L	4.1	n	1	U	1	U	1	U	1	U	1	U
Tetrahydrofuran	109999	8260B	µg/L	340	n	14	U	14	U	14	U	14	U	14	U
Toluene	108883	8260B	µg/L	110	n	1	U	1	U	1	U	1	U	1	U
trans-1,2-Dichloroethene	156605	8260B	µg/L	36	n	1	U	1	U	1	U	1	U	1	U
trans-1,3-Dichloropropene	10061026	8260B	µg/L	NBA		1	U	1	U	1	U	1	U	1	U
Trichloroethene	79016	8260B	µg/L	0.28	n	1	U	1	U	1	U	1	U	0.18	J
Trichlorofluoromethane	75694	8260B	µg/L	520	n	1	U	1	U	1	U	1	U	1	U
Vinyl acetate	108054	8260B	µg/L	41	n	1	U	1	U	1	U	1	U	1	UJ
Vinyl chloride	75014	8260B	µg/L	0.019	c	1	U	1	U	1	U	1	U	1	U
Xylenes, Total	1330207	8260B	µg/L	19	n	1	U	1	U	1	U	1	U	0.65	J
1,1'-Biphenyl	92524	8270C PAH	µg/L	0.083	n	0.019	U	0.019	U	0.019	U	0.019	U	**10**	
1-Methylnaphthalene	90120	8270C PAH	µg/L	1.1	c	0.0038	J	0.019	U	0.019	U	0.019	U	**53**	
1-Methylphenanthrene	832699	8270C PAH	µg/L	NBA		0.019	U	0.019	U	0.019	U	0.019	U	1.3	U
2,3,5-Trimethylnaphthalene	2245387	8270C PAH	µg/L	NBA		0.019	U	0.019	U	0.019	U	0.019	U	4	
2,6-Dimethylnaphthalene	581420	8270C PAH	µg/L	NBA		0.019	U	0.019	U	0.019	U	0.019	U	22	
2-Methylnaphthalene	91576	8270C PAH	µg/L	3.6	n	0.0038	J	0.019	U	0.019	U	0.019	U	1	J

Table A.2-3
Monitoring Well Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-MW01-100512		LO58-MW02-100312		LO58-MW03-100312		LO58-MW04-100412		LO58-MW05-100812	
				Sample Description		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well	
				Sample Date		10/6/2012		10/4/2012		10/4/2012		10/5/2012		10/9/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value[a]**											
Acenaphthene	83329	8270C PAH	µg/L	53	n	0.0028	J	0.019	U	0.019	U	0.019	U	1.6	
Acenaphthylene	208968	8270C PAH	µg/L	53	n	0.0018	J	0.019	U	0.019	U	0.019	U	1.3	U
Anthracene	120127	8270C PAH	µg/L	180	n	0.0026	J	0.0056	J	0.019	U	0.019	U	1.3	U
Benzo[a]anthracene	56553	8270C PAH	µg/L	0.012	c	0.0065	J	0.0052	J	**0.017**	J	0.019	U	1.3	U
Benzo[a]pyrene	50328	8270C PAH	µg/L	0.0034	c	**0.0051**	J	0.019	U	**0.018**	J	0.019	U	1.3	U
Benzo[b]fluoranthene	205992	8270C PAH	µg/L	0.034	c	0.0051	J	0.019	U	0.019		0.019	U	1.3	U
Benzo[e]pyrene	192972	8270C PAH	µg/L	NBA		0.0054	J	0.019	U	0.012	J	0.019	U	1.3	U
Benzo[g,h,i]perylene	191242	8270C PAH	µg/L	0.17	c	0.019	U	0.019	U	0.012	J	0.019	U	1.3	U
Benzo[k]fluoranthene	207089	8270C PAH	µg/L	0.34	c	0.019	U	0.019	U	0.02		0.019	U	1.3	U
Chrysene	218019	8270C PAH	µg/L	3.4	c	0.0057	J	0.019	U	0.018	J	0.019	U	1.3	U
Dibenz(a,h)anthracene	53703	8270C PAH	µg/L	0.0034	c	0.019	U	0.019	U	**0.0076**	J	0.019	U	1.3	U
Dibenzothiophene	132650	8270C PAH	µg/L	6.5	n	0.019	U	0.019	U	0.019	U	0.019	U	0.59	J
Fluoranthene	206440	8270C PAH	µg/L	80	n	0.0088	J	0.014	J	0.014	J	0.019	U	1.3	U
Fluorene	86737	8270C PAH	µg/L	29	n	0.0031	J	0.019	U	0.019	U	0.019	U	2	
Indeno[1,2,3-cd]pyrene	193395	8270C PAH	µg/L	0.034	c	0.019	U	0.019	U	0.016	J	0.019	U	1.3	U
Naphthalene	91203	8270C PAH	µg/L	0.17	c	0.0065	J	0.019	U	0.019	U	0.019	U	**9.3**	
Perylene	198550	8270C PAH	µg/L	NBA		0.019	U	0.019	U	0.0051	J	0.019	U	1.3	U
Phenanthrene	85018	8270C PAH	µg/L	180	n	0.0068	J	0.0069	J	0.019	U	0.019	U	0.56	J
Pyrene	129000	8270C PAH	µg/L	12	n	0.0078	J	0.014	J	0.012	J	0.019	U	1.3	U
1,1'-Biphenyl	92524	8270D	µg/L	0.083	n	9.5	U	9.4	U	9.4	U	9.4	U	**7.3**	J
1,2,4,5-Tetrachlorobenzene	95943	8270D	µg/L	0.17	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
1,2,4-Trichlorobenzene	120821	8270D	µg/L	0.4	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
1,2-Dichlorobenzene	95501	8270D	µg/L	30	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
1,3-Dichlorobenzene	541731	8270D	µg/L	NBA		9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
1,4-Dichlorobenzene	106467	8270D	µg/L	0.48	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
1-Methylnaphthalene	90120	8270D	µg/L	1.1	c	9.5	U	9.4	U	9.4	U	9.4	U	**43**	
2,3,4,6-Tetrachlorophenol	58902	8270D	µg/L	24	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
2,4,5-Trichlorophenol	95954	8270D	µg/L	120	n	24	U	24	U	24	U	24	U	24	U
2,4,6-Trichlorophenol	88062	8270D	µg/L	1.2	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
2,4-Dichlorophenol	120832	8270D	µg/L	4.6	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
2,4-Dimethylphenol	105679	8270D	µg/L	36	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U

Table A.2-3
Monitoring Well Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-MW01-100512		LO58-MW02-100312		LO58-MW03-100312		LO58-MW04-100412		LO58-MW05-100812	
				Sample Description		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well	
				Sample Date		10/6/2012		10/4/2012		10/4/2012		10/5/2012		10/9/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value[a]**											
2,4-Dinitrophenol	51285	8270D	µg/L	3.9	n	24	U	24	U	24	U	24	U	24	U
2,4-Dinitrotoluene	121142	8270D	µg/L	0.24	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
2,6-Dichlorophenol	87650	8270D	µg/L	NBA		9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
2,6-Dinitrotoluene	606202	8270D	µg/L	0.049	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
2-Chloronaphthalene	91587	8270D	µg/L	75	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
2-Chlorophenol	95578	8270D	µg/L	9.1	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
2-Methylnaphthalene	91576	8270D	µg/L	3.6	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
2-Methylphenol	95487	8270D	µg/L	93	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
2-Nitroaniline	88744	8270D	µg/L	19	n	24	U	24	U	24	U	24	U	24	U
2-Nitrophenol	88755	8270D	µg/L	NBA		9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
3 & 4 Methylphenol	15831104	8270D	µg/L	NBA		9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
3,3'-Dichlorobenzidine	91941	8270D	µg/L	0.13	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
3-Nitroaniline	99092	8270D	µg/L	NBA		24	U	24	U	24	U	24	U	24	U
4,6-Dinitro-2-methylphenol	534521	8270D	µg/L	0.15	n	24	U	24	U	24	U	24	U	24	U
4-Bromophenyl phenyl ether	101553	8270D	µg/L	NBA		9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
4-Chloro-3-methylphenol	59507	8270D	µg/L	140	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
4-Chloroaniline	106478	8270D	µg/L	0.37	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
4-Chlorophenyl phenyl ether	7005723	8270D	µg/L	NBA		9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
4-Nitroaniline	100016	8270D	µg/L	3.8	c	24	U	24	U	24	U	24	U	24	U
4-Nitrophenol	100027	8270D	µg/L	NBA		24	U	24	U	24	UJ	24	U	24	U
Acenaphthene	83329	8270D	µg/L	53	n	9.5	U	9.4	U	9.4	U	9.4	U	1.3	J
Acenaphthylene	208968	8270D	µg/L	53	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Acetophenone	98862	8270D	µg/L	190	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Aniline	62533	8270D	µg/L	13	c	24	U	24	U	24	U	24	U	24	U
Anthracene	120127	8270D	µg/L	180	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Atrazine	1912249	8270D	µg/L	0.3	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Azobenzene	103333	8270D	µg/L	0.12	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Benzaldehyde	100527	8270D	µg/L	19	c	24	U	24	U	24	U	24	U	24	U
Benzidine	92875	8270D	µg/L	0.00011	c		R		R		R		R		R
Benzo[a]anthracene	56553	8270D	µg/L	0.012	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Benzo[a]pyrene	50328	8270D	µg/L	0.0034	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U

Table A.2-3
Monitoring Well Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-MW01-100512		LO58-MW02-100312		LO58-MW03-100312		LO58-MW04-100412		LO58-MW05-100812	
				Sample Description		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well	
				Sample Date		10/6/2012		10/4/2012		10/4/2012		10/5/2012		10/9/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value**[a]											
Benzo[b]fluoranthene	205992	8270D	µg/L	0.034	c	9.5	U	9.4	U	9.4	U	9.4	UJ	9.6	U
Benzo[e]pyrene	192972	8270D	µg/L	NBA		9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Benzo[g,h,i]perylene	191242	8270D	µg/L	0.17	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Benzo[k]fluoranthene	207089	8270D	µg/L	0.34	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Benzoic acid	65850	8270D	µg/L	7500	n	100	U	100	U	100	U	100	UJ		R
Benzyl alcohol	100516	8270D	µg/L	200	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Bis(2-chloroethoxy)methane	111911	8270D	µg/L	5.9	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Bis(2-chloroethyl)ether	111444	8270D	µg/L	0.014	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
2,2'-oxybis[1-chloropropane]	108601	8270D	µg/L	71	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Bis(2-ethylhexyl) phthalate	117817	8270D	µg/L	5.6	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Butyl benzyl phthalate	85687	8270D	µg/L	16	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Caprolactam	105602	8270D	µg/L	990	n	9.5	U	9.4	U	9.4	U	9.4	UJ	9.6	U
Carbazole	86748	8270D	µg/L	NBA		9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Chrysene	218019	8270D	µg/L	3.4	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Dibenz(a,h)anthracene	53703	8270D	µg/L	0.0034	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Dibenzofuran	132649	8270D	µg/L	0.79	n	9.5	U	9.4	U	9.4	U	9.4	U	**1.6**	J
Diethyl phthalate	84662	8270D	µg/L	1500	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Dimethyl phthalate	131113	8270D	µg/L	NBA		9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Di-n-butyl phthalate	84742	8270D	µg/L	90	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Di-n-octyl phthalate	117840	8270D	µg/L	20	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Fluoranthene	206440	8270D	µg/L	80	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Fluorene	86737	8270D	µg/L	29	n	9.5	U	9.4	U	9.4	U	9.4	U	1.6	J
Hexachlorobenzene	118741	8270D	µg/L	0.0098	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Hexachlorobutadiene	87683	8270D	µg/L	0.14	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Hexachlorocyclopentadiene	77474	8270D	µg/L	0.041	n	9.5	UJ	9.4	UJ	9.4	U	9.4	UJ	9.6	U
Hexachloroethane	67721	8270D	µg/L	0.33	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Indeno[1,2,3-cd]pyrene	193395	8270D	µg/L	0.034	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Isophorone	78591	8270D	µg/L	78	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Naphthalene	91203	8270D	µg/L	0.17	c	9.5	U	9.4	U	9.4	U	9.4	U	**7.8**	J
Nitrobenzene	98953	8270D	µg/L	0.14	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
N-Nitrosodimethylamine	62759	8270D	µg/L	0.00011	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U

Table A.2-3
Monitoring Well Data
LO-58
Caribou, Maine

				Sample Point ID		**LO58-MW01-100512**		**LO58-MW02-100312**		**LO58-MW03-100312**		**LO58-MW04-100412**		**LO58-MW05-100812**	
				Sample Description		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**	
				Sample Date		**10/6/2012**		**10/4/2012**		**10/4/2012**		**10/5/2012**		**10/9/2012**	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value**[a]											
N-Nitrosodi-n-propylamine	621647	8270D	µg/L	0.011	c	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
N-Nitrosodiphenylamine	86306	8270D	µg/L	12	c	11	U	11	U	11	U	11	U	11	U
Pentachlorophenol	87865	8270D	µg/L	0.041	c	24	U	24	U	24	U	24	U	24	U
Perylene	198550	8270D	µg/L	NBA		9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Phenanthrene	85018	8270D	µg/L	180	n	9.5	U	9.4	U	9.4	U	9.4	U	0.49	J
Phenol	108952	8270D	µg/L	580	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Pyrene	129000	8270D	µg/L	12	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Pyridine	110861	8270D	µg/L	2	n	9.5	U	9.4	U	9.4	U	9.4	U	9.6	U
Nitrate as N	14797558	9056 N	mg/L	3200	n	1.6		3.5	J	4.4		5		0.5	U
Nitrite as N	14797650	9056 N	mg/L	200	n	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U
1,1-Dimethylhydrazine	57147	Hydrazines	µg/L	0.00042	n	10	U	10	UJ	10	U	10	U	10	UJ
Hydrazine	302012	Hydrazines	µg/L	0.0011	c	5	U	5	UJ	5	U	5	U	5	UJ
Monomethyl Hydrazine	60344	Hydrazines	µg/L	0.0042	n	10	U	10	UJ	10	U	10	U	10	U

[a] Regional Screening Level (RSL) Residential Tapwater Table (May 2016).

Bold values indicate exceedance of residential RSL.

µg/L = Micrograms per liter.

c = Cancer based, target risk equals 1E-06.

J = Result is an approximate value.

mg/L = Milligrams per liter.

NBA = No benchmark available.

n = Noncancer based, target hazard quotient equals 0.1.

U = Not detected.

UJ = Not detected. SQL is <RL but >=MDL and the SQL is an approximate value.

Table A.2-3
Monitoring Well Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-MW-DUP-01		LO58-MW-TB01		LO58-MW-TB02	
				Sample Description		DUP of MW05		Trip Blank		Trip Blank	
				Sample Date		10/9/2012		10/2/2012		10/8/2012	
Analyte	CAS Number	Method	Units	Screening Toxicity Value[a]							
C9-C18 Aliphatic Hydrocarbons	EPH2	MADEP EPH	µg/L	NBA		200	U				
C11-C22 Aromatic Hydrocarbons	EPH4	MADEP EPH	µg/L	NBA		216					
C19-C36 Aliphatic Hydrocarbons	EPH3	MADEP EPH	µg/L	NBA		200	U				
Unadjusted C11-C22 Aromatics	EPH1	MADEP EPH	µg/L	NBA		269					
C5-C8 Aliphatics Hydrocarbons	VPH3	MADEP VPH	µg/L	NBA		26	J				
C9-C10 Aromatic Hydrocarbons	VPH5	MADEP VPH	µg/L	NBA		464					
C9-C12 Aliphatic Hydrocarbons	VPH4	MADEP VPH	µg/L	NBA		260					
Unadjusted C5-C8 Aliphatics	VPH1	MADEP VPH	µg/L	NBA		50	U				
Unadjusted C9-C12 Aliphatics	VPH2	MADEP VPH	µg/L	NBA		50	U				
Aluminum	7429905	6010C	µg/L	2000	n	200	U				
Antimony	7440360	6010C	µg/L	0.78	n	60	U				
Arsenic	7440382	6010C	µg/L	0.052	c	10	U				
Barium	7440393	6010C	µg/L	380	n	75.6	J				
Beryllium	7440417	6010C	µg/L	2.5	n	5	U				
Cadmium	7440439	6010C	µg/L	0.92	n	5	U				
Calcium	7440702	6010C	µg/L	NBA		107000					
Chromium	7440473	6010C	µg/L	0.035	c	10	U				
Cobalt	7440484	6010C	µg/L	0.6	n	**5.2**	J				
Copper	7440508	6010C	µg/L	80	n	25	U				
Iron	7439896	6010C	µg/L	1400	n	950					
Lead	7439921	6010C	µg/L	15		10	U				
Magnesium	7439954	6010C	µg/L	NBA		14200					
Manganese	7439965	6010C	µg/L	43	n	**1330**					
Nickel	7440020	6010C	µg/L	39	n	3.1	J				
Potassium	7440097	6010C	µg/L	NBA		691	J				
Selenium	7782492	6010C	µg/L	10	n	35	U				
Silver	7440224	6010C	µg/L	9.4	n	10	U				
Sodium	7440235	6010C	µg/L	NBA		5840					
Thallium	7440280	6010C	µg/L	0.02	n	25	U				
Vanadium	7440622	6010C	µg/L	8.6	n	50	U				
Zinc	7440666	6010C	µg/L	600	n	23.2					

Table A.2-3
Monitoring Well Data
LO-58
Caribou, Maine

				Sample Point ID		**LO58-MW-DUP-01**		**LO58-MW-TB01**		**LO58-MW-TB02**	
				Sample Description		**DUP of MW05**		**Trip Blank**		**Trip Blank**	
				Sample Date		**10/9/2012**		**10/2/2012**		**10/8/2012**	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value[a]**							
Mercury	7439976	7470A	µg/L	0.063	n	0.2	U				
PCB-1016	12674112	8082A	µg/L	0.14	n	0.48	U				
PCB-1221	11104282	8082A	µg/L	0.0047	c	0.48	U				
PCB-1232	11141165	8082A	µg/L	0.0047	c	0.48	U				
PCB-1242	53469219	8082A	µg/L	0.0078	c	0.48	U				
PCB-1248	12672296	8082A	µg/L	0.0078	c	0.48	U				
PCB-1254	11097691	8082A	µg/L	0.0078	c	0.48	U				
PCB-1260	11096825	8082A	µg/L	0.0078	c	0.48	U				
PCB-1262	37324235	8082A	µg/L	NBA		0.48	U				
PCB-1268	11100144	8082A	µg/L	NBA		0.48	U				
1,1,1,2-Tetrachloroethane	630206	8260B	µg/L	0.57	c	1	U	1	U	1	U
1,1,1-Trichloroethane	71556	8260B	µg/L	800	n	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	79345	8260B	µg/L	0.076	c	1	U	1	U	1	U
1,1,2-Trichloroethane	79005	8260B	µg/L	0.041	n	1	U	1	U	1	U
1,1-Dichloroethane	75343	8260B	µg/L	2.8	c	1	U	1	U	1	U
1,1-Dichloroethene	75354	8260B	µg/L	28	n	1	U	1	U	1	U
1,1-Dichloropropene	563586	8260B	µg/L	NBA		1	U	1	U	1	U
1,2,3-Trichlorobenzene	87616	8260B	µg/L	0.7	n	1	U	1	U	1	U
1,2,3-Trichloropropane	96184	8260B	µg/L	0.00075	c	1	U	1	U	1	U
1,2,4-Trichlorobenzene	120821	8260B	µg/L	0.4	n	1	U	1	U	1	U
1,2,4-Trimethylbenzene	95636	8260B	µg/L	1.5	n	**29**		1	U	1	U
1,2-Dibromo-3-Chloropropane	96128	8260B	µg/L	0.00033	c	1	U	1	U	1	U
1,2-Dibromoethane	106934	8260B	µg/L	0.0075	c	1	U	1	U	1	U
1,2-Dichlorobenzene	95501	8260B	µg/L	30	n	1	U	1	U	1	U
1,2-Dichloroethane	107062	8260B	µg/L	0.17	c	1	U	1	U	1	U
1,2-Dichloroethene, Total	540590	8260B	µg/L	NBA		1	U	1	U	1	U
1,2-Dichloropropane	78875	8260B	µg/L	0.44	c	1	U	1	U	1	U
1,3,5-Trimethylbenzene	108678	8260B	µg/L	12	n	1.2		1	U	1	U
1,3-Dichlorobenzene	541731	8260B	µg/L	NBA		1	U	1	U	1	U
1,3-Dichloropropane	142289	8260B	µg/L	37	n	1	U	1	U	1	U
1,4-Dichlorobenzene	106467	8260B	µg/L	0.48	c	1	U	1	U	1	U

Table A.2-3
Monitoring Well Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-MW-DUP-01		LO58-MW-TB01		LO58-MW-TB02	
				Sample Description		DUP of MW05		Trip Blank		Trip Blank	
				Sample Date		10/9/2012		10/2/2012		10/8/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value**[a]							
1,4-Dioxane	123911	8260B	µg/L	0.46	c	50	U	50	U	50	U
2,2-Dichloropropane	594207	8260B	µg/L	NBA		1	U	1	U	1	U
2-Butanone	78933	8260B	µg/L	560	n	5	U	5	U	5	U
2-Chloroethyl vinyl ether	110758	8260B	µg/L	NBA		1	U	1	U	1	U
2-Chlorotoluene	95498	8260B	µg/L	24	n	1	U	1	U	1	U
2-Hexanone	591786	8260B	µg/L	3.8	n	5	U	5	U	5	U
4-Isopropyltoluene	99876	8260B	µg/L	NBA		4.2		1	U	1	U
4-Methyl-2-pentanone	108101	8260B	µg/L	630	n	5	U	5	U	5	U
Acetone	67641	8260B	µg/L	1400	n	5	U	5	U	1.9	J
Benzene	71432	8260B	µg/L	0.46	c	1	U	1	U	1	U
Bromobenzene	108861	8260B	µg/L	6.2	n	1	U	1	U	1	U
Bromochloromethane	74975	8260B	µg/L	8.3	n	1	U	1	U	1	U
Bromodichloromethane	75274	8260B	µg/L	0.13	c	1	U	1	U	1	U
Bromoform	75252	8260B	µg/L	3.3	c	1	U	1	U	1	U
Bromomethane	74839	8260B	µg/L	0.75	n	1	U	1	U	1	U
Carbon disulfide	75150	8260B	µg/L	81	n	1	U	1	U	1	U
Carbon tetrachloride	56235	8260B	µg/L	0.46	c	1	U	1	U	1	U
Chlorobenzene	108907	8260B	µg/L	7.8	n	1	U	1	U	1	U
Dibromochloromethane	124481	8260B	µg/L	0.87	c	1	U	1	U	1	U
Chloroethane	75003	8260B	µg/L	2100	n	1	U	1	U	1	U
Chloroform	67663	8260B	µg/L	0.22	c	1	U	1	U	1	U
Chloromethane	74873	8260B	µg/L	19	n	1	U	1	U	1	U
cis-1,2-Dichloroethene	156592	8260B	µg/L	3.6	n	1	U	1	U	1	U
cis-1,3-Dichloropropene	10061015	8260B	µg/L	NBA		1	U	1	U	1	U
Cyclohexane	110827	8260B	µg/L	1300	n	1	U	1	U	1	U
Dibromomethane	74953	8260B	µg/L	0.83	n	1	U	1	U	1	U
Dichlorodifluoromethane	75718	8260B	µg/L	20	n	1	U	1	U	1	U
Ethylbenzene	100414	8260B	µg/L	1.5	c	1.3		1	U	1	U
Freon TF	76131	8260B	µg/L	5500	n	1	U	1	U	1	U
Hexachlorobutadiene	87683	8260B	µg/L	0.14	c	1	U	1	U	1	U
Methyl iodide	74884	8260B	µg/L	NBA		1	U	1	U	1	U

Table A.2-3
Monitoring Well Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-MW-DUP-01		LO58-MW-TB01		LO58-MW-TB02	
				Sample Description		DUP of MW05		Trip Blank		Trip Blank	
				Sample Date		10/9/2012		10/2/2012		10/8/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value[a]**							
Isobutyl alcohol	78831	8260B	µg/L	590	n	50	U	50	U	50	U
Isopropylbenzene	98828	8260B	µg/L	45	n	4.4		1	U	1	U
m&p-Xylene	179601231	8260B	µg/L	19	n	0.45	J	1	U	1	U
Methyl acetate	79209	8260B	µg/L	2000	n	1	U	1	U	1	U
Methylcyclohexane	108872	8260B	µg/L	NBA		1	U	1	U	1	U
Methyl t-butyl ether	1634044	8260B	µg/L	14	c	1	U	1	U	1	U
Methylene Chloride	75092	8260B	µg/L	11	n	1	U	0.51	J	0.55	J
Naphthalene	91203	8260B	µg/L	0.17	c	**12**		1	U	1	U
n-Butylbenzene	104518	8260B	µg/L	100	n	1	U	1	U	1	U
n-Propylbenzene	103651	8260B	µg/L	66	n	4.6		1	U	1	U
o-Xylene	95476	8260B	µg/L	19	n	0.22	J	1	U	1	U
4-Chlorotoluene	106434	8260B	µg/L	25	n	1	U	1	U	1	U
sec-Butylbenzene	135988	8260B	µg/L	200	n	5.8		1	U	1	U
Styrene	100425	8260B	µg/L	120	n	1	U	1	U	1	U
tert-Butylbenzene	98066	8260B	µg/L	69	n	2.7		1	U	1	U
Tetrachloroethene	127184	8260B	µg/L	4.1	n	1	U	1	U	1	U
Tetrahydrofuran	109999	8260B	µg/L	340	n	14	U	14	U	14	U
Toluene	108883	8260B	µg/L	110	n	1	U	1	U	1	U
trans-1,2-Dichloroethene	156605	8260B	µg/L	36	n	1	U	1	U	1	U
trans-1,3-Dichloropropene	10061026	8260B	µg/L	NBA		1	U	1	U	1	U
Trichloroethene	79016	8260B	µg/L	0.28	n	1	U	1	U	1	U
Trichlorofluoromethane	75694	8260B	µg/L	520	n	1	U	1	U	1	U
Vinyl acetate	108054	8260B	µg/L	41	n	1	UJ	1	U	1	U
Vinyl chloride	75014	8260B	µg/L	0.019	c	1	U	1	U	1	U
Xylenes, Total	1330207	8260B	µg/L	19	n	0.67	J	1	U	1	U
1,1'-Biphenyl	92524	8270C PAH	µg/L	0.083	n	**7.8**					
1-Methylnaphthalene	90120	8270C PAH	µg/L	1.1	c	**41**					
1-Methylphenanthrene	832699	8270C PAH	µg/L	NBA		1.3	U				
2,3,5-Trimethylnaphthalene	2245387	8270C PAH	µg/L	NBA		2.9					
2,6-Dimethylnaphthalene	581420	8270C PAH	µg/L	NBA		17					
2-Methylnaphthalene	91576	8270C PAH	µg/L	3.6	n	0.79	J				

Table A.2-3
Monitoring Well Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-MW-DUP-01		LO58-MW-TB01		LO58-MW-TB02	
				Sample Description		DUP of MW05		Trip Blank		Trip Blank	
				Sample Date		10/9/2012		10/2/2012		10/8/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value[a]**							
Acenaphthene	83329	8270C PAH	µg/L	53	n	1.2	J				
Acenaphthylene	208968	8270C PAH	µg/L	53	n	1.3	U				
Anthracene	120127	8270C PAH	µg/L	180	n	1.3	U				
Benzo[a]anthracene	56553	8270C PAH	µg/L	0.012	c	1.3	U				
Benzo[a]pyrene	50328	8270C PAH	µg/L	0.0034	c	1.3	U				
Benzo[b]fluoranthene	205992	8270C PAH	µg/L	0.034	c	1.3	U				
Benzo[e]pyrene	192972	8270C PAH	µg/L	NBA		1.3	U				
Benzo[g,h,i]perylene	191242	8270C PAH	µg/L	0.17	c	1.3	U				
Benzo[k]fluoranthene	207089	8270C PAH	µg/L	0.34	c	1.3	U				
Chrysene	218019	8270C PAH	µg/L	3.4	c	1.3	U				
Dibenz(a,h)anthracene	53703	8270C PAH	µg/L	0.0034	c	1.3	U				
Dibenzothiophene	132650	8270C PAH	µg/L	6.5	n	0.43	J				
Fluoranthene	206440	8270C PAH	µg/L	80	n	1.3	U				
Fluorene	86737	8270C PAH	µg/L	29	n	1.6					
Indeno[1,2,3-cd]pyrene	193395	8270C PAH	µg/L	0.034	c	1.3	U				
Naphthalene	91203	8270C PAH	µg/L	0.17	c	**7.3**					
Perylene	198550	8270C PAH	µg/L	NBA		1.3	U				
Phenanthrene	85018	8270C PAH	µg/L	180	n	0.44	J				
Pyrene	129000	8270C PAH	µg/L	12	n	1.3	U				
1,1'-Biphenyl	92524	8270D	µg/L	0.083	n	**7.1**	J				
1,2,4,5-Tetrachlorobenzene	95943	8270D	µg/L	0.17	n	9.8	U				
1,2,4-Trichlorobenzene	120821	8270D	µg/L	0.4	n	9.8	U				
1,2-Dichlorobenzene	95501	8270D	µg/L	30	n	9.8	U				
1,3-Dichlorobenzene	541731	8270D	µg/L	NBA		9.8	U				
1,4-Dichlorobenzene	106467	8270D	µg/L	0.48	c	9.8	U				
1-Methylnaphthalene	90120	8270D	µg/L	1.1	c	**44**					
2,3,4,6-Tetrachlorophenol	58902	8270D	µg/L	24	n	9.8	U				
2,4,5-Trichlorophenol	95954	8270D	µg/L	120	n	25	U				
2,4,6-Trichlorophenol	88062	8270D	µg/L	1.2	n	9.8	U				
2,4-Dichlorophenol	120832	8270D	µg/L	4.6	n	9.8	U				
2,4-Dimethylphenol	105679	8270D	µg/L	36	n	9.8	U				

Table A.2-3
Monitoring Well Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-MW-DUP-01		LO58-MW-TB01		LO58-MW-TB02	
				Sample Description		DUP of MW05		Trip Blank		Trip Blank	
				Sample Date		10/9/2012		10/2/2012		10/8/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value**[a]							
2,4-Dinitrophenol	51285	8270D	µg/L	3.9	n	25	U				
2,4-Dinitrotoluene	121142	8270D	µg/L	0.24	c	9.8	U				
2,6-Dichlorophenol	87650	8270D	µg/L	NBA		9.8	U				
2,6-Dinitrotoluene	606202	8270D	µg/L	0.049	c	9.8	U				
2-Chloronaphthalene	91587	8270D	µg/L	75	n	9.8	U				
2-Chlorophenol	95578	8270D	µg/L	9.1	n	9.8	U				
2-Methylnaphthalene	91576	8270D	µg/L	3.6	n	9.8	U				
2-Methylphenol	95487	8270D	µg/L	93	n	9.8	U				
2-Nitroaniline	88744	8270D	µg/L	19	n	25	U				
2-Nitrophenol	88755	8270D	µg/L	NBA		9.8	U				
3 & 4 Methylphenol	15831104	8270D	µg/L	NBA		9.8	U				
3,3'-Dichlorobenzidine	91941	8270D	µg/L	0.13	c	9.8	U				
3-Nitroaniline	99092	8270D	µg/L	NBA		25	U				
4,6-Dinitro-2-methylphenol	534521	8270D	µg/L	0.15	n	25	U				
4-Bromophenyl phenyl ether	101553	8270D	µg/L	NBA		9.8	U				
4-Chloro-3-methylphenol	59507	8270D	µg/L	140	n	9.8	U				
4-Chloroaniline	106478	8270D	µg/L	0.37	c	9.8	U				
4-Chlorophenyl phenyl ether	7005723	8270D	µg/L	NBA		9.8	U				
4-Nitroaniline	100016	8270D	µg/L	3.8	c	25	U				
4-Nitrophenol	100027	8270D	µg/L	NBA		25	U				
Acenaphthene	83329	8270D	µg/L	53	n	1.3	J				
Acenaphthylene	208968	8270D	µg/L	53	n	9.8	U				
Acetophenone	98862	8270D	µg/L	190	n	9.8	U				
Aniline	62533	8270D	µg/L	13	c	25	U				
Anthracene	120127	8270D	µg/L	180	n	9.8	U				
Atrazine	1912249	8270D	µg/L	0.3	c	9.8	U				
Azobenzene	103333	8270D	µg/L	0.12	c	9.8	U				
Benzaldehyde	100527	8270D	µg/L	19	c	25	U				
Benzidine	92875	8270D	µg/L	0.00011	c		R				
Benzo[a]anthracene	56553	8270D	µg/L	0.012	c	9.8	U				
Benzo[a]pyrene	50328	8270D	µg/L	0.0034	c	9.8	U				

Table A.2-3
Monitoring Well Data
LO-58
Caribou, Maine

				Sample Point ID		**LO58-MW-DUP-01**		**LO58-MW-TB01**		**LO58-MW-TB02**	
				Sample Description		**DUP of MW05**		**Trip Blank**		**Trip Blank**	
				Sample Date		**10/9/2012**		**10/2/2012**		**10/8/2012**	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value**[a]							
Benzo[b]fluoranthene	205992	8270D	µg/L	0.034	c	9.8	U				
Benzo[e]pyrene	192972	8270D	µg/L	NBA		9.8	U				
Benzo[g,h,i]perylene	191242	8270D	µg/L	0.17	c	9.8	U				
Benzo[k]fluoranthene	207089	8270D	µg/L	0.34	c	9.8	U				
Benzoic acid	65850	8270D	µg/L	7500	n		R				
Benzyl alcohol	100516	8270D	µg/L	200	n	9.8	U				
Bis(2-chloroethoxy)methane	111911	8270D	µg/L	5.9	n	9.8	U				
Bis(2-chloroethyl)ether	111444	8270D	µg/L	0.014	c	9.8	U				
2,2'-oxybis[1-chloropropane]	108601	8270D	µg/L	71	n	9.8	U				
Bis(2-ethylhexyl) phthalate	117817	8270D	µg/L	5.6	c	9.8	U				
Butyl benzyl phthalate	85687	8270D	µg/L	16	c	9.8	U				
Caprolactam	105602	8270D	µg/L	990	n	9.8	U				
Carbazole	86748	8270D	µg/L	NBA		9.8	U				
Chrysene	218019	8270D	µg/L	3.4	c	9.8	U				
Dibenz(a,h)anthracene	53703	8270D	µg/L	0.0034	c	9.8	U				
Dibenzofuran	132649	8270D	µg/L	0.79	n	**1.6**	J				
Diethyl phthalate	84662	8270D	µg/L	1500	n	9.8	U				
Dimethyl phthalate	131113	8270D	µg/L	NBA		9.8	U				
Di-n-butyl phthalate	84742	8270D	µg/L	90	n	9.8	U				
Di-n-octyl phthalate	117840	8270D	µg/L	20	n	9.8	U				
Fluoranthene	206440	8270D	µg/L	80	n	9.8	U				
Fluorene	86737	8270D	µg/L	29	n	1.6	J				
Hexachlorobenzene	118741	8270D	µg/L	0.0098	c	9.8	U				
Hexachlorobutadiene	87683	8270D	µg/L	0.14	c	9.8	U				
Hexachlorocyclopentadiene	77474	8270D	µg/L	0.041	n	9.8	U				
Hexachloroethane	67721	8270D	µg/L	0.33	c	9.8	U				
Indeno[1,2,3-cd]pyrene	193395	8270D	µg/L	0.034	c	9.8	U				
Isophorone	78591	8270D	µg/L	78	c	9.8	U				
Naphthalene	91203	8270D	µg/L	0.17	c	**7.9**	J				
Nitrobenzene	98953	8270D	µg/L	0.14	c	9.8	U				
N-Nitrosodimethylamine	62759	8270D	µg/L	0.00011	c	9.8	U				

Table A.2-3
Monitoring Well Data
LO-58
Caribou, Maine

				Sample Point ID		LO58-MW-DUP-01		LO58-MW-TB01		LO58-MW-TB02	
				Sample Description		DUP of MW05		Trip Blank		Trip Blank	
				Sample Date		10/9/2012		10/2/2012		10/8/2012	
Analyte	**CAS Number**	**Method**	**Units**	**Screening Toxicity Value[a]**							
N-Nitrosodi-n-propylamine	621647	8270D	µg/L	0.011	c	9.8	U				
N-Nitrosodiphenylamine	86306	8270D	µg/L	12	c	12	U				
Pentachlorophenol	87865	8270D	µg/L	0.041	c	25	U				
Perylene	198550	8270D	µg/L	NBA		9.8	U				
Phenanthrene	85018	8270D	µg/L	180	n	9.8	U				
Phenol	108952	8270D	µg/L	580	n	9.8	U				
Pyrene	129000	8270D	µg/L	12	n	9.8	U				
Pyridine	110861	8270D	µg/L	2	n	9.8	U				
Nitrate as N	14797558	9056 N	mg/L	3200	n	0.5	U				
Nitrite as N	14797650	9056 N	mg/L	200	n	0.5	U				
1,1-Dimethylhydrazine	57147	Hydrazines	µg/L	0.00042	n	10	UJ				
Hydrazine	302012	Hydrazines	µg/L	0.0011	c	5	UJ				
Monomethyl Hydrazine	60344	Hydrazines	µg/L	0.0042	n	10	U				

[a] Regional Screening Level (RSL) Residential Tapwater Table (May 2016).

Bold values indicate exceedance of residential RSL.

µg/L = Micrograms per liter.

c = Cancer based, target risk equals 1E-06.

J = Result is an approximate value.

mg/L = Milligrams per liter.

NBA = No benchmark available.

n = Noncancer based, target hazard quotient equals 0.1.

U = Not detected.

UJ = Not detected. SQL is <RL but >=MDL and the SQL is an approximate value.

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB01-0002		LO58-SB01-0608		LO58-SB02-0002		LO58-SB02-0608		LO58-SB03-0002	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Percent Solids	DEP1005	D4643	%	NBA		NBA		NBA	89.4		83.8		85.5		74.2		74.1	
2-Methylnaphthalene	91576	MADEP EPH	µg/kg	24000	n	300000	n	NBA	288	U	306	U	293	U	334	U	383	U
Acenaphthene	83329	MADEP EPH	µg/kg	360000	n	4500000	n	NBA	288	U	306	U	293	U	334	U	383	U
Acenaphthylene	208968	MADEP EPH	µg/kg	360000	n	4500000	n	NBA	288	U	306	U	293	U	334	U	383	U
Anthracene	120127	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA	197	J	306	U	293	U	334	U	383	U
Benzo[a]anthracene	56553	MADEP EPH	µg/kg	160	c	2900	c	NBA	**465**		306	U	293	U	334	U	383	U
Benzo[a]pyrene	50328	MADEP EPH	µg/kg	16	c	290	c	NBA	**457**		306	U	293	U	334	U	383	U
Benzo[b]fluoranthene	205992	MADEP EPH	µg/kg	160	c	2900	c	NBA	**594**		306	U	293	U	334	U	383	U
Benzo[g,h,i]perylene	191242	MADEP EPH	µg/kg	3800	c	17000	c	NBA	372		306	U	293	U	334	U	383	U
Benzo[k]fluoranthene	207089	MADEP EPH	µg/kg	1600	c	29000	c	NBA	237	J	306	U	293	U	334	U	383	U
C11-C22 Aromatic Hydrocarbons	EPH4	MADEP EPH	µg/kg	NBA		NBA		NBA	28800	U	30600	U	29300	U	33400	U	38300	U
C19-C36 Aliphatic Hydrocarbons	EPH3	MADEP EPH	µg/kg	NBA		NBA		NBA	28800	U	30600	U	29300	U	33400	U	38300	U
C9-C18 Aliphatic Hydrocarbons	EPH2	MADEP EPH	µg/kg	NBA		NBA		NBA	28800	U	30600	U	29300	U	33400	U	38300	U
Chrysene	218019	MADEP EPH	µg/kg	16000	c	290000	c	NBA	480		306	U	293	U	334	U	383	U
Dibenzo[a,h]anthracene	53703	MADEP EPH	µg/kg	16	c	290	c	NBA	288	U	306	U	293	U	334	U	383	U
Fluoranthene	206440	MADEP EPH	µg/kg	240000	n	3000000	n	NBA	1050		306	U	293	U	334	U	383	U
Fluorene	86737	MADEP EPH	µg/kg	240000	n	3000000	n	NBA	288	U	306	U	293	U	334	U	383	U
Indeno[1,2,3-cd]pyrene	193395	MADEP EPH	µg/kg	160	c	2900	c	NBA	**366**		306	U	293	U	334	U	383	U
Naphthalene	91203	MADEP EPH	µg/kg	3800	c	17000	c	NBA	288	U	306	U	293	U	334	U	383	U
Phenanthrene	85018	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA	758		306	U	293	U	334	U	383	U
Pyrene	129000	MADEP EPH	µg/kg	180000	n	2300000	n	NBA	875		306	U	293	U	334	U	383	U
Unadjusted C11-C22 Aromatics	EPH1	MADEP EPH	µg/kg	NBA		NBA		NBA	15300	J	30600	U	29300	U	33400	U	38300	U
C5-C8 Aliphatics Hydrocarbons	VPH3	MADEP VPH	µg/kg	NBA		NBA		NBA	2090	U	2720	U	2090	U	2990	U	3870	U
C9-C10 Aromatic Hydrocarbons	VPH5	MADEP VPH	µg/kg	NBA		NBA		NBA	522	U	681	U	522	U	749	U	966	U
C9-C12 Aliphatic Hydrocarbons	VPH4	MADEP VPH	µg/kg	NBA		NBA		NBA	2090	U	2720	U	2090	U	2990	U	3870	U
Unadjusted C5-C8 Aliphatics	VPH1	MADEP VPH	µg/kg	NBA		NBA		NBA	2090	U	2720	U	2090	U	2990	U	3870	U
Unadjusted C9-C12 Aliphatics	VPH2	MADEP VPH	µg/kg	NBA		NBA		NBA	2090	U	2720	U	2090	U	2990	U	3870	U
Aluminum	7429905	6010C	mg/kg	7700	n	110000		NBA	**15700**		**15900**		**15900**	J	**29900**		**25600**	
Antimony	7440360	6010C	mg/kg	3.1	n	47	n	NBA		R		R		R		R		R
Arsenic	7440382	6010C	mg/kg	0.68	c	3	cR	NBA	**6.2**		**4.4**		**4.8**		**6.6**		**8.5**	
Barium	7440393	6010C	mg/kg	1500	n	22000	n	NBA	44		37.8		59.9		104		62.6	J
Beryllium	7440417	6010C	mg/kg	16	n	230	n	NBA	0.61		0.77		1		1.4	J	1.4	J
Cadmium	7440439	6010C	mg/kg	7.1	n	98	n	NBA	0.065	J	0.83	UJ	0.073	J	2.5	UJ	2.3	UJ

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB01-0002		LO58-SB01-0608		LO58-SB02-0002		LO58-SB02-0608		LO58-SB03-0002	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Calcium	7440702	6010C	mg/kg	NBA		NBA		NBA	9360	J	43600	J	907	J	6610	J	5140	J
Chromium	7440473	6010C	mg/kg	0.3	c	6.3	c	NBA	**32**		**35.6**		**35.8**		**61.4**		**56.3**	
Cobalt	7440484	6010C	mg/kg	2.3	n	35	n	NBA	**10.3**	J	**13.2**		**10.9**		**21**	J	**19.6**	J
Copper	7440508	6010C	mg/kg	310	n	4700	n	NBA	26.6	J	17.6		23.3		32.7		34	
Iron	7439896	6010C	mg/kg	5500	n	82000	n	NBA	**31000**		**27800**		**31500**		**36400**		**49300**	
Lead	7439921	6010C	mg/kg	400		800		NBA	16.1		14.1		13.9		17.1		23.3	
Magnesium	7439954	6010C	mg/kg	NBA		NBA		NBA	8980		11600		10700		17500		16600	
Manganese	7439965	6010C	mg/kg	180	n	2600	n	NBA	**487**		**413**		**486**		**593**		**654**	
Nickel	7440020	6010C	mg/kg	150	n	2200	n	NBA	38.4		49.1		51.6		86.4		84.6	
Potassium	7440097	6010C	mg/kg	NBA		NBA		NBA	924		986		924		1780	J	1310	J
Selenium	7782492	6010C	mg/kg	39	n	580	n	NBA	0.85	J	5.8	UJ	1.2	J	17.2	UJ	16.2	UJ
Silver	7440224	6010C	mg/kg	39	n	580	n	NBA	0.71	UJ	4.4	UJ	0.88	UJ	4.8	UJ	4.7	UJ
Sodium	7440235	6010C	mg/kg	NBA		NBA		NBA	35.4	J	34	J	27.9	J	43.1	J	44.6	J
Thallium	7440280	6010C	mg/kg	0.078	n	1.2	n	NBA	1.9	U	**0.46**	J	1.9	U	2.5	U	2.3	U
Vanadium	7440622	6010C	mg/kg	39	n	580	n	NBA	22.2		16.6		20.1		22.4		29.2	
Zinc	7440666	6010C	mg/kg	2300	n	35000	n	NBA	54.8		51.8		53.8		85.6		91.9	
Mercury	7439976	7471B	mg/kg	1.1	n	4.6		NBA	0.048	J	0.013	J	0.065	J	0.044	U	0.025	J
PCB-1016	12674112	8082A	µg/kg	410	n	5100	n	NBA	19	U	20	U	20	U	22	U	23	U
PCB-1221	11104282	8082A	µg/kg	200	c	830	c	NBA	19	U	20	U	20	U	22	U	23	U
PCB-1232	11141165	8082A	µg/kg	170	c	720	c	NBA	19	U	20	U	20	U	22	U	23	U
PCB-1242	53469219	8082A	µg/kg	230	c	950	c	NBA	19	U	20	U	20	U	22	U	23	U
PCB-1248	12672296	8082A	µg/kg	230	c	950	c	NBA	19	U	20	U	20	U	22	U	23	U
PCB-1254	11097691	8082A	µg/kg	120	n	970	c	NBA	19	U	20	U	20	U	22	U	23	U
PCB-1260	11096825	8082A	µg/kg	240	c	990	c	NBA	15	J	20	U	20	U	22	U	23	U
PCB-1262	37324235	8082A	µg/kg	NBA		NBA		NBA	19	U	20	U	20	U	22	U	23	U
PCB-1268	11100144	8082A	µg/kg	NBA		NBA		NBA	19	U	20	U	20	U	22	U	23	U
1,1,1,2-Tetrachloroethane	630206	8260B	µg/kg	2000	c	8800	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,1,1-Trichloroethane	71556	8260B	µg/kg	810000	n	3600000		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,1,2,2-Tetrachloroethane	79345	8260B	µg/kg	600	c	2700	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,1,2-Trichloroethane	79005	8260B	µg/kg	150	n	630	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,1-Dichloroethane	75343	8260B	µg/kg	3600	c	16000	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,1-Dichloroethene	75354	8260B	µg/kg	23000	n	100000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,1-Dichloropropene	563586	8260B	µg/kg	NBA		NBA		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB01-0002		LO58-SB01-0608		LO58-SB02-0002		LO58-SB02-0608		LO58-SB03-0002	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**		**Ecological[c]**										
1,2,3-Trichlorobenzene	87616	8260B	µg/kg	6300	n	93000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,2,3-Trichloropropane	96184	8260B	µg/kg	5.1	c	110	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,2,4-Trichlorobenzene	120821	8260B	µg/kg	5800	n	26000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,2,4-Trimethylbenzene	95636	8260B	µg/kg	5800	n	24000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,2-Dibromo-3-Chloropropane	96128	8260B	µg/kg	5.3	c	64	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,2-Dibromoethane	106934	8260B	µg/kg	36	c	160	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,2-Dichlorobenzene	95501	8260B	µg/kg	180000	n	930000		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,2-Dichloroethane	107062	8260B	µg/kg	460	c	2000	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,2-Dichloroethene, Total	540590	8260B	µg/kg	NBA		NBA		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,2-Dichloropropane	78875	8260B	µg/kg	1000	c	4400	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,3,5-Trimethylbenzene	108678	8260B	µg/kg	78000	n	1200000		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,3-Dichlorobenzene	541731	8260B	µg/kg	NBA		NBA		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,3-Dichloropropane	142289	8260B	µg/kg	160000	n	2300000		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,4-Dichlorobenzene	106467	8260B	µg/kg	2600	c	11000	c	NBA	1.1	J	3.9	J	0.72	J	0.76	J	1.1	J
1,4-Dioxane	123911	8260B	µg/kg	5300	c	24000	c	NBA	230	U	1000	U	270	UJ	320	UJ	330	U
2,2-Dichloropropane	594207	8260B	µg/kg	NBA		NBA		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
2-Butanone	78933	8260B	µg/kg	2700000	n	19000000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	33	
2-Chloroethyl vinyl ether	110758	8260B	µg/kg	NBA		NBA		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
2-Chlorotoluene	95498	8260B	µg/kg	160000	n	2300000		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
2-Hexanone	591786	8260B	µg/kg	20000	n	130000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
4-Chlorotoluene	106434	8260B	µg/kg	160000	n	2300000		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
4-Isopropyltoluene	99876	8260B	µg/kg	NBA		NBA		NBA	0.17	J	20	U	5.4	UJ	6.3	UJ	6.7	U
4-Methyl-2-pentanone	108101	8260B	µg/kg	3300000	n	14000000		NBA	2	J	20	U	5.4	UJ	6.3	UJ	6.7	U
Acetone	67641	8260B	µg/kg	6100000	n	67000000	n	NBA	210		47		140	J	49	J	300	
Benzene	71432	8260B	µg/kg	1200	c	5100	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Bromobenzene	108861	8260B	µg/kg	29000	n	180000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Bromochloromethane	74975	8260B	µg/kg	15000	n	63000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Bromodichloromethane	75274	8260B	µg/kg	290	c	1300	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Bromoform	75252	8260B	µg/kg	19000	c	86000	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Bromomethane	74839	8260B	µg/kg	680	n	3000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Carbon disulfide	75150	8260B	µg/kg	77000	n	350000	n	NBA	1.4	J	20	U	5.4	UJ	1	J	0.58	J
Carbon tetrachloride	56235	8260B	µg/kg	650	c	2900	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Chlorobenzene	108907	8260B	µg/kg	28000	n	130000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB01-0002		LO58-SB01-0608		LO58-SB02-0002		LO58-SB02-0608		LO58-SB03-0002	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Chloroethane	75003	8260B	µg/kg	1400000	n	5700000		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Chloroform	67663	8260B	µg/kg	320	c	1400	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Chloromethane	74873	8260B	µg/kg	11000	n	46000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
cis-1,2-Dichloroethene	156592	8260B	µg/kg	16000	n	230000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
cis-1,3-Dichloropropene	10061015	8260B	µg/kg	NBA		NBA		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Cyclohexane	110827	8260B	µg/kg	650000	n	2700000		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Dibromochloromethane	124481	8260B	µg/kg	8300	c	39000	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Dibromomethane	74953	8260B	µg/kg	2400	n	9900	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Dichlorodifluoromethane	75718	8260B	µg/kg	8700	n	37000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Ethylbenzene	100414	8260B	µg/kg	5800	c	25000	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Freon TF	76131	8260B	µg/kg	4000000	n	17000000		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Hexachlorobutadiene	87683	8260B	µg/kg	1200	c	5300	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Isobutyl alcohol	78831	8260B	µg/kg	2300000	n	35000000		NBA	230	U	1000	U	270	UJ	320	UJ	330	U
Isopropylbenzene	98828	8260B	µg/kg	190000	n	990000		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
m&p-Xylene	179601231	8260B	µg/kg	58000	n	250000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Methyl acetate	79209	8260B	µg/kg	7800000	n	120000000	s	NBA	9.7		20	U	5.1	J	4.9	J	42	
Methyl iodide	74884	8260B	µg/kg	NBA		NBA		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Methyl t-butyl ether	1634044	8260B	µg/kg	47000	c	210000	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Methylcyclohexane	108872	8260B	µg/kg	NBA		NBA		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Methylene Chloride	75092	8260B	µg/kg	35000	n	320000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Naphthalene	91203	8260B	µg/kg	3800	c	17000	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
n-Butylbenzene	104518	8260B	µg/kg	390000	n	5800000		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
n-Propylbenzene	103651	8260B	µg/kg	380000	n	2400000		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
o-Xylene	95476	8260B	µg/kg	65000	n	280000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
sec-Butylbenzene	135988	8260B	µg/kg	780000	n	12000000		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Styrene	100425	8260B	µg/kg	600000	n	3500000		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
tert-Butylbenzene	98066	8260B	µg/kg	780000	n	12000000		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Tetrachloroethene	127184	8260B	µg/kg	8100	n	39000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Tetrahydrofuran	109999	8260B	µg/kg	1800000	n	9400000	n	NBA	47	U	200	U	54	UJ	63	UJ	67	U
Toluene	108883	8260B	µg/kg	490000	n	4700000		NBA	0.25	J	20	U	5.4	UJ	6.3	UJ	6.7	U
trans-1,2-Dichloroethene	156605	8260B	µg/kg	160000	n	2300000		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
trans-1,3-Dichloropropene	10061026	8260B	µg/kg	NBA		NBA		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Trichloroethene	79016	8260B	µg/kg	410	n	1900	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	**LO58-SB01-0002**		**LO58-SB01-0608**		**LO58-SB02-0002**		**LO58-SB02-0608**		**LO58-SB03-0002**	
								Sample Description	**Soil Bore**		**Soil Bore**		**Soil Bore**		**Soil Bore**		**Soil Bore**	
								Sample Date	**10/2/2012**		**10/2/2012**		**10/2/2012**		**10/2/2012**		**10/2/2012**	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Trichlorofluoromethane	75694	8260B	µg/kg	2300000	n	35000000		NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Vinyl acetate	108054	8260B	µg/kg	91000	n	380000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Vinyl chloride	75014	8260B	µg/kg	59	c	1700	c	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
Xylenes, Total	1330207	8260B	µg/kg	58000	n	250000	n	NBA	4.7	U	20	U	5.4	UJ	6.3	UJ	6.7	U
1,1'-Biphenyl	92524	8270C PAH	µg/kg	4700	n	20000	n	NBA	0.75	U	0.8	U	0.79	U	0.9	U	9	U
1-Methylnaphthalene	90120	8270C PAH	µg/kg	18000	c	73000	c	NBA	0.29	J	0.8	U	0.79	U	0.9	U	9	U
1-Methylphenanthrene	832699	8270C PAH	µg/kg	NBA		NBA		NBA	2.4		0.8	U	0.79	U	0.9	U	30	
2,3,5-Trimethylnaphthalene	2245387	8270C PAH	µg/kg	NBA		NBA		NBA	0.75	U	0.8	U	0.79	U	0.9	U	9	U
2,6-Dimethylnaphthalene	581420	8270C PAH	µg/kg	NBA		NBA		NBA	0.27	J	0.8	U	0.79	U	0.9	U	9	U
2-Methylnaphthalene	91576	8270C PAH	µg/kg	24000	n	300000	n	NBA	0.42	J	0.8	U	0.79	U	0.9	U	9	U
Acenaphthene	83329	8270C PAH	µg/kg	360000	n	4500000	n	NBA	1.4		0.8	U	0.79	U	0.9	U	6.4	J
Acenaphthylene	208968	8270C PAH	µg/kg	360000	n	4500000	n	NBA	0.81		0.8	U	0.79	U	0.9	U	8.5	J
Anthracene	120127	8270C PAH	µg/kg	1800000	n	23000000	n	NBA	3.3		0.8	U	0.79	U	0.9	U	26	
Benzo[a]anthracene	56553	8270C PAH	µg/kg	160	c	2900	c	NBA	14		0.8	U	0.79	U	0.9	U	**170**	
Benzo[a]pyrene	50328	8270C PAH	µg/kg	16	c	290	c	NBA	13		0.8	U	0.79	U	0.9	U	**170**	
Benzo[b]fluoranthene	205992	8270C PAH	µg/kg	160	c	2900	c	NBA	16		0.37	J	0.22	J	0.26	J	**210**	
Benzo[e]pyrene	192972	8270C PAH	µg/kg	NBA		NBA		NBA	11		0.8	U	0.79	U	0.9	U	130	
Benzo[g,h,i]perylene	191242	8270C PAH	µg/kg	3800	c	17000	c	NBA	5.4		0.8	U	0.79	U	0.9	U	71	
Benzo[k]fluoranthene	207089	8270C PAH	µg/kg	1600	c	29000	c	NBA	12		0.8	U	0.79	U	0.9	U	160	
Chrysene	218019	8270C PAH	µg/kg	16000	c	290000	c	NBA	14		0.8	U	0.79	U	0.9	U	180	
Dibenzo[a,h]anthracene	53703	8270C PAH	µg/kg	16	c	290	c	NBA	2.7		0.8	U	0.79	U	0.9	U	**35**	
Dibenzothiophene	132650	8270C PAH	µg/kg	78000	n	1200000	n	NBA	0.82		0.8	U	0.79	U	0.9	U	6.9	J
Fluoranthene	206440	8270C PAH	µg/kg	240000	n	3000000	n	NBA	26		0.8	U	0.79	U	0.9	U	350	
Fluorene	86737	8270C PAH	µg/kg	240000	n	3000000	n	NBA	1.4		0.8	U	0.79	U	0.9	U	6.7	J
Indeno[1,2,3-cd]pyrene	193395	8270C PAH	µg/kg	160	c	2900	c	NBA	8.6		0.8	U	0.79	U	0.9	U	100	
Naphthalene	91203	8270C PAH	µg/kg	3800	c	17000	c	NBA	0.41	J	0.24	J	0.27	J	0.25	J	9	U
Perylene	198550	8270C PAH	µg/kg	NBA		NBA		NBA	3.7		0.8	U	0.79	U	0.9	U	43	
Phenanthrene	85018	8270C PAH	µg/kg	1800000	n	23000000	n	NBA	13		0.27	J	0.79	U	0.9	U	120	
Pyrene	129000	8270C PAH	µg/kg	180000	n	2300000	n	NBA	21		0.8	U	0.79	U	0.9	U	310	
1,1'-Biphenyl	92524	8270D	µg/kg	4700	n	20000	n	NBA	370	U	390	U	390	U	440	U	440	U
1,2,4,5-Tetrachlorobenzene	95943	8270D	µg/kg	2300	n	35000	n	NBA	370	U	390	U	390	U	440	U	440	U
1,2,4-Trichlorobenzene	120821	8270D	µg/kg	5800	n	26000	n	NBA	370	U	390	U	390	U	440	U	440	U
1,2-Dichlorobenzene	95501	8270D	µg/kg	180000	n	930000	n	NBA	370	U	390	U	390	U	440	U	440	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB01-0002		LO58-SB01-0608		LO58-SB02-0002		LO58-SB02-0608		LO58-SB03-0002	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	CAS Number	Method	Units	Residential[a]		Industrial[b]		Ecological[c]										
1,3-Dichlorobenzene	541731	8270D	µg/kg	NBA		NBA		NBA	370	U	390	U	390	U	440	U	440	U
1,4-Dichlorobenzene	106467	8270D	µg/kg	2600	c	11000	c	NBA	370	U	390	U	390	U	440	U	440	U
1-Methylnaphthalene	90120	8270D	µg/kg	18000	c	73000	c	NBA	370	U	390	U	390	U	440	U	440	U
2,2'-oxybis[1-chloropropane]	108601	8270D	µg/kg	310000	n	4700000		NBA	370	U	390	U	390	U	440	U	440	U
2,3,4,6-Tetrachlorophenol	58902	8270D	µg/kg	190000	n	2500000	n	NBA	370	U	390	U	390	U	440	U	440	U
2,4,5-Trichlorophenol	95954	8270D	µg/kg	630000	n	8200000	n	NBA	930	U	990	U	970	U	1100	U	1100	U
2,4,6-Trichlorophenol	88062	8270D	µg/kg	6300	n	82000	n	NBA	370	U	390	U	390	U	440	U	440	U
2,4-Dichlorophenol	120832	8270D	µg/kg	19000	n	250000	n	NBA	370	U	390	U	390	U	440	U	440	U
2,4-Dimethylphenol	105679	8270D	µg/kg	130000	n	1600000	n	NBA	370	U	390	U	390	U	440	U	440	U
2,4-Dinitrophenol	51285	8270D	µg/kg	13000	n	160000	n	NBA	930	U	990	U	970	U	1100	U	1100	U
2,4-Dinitrotoluene	121142	8270D	µg/kg	1700	c	7400	c	NBA	370	U	390	U	390	U	440	U	440	U
2,6-Dichlorophenol	87650	8270D	µg/kg	NBA		NBA		NBA	370	U	390	U	390	U	440	U	440	U
2,6-Dinitrotoluene	606202	8270D	µg/kg	360	c	1500	c	NBA	370	U	390	U	390	U	440	U	440	U
2-Chloronaphthalene	91587	8270D	µg/kg	480000	n	6000000	n	NBA	370	U	390	U	390	U	440	U	440	U
2-Chlorophenol	95578	8270D	µg/kg	39000	n	580000	n	NBA	370	U	390	U	390	U	440	U	440	U
2-Methylnaphthalene	91576	8270D	µg/kg	24000	n	300000	n	NBA	370	U	390	U	390	U	440	U	440	U
2-Methylphenol	95487	8270D	µg/kg	320000	n	4100000	n	NBA	370	U	390	U	390	U	440	U	440	U
2-Nitroaniline	88744	8270D	µg/kg	63000	n	800000	n	NBA	930	U	990	U	970	U	1100	U	1100	U
2-Nitrophenol	88755	8270D	µg/kg	NBA		NBA		NBA	370	U	390	U	390	U	440	U	440	U
3 & 4 Methylphenol	15831104	8270D	µg/kg	NBA		NBA		NBA	750	U	800	U	790	U	900	U	900	U
3,3'-Dichlorobenzidine	91941	8270D	µg/kg	1200	c	5100	c	NBA	370	U	390	U	390	U	440	U	440	U
3-Nitroaniline	99092	8270D	µg/kg	NBA		NBA		NBA	930	U	990	U	970	U	1100	U	1100	U
4,6-Dinitro-2-methylphenol	534521	8270D	µg/kg	510	n	6600	n	NBA	930	U	990	U	970	U	1100	U	1100	U
4-Bromophenyl phenyl ether	101553	8270D	µg/kg	NBA		NBA		NBA	370	U	390	U	390	U	440	U	440	U
4-Chloro-3-methylphenol	59507	8270D	µg/kg	630000	n	8200000	n	NBA	370	U	390	U	390	U	440	U	440	U
4-Chloroaniline	106478	8270D	µg/kg	2700	c	11000	c	NBA	370	U	390	U	390	U	440	U	440	U
4-Chlorophenyl phenyl ether	7005723	8270D	µg/kg	NBA		NBA		NBA	370	U	390	U	390	U	440	U	440	U
4-Nitroaniline	100016	8270D	µg/kg	25000	n	110000	c	NBA	930	U	990	U	970	U	1100	U	1100	U
4-Nitrophenol	100027	8270D	µg/kg	NBA		NBA		NBA	930	U	990	U	970	U	1100	U	1100	U
Acenaphthene	83329	8270D	µg/kg	360000	n	4500000	n	NBA	370	U	390	U	390	U	440	U	440	U
Acenaphthylene	208968	8270D	µg/kg	360000	n	4500000	n	NBA	370	U	390	U	390	U	440	U	440	U
Acetophenone	98862	8270D	µg/kg	780000	n	12000000		NBA	370	U	390	U	390	U	440	U	440	U
Aniline	62533	8270D	µg/kg	44000	n	400000	c	NBA	930	U	990	U	970	U	1100	U	1100	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB01-0002		LO58-SB01-0608		LO58-SB02-0002		LO58-SB02-0608		LO58-SB03-0002	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Anthracene	120127	8270D	µg/kg	1800000	n	23000000	n	NBA	370	U	390	U	390	U	440	U	21	J
Atrazine	1912249	8270D	µg/kg	2400	c	10000	c	NBA	370	U	390	U	390	U	440	U	440	U
Azobenzene	103333	8270D	µg/kg	5600	c	26000	c	NBA	370	U	390	U	390	U	440	U	440	U
Benzaldehyde	100527	8270D	µg/kg	170000	c	820000	c	NBA	370	U	390	U	390	U	440	U	440	U
Benzidine	92875	8270D	µg/kg	0.53	c	10	c	NBA		R		R		R		R		R
Benzo[a]anthracene	56553	8270D	µg/kg	160	c	2900	c	NBA	16	J	390	U	390	U	440	U	140	J
Benzo[a]pyrene	50328	8270D	µg/kg	16	c	290	c	NBA	15	J	390	U	390	U	440	U	**150**	J
Benzo[b]fluoranthene	205992	8270D	µg/kg	160	c	2900	c	NBA	370	U	390	U	390	U	440	U	**170**	J
Benzo[e]pyrene	192972	8270D	µg/kg	NBA		NBA		NBA	370	U	390	U	390	U	440	U	120	J
Benzo[g,h,i]perylene	191242	8270D	µg/kg	3800	c	17000	c	NBA	370	U	390	U	390	U	440	U	81	J
Benzo[k]fluoranthene	207089	8270D	µg/kg	1600	c	29000	c	NBA	370	U	390	U	390	U	440	U	130	J
Benzoic acid	65850	8270D	µg/kg	25000000	n	330000000		NBA	930	U	990	U	970	U	1100	U	1100	U
Benzyl alcohol	100516	8270D	µg/kg	630000	n	8200000	n	NBA	370	UJ	390	UJ	390	UJ	440	UJ	440	UJ
Bis(2-chloroethoxy)methane	111911	8270D	µg/kg	19000	n	250000	n	NBA	370	U	390	U	390	U	440	U	440	U
Bis(2-chloroethyl)ether	111444	8270D	µg/kg	230	c	1000	c	NBA	370	U	390	U	390	U	440	U	440	U
Bis(2-ethylhexyl) phthalate	117817	8270D	µg/kg	39000	c	160000	c	NBA	29	J	27	J	390	U	32	J	32	J
Butyl benzyl phthalate	85687	8270D	µg/kg	290000	c	1200000	c	NBA	370	U	390	U	390	U	440	U	440	U
Caprolactam	105602	8270D	µg/kg	3100000	n	40000000	n	NBA	370	U	390	U	390	U	440	U	440	U
Carbazole	86748	8270D	µg/kg	NBA		NBA		NBA	370	U	390	U	390	U	440	U	440	U
Chrysene	218019	8270D	µg/kg	16000	c	290000	c	NBA	370	U	390	U	390	U	440	U	200	J
Dibenzo[a,h]anthracene	53703	8270D	µg/kg	16	c	290	c	NBA	370	U	390	U	390	U	440	U	**26**	J
Dibenzofuran	132649	8270D	µg/kg	7300	n	100000	n	NBA	370	U	390	U	390	U	440	U	440	U
Diethyl phthalate	84662	8270D	µg/kg	5100000	n	66000000	n	NBA	370	U	390	U	390	U	440	U	440	U
Dimethyl phthalate	131113	8270D	µg/kg	NBA		NBA		NBA	370	U	390	U	390	U	440	U	440	U
Di-n-butyl phthalate	84742	8270D	µg/kg	630000	n	8200000	n	NBA	370	U	390	U	390	U	440	U	440	U
Di-n-octyl phthalate	117840	8270D	µg/kg	63000	n	820000	n	NBA	370	U	390	U	390	U	440	U	440	U
Fluoranthene	206440	8270D	µg/kg	240000	n	3000000	n	NBA	26	J	390	U	390	U	440	U	290	J
Fluorene	86737	8270D	µg/kg	240000	n	3000000	n	NBA	370	U	390	U	390	U	440	U	440	U
Hexachlorobenzene	118741	8270D	µg/kg	210	c	960	c	NBA	370	U	390	U	390	U	440	U	440	U
Hexachlorobutadiene	87683	8270D	µg/kg	1200	c	5300	c	NBA	370	U	390	U	390	U	440	U	440	U
Hexachlorocyclopentadiene	77474	8270D	µg/kg	180	n	750	n	NBA	370	U	390	U	390	U	440	U	440	U
Hexachloroethane	67721	8270D	µg/kg	1800	c	8000	c	NBA	370	U	390	U	390	U	440	U	440	U
Indeno[1,2,3-cd]pyrene	193395	8270D	µg/kg	160	c	2900	c	NBA	370	U	390	U	390	U	440	U	70	J

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB01-0002		LO58-SB01-0608		LO58-SB02-0002		LO58-SB02-0608		LO58-SB03-0002	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	CAS Number	Method	Units	Residential[a]		Industrial[b]		Ecological[c]										
Isophorone	78591	8270D	µg/kg	570000	c	2400000	c	NBA	370	U	390	U	390	U	440	U	440	U
Naphthalene	91203	8270D	µg/kg	3800	c	17000	c	NBA	370	U	390	U	390	U	440	U	440	U
Nitrobenzene	98953	8270D	µg/kg	5100	c	22000	c	NBA	370	U	390	U	390	U	440	U	440	U
N-Nitrosodimethylamine	62759	8270D	µg/kg	2	c	34	c	NBA	370	U	390	U	390	U	440	U	440	U
N-Nitrosodi-n-propylamine	621647	8270D	µg/kg	78	c	330	c	NBA	370	U	390	U	390	U	440	U	440	U
N-Nitrosodiphenylamine	86306	8270D	µg/kg	110000	c	470000	c	NBA	430	U	460	U	450	U	520	U	520	U
Pentachlorophenol	87865	8270D	µg/kg	1000	c	4000	c	NBA	930	U	990	U	970	U	1100	U	1100	U
Perylene	198550	8270D	µg/kg	NBA		NBA		NBA	370	U	390	U	390	U	440	U	48	J
Phenanthrene	85018	8270D	µg/kg	1800000	n	23000000	n	NBA	14	J	390	U	390	U	440	U	130	J
Phenol	108952	8270D	µg/kg	1900000	n	25000000	n	NBA	370	U	390	U	390	U	440	U	440	U
Pyrene	129000	8270D	µg/kg	180000	n	2300000	n	NBA	29	J	390	U	390	U	440	U	290	J
Pyridine	110861	8270D	µg/kg	7800	n	120000	n	NBA	370	U	390	U	390	U	440	U	440	U

[a] Regional Screening Level (RSL) Residential Soil Table (May 2016).

[b] Regional Screening Level (RSL) Industrial Soil Table (May 2016).

[c] As per QAPP.

Bold values indicate exceedance of residential RSL.

Highlghted values indicate exceedance of industrial RSL or eco benchmark.

All trip blank analytes measured under method SW8260.

µg/kg = Micrograms per kilograms.

C = Cancer based, target risk equals 1E-06.

J = Result is <RL but >=MDL and the concentration is an approximate value.

mg/kg = Milligram per kilogram.

NBA = No benchmark available.

NC = Noncancer based, target hazard quotient equals 0.1.

R=Rejected; result not valid due to quality control failure.

U = Not detected.

UJ = Not detected. SQL is <RL but >=MDL and the SQL is an approximate value.

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	**LO58-SB03-0305**		**LO58-SB04-0002**		**LO58-SB04-0608**		**LO58-SB-DUP-01**		**LO58-SB05-0002**	
								Sample Description	**Soil Bore**		**Soil Bore**		**Soil Bore**		**DUP OF SB04-0608**		**Soil Bore**	
								Sample Date	**10/2/2012**		**10/2/2012**		**10/2/2012**		**10/2/2012**		**10/2/2012**	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Percent Solids	DEP1005	D4643	%	NBA		NBA		NBA	86.5		85.4		87.8		88.4		88.8	
2-Methylnaphthalene	91576	MADEP EPH	µg/kg	24000	n	300000	n	NBA	279	U								
Acenaphthene	83329	MADEP EPH	µg/kg	360000	n	4500000	n	NBA	279	U								
Acenaphthylene	208968	MADEP EPH	µg/kg	360000	n	4500000	n	NBA	279	U								
Anthracene	120127	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA	279	U								
Benzo[a]anthracene	56553	MADEP EPH	µg/kg	160	c	2900	c	NBA	279	U								
Benzo[a]pyrene	50328	MADEP EPH	µg/kg	16	c	290	c	NBA	279	U								
Benzo[b]fluoranthene	205992	MADEP EPH	µg/kg	160	c	2900	c	NBA	279	U								
Benzo[g,h,i]perylene	191242	MADEP EPH	µg/kg	3800	c	17000	c	NBA	279	U								
Benzo[k]fluoranthene	207089	MADEP EPH	µg/kg	1600	c	29000	c	NBA	279	U								
C11-C22 Aromatic Hydrocarbons	EPH4	MADEP EPH	µg/kg	NBA		NBA		NBA	27900	U	29300	U	31000	U	30200	U	27300	U
C19-C36 Aliphatic Hydrocarbons	EPH3	MADEP EPH	µg/kg	NBA		NBA		NBA	27900	U	29300	U	31000	U	30200	U	27300	U
C9-C18 Aliphatic Hydrocarbons	EPH2	MADEP EPH	µg/kg	NBA		NBA		NBA	27900	U	29300	U	31000	U	30200	U	27300	U
Chrysene	218019	MADEP EPH	µg/kg	16000	c	290000	c	NBA	279	U								
Dibenzo[a,h]anthracene	53703	MADEP EPH	µg/kg	16	c	290	c	NBA	279	U								
Fluoranthene	206440	MADEP EPH	µg/kg	240000	n	3000000	n	NBA	279	U								
Fluorene	86737	MADEP EPH	µg/kg	240000	n	3000000	n	NBA	279	U								
Indeno[1,2,3-cd]pyrene	193395	MADEP EPH	µg/kg	160	c	2900	c	NBA	279	U								
Naphthalene	91203	MADEP EPH	µg/kg	3800	c	17000	c	NBA	279	U								
Phenanthrene	85018	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA	279	U								
Pyrene	129000	MADEP EPH	µg/kg	180000	n	2300000	n	NBA	279	U								
Unadjusted C11-C22 Aromatics	EPH1	MADEP EPH	µg/kg	NBA		NBA		NBA	27900	U	29300	U	31000	U	30200	U	27300	U
C5-C8 Aliphatics Hydrocarbons	VPH3	MADEP VPH	µg/kg	NBA		NBA		NBA	2190	U	2180	U	2350	U	2580	U	1940	U
C9-C10 Aromatic Hydrocarbons	VPH5	MADEP VPH	µg/kg	NBA		NBA		NBA	547	U	546	U	586	U	645	U	486	U
C9-C12 Aliphatic Hydrocarbons	VPH4	MADEP VPH	µg/kg	NBA		NBA		NBA	2190	U	2180	U	2350	U	2580	U	1940	U
Unadjusted C5-C8 Aliphatics	VPH1	MADEP VPH	µg/kg	NBA		NBA		NBA	2190	U	2180	U	2350	U	25400	U	1940	U
Unadjusted C9-C12 Aliphatics	VPH2	MADEP VPH	µg/kg	NBA		NBA		NBA	2190	U	2180	U	2350	U	25400	U	1940	U
Aluminum	7429905	6010C	mg/kg	7700	n	110000		NBA	**15300**		**13900**		**14800**		**13900**		**15500**	
Antimony	7440360	6010C	mg/kg	3.1	n	47	n	NBA		R	0.52	J	0.58	J	0.45	J	0.35	J
Arsenic	7440382	6010C	mg/kg	0.68	c	3	cR	NBA	**3.9**		**7.3**	J	**5.2**	J	**4.6**	J	**8**	J
Barium	7440393	6010C	mg/kg	1500	n	22000	n	NBA	33.3		34.5		25.3		25.4		40.5	
Beryllium	7440417	6010C	mg/kg	16	n	230	n	NBA	0.79		0.93		0.85		0.83		0.6	
Cadmium	7440439	6010C	mg/kg	7.1	n	98	n	NBA	0.84	UJ	0.1	J	0.087	J	0.095	J	0.12	J

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	**LO58-SB03-0305**		**LO58-SB04-0002**		**LO58-SB04-0608**		**LO58-SB-DUP-01**		**LO58-SB05-0002**	
								Sample Description	**Soil Bore**		**Soil Bore**		**Soil Bore**		**DUP OF SB04-0608**		**Soil Bore**	
								Sample Date	**10/2/2012**		**10/2/2012**		**10/2/2012**		**10/2/2012**		**10/2/2012**	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Calcium	7440702	6010C	mg/kg	NBA		NBA		NBA	48000	J	3150	J	4620	J	20900	J	5950	J
Chromium	7440473	6010C	mg/kg	0.3	c	6.3	c	NBA	**33.3**		**28.8**	J	**37.2**	J	**31.5**	J	**29.1**	J
Cobalt	7440484	6010C	mg/kg	2.3	n	35	n	NBA	**13.8**		**13.4**		**16.9**		**16**		**11.3**	
Copper	7440508	6010C	mg/kg	310	n	4700	n	NBA	15.6		23.7	J	23.6	J	21.7	J	21.9	J
Iron	7439896	6010C	mg/kg	5500	n	82000	n	NBA	**28400**		**32200**	J	**34300**	J	**32700**	J	**31900**	J
Lead	7439921	6010C	mg/kg	400		800		NBA	14.5		19.4		53.9		33.2		16.6	
Magnesium	7439954	6010C	mg/kg	NBA		NBA		NBA	13000		8800		10400		9610		8960	
Manganese	7439965	6010C	mg/kg	180	n	2600	n	NBA	**412**		**640**		**494**		**469**		**669**	
Nickel	7440020	6010C	mg/kg	150	n	2200	n	NBA	50		52.1		69.6		64.6		39.5	
Potassium	7440097	6010C	mg/kg	NBA		NBA		NBA	950		672		756		771		746	
Selenium	7782492	6010C	mg/kg	39	n	580	n	NBA	5.9	UJ	2.4	U	2.4	U	2.4	U	2.4	U
Silver	7440224	6010C	mg/kg	39	n	580	n	NBA	0.78	UJ	0.68	U	0.67	U	0.69	U	0.68	U
Sodium	7440235	6010C	mg/kg	NBA		NBA		NBA	30.4	J	26.3	J	29.9	J	30.5	J	35.5	J
Thallium	7440280	6010C	mg/kg	0.078	n	1.2	n	NBA	2.1	U	**0.49**	J	1.7	U	1.7	U	1.7	U
Vanadium	7440622	6010C	mg/kg	39	n	580	n	NBA	16.4		16.4	J	18.4	J	16.9	J	24.6	J
Zinc	7440666	6010C	mg/kg	2300	n	35000	n	NBA	52.1		60.3		69.7		64.6		56.4	
Mercury	7439976	7471B	mg/kg	1.1	n	4.6		NBA	0.036	U	0.093	J	0.014	J	0.009	J	0.051	J
PCB-1016	12674112	8082A	µg/kg	410	n	5100	n	NBA	19	U	20	U	19	U	19	U	19	U
PCB-1221	11104282	8082A	µg/kg	200	c	830	c	NBA	19	U	20	U	19	U	19	U	19	U
PCB-1232	11141165	8082A	µg/kg	170	c	720	c	NBA	19	U	20	U	19	U	19	U	19	U
PCB-1242	53469219	8082A	µg/kg	230	c	950	c	NBA	19	U	20	U	19	U	19	U	19	U
PCB-1248	12672296	8082A	µg/kg	230	c	950	c	NBA	19	U	20	U	19	U	19	U	19	U
PCB-1254	11097691	8082A	µg/kg	120	n	970	c	NBA	19	U	20	U	19	U	19	U	19	U
PCB-1260	11096825	8082A	µg/kg	240	c	990	c	NBA	19	U	20	U	19	U	19	U	19	U
PCB-1262	37324235	8082A	µg/kg	NBA		NBA		NBA	19	U	20	U	19	U	19	U	19	U
PCB-1268	11100144	8082A	µg/kg	NBA		NBA		NBA	19	U	20	U	19	U	19	U	19	U
1,1,1,2-Tetrachloroethane	630206	8260B	µg/kg	2000	c	8800	c	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
1,1,1-Trichloroethane	71556	8260B	µg/kg	810000	n	3600000		NBA	0.82	J	5.3	U	5.2	U	6.3	U	5.4	U
1,1,2,2-Tetrachloroethane	79345	8260B	µg/kg	600	c	2700	c	NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
1,1,2-Trichloroethane	79005	8260B	µg/kg	150	n	630	n	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
1,1-Dichloroethane	75343	8260B	µg/kg	3600	c	16000	c	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
1,1-Dichloroethene	75354	8260B	µg/kg	23000	n	100000	n	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
1,1-Dichloropropene	563586	8260B	µg/kg	NBA		NBA		NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB03-0305		LO58-SB04-0002		LO58-SB04-0608		LO58-SB-DUP-01		LO58-SB05-0002	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		DUP OF SB04-0608		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
1,2,3-Trichlorobenzene	87616	8260B	µg/kg	6300	n	93000	n	NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
1,2,3-Trichloropropane	96184	8260B	µg/kg	5.1	c	110	c	NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
1,2,4-Trichlorobenzene	120821	8260B	µg/kg	5800	n	26000	n	NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
1,2,4-Trimethylbenzene	95636	8260B	µg/kg	5800	n	24000	n	NBA	5.2	U	5.3	UJ	5.2	UJ	6.3	UJ	5.4	U
1,2-Dibromo-3-Chloropropane	96128	8260B	µg/kg	5.3	c	64	c	NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
1,2-Dibromoethane	106934	8260B	µg/kg	36	c	160	c	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
1,2-Dichlorobenzene	95501	8260B	µg/kg	180000	n	930000		NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
1,2-Dichloroethane	107062	8260B	µg/kg	460	c	2000	c	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
1,2-Dichloroethene, Total	540590	8260B	µg/kg	NBA		NBA		NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
1,2-Dichloropropane	78875	8260B	µg/kg	1000	c	4400	c	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
1,3,5-Trimethylbenzene	108678	8260B	µg/kg	78000	n	1200000		NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
1,3-Dichlorobenzene	541731	8260B	µg/kg	NBA		NBA		NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
1,3-Dichloropropane	142289	8260B	µg/kg	160000	n	2300000		NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
1,4-Dichlorobenzene	106467	8260B	µg/kg	2600	c	11000	c	NBA	1.1	J	5.3	U	5.2	UJ	6.3	UJ	5.4	U
1,4-Dioxane	123911	8260B	µg/kg	5300	c	24000	c	NBA	260	U	270	U	260	U	310	U	270	U
2,2-Dichloropropane	594207	8260B	µg/kg	NBA		NBA		NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
2-Butanone	78933	8260B	µg/kg	2700000	n	19000000	n	NBA	5.2	U	15		29		6.3	U	8.8	
2-Chloroethyl vinyl ether	110758	8260B	µg/kg	NBA		NBA		NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
2-Chlorotoluene	95498	8260B	µg/kg	160000	n	2300000		NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
2-Hexanone	591786	8260B	µg/kg	20000	n	130000	n	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
4-Chlorotoluene	106434	8260B	µg/kg	160000	n	2300000		NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
4-Isopropyltoluene	99876	8260B	µg/kg	NBA		NBA		NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
4-Methyl-2-pentanone	108101	8260B	µg/kg	3300000	n	14000000		NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Acetone	67641	8260B	µg/kg	6100000	n	67000000	n	NBA	20		120	J	160	J	75	J	74	
Benzene	71432	8260B	µg/kg	1200	c	5100	c	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Bromobenzene	108861	8260B	µg/kg	29000	n	180000	n	NBA	5.2	U	5.3	UJ	5.2	UJ	6.3	UJ	5.4	U
Bromochloromethane	74975	8260B	µg/kg	15000	n	63000	n	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Bromodichloromethane	75274	8260B	µg/kg	290	c	1300	c	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Bromoform	75252	8260B	µg/kg	19000	c	86000	c	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Bromomethane	74839	8260B	µg/kg	680	n	3000	n	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Carbon disulfide	75150	8260B	µg/kg	77000	n	350000	n	NBA	5.1	J	5.3	U	5.2	U	0.47	J	5.4	U
Carbon tetrachloride	56235	8260B	µg/kg	650	c	2900	c	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Chlorobenzene	108907	8260B	µg/kg	28000	n	130000	n	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	**LO58-SB03-0305**		**LO58-SB04-0002**		**LO58-SB04-0608**		**LO58-SB-DUP-01**		**LO58-SB05-0002**	
								Sample Description	**Soil Bore**		**Soil Bore**		**Soil Bore**		**DUP OF SB04-0608**		**Soil Bore**	
								Sample Date	**10/2/2012**		**10/2/2012**		**10/2/2012**		**10/2/2012**		**10/2/2012**	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Chloroethane	75003	8260B	µg/kg	1400000	n	5700000		NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Chloroform	67663	8260B	µg/kg	320	c	1400	c	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Chloromethane	74873	8260B	µg/kg	11000	n	46000	n	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
cis-1,2-Dichloroethene	156592	8260B	µg/kg	16000	n	230000	n	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
cis-1,3-Dichloropropene	10061015	8260B	µg/kg	NBA		NBA		NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Cyclohexane	110827	8260B	µg/kg	650000	n	2700000		NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Dibromochloromethane	124481	8260B	µg/kg	8300	c	39000	c	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Dibromomethane	74953	8260B	µg/kg	2400	n	9900	n	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Dichlorodifluoromethane	75718	8260B	µg/kg	8700	n	37000	n	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Ethylbenzene	100414	8260B	µg/kg	5800	c	25000	c	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Freon TF	76131	8260B	µg/kg	4000000	n	17000000		NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Hexachlorobutadiene	87683	8260B	µg/kg	1200	c	5300	c	NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
Isobutyl alcohol	78831	8260B	µg/kg	2300000	n	35000000		NBA	260	U	270	U	260	U	310	U	270	U
Isopropylbenzene	98828	8260B	µg/kg	190000	n	990000		NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
m&p-Xylene	179601231	8260B	µg/kg	58000	n	250000	n	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Methyl acetate	79209	8260B	µg/kg	7800000	n	120000000	s	NBA	5.2	U	6.6	J	5.2	U	4.7	J	19	J
Methyl iodide	74884	8260B	µg/kg	NBA		NBA		NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Methyl t-butyl ether	1634044	8260B	µg/kg	47000	c	210000	c	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Methylcyclohexane	108872	8260B	µg/kg	NBA		NBA		NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Methylene Chloride	75092	8260B	µg/kg	35000	n	320000	n	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Naphthalene	91203	8260B	µg/kg	3800	c	17000	c	NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
n-Butylbenzene	104518	8260B	µg/kg	390000	n	5800000		NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
n-Propylbenzene	103651	8260B	µg/kg	380000	n	2400000		NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
o-Xylene	95476	8260B	µg/kg	65000	n	280000	n	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
sec-Butylbenzene	135988	8260B	µg/kg	780000	n	12000000		NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
Styrene	100425	8260B	µg/kg	600000	n	3500000		NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
tert-Butylbenzene	98066	8260B	µg/kg	780000	n	12000000		NBA	5.2	U	5.3	U	5.2	UJ	6.3	UJ	5.4	U
Tetrachloroethene	127184	8260B	µg/kg	8100	n	39000	n	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Tetrahydrofuran	109999	8260B	µg/kg	1800000	n	9400000	n	NBA	52	U	53	U	52	U	63	U	54	U
Toluene	108883	8260B	µg/kg	490000	n	4700000		NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
trans-1,2-Dichloroethene	156605	8260B	µg/kg	160000	n	2300000		NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
trans-1,3-Dichloropropene	10061026	8260B	µg/kg	NBA		NBA		NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Trichloroethene	79016	8260B	µg/kg	410	n	1900	n	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB03-0305		LO58-SB04-0002		LO58-SB04-0608		LO58-SB-DUP-01		LO58-SB05-0002	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		DUP OF SB04-0608		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	CAS Number	Method	Units	Residential[a]		Industrial[b]		Ecological[c]										
Trichlorofluoromethane	75694	8260B	µg/kg	2300000	n	35000000		NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Vinyl acetate	108054	8260B	µg/kg	91000	n	380000	n	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Vinyl chloride	75014	8260B	µg/kg	59	c	1700	c	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
Xylenes, Total	1330207	8260B	µg/kg	58000	n	250000	n	NBA	5.2	U	5.3	U	5.2	U	6.3	U	5.4	U
1,1'-Biphenyl	92524	8270C PAH	µg/kg	4700	n	20000	n	NBA	0.76	U	0.77	U	0.74	U	0.76	U	0.74	U
1-Methylnaphthalene	90120	8270C PAH	µg/kg	18000	c	73000	c	NBA	0.26	J	0.77	U	0.74	U	0.76	U	0.19	J
1-Methylphenanthrene	832699	8270C PAH	µg/kg	NBA		NBA		NBA	5.2		0.77	U	0.2	J	0.76	U	0.64	J
2,3,5-Trimethylnaphthalene	2245387	8270C PAH	µg/kg	NBA		NBA		NBA	0.76	U	0.77	U	0.74	U	0.76	U	0.74	U
2,6-Dimethylnaphthalene	581420	8270C PAH	µg/kg	NBA		NBA		NBA	0.76	U	0.77	U	0.74	U	0.76	U	0.19	J
2-Methylnaphthalene	91576	8270C PAH	µg/kg	24000	n	300000	n	NBA	0.26	J	0.21	J	0.23	J	0.21	J	0.34	J
Acenaphthene	83329	8270C PAH	µg/kg	360000	n	4500000	n	NBA	0.48	J	0.77	U	0.74	U	0.76	U	0.25	J
Acenaphthylene	208968	8270C PAH	µg/kg	360000	n	4500000	n	NBA	0.93		0.77	U	0.74	U	0.76	U	0.74	U
Anthracene	120127	8270C PAH	µg/kg	1800000	n	23000000	n	NBA	1.8		0.77	U	0.23	J	0.76	U	0.83	
Benzo[a]anthracene	56553	8270C PAH	µg/kg	160	c	2900	c	NBA	15		0.44	J	2	J	0.53	J	6.2	
Benzo[a]pyrene	50328	8270C PAH	µg/kg	16	c	290	c	NBA	15		0.36	J	2.1	J	0.56	J	5.4	
Benzo[b]fluoranthene	205992	8270C PAH	µg/kg	160	c	2900	c	NBA	17		1.2	J	3.6	J	1.5	J	7.1	
Benzo[e]pyrene	192972	8270C PAH	µg/kg	NBA		NBA		NBA	13		0.83	J	5.2	J	1.4	J	5.1	
Benzo[g,h,i]perylene	191242	8270C PAH	µg/kg	3800	c	17000	c	NBA	7.1		0.4	J	1.3		0.51	J	2.1	
Benzo[k]fluoranthene	207089	8270C PAH	µg/kg	1600	c	29000	c	NBA	17		0.63	J	2.1	J	0.57	J	4.9	
Chrysene	218019	8270C PAH	µg/kg	16000	c	290000	c	NBA	17		0.78	J	3	J	0.87	J	5.9	
Dibenzo[a,h]anthracene	53703	8270C PAH	µg/kg	16	c	290	c	NBA	2.9		0.77	U	0.44	J	0.76	U	0.96	
Dibenzothiophene	132650	8270C PAH	µg/kg	78000	n	1200000	n	NBA	0.8		0.77	U	0.19	J	0.76	U	0.21	J
Fluoranthene	206440	8270C PAH	µg/kg	240000	n	3000000	n	NBA	30		0.81	J	4.8	J	1.1	J	7.8	
Fluorene	86737	8270C PAH	µg/kg	240000	n	3000000	n	NBA	0.81		0.77	U	0.24	J	0.76	U	0.28	J
Indeno[1,2,3-cd]pyrene	193395	8270C PAH	µg/kg	160	c	2900	c	NBA	10		0.39	J	0.99		0.39	J	2.4	
Naphthalene	91203	8270C PAH	µg/kg	3800	c	17000	c	NBA	0.29	J	0.77	U	0.74	U	0.76	U	0.74	U
Perylene	198550	8270C PAH	µg/kg	NBA		NBA		NBA	3.8		0.77	U	1.2		0.27	J	1.7	
Phenanthrene	85018	8270C PAH	µg/kg	1800000	n	23000000	n	NBA	12		0.62	J	2.2	J	0.6	J	3.1	
Pyrene	129000	8270C PAH	µg/kg	180000	n	2300000	n	NBA	27		0.95	J	4.1	J	1.1	J	7.6	
1,1'-Biphenyl	92524	8270D	µg/kg	4700	n	20000	n	NBA	380	U	380	U	370	U	370	U	360	U
1,2,4,5-Tetrachlorobenzene	95943	8270D	µg/kg	2300	n	35000	n	NBA	380	U	380	U	370	U	370	U	360	U
1,2,4-Trichlorobenzene	120821	8270D	µg/kg	5800	n	26000	n	NBA	380	U	380	U	370	U	370	U	360	U
1,2-Dichlorobenzene	95501	8270D	µg/kg	180000	n	930000	n	NBA	380	U	380	U	370	U	370	U	360	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	**LO58-SB03-0305**		**LO58-SB04-0002**		**LO58-SB04-0608**		**LO58-SB-DUP-01**		**LO58-SB05-0002**	
								Sample Description	**Soil Bore**		**Soil Bore**		**Soil Bore**		**DUP OF SB04-0608**		**Soil Bore**	
								Sample Date	**10/2/2012**		**10/2/2012**		**10/2/2012**		**10/2/2012**		**10/2/2012**	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**		**Ecological[c]**										
1,3-Dichlorobenzene	541731	8270D	µg/kg	NBA		NBA		NBA	380	U	380	U	370	U	370	U	360	U
1,4-Dichlorobenzene	106467	8270D	µg/kg	2600	c	11000	c	NBA	380	U	380	U	370	U	370	U	360	U
1-Methylnaphthalene	90120	8270D	µg/kg	18000	c	73000	c	NBA	380	U	380	U	370	U	370	U	360	U
2,2'-oxybis[1-chloropropane]	108601	8270D	µg/kg	310000	n	4700000		NBA	380	U	380	U	370	U	370	U	360	U
2,3,4,6-Tetrachlorophenol	58902	8270D	µg/kg	190000	n	2500000	n	NBA	380	U	380	U	370	U	370	U	360	U
2,4,5-Trichlorophenol	95954	8270D	µg/kg	630000	n	8200000	n	NBA	940	U	950	U	920	U	940	U	910	U
2,4,6-Trichlorophenol	88062	8270D	µg/kg	6300	n	82000	n	NBA	380	U	380	U	370	U	370	U	360	U
2,4-Dichlorophenol	120832	8270D	µg/kg	19000	n	250000	n	NBA	380	U	380	U	370	U	370	U	360	U
2,4-Dimethylphenol	105679	8270D	µg/kg	130000	n	1600000	n	NBA	380	U	380	U	370	U	370	U	360	U
2,4-Dinitrophenol	51285	8270D	µg/kg	13000	n	160000	n	NBA	940	U	950	U	920	U	940	U	910	U
2,4-Dinitrotoluene	121142	8270D	µg/kg	1700	c	7400	c	NBA	380	U	380	U	370	U	370	U	360	U
2,6-Dichlorophenol	87650	8270D	µg/kg	NBA		NBA		NBA	380	U	380	U	370	U	370	U	360	U
2,6-Dinitrotoluene	606202	8270D	µg/kg	360	c	1500	c	NBA	380	U	380	U	370	U	370	U	360	U
2-Chloronaphthalene	91587	8270D	µg/kg	480000	n	6000000	n	NBA	380	U	380	U	370	U	370	U	360	U
2-Chlorophenol	95578	8270D	µg/kg	39000	n	580000	n	NBA	380	U	380	U	370	U	370	U	360	U
2-Methylnaphthalene	91576	8270D	µg/kg	24000	n	300000	n	NBA	380	U	380	U	370	U	370	U	360	U
2-Methylphenol	95487	8270D	µg/kg	320000	n	4100000	n	NBA	380	U	380	U	370	U	370	U	360	U
2-Nitroaniline	88744	8270D	µg/kg	63000	n	800000	n	NBA	940	U	950	U	920	U	940	U	910	U
2-Nitrophenol	88755	8270D	µg/kg	NBA		NBA		NBA	380	U	380	U	370	U	370	U	360	U
3 & 4 Methylphenol	15831104	8270D	µg/kg	NBA		NBA		NBA	760	U	770	U	740	U	760	U	740	U
3,3'-Dichlorobenzidine	91941	8270D	µg/kg	1200	c	5100	c	NBA	380	U	380	U	370	U	370	U	360	U
3-Nitroaniline	99092	8270D	µg/kg	NBA		NBA		NBA	940	U	950	U	920	U	940	U	910	U
4,6-Dinitro-2-methylphenol	534521	8270D	µg/kg	510	n	6600	n	NBA	940	U	950	U	920	U	940	U	910	U
4-Bromophenyl phenyl ether	101553	8270D	µg/kg	NBA		NBA		NBA	380	U	380	U	370	U	370	U	360	U
4-Chloro-3-methylphenol	59507	8270D	µg/kg	630000	n	8200000	n	NBA	380	U	380	U	370	U	370	U	360	U
4-Chloroaniline	106478	8270D	µg/kg	2700	c	11000	c	NBA	380	U	380	U	370	U	370	U	360	U
4-Chlorophenyl phenyl ether	7005723	8270D	µg/kg	NBA		NBA		NBA	380	U	380	U	370	U	370	U	360	U
4-Nitroaniline	100016	8270D	µg/kg	25000	n	110000	c	NBA	940	U	950	U	920	U	940	U	910	U
4-Nitrophenol	100027	8270D	µg/kg	NBA		NBA		NBA	940	U	950	U	920	U	940	U	910	U
Acenaphthene	83329	8270D	µg/kg	360000	n	4500000	n	NBA	380	U	380	U	370	U	370	U	360	U
Acenaphthylene	208968	8270D	µg/kg	360000	n	4500000	n	NBA	380	U	380	U	370	U	370	U	360	U
Acetophenone	98862	8270D	µg/kg	780000	n	12000000		NBA	380	U	380	U	370	U	370	U	360	U
Aniline	62533	8270D	µg/kg	44000	n	400000	c	NBA	940	U	950	U	920	U	940	U	910	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB03-0305		LO58-SB04-0002		LO58-SB04-0608		LO58-SB-DUP-01		LO58-SB05-0002	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		DUP OF SB04-0608		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Anthracene	120127	8270D	µg/kg	1800000	n	23000000	n	NBA	380	U	380	U	370	U	370	U	360	U
Atrazine	1912249	8270D	µg/kg	2400	c	10000	c	NBA	380	U	380	U	370	U	370	U	360	U
Azobenzene	103333	8270D	µg/kg	5600	c	26000	c	NBA	380	U	380	U	370	U	370	U	360	U
Benzaldehyde	100527	8270D	µg/kg	170000	c	820000	c	NBA	380	U	380	U	370	U	370	U	360	U
Benzidine	92875	8270D	µg/kg	0.53	c	10	c	NBA		R		R		R		R		R
Benzo[a]anthracene	56553	8270D	µg/kg	160	c	2900	c	NBA	15	J	380	U	370	U	370	U	360	U
Benzo[a]pyrene	50328	8270D	µg/kg	16	c	290	c	NBA	15	J	380	U	370	U	370	U	360	U
Benzo[b]fluoranthene	205992	8270D	µg/kg	160	c	2900	c	NBA	380	U	380	U	370	U	370	U	360	U
Benzo[e]pyrene	192972	8270D	µg/kg	NBA		NBA		NBA	380	U	380	U	370	U	370	U	360	U
Benzo[g,h,i]perylene	191242	8270D	µg/kg	3800	c	17000	c	NBA	380	U	380	U	370	U	370	U	360	U
Benzo[k]fluoranthene	207089	8270D	µg/kg	1600	c	29000	c	NBA	380	U	380	U	370	U	370	U	360	U
Benzoic acid	65850	8270D	µg/kg	25000000	n	330000000		NBA	940	U	950	U	920	U	940	U	910	U
Benzyl alcohol	100516	8270D	µg/kg	630000	n	8200000	n	NBA	380	UJ	380	UJ	370	U	370	U	360	U
Bis(2-chloroethoxy)methane	111911	8270D	µg/kg	19000	n	250000	n	NBA	380	U	380	U	370	U	370	U	360	U
Bis(2-chloroethyl)ether	111444	8270D	µg/kg	230	c	1000	c	NBA	380	U	380	U	370	U	370	U	360	U
Bis(2-ethylhexyl) phthalate	117817	8270D	µg/kg	39000	c	160000	c	NBA	32	J	380	U	370	U	370	U	360	U
Butyl benzyl phthalate	85687	8270D	µg/kg	290000	c	1200000	c	NBA	380	U	380	U	370	U	370	U	360	U
Caprolactam	105602	8270D	µg/kg	3100000	n	40000000	n	NBA	380	U	380	U	370	U	370	U	360	U
Carbazole	86748	8270D	µg/kg	NBA		NBA		NBA	380	U	380	U	370	U	370	U	360	U
Chrysene	218019	8270D	µg/kg	16000	c	290000	c	NBA	20	J	380	U	370	U	370	U	360	U
Dibenzo[a,h]anthracene	53703	8270D	µg/kg	16	c	290	c	NBA	380	U	380	U	370	U	370	U	360	U
Dibenzofuran	132649	8270D	µg/kg	7300	n	100000	n	NBA	380	U	380	U	370	U	370	U	360	U
Diethyl phthalate	84662	8270D	µg/kg	5100000	n	66000000	n	NBA	380	U	380	U	370	U	370	U	360	U
Dimethyl phthalate	131113	8270D	µg/kg	NBA		NBA		NBA	380	U	380	U	370	U	370	U	360	U
Di-n-butyl phthalate	84742	8270D	µg/kg	630000	n	8200000	n	NBA	380	U	380	U	370	U	370	U	360	U
Di-n-octyl phthalate	117840	8270D	µg/kg	63000	n	820000	n	NBA	380	U	380	U	370	U	370	U	360	U
Fluoranthene	206440	8270D	µg/kg	240000	n	3000000	n	NBA	28	J	380	U	370	U	370	U	360	U
Fluorene	86737	8270D	µg/kg	240000	n	3000000	n	NBA	380	U	380	U	370	U	370	U	360	U
Hexachlorobenzene	118741	8270D	µg/kg	210	c	960	c	NBA	380	U	380	U	370	U	370	U	360	U
Hexachlorobutadiene	87683	8270D	µg/kg	1200	c	5300	c	NBA	380	U	380	U	370	U	370	U	360	U
Hexachlorocyclopentadiene	77474	8270D	µg/kg	180	n	750	n	NBA	380	U	380	U	370	U	370	U	360	U
Hexachloroethane	67721	8270D	µg/kg	1800	c	8000	c	NBA	380	U	380	U	370	U	370	U	360	U
Indeno[1,2,3-cd]pyrene	193395	8270D	µg/kg	160	c	2900	c	NBA	380	U	380	U	370	U	370	U	360	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB03-0305		LO58-SB04-0002		LO58-SB04-0608		LO58-SB-DUP-01		LO58-SB05-0002	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		DUP OF SB04-0608		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	CAS Number	Method	Units	Residential[a]		Industrial[b]		Ecological[c]										
Isophorone	78591	8270D	µg/kg	570000	c	2400000	c	NBA	380	U	380	U	370	U	370	U	360	U
Naphthalene	91203	8270D	µg/kg	3800	c	17000	c	NBA	380	U	380	U	370	U	370	U	360	U
Nitrobenzene	98953	8270D	µg/kg	5100	c	22000	c	NBA	380	U	380	U	370	U	370	U	360	U
N-Nitrosodimethylamine	62759	8270D	µg/kg	2	c	34	c	NBA	380	U	380	U	370	U	370	U	360	U
N-Nitrosodi-n-propylamine	621647	8270D	µg/kg	78	c	330	c	NBA	380	U	380	U	370	U	370	U	360	U
N-Nitrosodiphenylamine	86306	8270D	µg/kg	110000	c	470000	c	NBA	440	U	440	U	430	U	440	U	420	U
Pentachlorophenol	87865	8270D	µg/kg	1000	c	4000	c	NBA	940	U	950	U	920	U	940	U	910	U
Perylene	198550	8270D	µg/kg	NBA		NBA		NBA	380	U	380	U	370	U	370	U	360	U
Phenanthrene	85018	8270D	µg/kg	1800000	n	23000000	n	NBA	380	U	380	U	370	U	370	U	360	U
Phenol	108952	8270D	µg/kg	1900000	n	25000000	n	NBA	380	U	380	U	370	U	370	U	360	U
Pyrene	129000	8270D	µg/kg	180000	n	2300000	n	NBA	29	J	380	U	370	U	370	U	360	U
Pyridine	110861	8270D	µg/kg	7800	n	120000	n	NBA	380	U	380	U	370	U	370	U	360	U

[a] Regional Screening Level (RSL) Residential Soil Table (May 2016).

[b] Regional Screening Level (RSL) Industrial Soil Table (May 2016).

[c] As per QAPP.

Bold values indicate exceedance of residential RSL.

Highlghted values indicate exceedance of industrial RSL or eco benchmark.

All trip blank analytes measured under method SW8260.

µg/kg = Micrograms per kilograms.

C = Cancer based, target risk equals 1E-06.

J = Result is <RL but >=MDL and the concentration is an approximate value.

mg/kg = Milligram per kilogram.

NBA = No benchmark available.

NC = Noncancer based, target hazard quotient equals 0.1.

R=Rejected; result not valid due to quality control failure.

U = Not detected.

UJ = Not detected. SQL is <RL but >=MDL and the SQL is an approximate value.

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB05-0305		LO58-SB06-0002		LO58-SB-DUP-02		LO58-SB06-0406		LO58-SB07-0002	
								Sample Description	Soil Bore		Soil Bore		DUP OF SB06-0002		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/3/2012		10/3/2012		10/3/2012		10/3/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**		**Ecological[c]**										
Percent Solids	DEP1005	D4643	%	NBA		NBA		NBA	83.8		72.7		76		91.1		82.3	
2-Methylnaphthalene	91576	MADEP EPH	µg/kg	24000	n	300000	n	NBA			300	U	303	U	300	U	294	U
Acenaphthene	83329	MADEP EPH	µg/kg	360000	n	4500000	n	NBA			300	U	303	U	300	U	294	U
Acenaphthylene	208968	MADEP EPH	µg/kg	360000	n	4500000	n	NBA			300	U	303	U	300	U	294	U
Anthracene	120127	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA			300	U	303	U	300	U	294	U
Benzo[a]anthracene	56553	MADEP EPH	µg/kg	160	c	2900	c	NBA			300	U	303	U	300	U	294	U
Benzo[a]pyrene	50328	MADEP EPH	µg/kg	16	c	290	c	NBA			300	U	303	U	300	U	294	U
Benzo[b]fluoranthene	205992	MADEP EPH	µg/kg	160	c	2900	c	NBA			300	U	303	U	300	U	294	U
Benzo[g,h,i]perylene	191242	MADEP EPH	µg/kg	3800	c	17000	c	NBA			300	U	303	U	300	U	294	U
Benzo[k]fluoranthene	207089	MADEP EPH	µg/kg	1600	c	29000	c	NBA			300	U	303	U	300	U	294	U
C11-C22 Aromatic Hydrocarbons	EPH4	MADEP EPH	µg/kg	NBA		NBA		NBA	30800	U	30000	U	30300	U	30000	U	29400	U
C19-C36 Aliphatic Hydrocarbons	EPH3	MADEP EPH	µg/kg	NBA		NBA		NBA	30800	U	30000	U	19900	J	30000	U	29400	U
C9-C18 Aliphatic Hydrocarbons	EPH2	MADEP EPH	µg/kg	NBA		NBA		NBA	30800	U	30000	U	30300	U	30000	U	29400	U
Chrysene	218019	MADEP EPH	µg/kg	16000	c	290000	c	NBA			300	U	303	U	300	U	294	U
Dibenzo[a,h]anthracene	53703	MADEP EPH	µg/kg	16	c	290	c	NBA			300	U	303	U	300	U	294	U
Fluoranthene	206440	MADEP EPH	µg/kg	240000	n	3000000	n	NBA			300	U	303	U	300	U	294	U
Fluorene	86737	MADEP EPH	µg/kg	240000	n	3000000	n	NBA			300	U	303	U	300	U	294	U
Indeno[1,2,3-cd]pyrene	193395	MADEP EPH	µg/kg	160	c	2900	c	NBA			300	U	303	U	300	U	294	U
Naphthalene	91203	MADEP EPH	µg/kg	3800	c	17000	c	NBA			300	U	303	U	300	U	294	U
Phenanthrene	85018	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA			300	U	303	U	300	U	294	U
Pyrene	129000	MADEP EPH	µg/kg	180000	n	2300000	n	NBA			300	U	303	U	300	U	294	U
Unadjusted C11-C22 Aromatics	EPH1	MADEP EPH	µg/kg	NBA		NBA		NBA	30800	U	30000	U	30300	U	30000	U	29400	U
C5-C8 Aliphatics Hydrocarbons	VPH3	MADEP VPH	µg/kg	NBA		NBA		NBA	2640	U	2450	U	2460	U	2510	U	2370	U
C9-C10 Aromatic Hydrocarbons	VPH5	MADEP VPH	µg/kg	NBA		NBA		NBA	661	U	612	U	616	U	627	U	593	U
C9-C12 Aliphatic Hydrocarbons	VPH4	MADEP VPH	µg/kg	NBA		NBA		NBA	2640	U	2450	U	2460	U	2510	U	2370	U
Unadjusted C5-C8 Aliphatics	VPH1	MADEP VPH	µg/kg	NBA		NBA		NBA	2640	U	2450	U	2460	U	2510	U	2370	U
Unadjusted C9-C12 Aliphatics	VPH2	MADEP VPH	µg/kg	NBA		NBA		NBA	2640	U	2450	U	2460	U	2510	U	2370	U
Aluminum	7429905	6010C	mg/kg	7700	n	110000		NBA	**16700**		**13000**	J	**15900**	J	**11900**		**14900**	
Antimony	7440360	6010C	mg/kg	3.1	n	47	n	NBA	0.51	J		R		R		R		R
Arsenic	7440382	6010C	mg/kg	0.68	c	3	cR	NBA	**6.7**	J	**6.7**		**9.3**		**4.6**		**5.7**	
Barium	7440393	6010C	mg/kg	1500	n	22000	n	NBA	75.1		43.4		52.8		46.4		40.3	
Beryllium	7440417	6010C	mg/kg	16	n	230	n	NBA	0.88		0.87		0.85		0.77		0.65	
Cadmium	7440439	6010C	mg/kg	7.1	n	98	n	NBA	0.11	J	0.12	J	0.12	J	0.4	UJ	0.069	J

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	**LO58-SB05-0305**		**LO58-SB06-0002**		**LO58-SB-DUP-02**		**LO58-SB06-0406**		**LO58-SB07-0002**	
								Sample Description	**Soil Bore**		**Soil Bore**		**DUP OF SB06-0002**		**Soil Bore**		**Soil Bore**	
								Sample Date	**10/2/2012**		**10/3/2012**		**10/3/2012**		**10/3/2012**		**10/3/2012**	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Calcium	7440702	6010C	mg/kg	NBA		NBA		NBA	16900	J	1600	J	8600	J	156000	J	9570	J
Chromium	7440473	6010C	mg/kg	0.3	c	6.3	c	NBA	**32.3**	J	**28**		**31**		**24.2**		**28.2**	
Cobalt	7440484	6010C	mg/kg	2.3	n	35	n	NBA	**13.5**		**9.1**		**11.3**		**9.2**		**9.7**	
Copper	7440508	6010C	mg/kg	310	n	4700	n	NBA	25.4	J	39.6		50.7		19.2		21.9	
Iron	7439896	6010C	mg/kg	5500	n	82000	n	NBA	**31400**	J	**29000**		**33900**		**27100**		**30200**	
Lead	7439921	6010C	mg/kg	400		800		NBA	19.1		12.9		17.2		15.6		17.5	
Magnesium	7439954	6010C	mg/kg	NBA		NBA		NBA	9890		7700		8190		8710		8950	
Manganese	7439965	6010C	mg/kg	180	n	2600	n	NBA	**897**		**474**		**584**		**353**		**464**	
Nickel	7440020	6010C	mg/kg	150	n	2200	n	NBA	48.5		41.4		42.9		43.4		38.7	
Potassium	7440097	6010C	mg/kg	NBA		NBA		NBA	785		886		1050		1120		1050	
Selenium	7782492	6010C	mg/kg	39	n	580	n	NBA	2.5	U	0.86	J	1.4	J	2.8	UJ	2.7	UJ
Silver	7440224	6010C	mg/kg	39	n	580	n	NBA	0.71	U	4.6	UJ	0.77	UJ	0.68	UJ	0.69	UJ
Sodium	7440235	6010C	mg/kg	NBA		NBA		NBA	31.5	J	22.7	J	29.9	J	44.3	J	31.6	J
Thallium	7440280	6010C	mg/kg	0.078	n	1.2	n	NBA	**0.6**	J	1.9	U	2.3	U	2	U	2	U
Vanadium	7440622	6010C	mg/kg	39	n	580	n	NBA	20	J	18.1		23.7		14.1		20.3	
Zinc	7440666	6010C	mg/kg	2300	n	35000	n	NBA	56.1		57.3		66.4		51.9		55.7	
Mercury	7439976	7471B	mg/kg	1.1	n	4.6		NBA	0.054	J	0.11	J	0.12	J	0.079	J	0.067	J
PCB-1016	12674112	8082A	µg/kg	410	n	5100	n	NBA	20	U	23	U	22	U	19	U	20	U
PCB-1221	11104282	8082A	µg/kg	200	c	830	c	NBA	20	U	23	U	22	U	19	U	20	U
PCB-1232	11141165	8082A	µg/kg	170	c	720	c	NBA	20	U	23	U	22	U	19	U	20	U
PCB-1242	53469219	8082A	µg/kg	230	c	950	c	NBA	20	U	23	U	22	U	19	U	20	U
PCB-1248	12672296	8082A	µg/kg	230	c	950	c	NBA	20	U	23	U	22	U	19	U	20	U
PCB-1254	11097691	8082A	µg/kg	120	n	970	c	NBA	20	U	23	U	22	U	19	U	20	U
PCB-1260	11096825	8082A	µg/kg	240	c	990	c	NBA	20	U	23	U	22	U	19	U	20	U
PCB-1262	37324235	8082A	µg/kg	NBA		NBA		NBA	20	U	23	U	22	U	19	U	20	U
PCB-1268	11100144	8082A	µg/kg	NBA		NBA		NBA	20	U	23	U	22	U	19	U	20	U
1,1,1,2-Tetrachloroethane	630206	8260B	µg/kg	2000	c	8800	c	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
1,1,1-Trichloroethane	71556	8260B	µg/kg	810000	n	3600000		NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
1,1,2,2-Tetrachloroethane	79345	8260B	µg/kg	600	c	2700	c	NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
1,1,2-Trichloroethane	79005	8260B	µg/kg	150	n	630	n	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
1,1-Dichloroethane	75343	8260B	µg/kg	3600	c	16000	c	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
1,1-Dichloroethene	75354	8260B	µg/kg	23000	n	100000	n	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
1,1-Dichloropropene	563586	8260B	µg/kg	NBA		NBA		NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB05-0305		LO58-SB06-0002		LO58-SB-DUP-02		LO58-SB06-0406		LO58-SB07-0002	
								Sample Description	Soil Bore		Soil Bore		DUP OF SB06-0002		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/3/2012		10/3/2012		10/3/2012		10/3/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
1,2,3-Trichlorobenzene	87616	8260B	µg/kg	6300	n	93000	n	NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
1,2,3-Trichloropropane	96184	8260B	µg/kg	5.1	c	110	c	NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
1,2,4-Trichlorobenzene	120821	8260B	µg/kg	5800	n	26000	n	NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
1,2,4-Trimethylbenzene	95636	8260B	µg/kg	5800	n	24000	n	NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
1,2-Dibromo-3-Chloropropane	96128	8260B	µg/kg	5.3	c	64	c	NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
1,2-Dibromoethane	106934	8260B	µg/kg	36	c	160	c	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
1,2-Dichlorobenzene	95501	8260B	µg/kg	180000	n	930000		NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
1,2-Dichloroethane	107062	8260B	µg/kg	460	c	2000	c	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
1,2-Dichloroethene, Total	540590	8260B	µg/kg	NBA		NBA		NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
1,2-Dichloropropane	78875	8260B	µg/kg	1000	c	4400	c	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
1,3,5-Trimethylbenzene	108678	8260B	µg/kg	78000	n	1200000		NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
1,3-Dichlorobenzene	541731	8260B	µg/kg	NBA		NBA		NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
1,3-Dichloropropane	142289	8260B	µg/kg	160000	n	2300000		NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
1,4-Dichlorobenzene	106467	8260B	µg/kg	2600	c	11000	c	NBA	2.1	J	0.89	J	1.6	J	0.89	J	6.1	U
1,4-Dioxane	123911	8260B	µg/kg	5300	c	24000	c	NBA	300	U	320	U	340	UJ	370	U	300	U
2,2-Dichloropropane	594207	8260B	µg/kg	NBA		NBA		NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
2-Butanone	78933	8260B	µg/kg	2700000	n	19000000	n	NBA	6	U	12	J	27	J	7.4	U	10	
2-Chloroethyl vinyl ether	110758	8260B	µg/kg	NBA		NBA		NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
2-Chlorotoluene	95498	8260B	µg/kg	160000	n	2300000		NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
2-Hexanone	591786	8260B	µg/kg	20000	n	130000	n	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
4-Chlorotoluene	106434	8260B	µg/kg	160000	n	2300000		NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
4-Isopropyltoluene	99876	8260B	µg/kg	NBA		NBA		NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
4-Methyl-2-pentanone	108101	8260B	µg/kg	3300000	n	14000000		NBA	6	U	5.4	J	6.9	UJ	7.4	U	6.1	U
Acetone	67641	8260B	µg/kg	6100000	n	67000000	n	NBA	50		320	J	590	J	130		170	
Benzene	71432	8260B	µg/kg	1200	c	5100	c	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Bromobenzene	108861	8260B	µg/kg	29000	n	180000	n	NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
Bromochloromethane	74975	8260B	µg/kg	15000	n	63000	n	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Bromodichloromethane	75274	8260B	µg/kg	290	c	1300	c	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Bromoform	75252	8260B	µg/kg	19000	c	86000	c	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Bromomethane	74839	8260B	µg/kg	680	n	3000	n	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Carbon disulfide	75150	8260B	µg/kg	77000	n	350000	n	NBA	17		14	J	2.2	J	8.8		18	
Carbon tetrachloride	56235	8260B	µg/kg	650	c	2900	c	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Chlorobenzene	108907	8260B	µg/kg	28000	n	130000	n	NBA	6	U	6.4	U	6.9	UJ	7.4		6.1	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB05-0305		LO58-SB06-0002		LO58-SB-DUP-02		LO58-SB06-0406		LO58-SB07-0002	
								Sample Description	Soil Bore		Soil Bore		DUP OF SB06-0002		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/3/2012		10/3/2012		10/3/2012		10/3/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential^{a}**		**Industrial^{b}**		**Ecological^{c}**										
Chloroethane	75003	8260B	µg/kg	1400000	n	5700000		NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Chloroform	67663	8260B	µg/kg	320	c	1400	c	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Chloromethane	74873	8260B	µg/kg	11000	n	46000	n	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
cis-1,2-Dichloroethene	156592	8260B	µg/kg	16000	n	230000	n	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
cis-1,3-Dichloropropene	10061015	8260B	µg/kg	NBA		NBA		NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Cyclohexane	110827	8260B	µg/kg	650000	n	2700000		NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Dibromochloromethane	124481	8260B	µg/kg	8300	c	39000	c	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Dibromomethane	74953	8260B	µg/kg	2400	n	9900	n	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Dichlorodifluoromethane	75718	8260B	µg/kg	8700	n	37000	n	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Ethylbenzene	100414	8260B	µg/kg	5800	c	25000	c	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Freon TF	76131	8260B	µg/kg	4000000	n	17000000		NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Hexachlorobutadiene	87683	8260B	µg/kg	1200	c	5300	c	NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
Isobutyl alcohol	78831	8260B	µg/kg	2300000	n	35000000		NBA	300	U	320	U	340	UJ	370	U	300	U
Isopropylbenzene	98828	8260B	µg/kg	190000	n	990000		NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
m&p-Xylene	179601231	8260B	µg/kg	58000	n	250000	n	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Methyl acetate	79209	8260B	µg/kg	7800000	n	120000000	s	NBA	6	U	6.4	UJ	30	J	7.4	U	6.1	U
Methyl iodide	74884	8260B	µg/kg	NBA		NBA		NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Methyl t-butyl ether	1634044	8260B	µg/kg	47000	c	210000	c	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Methylcyclohexane	108872	8260B	µg/kg	NBA		NBA		NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Methylene Chloride	75092	8260B	µg/kg	35000	n	320000	n	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Naphthalene	91203	8260B	µg/kg	3800	c	17000	c	NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
n-Butylbenzene	104518	8260B	µg/kg	390000	n	5800000		NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
n-Propylbenzene	103651	8260B	µg/kg	380000	n	2400000		NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
o-Xylene	95476	8260B	µg/kg	65000	n	280000	n	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
sec-Butylbenzene	135988	8260B	µg/kg	780000	n	12000000		NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
Styrene	100425	8260B	µg/kg	600000	n	3500000		NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
tert-Butylbenzene	98066	8260B	µg/kg	780000	n	12000000		NBA	6	UJ	6.4	U	6.9	UJ	7.4	U	6.1	U
Tetrachloroethene	127184	8260B	µg/kg	8100	n	39000	n	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Tetrahydrofuran	109999	8260B	µg/kg	1800000	n	9400000	n	NBA	60	U	64	U	69	UJ	74	U	61	U
Toluene	108883	8260B	µg/kg	490000	n	4700000		NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
trans-1,2-Dichloroethene	156605	8260B	µg/kg	160000	n	2300000		NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
trans-1,3-Dichloropropene	10061026	8260B	µg/kg	NBA		NBA		NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Trichloroethene	79016	8260B	µg/kg	410	n	1900	n	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB05-0305		LO58-SB06-0002		LO58-SB-DUP-02		LO58-SB06-0406		LO58-SB07-0002	
								Sample Description	Soil Bore		Soil Bore		DUP OF SB06-0002		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/3/2012		10/3/2012		10/3/2012		10/3/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**^{a}		**Industrial**^{b}		**Ecological**^{c}										
Trichlorofluoromethane	75694	8260B	µg/kg	2300000	n	35000000		NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Vinyl acetate	108054	8260B	µg/kg	91000	n	380000	n	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Vinyl chloride	75014	8260B	µg/kg	59	c	1700	c	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
Xylenes, Total	1330207	8260B	µg/kg	58000	n	250000	n	NBA	6	U	6.4	U	6.9	UJ	7.4	U	6.1	U
1,1'-Biphenyl	92524	8270C PAH	µg/kg	4700	n	20000	n	NBA	0.25	J	0.91	U	0.87	U	0.71	U	0.83	U
1-Methylnaphthalene	90120	8270C PAH	µg/kg	18000	c	73000	c	NBA	0.37	J	0.91	U	0.87	U	0.71	U	0.83	U
1-Methylphenanthrene	832699	8270C PAH	µg/kg	NBA		NBA		NBA	0.28	J	0.85	J	1.4		0.25	J	1.8	
2,3,5-Trimethylnaphthalene	2245387	8270C PAH	µg/kg	NBA		NBA		NBA	0.82	U	0.91	U	0.87	U	0.71	U	0.83	U
2,6-Dimethylnaphthalene	581420	8270C PAH	µg/kg	NBA		NBA		NBA	0.23	J	0.91	U	0.87	U	0.71	U	0.21	J
2-Methylnaphthalene	91576	8270C PAH	µg/kg	24000	n	300000	n	NBA	0.54	J	0.91	U	0.87	U	0.71	U	0.31	J
Acenaphthene	83329	8270C PAH	µg/kg	360000	n	4500000	n	NBA	0.82	U	0.91	U	0.87	U	0.71	U	0.83	U
Acenaphthylene	208968	8270C PAH	µg/kg	360000	n	4500000	n	NBA	0.37	J	0.43	J	0.59	J	0.71	U	0.34	J
Anthracene	120127	8270C PAH	µg/kg	1800000	n	23000000	n	NBA	0.28	J	0.91	U	0.28	J	0.71	U	0.49	J
Benzo[a]anthracene	56553	8270C PAH	µg/kg	160	c	2900	c	NBA	1.1		2.3		3.5		0.6	J	5	
Benzo[a]pyrene	50328	8270C PAH	µg/kg	16	c	290	c	NBA	1.2		2.5		3.9		0.66	J	5.4	
Benzo[b]fluoranthene	205992	8270C PAH	µg/kg	160	c	2900	c	NBA	2.3		4.5		6.3		1.1		6.5	
Benzo[e]pyrene	192972	8270C PAH	µg/kg	NBA		NBA		NBA	1.4		2.8		4		0.93		5.4	
Benzo[g,h,i]perylene	191242	8270C PAH	µg/kg	3800	c	17000	c	NBA	0.67	J	1.1		1.7		0.52	J	3.2	
Benzo[k]fluoranthene	207089	8270C PAH	µg/kg	1600	c	29000	c	NBA	1.4		3.2		4.5		0.75		5.1	
Chrysene	218019	8270C PAH	µg/kg	16000	c	290000	c	NBA	1.6		3.5		5.3		0.95		6.3	
Dibenzo[a,h]anthracene	53703	8270C PAH	µg/kg	16	c	290	c	NBA	0.31	J	0.42	J	0.83	J	0.71	U	1.5	
Dibenzothiophene	132650	8270C PAH	µg/kg	78000	n	1200000	n	NBA	0.82	U	0.91	U	0.31	J	0.71	U	0.28	J
Fluoranthene	206440	8270C PAH	µg/kg	240000	n	3000000	n	NBA	2.2		6.3		9.2		1.7		12	
Fluorene	86737	8270C PAH	µg/kg	240000	n	3000000	n	NBA	0.31	J	0.23	J	0.29	J	0.71	U	0.31	J
Indeno[1,2,3-cd]pyrene	193395	8270C PAH	µg/kg	160	c	2900	c	NBA	0.95		1.8		2.9		0.5	J	4.6	
Naphthalene	91203	8270C PAH	µg/kg	3800	c	17000	c	NBA	0.82	U	0.26	J	0.24	J	0.22	J	0.29	J
Perylene	198550	8270C PAH	µg/kg	NBA		NBA		NBA	0.35	J	0.53	J	0.82	J	0.71	U	1.4	
Phenanthrene	85018	8270C PAH	µg/kg	1800000	n	23000000	n	NBA	1.1		2.8		4.1		0.87		4.6	
Pyrene	129000	8270C PAH	µg/kg	180000	n	2300000	n	NBA	2		4.7		7.3		1.5		9.3	
1,1'-Biphenyl	92524	8270D	µg/kg	4700	n	20000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
1,2,4,5-Tetrachlorobenzene	95943	8270D	µg/kg	2300	n	35000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
1,2,4-Trichlorobenzene	120821	8270D	µg/kg	5800	n	26000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
1,2-Dichlorobenzene	95501	8270D	µg/kg	180000	n	930000		NBA	400	UJ	450	U	430	U	350	U	410	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB05-0305		LO58-SB06-0002		LO58-SB-DUP-02		LO58-SB06-0406		LO58-SB07-0002	
								Sample Description	Soil Bore		Soil Bore		DUP OF SB06-0002		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/3/2012		10/3/2012		10/3/2012		10/3/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
1,3-Dichlorobenzene	541731	8270D	µg/kg	NBA		NBA		NBA	400	UJ	450	U	430	U	350	U	410	U
1,4-Dichlorobenzene	106467	8270D	µg/kg	2600	c	11000	c	NBA	400	UJ	450	U	430	U	350	U	410	U
1-Methylnaphthalene	90120	8270D	µg/kg	18000	c	73000	c	NBA	400	UJ	450	U	430	U	350	U	410	U
2,2'-oxybis[1-chloropropane]	108601	8270D	µg/kg	310000	n	4700000		NBA	400	UJ	450	U	430	U	350	U	410	U
2,3,4,6-Tetrachlorophenol	58902	8270D	µg/kg	190000	n	2500000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
2,4,5-Trichlorophenol	95954	8270D	µg/kg	630000	n	8200000	n	NBA	1000	UJ	1100	U	1100	U	880	U	1000	U
2,4,6-Trichlorophenol	88062	8270D	µg/kg	6300	n	82000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
2,4-Dichlorophenol	120832	8270D	µg/kg	19000	n	250000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
2,4-Dimethylphenol	105679	8270D	µg/kg	130000	n	1600000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
2,4-Dinitrophenol	51285	8270D	µg/kg	13000	n	160000	n	NBA	1000	UJ	1100	U	1100	U	880	U	1000	U
2,4-Dinitrotoluene	121142	8270D	µg/kg	1700	c	7400	c	NBA	400	UJ	450	U	430	U	350	U	410	U
2,6-Dichlorophenol	87650	8270D	µg/kg	NBA		NBA		NBA	400	UJ	450	U	430	U	350	U	410	U
2,6-Dinitrotoluene	606202	8270D	µg/kg	360	c	1500	c	NBA	400	UJ	450	U	430	U	350	U	410	U
2-Chloronaphthalene	91587	8270D	µg/kg	480000	n	6000000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
2-Chlorophenol	95578	8270D	µg/kg	39000	n	580000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
2-Methylnaphthalene	91576	8270D	µg/kg	24000	n	300000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
2-Methylphenol	95487	8270D	µg/kg	320000	n	4100000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
2-Nitroaniline	88744	8270D	µg/kg	63000	n	800000	n	NBA	1000	UJ	1100	U	1100	U	880	U	1000	U
2-Nitrophenol	88755	8270D	µg/kg	NBA		NBA		NBA	400	UJ	450	U	430	U	350	U	410	U
3 & 4 Methylphenol	15831104	8270D	µg/kg	NBA		NBA		NBA	820	UJ	910	U	870	U	710	U	830	U
3,3'-Dichlorobenzidine	91941	8270D	µg/kg	1200	c	5100	c	NBA	400	UJ	450	U	430	U	350	U	410	U
3-Nitroaniline	99092	8270D	µg/kg	NBA		NBA		NBA	1000	UJ	1100	U	1100	U	880	U	1000	U
4,6-Dinitro-2-methylphenol	534521	8270D	µg/kg	510	n	6600	n	NBA	1000	UJ	1100	U	1100	U	880	U	1000	U
4-Bromophenyl phenyl ether	101553	8270D	µg/kg	NBA		NBA		NBA	400	UJ	450	U	430	U	350	U	410	U
4-Chloro-3-methylphenol	59507	8270D	µg/kg	630000	n	8200000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
4-Chloroaniline	106478	8270D	µg/kg	2700	c	11000	c	NBA	400	UJ	450	U	430	U	350	U	410	U
4-Chlorophenyl phenyl ether	7005723	8270D	µg/kg	NBA		NBA		NBA	400	UJ	450	U	430	U	350	U	410	U
4-Nitroaniline	100016	8270D	µg/kg	25000	n	110000	c	NBA	1000	UJ	1100	U	1100	U	880	U	1000	U
4-Nitrophenol	100027	8270D	µg/kg	NBA		NBA		NBA	1000	UJ	1100	U	1100	U	880	U	1000	U
Acenaphthene	83329	8270D	µg/kg	360000	n	4500000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
Acenaphthylene	208968	8270D	µg/kg	360000	n	4500000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
Acetophenone	98862	8270D	µg/kg	780000	n	12000000		NBA	400	UJ	450	U	430	U	350	U	410	U
Aniline	62533	8270D	µg/kg	44000	n	400000	c	NBA	1000	UJ	1100	U	1100	U	880	U	1000	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB05-0305		LO58-SB06-0002		LO58-SB-DUP-02		LO58-SB06-0406		LO58-SB07-0002	
								Sample Description	Soil Bore		Soil Bore		DUP OF SB06-0002		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/3/2012		10/3/2012		10/3/2012		10/3/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Anthracene	120127	8270D	µg/kg	1800000	n	23000000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
Atrazine	1912249	8270D	µg/kg	2400	c	10000	c	NBA	400	UJ	450	U	430	U	350	U	410	U
Azobenzene	103333	8270D	µg/kg	5600	c	26000	c	NBA	400	UJ	450	U	430	U	350	U	410	U
Benzaldehyde	100527	8270D	µg/kg	170000	c	820000	c	NBA	400	UJ	450	U	430	U	350	U	410	U
Benzidine	92875	8270D	µg/kg	0.53	c	10	c	NBA		R		R		R		R		R
Benzo[a]anthracene	56553	8270D	µg/kg	160	c	2900	c	NBA	400	UJ	450	U	430	U	350	U	410	U
Benzo[a]pyrene	50328	8270D	µg/kg	16	c	290	c	NBA	400	UJ	450	U	430	U	350	U	410	U
Benzo[b]fluoranthene	205992	8270D	µg/kg	160	c	2900	c	NBA	400	UJ	450	U	430	U	350	U	410	U
Benzo[e]pyrene	192972	8270D	µg/kg	NBA		NBA		NBA	400	UJ	450	U	430	U	350	U	410	U
Benzo[g,h,i]perylene	191242	8270D	µg/kg	3800	c	17000	c	NBA	400	UJ	450	U	430	U	350	U	410	U
Benzo[k]fluoranthene	207089	8270D	µg/kg	1600	c	29000	c	NBA	400	UJ	450	U	430	U	350	U	410	U
Benzoic acid	65850	8270D	µg/kg	25000000	n	330000000		NBA	1000	UJ	1100	U	1100	U	880	U	1000	U
Benzyl alcohol	100516	8270D	µg/kg	630000	n	8200000	n	NBA	400	UJ	450	UJ	430	UJ	350	UJ	410	UJ
Bis(2-chloroethoxy)methane	111911	8270D	µg/kg	19000	n	250000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
Bis(2-chloroethyl)ether	111444	8270D	µg/kg	230	c	1000	c	NBA	400	UJ	450	U	430	U	350	U	410	U
Bis(2-ethylhexyl) phthalate	117817	8270D	µg/kg	39000	c	160000	c	NBA	400	UJ	35	J	31	J	350	U	36	J
Butyl benzyl phthalate	85687	8270D	µg/kg	290000	c	1200000	c	NBA	400	UJ	450	U	430	U	350	U	410	U
Caprolactam	105602	8270D	µg/kg	3100000	n	40000000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
Carbazole	86748	8270D	µg/kg	NBA		NBA		NBA	400	UJ	450	U	430	U	350	U	410	U
Chrysene	218019	8270D	µg/kg	16000	c	290000	c	NBA	400	UJ	450	U	430	U	350	U	410	U
Dibenzo[a,h]anthracene	53703	8270D	µg/kg	16	c	290	c	NBA	400	UJ	450	U	430	U	350	U	410	U
Dibenzofuran	132649	8270D	µg/kg	7300	n	100000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
Diethyl phthalate	84662	8270D	µg/kg	5100000	n	66000000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
Dimethyl phthalate	131113	8270D	µg/kg	NBA		NBA		NBA	400	UJ	450	U	430	U	350	U	410	U
Di-n-butyl phthalate	84742	8270D	µg/kg	630000	n	8200000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
Di-n-octyl phthalate	117840	8270D	µg/kg	63000	n	820000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
Fluoranthene	206440	8270D	µg/kg	240000	n	3000000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
Fluorene	86737	8270D	µg/kg	240000	n	3000000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
Hexachlorobenzene	118741	8270D	µg/kg	210	c	960	c	NBA	400	UJ	450	U	430	U	350	U	410	U
Hexachlorobutadiene	87683	8270D	µg/kg	1200	c	5300	c	NBA	400	UJ	450	U	430	U	350	U	410	U
Hexachlorocyclopentadiene	77474	8270D	µg/kg	180	n	750	n	NBA	400	UJ	450	U	430	U	350	U	410	U
Hexachloroethane	67721	8270D	µg/kg	1800	c	8000	c	NBA	400	UJ	450	U	430	U	350	U	410	U
Indeno[1,2,3-cd]pyrene	193395	8270D	µg/kg	160	c	2900	c	NBA	400	UJ	450	U	430	U	350	U	410	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB05-0305		LO58-SB06-0002		LO58-SB-DUP-02		LO58-SB06-0406		LO58-SB07-0002	
								Sample Description	Soil Bore		Soil Bore		DUP OF SB06-0002		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/3/2012		10/3/2012		10/3/2012		10/3/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Isophorone	78591	8270D	µg/kg	570000	c	2400000	c	NBA	400	UJ	450	U	430	U	350	U	410	U
Naphthalene	91203	8270D	µg/kg	3800	c	17000	c	NBA	400	UJ	450	U	430	U	350	U	410	U
Nitrobenzene	98953	8270D	µg/kg	5100	c	22000	c	NBA	400	UJ	450	U	430	U	350	U	410	U
N-Nitrosodimethylamine	62759	8270D	µg/kg	2	c	34	c	NBA	400	UJ	450	U	430	U	350	U	410	U
N-Nitrosodi-n-propylamine	621647	8270D	µg/kg	78	c	330	c	NBA	400	UJ	450	U	430	U	350	U	410	U
N-Nitrosodiphenylamine	86306	8270D	µg/kg	110000	c	470000	c	NBA	470	UJ	520	U	500	U	410	U	480	U
Pentachlorophenol	87865	8270D	µg/kg	1000	c	4000	c	NBA	1000	UJ	1100	U	1100	U	880	U	1000	U
Perylene	198550	8270D	µg/kg	NBA		NBA		NBA	400	UJ	450	U	430	U	350	U	410	U
Phenanthrene	85018	8270D	µg/kg	1800000	n	23000000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
Phenol	108952	8270D	µg/kg	1900000	n	25000000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
Pyrene	129000	8270D	µg/kg	180000	n	2300000	n	NBA	400	UJ	450	U	430	U	350	U	410	U
Pyridine	110861	8270D	µg/kg	7800	n	120000	n	NBA	400	UJ	450	U	430	U	350	U	410	U

[a] Regional Screening Level (RSL) Residential Soil Table (May 2016).

[b] Regional Screening Level (RSL) Industrial Soil Table (May 2016).

[c] As per QAPP.

Bold values indicate exceedance of residential RSL.

Highlghted values indicate exceedance of industrial RSL or eco benchmark.

All trip blank analytes measured under method SW8260.

µg/kg = Micrograms per kilograms.

C = Cancer based, target risk equals 1E-06.

J = Result is <RL but >=MDL and the concentration is an approximate value.

mg/kg = Milligram per kilogram.

NBA = No benchmark available.

NC = Noncancer based, target hazard quotient equals 0.1.

R=Rejected; result not valid due to quality control failure.

U = Not detected.

UJ = Not detected. SQL is <RL but >=MDL and the SQL is an approximate value.

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	**LO58-SB07-0911**		**LO58-SB08-0001**		**LO58-SB08-0608**		**LO58-SB09-0002**		**LO58-SB09-0406**	
								Sample Description	**Soil Bore**		**Soil Bore**		**Soil Bore**		**Soil Bore**		**Soil Bore**	
								Sample Date	**10/3/2012**		**10/3/2012**		**10/3/2012**		**10/3/2012**		**10/3/2012**	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**^{a}		**Industrial**^{b}		**Ecological**^{c}										
Percent Solids	DEP1005	D4643	%	NBA		NBA		NBA	81.5		79.4		88.1		87.6		92.5	
2-Methylnaphthalene	91576	MADEP EPH	µg/kg	24000	n	300000	n	NBA										
Acenaphthene	83329	MADEP EPH	µg/kg	360000	n	4500000	n	NBA										
Acenaphthylene	208968	MADEP EPH	µg/kg	360000	n	4500000	n	NBA										
Anthracene	120127	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA										
Benzo[a]anthracene	56553	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Benzo[a]pyrene	50328	MADEP EPH	µg/kg	16	c	290	c	NBA										
Benzo[b]fluoranthene	205992	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Benzo[g,h,i]perylene	191242	MADEP EPH	µg/kg	3800	c	17000	c	NBA										
Benzo[k]fluoranthene	207089	MADEP EPH	µg/kg	1600	c	29000	c	NBA										
C11-C22 Aromatic Hydrocarbons	EPH4	MADEP EPH	µg/kg	NBA		NBA		NBA	36000	U	32600	U	29400	U	29000	U	28300	U
C19-C36 Aliphatic Hydrocarbons	EPH3	MADEP EPH	µg/kg	NBA		NBA		NBA	36000	U	32600	U	29400	U	29000	U	28300	U
C9-C18 Aliphatic Hydrocarbons	EPH2	MADEP EPH	µg/kg	NBA		NBA		NBA	36000	U	32600	U	29400	U	29000	U	28300	U
Chrysene	218019	MADEP EPH	µg/kg	16000	c	290000	c	NBA										
Dibenzo[a,h]anthracene	53703	MADEP EPH	µg/kg	16	c	290	c	NBA										
Fluoranthene	206440	MADEP EPH	µg/kg	240000	n	3000000	n	NBA										
Fluorene	86737	MADEP EPH	µg/kg	240000	n	3000000	n	NBA										
Indeno[1,2,3-cd]pyrene	193395	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Naphthalene	91203	MADEP EPH	µg/kg	3800	c	17000	c	NBA										
Phenanthrene	85018	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA										
Pyrene	129000	MADEP EPH	µg/kg	180000	n	2300000	n	NBA										
Unadjusted C11-C22 Aromatics	EPH1	MADEP EPH	µg/kg	NBA		NBA		NBA	36000	U	32600	U	29400	U	29000	U	28300	U
C5-C8 Aliphatics Hydrocarbons	VPH3	MADEP VPH	µg/kg	NBA		NBA		NBA	3440	U	2660	U	2800	U	2160	U	2220	U
C9-C10 Aromatic Hydrocarbons	VPH5	MADEP VPH	µg/kg	NBA		NBA		NBA	861	U	666	U	701	U	540	U	554	U
C9-C12 Aliphatic Hydrocarbons	VPH4	MADEP VPH	µg/kg	NBA		NBA		NBA	3440	U	2660	U	2800	U	2160	U	2220	U
Unadjusted C5-C8 Aliphatics	VPH1	MADEP VPH	µg/kg	NBA		NBA		NBA	3440	U	2660	U	2800	U	2160	U	2220	U
Unadjusted C9-C12 Aliphatics	VPH2	MADEP VPH	µg/kg	NBA		NBA		NBA	3440	U	2660	U	2800	U	2160	U	2220	U
Aluminum	7429905	6010C	mg/kg	7700	n	110000		NBA	**19500**		**18100**	J	**16500**		**13500**	J	**20600**	
Antimony	7440360	6010C	mg/kg	3.1	n	47	n	NBA		R		R		R		R		R
Arsenic	7440382	6010C	mg/kg	0.68	c	3	cR	NBA	**6.5**		**9**		**3**		**5.9**		**6.3**	
Barium	7440393	6010C	mg/kg	1500	n	22000	n	NBA	35.3	J	65.2		36.6		42.7		52.9	J
Beryllium	7440417	6010C	mg/kg	16	n	230	n	NBA	0.85	J	0.69		0.73		0.66		1.4	J
Cadmium	7440439	6010C	mg/kg	7.1	n	98	n	NBA	2.1	UJ	0.43		0.41	UJ	0.33	UJ	1.8	UJ

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	**LO58-SB07-0911**		**LO58-SB08-0001**		**LO58-SB08-0608**		**LO58-SB09-0002**		**LO58-SB09-0406**	
								Sample Description	**Soil Bore**		**Soil Bore**		**Soil Bore**		**Soil Bore**		**Soil Bore**	
								Sample Date	**10/3/2012**		**10/3/2012**		**10/3/2012**		**10/3/2012**		**10/3/2012**	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Calcium	7440702	6010C	mg/kg	NBA		NBA		NBA	8150	J	5530	J	81400	J	827	J	4840	J
Chromium	7440473	6010C	mg/kg	0.3	c	6.3	c	NBA	**53.5**		**34.4**		**40.1**		**29.1**		**35.5**	
Cobalt	7440484	6010C	mg/kg	2.3	n	35	n	NBA	**18.9**	J	**10**		**10.4**		**11.6**		**15.2**	J
Copper	7440508	6010C	mg/kg	310	n	4700	n	NBA	26.2		40.9		16		18.7		24.2	
Iron	7439896	6010C	mg/kg	5500	n	82000	n	NBA	**38100**		**36500**		**29400**		**30600**		**35800**	
Lead	7439921	6010C	mg/kg	400		800		NBA	19.3		34.2		13.3		15.3		20.9	
Magnesium	7439954	6010C	mg/kg	NBA		NBA		NBA	14200		7410		13400		8420		13400	
Manganese	7439965	6010C	mg/kg	180	n	2600	n	NBA	**462**		**607**		**327**		**682**		**779**	
Nickel	7440020	6010C	mg/kg	150	n	2200	n	NBA	82.9		43.2		56.6		37.7		61.3	
Potassium	7440097	6010C	mg/kg	NBA		NBA		NBA	1040	J	1210		1060		828		1320	J
Selenium	7782492	6010C	mg/kg	39	n	580	n	NBA	14.9	UJ	1.1	J	0.78	J	1	J	12.5	UJ
Silver	7440224	6010C	mg/kg	39	n	580	n	NBA	3.9	UJ	0.88	UJ	1.4	UJ	0.7	UJ	3.3	UJ
Sodium	7440235	6010C	mg/kg	NBA		NBA		NBA	2130	U	37.8	J	45.6	J	31.5	J	41.5	J
Thallium	7440280	6010C	mg/kg	0.078	n	1.2	n	NBA	2.1	U	2.2	U	2.1	U	1.6	U	**0.44**	J
Vanadium	7440622	6010C	mg/kg	39	n	580	n	NBA	21.9		29.1		19.6		20.5		19.7	
Zinc	7440666	6010C	mg/kg	2300	n	35000	n	NBA	73.1		79.6		53.9		51.6		65.3	
Mercury	7439976	7471B	mg/kg	1.1	n	4.6		NBA	0.018	J	0.35	J	0.034	U	0.027	J	0.041	J
PCB-1016	12674112	8082A	µg/kg	410	n	5100	n	NBA	21	U	21	U	19	U	19	U	18	U
PCB-1221	11104282	8082A	µg/kg	200	c	830	c	NBA	21	U	21	U	19	U	19	U	18	U
PCB-1232	11141165	8082A	µg/kg	170	c	720	c	NBA	21	U	21	U	19	U	19	U	18	U
PCB-1242	53469219	8082A	µg/kg	230	c	950	c	NBA	21	U	21	U	19	U	19	U	18	U
PCB-1248	12672296	8082A	µg/kg	230	c	950	c	NBA	21	U	21	U	19	U	19	U	18	U
PCB-1254	11097691	8082A	µg/kg	120	n	970	c	NBA	21	U	21	U	19	U	19	U	18	U
PCB-1260	11096825	8082A	µg/kg	240	c	990	c	NBA	21	U	5.3	J	19	U	19	U	18	U
PCB-1262	37324235	8082A	µg/kg	NBA		NBA		NBA	21	U	21	U	19	U	19	U	18	U
PCB-1268	11100144	8082A	µg/kg	NBA		NBA		NBA	21	U	21	U	19	U	19	U	18	U
1,1,1,2-Tetrachloroethane	630206	8260B	µg/kg	2000	c	8800	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,1,1-Trichloroethane	71556	8260B	µg/kg	810000	n	3600000		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,1,2,2-Tetrachloroethane	79345	8260B	µg/kg	600	c	2700	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,1,2-Trichloroethane	79005	8260B	µg/kg	150	n	630	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,1-Dichloroethane	75343	8260B	µg/kg	3600	c	16000	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,1-Dichloroethene	75354	8260B	µg/kg	23000	n	100000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,1-Dichloropropene	563586	8260B	µg/kg	NBA		NBA		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB07-0911		LO58-SB08-0001		LO58-SB08-0608		LO58-SB09-0002		LO58-SB09-0406	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/3/2012		10/3/2012		10/3/2012		10/3/2012		10/3/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
1,2,3-Trichlorobenzene	87616	8260B	µg/kg	6300	n	93000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,2,3-Trichloropropane	96184	8260B	µg/kg	5.1	c	110	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,2,4-Trichlorobenzene	120821	8260B	µg/kg	5800	n	26000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,2,4-Trimethylbenzene	95636	8260B	µg/kg	5800	n	24000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,2-Dibromo-3-Chloropropane	96128	8260B	µg/kg	5.3	c	64	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,2-Dibromoethane	106934	8260B	µg/kg	36	c	160	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,2-Dichlorobenzene	95501	8260B	µg/kg	180000	n	930000		NBA	5.4	U	6.5	U	0.43	J	5.3	U	5.3	U
1,2-Dichloroethane	107062	8260B	µg/kg	460	c	2000	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,2-Dichloroethene, Total	540590	8260B	µg/kg	NBA		NBA		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,2-Dichloropropane	78875	8260B	µg/kg	1000	c	4400	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,3,5-Trimethylbenzene	108678	8260B	µg/kg	78000	n	1200000		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,3-Dichlorobenzene	541731	8260B	µg/kg	NBA		NBA		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,3-Dichloropropane	142289	8260B	µg/kg	160000	n	2300000		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,4-Dichlorobenzene	106467	8260B	µg/kg	2600	c	11000	c	NBA	0.63	J	6.5	U	5.3	U	5.3	U	5.3	U
1,4-Dioxane	123911	8260B	µg/kg	5300	c	24000	c	NBA	270	U	330	U	270	U	260	U	260	U
2,2-Dichloropropane	594207	8260B	µg/kg	NBA		NBA		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
2-Butanone	78933	8260B	µg/kg	2700000	n	19000000	n	NBA	9.7		18		5.3	U	6		5.3	U
2-Chloroethyl vinyl ether	110758	8260B	µg/kg	NBA		NBA		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
2-Chlorotoluene	95498	8260B	µg/kg	160000	n	2300000		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
2-Hexanone	591786	8260B	µg/kg	20000	n	130000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
4-Chlorotoluene	106434	8260B	µg/kg	160000	n	2300000		NBA	5.4	U	6.5	U	5.3	U	0.56	J	5.3	U
4-Isopropyltoluene	99876	8260B	µg/kg	NBA		NBA		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
4-Methyl-2-pentanone	108101	8260B	µg/kg	3300000	n	14000000		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Acetone	67641	8260B	µg/kg	6100000	n	67000000	n	NBA	320		340		68		180		45	
Benzene	71432	8260B	µg/kg	1200	c	5100	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Bromobenzene	108861	8260B	µg/kg	29000	n	180000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Bromochloromethane	74975	8260B	µg/kg	15000	n	63000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Bromodichloromethane	75274	8260B	µg/kg	290	c	1300	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Bromoform	75252	8260B	µg/kg	19000	c	86000	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Bromomethane	74839	8260B	µg/kg	680	n	3000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Carbon disulfide	75150	8260B	µg/kg	77000	n	350000	n	NBA	1	J	6.5	U	2.6	J	5.3	U	2	J
Carbon tetrachloride	56235	8260B	µg/kg	650	c	2900	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Chlorobenzene	108907	8260B	µg/kg	28000	n	130000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	**LO58-SB07-0911**		**LO58-SB08-0001**		**LO58-SB08-0608**		**LO58-SB09-0002**		**LO58-SB09-0406**	
								Sample Description	**Soil Bore**		**Soil Bore**		**Soil Bore**		**Soil Bore**		**Soil Bore**	
								Sample Date	**10/3/2012**		**10/3/2012**		**10/3/2012**		**10/3/2012**		**10/3/2012**	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Chloroethane	75003	8260B	µg/kg	1400000	n	5700000		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Chloroform	67663	8260B	µg/kg	320	c	1400	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Chloromethane	74873	8260B	µg/kg	11000	n	46000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
cis-1,2-Dichloroethene	156592	8260B	µg/kg	16000	n	230000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
cis-1,3-Dichloropropene	10061015	8260B	µg/kg	NBA		NBA		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Cyclohexane	110827	8260B	µg/kg	650000	n	2700000		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Dibromochloromethane	124481	8260B	µg/kg	8300	c	39000	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Dibromomethane	74953	8260B	µg/kg	2400	n	9900	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Dichlorodifluoromethane	75718	8260B	µg/kg	8700	n	37000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Ethylbenzene	100414	8260B	µg/kg	5800	c	25000	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Freon TF	76131	8260B	µg/kg	4000000	n	17000000		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Hexachlorobutadiene	87683	8260B	µg/kg	1200	c	5300	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Isobutyl alcohol	78831	8260B	µg/kg	2300000	n	35000000		NBA	270	U	330	U	270	U	260	U	260	U
Isopropylbenzene	98828	8260B	µg/kg	190000	n	990000		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
m&p-Xylene	179601231	8260B	µg/kg	58000	n	250000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Methyl acetate	79209	8260B	µg/kg	7800000	n	120000000	s	NBA	9.5		20		5.3	U	3.7	J	5.3	U
Methyl iodide	74884	8260B	µg/kg	NBA		NBA		NBA	0.81	J	2	J	0.72	J	5.3	U	5.3	U
Methyl t-butyl ether	1634044	8260B	µg/kg	47000	c	210000	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Methylcyclohexane	108872	8260B	µg/kg	NBA		NBA		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Methylene Chloride	75092	8260B	µg/kg	35000	n	320000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Naphthalene	91203	8260B	µg/kg	3800	c	17000	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
n-Butylbenzene	104518	8260B	µg/kg	390000	n	5800000		NBA	5.4	U	0.4	J	0.62	J	0.48	J	0.51	J
n-Propylbenzene	103651	8260B	µg/kg	380000	n	2400000		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
o-Xylene	95476	8260B	µg/kg	65000	n	280000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
sec-Butylbenzene	135988	8260B	µg/kg	780000	n	12000000		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Styrene	100425	8260B	µg/kg	600000	n	3500000		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
tert-Butylbenzene	98066	8260B	µg/kg	780000	n	12000000		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Tetrachloroethene	127184	8260B	µg/kg	8100	n	39000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Tetrahydrofuran	109999	8260B	µg/kg	1800000	n	9400000	n	NBA	54	U	65	U	53	U	53	U	53	U
Toluene	108883	8260B	µg/kg	490000	n	4700000		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
trans-1,2-Dichloroethene	156605	8260B	µg/kg	160000	n	2300000		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
trans-1,3-Dichloropropene	10061026	8260B	µg/kg	NBA		NBA		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Trichloroethene	79016	8260B	µg/kg	410	n	1900	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB07-0911		LO58-SB08-0001		LO58-SB08-0608		LO58-SB09-0002		LO58-SB09-0406	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/3/2012		10/3/2012		10/3/2012		10/3/2012		10/3/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Trichlorofluoromethane	75694	8260B	µg/kg	2300000	n	35000000		NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Vinyl acetate	108054	8260B	µg/kg	91000	n	380000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Vinyl chloride	75014	8260B	µg/kg	59	c	1700	c	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
Xylenes, Total	1330207	8260B	µg/kg	58000	n	250000	n	NBA	5.4	U	6.5	U	5.3	U	5.3	U	5.3	U
1,1'-Biphenyl	92524	8270C PAH	µg/kg	4700	n	20000	n	NBA	0.82	U	1.2	U	0.75	U	0.75	U	0.71	U
1-Methylnaphthalene	90120	8270C PAH	µg/kg	18000	c	73000	c	NBA	0.82	U	0.57	J	0.75	U	0.75	U	0.71	U
1-Methylphenanthrene	832699	8270C PAH	µg/kg	NBA		NBA		NBA	1		4.5		0.75	U	0.75	U	0.71	U
2,3,5-Trimethylnaphthalene	2245387	8270C PAH	µg/kg	NBA		NBA		NBA	0.82	U	0.54	J	0.75	U	0.75	U	0.71	U
2,6-Dimethylnaphthalene	581420	8270C PAH	µg/kg	NBA		NBA		NBA	0.82	U	0.51	J	0.75	U	0.75	U	0.71	U
2-Methylnaphthalene	91576	8270C PAH	µg/kg	24000	n	300000	n	NBA	0.29	J	0.73	J	0.75	U	0.75	U	0.71	U
Acenaphthene	83329	8270C PAH	µg/kg	360000	n	4500000	n	NBA	0.82	U	1	J	0.75	U	0.75	U	0.71	U
Acenaphthylene	208968	8270C PAH	µg/kg	360000	n	4500000	n	NBA	0.35	J	1.2		0.75	U	0.75	U	0.71	U
Anthracene	120127	8270C PAH	µg/kg	1800000	n	23000000	n	NBA	0.82	U	2		0.75	U	0.75	U	0.71	U
Benzo[a]anthracene	56553	8270C PAH	µg/kg	160	c	2900	c	NBA	2		18		0.75	U	0.2	J	0.71	U
Benzo[a]pyrene	50328	8270C PAH	µg/kg	16	c	290	c	NBA	2		**22**		0.75	U	0.19	J	0.71	U
Benzo[b]fluoranthene	205992	8270C PAH	µg/kg	160	c	2900	c	NBA	3.7		26		0.37	J	0.36	J	0.3	J
Benzo[e]pyrene	192972	8270C PAH	µg/kg	NBA		NBA		NBA	2.5		21		0.75	U	0.24	J	0.71	U
Benzo[g,h,i]perylene	191242	8270C PAH	µg/kg	3800	c	17000	c	NBA	1.5		9.1		0.75	U	0.75	U	0.71	U
Benzo[k]fluoranthene	207089	8270C PAH	µg/kg	1600	c	29000	c	NBA	2.3		25		0.75	U	0.19	J	0.71	U
Chrysene	218019	8270C PAH	µg/kg	16000	c	290000	c	NBA	3.1		23		0.75	U	0.29	J	0.71	U
Dibenzo[a,h]anthracene	53703	8270C PAH	µg/kg	16	c	290	c	NBA	0.58	J	4.4		0.75	U	0.75	U	0.71	U
Dibenzothiophene	132650	8270C PAH	µg/kg	78000	n	1200000	n	NBA	0.22	J	1.2		0.75	U	0.75	U	0.71	U
Fluoranthene	206440	8270C PAH	µg/kg	240000	n	3000000	n	NBA	4.7		44		0.75	U	0.53	J	0.33	J
Fluorene	86737	8270C PAH	µg/kg	240000	n	3000000	n	NBA	0.24	J	1.3		0.75	U	0.75	U	0.71	U
Indeno[1,2,3-cd]pyrene	193395	8270C PAH	µg/kg	160	c	2900	c	NBA	2		14		0.75	U	0.19	J	0.71	U
Naphthalene	91203	8270C PAH	µg/kg	3800	c	17000	c	NBA	0.23	J	0.58	J	0.75	U	0.75	U	0.71	U
Perylene	198550	8270C PAH	µg/kg	NBA		NBA		NBA	0.48	J	4.7		0.75	U	0.75	U	0.71	U
Phenanthrene	85018	8270C PAH	µg/kg	1800000	n	23000000	n	NBA	2.5		20		0.21	J	0.28	J	0.31	J
Pyrene	129000	8270C PAH	µg/kg	180000	n	2300000	n	NBA	4.3		36		0.75	U	0.37	J	0.26	J
1,1'-Biphenyl	92524	8270D	µg/kg	4700	n	20000	n	NBA	410	U	420	U	370	U	370	U	350	U
1,2,4,5-Tetrachlorobenzene	95943	8270D	µg/kg	2300	n	35000	n	NBA	410	U	420	U	370	U	370	U	350	U
1,2,4-Trichlorobenzene	120821	8270D	µg/kg	5800	n	26000	n	NBA	410	U	420	U	370	U	370	U	350	U
1,2-Dichlorobenzene	95501	8270D	µg/kg	180000	n	930000		NBA	410	U	420	U	370	U	370	U	350	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB07-0911		LO58-SB08-0001		LO58-SB08-0608		LO58-SB09-0002		LO58-SB09-0406	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/3/2012		10/3/2012		10/3/2012		10/3/2012		10/3/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
1,3-Dichlorobenzene	541731	8270D	µg/kg	NBA		NBA		NBA	410	U	420	U	370	U	370	U	350	U
1,4-Dichlorobenzene	106467	8270D	µg/kg	2600	c	11000	c	NBA	410	U	420	U	370	U	370	U	350	U
1-Methylnaphthalene	90120	8270D	µg/kg	18000	c	73000	c	NBA	410	U	420	U	370	U	370	U	350	U
2,2'-oxybis[1-chloropropane]	108601	8270D	µg/kg	310000	n	4700000		NBA	410	U	420	U	370	U	370	U	350	U
2,3,4,6-Tetrachlorophenol	58902	8270D	µg/kg	190000	n	2500000	n	NBA	410	U	420	U	370	U	370	U	350	U
2,4,5-Trichlorophenol	95954	8270D	µg/kg	630000	n	8200000	n	NBA	1000	U	1100	U	930	U	930	U	880	U
2,4,6-Trichlorophenol	88062	8270D	µg/kg	6300	n	82000	n	NBA	410	U	420	U	370	U	370	U	350	U
2,4-Dichlorophenol	120832	8270D	µg/kg	19000	n	250000	n	NBA	410	U	420	U	370	U	370	U	350	U
2,4-Dimethylphenol	105679	8270D	µg/kg	130000	n	1600000	n	NBA	410	U	420	U	370	U	370	U	350	U
2,4-Dinitrophenol	51285	8270D	µg/kg	13000	n	160000	n	NBA	1000	U	1100	U	930	U	930	U	880	U
2,4-Dinitrotoluene	121142	8270D	µg/kg	1700	c	7400	c	NBA	410	U	420	U	370	U	370	U	350	U
2,6-Dichlorophenol	87650	8270D	µg/kg	NBA		NBA		NBA	410	U	420	U	370	U	370	U	350	U
2,6-Dinitrotoluene	606202	8270D	µg/kg	360	c	1500	c	NBA	410	U	420	U	370	U	370	U	350	U
2-Chloronaphthalene	91587	8270D	µg/kg	480000	n	6000000	n	NBA	410	U	420	U	370	U	370	U	350	U
2-Chlorophenol	95578	8270D	µg/kg	39000	n	580000	n	NBA	410	U	420	U	370	U	370	U	350	U
2-Methylnaphthalene	91576	8270D	µg/kg	24000	n	300000	n	NBA	410	U	420	U	370	U	370	U	350	U
2-Methylphenol	95487	8270D	µg/kg	320000	n	4100000	n	NBA	410	U	420	U	370	U	370	U	350	U
2-Nitroaniline	88744	8270D	µg/kg	63000	n	800000	n	NBA	1000	U	1100	U	930	U	930	U	880	U
2-Nitrophenol	88755	8270D	µg/kg	NBA		NBA		NBA	410	U	420	U	370	U	370	U	350	U
3 & 4 Methylphenol	15831104	8270D	µg/kg	NBA		NBA		NBA	820	U	850	U	750	U	750	U	710	U
3,3'-Dichlorobenzidine	91941	8270D	µg/kg	1200	c	5100	c	NBA	410	U	420	U	370	U	370	U	350	U
3-Nitroaniline	99092	8270D	µg/kg	NBA		NBA		NBA	1000	U	1100	U	930	U	930	U	880	U
4,6-Dinitro-2-methylphenol	534521	8270D	µg/kg	510	n	6600	n	NBA	1000	U	1100	U	930	U	930	U	880	U
4-Bromophenyl phenyl ether	101553	8270D	µg/kg	NBA		NBA		NBA	410	U	420	U	370	U	370	U	350	U
4-Chloro-3-methylphenol	59507	8270D	µg/kg	630000	n	8200000	n	NBA	410	U	420	U	370	U	370	U	350	U
4-Chloroaniline	106478	8270D	µg/kg	2700	c	11000	c	NBA	410	U	420	U	370	U	370	U	350	U
4-Chlorophenyl phenyl ether	7005723	8270D	µg/kg	NBA		NBA		NBA	410	U	420	U	370	U	370	U	350	U
4-Nitroaniline	100016	8270D	µg/kg	25000	n	110000	c	NBA	1000	U	1100	U	930	U	930	U	880	U
4-Nitrophenol	100027	8270D	µg/kg	NBA		NBA		NBA	1000	U	1100	U	930	U	930	U	880	U
Acenaphthene	83329	8270D	µg/kg	360000	n	4500000	n	NBA	410	U	420	U	370	U	370	U	350	U
Acenaphthylene	208968	8270D	µg/kg	360000	n	4500000	n	NBA	410	U	420	U	370	U	370	U	350	U
Acetophenone	98862	8270D	µg/kg	780000	n	12000000		NBA	410	U	420	U	370	U	370	U	350	U
Aniline	62533	8270D	µg/kg	44000	n	400000	c	NBA	1000	U	1100	U	930	U	930	U	880	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB07-0911		LO58-SB08-0001		LO58-SB08-0608		LO58-SB09-0002		LO58-SB09-0406	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/3/2012		10/3/2012		10/3/2012		10/3/2012		10/3/2012	
				Screening Toxicity Value														
Analyte	CAS Number	Method	Units	Residential[a]		Industrial[b]		Ecological[c]										
Anthracene	120127	8270D	µg/kg	1800000	n	23000000	n	NBA	410	U	420	U	370	U	370	U	350	U
Atrazine	1912249	8270D	µg/kg	2400	c	10000	c	NBA	410	U	420	U	370	U	370	U	350	U
Azobenzene	103333	8270D	µg/kg	5600	c	26000	c	NBA	410	U	420	U	370	U	370	U	350	U
Benzaldehyde	100527	8270D	µg/kg	170000	c	820000	c	NBA	410	U	420	U	370	U	370	U	350	U
Benzidine	92875	8270D	µg/kg	0.53	c	10	c	NBA		R		R		R		R		R
Benzo[a]anthracene	56553	8270D	µg/kg	160	c	2900	c	NBA	410	U	17	J	370	U	370	U	350	U
Benzo[a]pyrene	50328	8270D	µg/kg	16	c	290	c	NBA	410	U	**25**	J	370	U	370	U	350	U
Benzo[b]fluoranthene	205992	8270D	µg/kg	160	c	2900	c	NBA	410	U	420	U	370	U	370	U	350	U
Benzo[e]pyrene	192972	8270D	µg/kg	NBA		NBA		NBA	410	U	22	J	370	U	370	U	350	U
Benzo[g,h,i]perylene	191242	8270D	µg/kg	3800	c	17000	c	NBA	410	U	420	U	370	U	370	U	350	U
Benzo[k]fluoranthene	207089	8270D	µg/kg	1600	c	29000	c	NBA	410	U	420	U	370	U	370	U	350	U
Benzoic acid	65850	8270D	µg/kg	25000000	n	330000000		NBA	1000	U	1100	U	930	U	930	U	880	U
Benzyl alcohol	100516	8270D	µg/kg	630000	n	8200000	n	NBA	410	UJ	420	UJ	370	UJ	370	UJ	350	UJ
Bis(2-chloroethoxy)methane	111911	8270D	µg/kg	19000	n	250000	n	NBA	410	U	420	U	370	U	370	U	350	U
Bis(2-chloroethyl)ether	111444	8270D	µg/kg	230	c	1000	c	NBA	410	U	420	U	370	U	370	U	350	U
Bis(2-ethylhexyl) phthalate	117817	8270D	µg/kg	39000	c	160000	c	NBA	44	J	33	J	370	U	25	J	350	U
Butyl benzyl phthalate	85687	8270D	µg/kg	290000	c	1200000	c	NBA	410	U	420	U	370	U	370	U	350	U
Caprolactam	105602	8270D	µg/kg	3100000	n	40000000	n	NBA	410	U	420	U	370	U	370	U	350	U
Carbazole	86748	8270D	µg/kg	NBA		NBA		NBA	410	U	420	U	370	U	370	U	350	U
Chrysene	218019	8270D	µg/kg	16000	c	290000	c	NBA	410	U	30	J	370	U	370	U	350	U
Dibenzo[a,h]anthracene	53703	8270D	µg/kg	16	c	290	c	NBA	410	U	420	U	370	U	370	U	350	U
Dibenzofuran	132649	8270D	µg/kg	7300	n	100000	n	NBA	410	U	420	U	370	U	370	U	350	U
Diethyl phthalate	84662	8270D	µg/kg	5100000	n	66000000	n	NBA	410	U	420	U	370	U	370	U	350	U
Dimethyl phthalate	131113	8270D	µg/kg	NBA		NBA		NBA	410	U	420	U	370	U	370	U	350	U
Di-n-butyl phthalate	84742	8270D	µg/kg	630000	n	8200000	n	NBA	410	U	420	U	370	U	370	U	350	U
Di-n-octyl phthalate	117840	8270D	µg/kg	63000	n	820000	n	NBA	410	U	420	U	370	U	370	U	350	U
Fluoranthene	206440	8270D	µg/kg	240000	n	3000000	n	NBA	410	U	40	J	370	U	370	U	350	U
Fluorene	86737	8270D	µg/kg	240000	n	3000000	n	NBA	410	U	420	U	370	U	370	U	350	U
Hexachlorobenzene	118741	8270D	µg/kg	210	c	960	c	NBA	410	U	420	U	370	U	370	U	350	U
Hexachlorobutadiene	87683	8270D	µg/kg	1200	c	5300	c	NBA	410	U	420	U	370	U	370	U	350	U
Hexachlorocyclopentadiene	77474	8270D	µg/kg	180	n	750	n	NBA	410	U	420	U	370	U	370	U	350	U
Hexachloroethane	67721	8270D	µg/kg	1800	c	8000	c	NBA	410	U	420	U	370	U	370	U	350	U
Indeno[1,2,3-cd]pyrene	193395	8270D	µg/kg	160	c	2900	c	NBA	410	U	420	U	370	U	370	U	350	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	**LO58-SB07-0911**		**LO58-SB08-0001**		**LO58-SB08-0608**		**LO58-SB09-0002**		**LO58-SB09-0406**	
								Sample Description	**Soil Bore**		**Soil Bore**		**Soil Bore**		**Soil Bore**		**Soil Bore**	
								Sample Date	**10/3/2012**		**10/3/2012**		**10/3/2012**		**10/3/2012**		**10/3/2012**	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Isophorone	78591	8270D	µg/kg	570000	c	2400000	c	NBA	410	U	420	U	370	U	370	U	350	U
Naphthalene	91203	8270D	µg/kg	3800	c	17000	c	NBA	410	U	420	U	370	U	370	U	350	U
Nitrobenzene	98953	8270D	µg/kg	5100	c	22000	c	NBA	410	U	420	U	370	U	370	U	350	U
N-Nitrosodimethylamine	62759	8270D	µg/kg	2	c	34	c	NBA	410	U	420	U	370	U	370	U	350	U
N-Nitrosodi-n-propylamine	621647	8270D	µg/kg	78	c	330	c	NBA	410	U	420	U	370	U	370	U	350	U
N-Nitrosodiphenylamine	86306	8270D	µg/kg	110000	c	470000	c	NBA	480	U	490	U	440	U	430	U	410	U
Pentachlorophenol	87865	8270D	µg/kg	1000	c	4000	c	NBA	1000	U	1100	U	930	U	930	U	880	U
Perylene	198550	8270D	µg/kg	NBA		NBA		NBA	410	U	420	U	370	U	370	U	350	U
Phenanthrene	85018	8270D	µg/kg	1800000	n	23000000	n	NBA	410	U	22	J	370	U	370	U	350	U
Phenol	108952	8270D	µg/kg	1900000	n	25000000	n	NBA	410	U	420	U	370	U	370	U	350	U
Pyrene	129000	8270D	µg/kg	180000	n	2300000	n	NBA	410	U	37	J	370	U	370	U	350	U
Pyridine	110861	8270D	µg/kg	7800	n	120000	n	NBA	410	U	420	U	370	U	370	U	350	U

[a] Regional Screening Level (RSL) Residential Soil Table (May 2016).

[b] Regional Screening Level (RSL) Industrial Soil Table (May 2016).

[c] As per QAPP.

Bold values indicate exceedance of residential RSL.

Highlghted values indicate exceedance of industrial RSL or eco benchmark.

All trip blank analytes measured under method SW8260.

µg/kg = Micrograms per kilograms.

C = Cancer based, target risk equals 1E-06.

J = Result is <RL but >=MDL and the concentration is an approximate value.

mg/kg = Milligram per kilogram.

NBA = No benchmark available.

NC = Noncancer based, target hazard quotient equals 0.1.

R=Rejected; result not valid due to quality control failure.

U = Not detected.

UJ = Not detected. SQL is <RL but >=MDL and the SQL is an approximate value.

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB10-0002		LO58-SB10-0507		LO58-SB11-0001		LO58-SB11-0810		LO58-SB12-0001	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/3/2012		10/3/2012		10/3/2012		10/3/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Percent Solids	DEP1005	D4643	%	NBA		NBA		NBA	90.4		88.2		85.9		84.5		87.2	
2-Methylnaphthalene	91576	MADEP EPH	µg/kg	24000	n	300000	n	NBA										
Acenaphthene	83329	MADEP EPH	µg/kg	360000	n	4500000	n	NBA										
Acenaphthylene	208968	MADEP EPH	µg/kg	360000	n	4500000	n	NBA										
Anthracene	120127	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA										
Benzo[a]anthracene	56553	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Benzo[a]pyrene	50328	MADEP EPH	µg/kg	16	c	290	c	NBA										
Benzo[b]fluoranthene	205992	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Benzo[g,h,i]perylene	191242	MADEP EPH	µg/kg	3800	c	17000	c	NBA										
Benzo[k]fluoranthene	207089	MADEP EPH	µg/kg	1600	c	29000	c	NBA										
C11-C22 Aromatic Hydrocarbons	EPH4	MADEP EPH	µg/kg	NBA		NBA		NBA	32100	U	30500	U	28700	U	29600	U	27700	U
C19-C36 Aliphatic Hydrocarbons	EPH3	MADEP EPH	µg/kg	NBA		NBA		NBA	32100	U	30500	U	28700	U	29600	U	27700	U
C9-C18 Aliphatic Hydrocarbons	EPH2	MADEP EPH	µg/kg	NBA		NBA		NBA	32100	U	30500	U	28700	U	29600	U	27700	U
Chrysene	218019	MADEP EPH	µg/kg	16000	c	290000	c	NBA										
Dibenzo[a,h]anthracene	53703	MADEP EPH	µg/kg	16	c	290	c	NBA										
Fluoranthene	206440	MADEP EPH	µg/kg	240000	n	3000000	n	NBA										
Fluorene	86737	MADEP EPH	µg/kg	240000	n	3000000	n	NBA										
Indeno[1,2,3-cd]pyrene	193395	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Naphthalene	91203	MADEP EPH	µg/kg	3800	c	17000	c	NBA										
Phenanthrene	85018	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA										
Pyrene	129000	MADEP EPH	µg/kg	180000	n	2300000	n	NBA										
Unadjusted C11-C22 Aromatics	EPH1	MADEP EPH	µg/kg	NBA		NBA		NBA	32100	U	30500	U	28700	U	29600	U	27700	U
C5-C8 Aliphatics Hydrocarbons	VPH3	MADEP VPH	µg/kg	NBA		NBA		NBA	2780	U	2710	U	2630	U	2250	U	2200	U
C9-C10 Aromatic Hydrocarbons	VPH5	MADEP VPH	µg/kg	NBA		NBA		NBA	694	U	679	U	658	U	563	U	549	U
C9-C12 Aliphatic Hydrocarbons	VPH4	MADEP VPH	µg/kg	NBA		NBA		NBA	2780	U	2710	U	2630	U	2250	U	2200	U
Unadjusted C5-C8 Aliphatics	VPH1	MADEP VPH	µg/kg	NBA		NBA		NBA	2780	U	2710	U	2630	U	2250	U	2200	U
Unadjusted C9-C12 Aliphatics	VPH2	MADEP VPH	µg/kg	NBA		NBA		NBA	2780	U	2710	U	2630	U	2250	U	2200	U
Aluminum	7429905	6010C	mg/kg	7700	n	110000		NBA	**18100**		**13800**		**19000**		**17500**		**15800**	
Antimony	7440360	6010C	mg/kg	3.1	n	47	n	NBA	0.49	J	4.9	U	4.6	U	10.1	U	0.39	J
Arsenic	7440382	6010C	mg/kg	0.68	c	3	cR	NBA	**7.6**		**6**		**9.4**		**3.9**		**7.1**	
Barium	7440393	6010C	mg/kg	1500	n	22000	n	NBA	32.5		37.4		51.9		45.9		39.5	
Beryllium	7440417	6010C	mg/kg	16	n	230	n	NBA	0.62		0.81		0.77		1		0.63	
Cadmium	7440439	6010C	mg/kg	7.1	n	98	n	NBA	0.11	J	0.09	J	0.12	J	0.84	U	0.13	J

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB10-0002		LO58-SB10-0507		LO58-SB11-0001		LO58-SB11-0810		LO58-SB12-0001	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/3/2012		10/3/2012		10/3/2012		10/3/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**		**Ecological[c]**										
Calcium	7440702	6010C	mg/kg	NBA		NBA		NBA	698		75100		1960		38200		732	
Chromium	7440473	6010C	mg/kg	0.3	c	6.3	c	NBA	**32.9**		**31.9**		**34.9**		**39.6**		**28.9**	
Cobalt	7440484	6010C	mg/kg	2.3	n	35	n	NBA	**12.9**		**11.5**		**13.9**		**13.4**		**13.3**	
Copper	7440508	6010C	mg/kg	310	n	4700	n	NBA	24		21.8		49.5		19.7		44.4	
Iron	7439896	6010C	mg/kg	5500	n	82000	n	NBA	**31000**		**25800**		**33500**		**31400**		**30100**	
Lead	7439921	6010C	mg/kg	400		800		NBA	17.3		16.9		21.1		19.2		21.1	
Magnesium	7439954	6010C	mg/kg	NBA		NBA		NBA	8060		8710		8130		12700		7410	
Manganese	7439965	6010C	mg/kg	180	n	2600	n	NBA	**565**		**469**		**616**		**487**		**780**	
Nickel	7440020	6010C	mg/kg	150	n	2200	n	NBA	42.2		47		48.4		58.4		36.1	
Potassium	7440097	6010C	mg/kg	NBA		NBA		NBA	704		882		900		894		703	
Selenium	7782492	6010C	mg/kg	39	n	580	n	NBA	1.7	J	1.3	J	2.3	J	5.9	U	2	J
Silver	7440224	6010C	mg/kg	39	n	580	n	NBA	0.77	U	0.82	U	0.76	U	1.7	U	0.71	U
Sodium	7440235	6010C	mg/kg	NBA		NBA		NBA	29.8	J	35.2	J	33.3	J	28.8	J	26.7	J
Thallium	7440280	6010C	mg/kg	0.078	n	1.2	n	NBA	1.9	U	2.1	U	1.9	U	2.1	U	1.8	U
Vanadium	7440622	6010C	mg/kg	39	n	580	n	NBA	24.2		16.8		25.9		18.7		24.1	
Zinc	7440666	6010C	mg/kg	2300	n	35000	n	NBA	54.5		46.9		66.7		54.5		57.7	
Mercury	7439976	7471B	mg/kg	1.1	n	4.6		NBA	0.037		0.053		0.098		0.017	J	0.043	
PCB-1016	12674112	8082A	µg/kg	410	n	5100	n	NBA	18	U	20	U	20	U	20	U	20	U
PCB-1221	11104282	8082A	µg/kg	200	c	830	c	NBA	18	U	20	U	20	U	20	U	20	U
PCB-1232	11141165	8082A	µg/kg	170	c	720	c	NBA	18	U	20	U	20	U	20	U	20	U
PCB-1242	53469219	8082A	µg/kg	230	c	950	c	NBA	18	U	20	U	20	U	20	U	20	U
PCB-1248	12672296	8082A	µg/kg	230	c	950	c	NBA	18	U	20	U	20	U	20	U	20	U
PCB-1254	11097691	8082A	µg/kg	120	n	970	c	NBA	18	U	20	U	20	U	20	U	20	U
PCB-1260	11096825	8082A	µg/kg	240	c	990	c	NBA	18	U	20	U	20	U	20	U	20	U
PCB-1262	37324235	8082A	µg/kg	NBA		NBA		NBA	18	U	20	U	20	U	20	U	20	U
PCB-1268	11100144	8082A	µg/kg	NBA		NBA		NBA	18	U	20	U	20	U	20	U	20	U
1,1,1,2-Tetrachloroethane	630206	8260B	µg/kg	2000	c	8800	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
1,1,1-Trichloroethane	71556	8260B	µg/kg	810000	n	3600000		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
1,1,2,2-Tetrachloroethane	79345	8260B	µg/kg	600	c	2700	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
1,1,2-Trichloroethane	79005	8260B	µg/kg	150	n	630	n	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
1,1-Dichloroethane	75343	8260B	µg/kg	3600	c	16000	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
1,1-Dichloroethene	75354	8260B	µg/kg	23000	n	100000	n	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
1,1-Dichloropropene	563586	8260B	µg/kg	NBA		NBA		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB10-0002		LO58-SB10-0507		LO58-SB11-0001		LO58-SB11-0810		LO58-SB12-0001	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/3/2012		10/3/2012		10/3/2012		10/3/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	CAS Number	Method	Units	Residential[a]		Industrial[b]		Ecological[c]										
1,2,3-Trichlorobenzene	87616	8260B	µg/kg	6300	n	93000	n	NBA	5.6	U	6.6	U	6.1	UJ	6.5	U	5.8	U
1,2,3-Trichloropropane	96184	8260B	µg/kg	5.1	c	110	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
1,2,4-Trichlorobenzene	120821	8260B	µg/kg	5800	n	26000	n	NBA	5.6	U	6.6	U	6.1	UJ	6.5	U	5.8	U
1,2,4-Trimethylbenzene	95636	8260B	µg/kg	5800	n	24000	n	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
1,2-Dibromo-3-Chloropropane	96128	8260B	µg/kg	5.3	c	64	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
1,2-Dibromoethane	106934	8260B	µg/kg	36	c	160	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
1,2-Dichlorobenzene	95501	8260B	µg/kg	180000	n	930000		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
1,2-Dichloroethane	107062	8260B	µg/kg	460	c	2000	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
1,2-Dichloroethene, Total	540590	8260B	µg/kg	NBA		NBA		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
1,2-Dichloropropane	78875	8260B	µg/kg	1000	c	4400	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
1,3,5-Trimethylbenzene	108678	8260B	µg/kg	78000	n	1200000		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
1,3-Dichlorobenzene	541731	8260B	µg/kg	NBA		NBA		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
1,3-Dichloropropane	142289	8260B	µg/kg	160000	n	2300000		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
1,4-Dichlorobenzene	106467	8260B	µg/kg	2600	c	11000	c	NBA	5.6	U	6.6	U	6.1	UJ	6.5	U	5.8	U
1,4-Dioxane	123911	8260B	µg/kg	5300	c	24000	c	NBA	280	U	330	U	310	U	320	U	290	U
2,2-Dichloropropane	594207	8260B	µg/kg	NBA		NBA		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
2-Butanone	78933	8260B	µg/kg	2700000	n	19000000	n	NBA	7.5		11		7.6	J	19		5.8	U
2-Chloroethyl vinyl ether	110758	8260B	µg/kg	NBA		NBA		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
2-Chlorotoluene	95498	8260B	µg/kg	160000	n	2300000		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
2-Hexanone	591786	8260B	µg/kg	20000	n	130000	n	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
4-Chlorotoluene	106434	8260B	µg/kg	160000	n	2300000		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
4-Isopropyltoluene	99876	8260B	µg/kg	NBA		NBA		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
4-Methyl-2-pentanone	108101	8260B	µg/kg	3300000	n	14000000		NBA	5.6	U	6.6	U	3.2	J	4.8	J	5.3	J
Acetone	67641	8260B	µg/kg	6100000	n	67000000	n	NBA	180		110		220	J	380		170	
Benzene	71432	8260B	µg/kg	1200	c	5100	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Bromobenzene	108861	8260B	µg/kg	29000	n	180000	n	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Bromochloromethane	74975	8260B	µg/kg	15000	n	63000	n	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Bromodichloromethane	75274	8260B	µg/kg	290	c	1300	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Bromoform	75252	8260B	µg/kg	19000	c	86000	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Bromomethane	74839	8260B	µg/kg	680	n	3000	n	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Carbon disulfide	75150	8260B	µg/kg	77000	n	350000	n	NBA	5.6	U	1.7	J	0.88	J	0.81	J	5.8	U
Carbon tetrachloride	56235	8260B	µg/kg	650	c	2900	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Chlorobenzene	108907	8260B	µg/kg	28000	n	130000	n	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB10-0002		LO58-SB10-0507		LO58-SB11-0001		LO58-SB11-0810		LO58-SB12-0001	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/3/2012		10/3/2012		10/3/2012		10/3/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**		**Ecological[c]**										
Chloroethane	75003	8260B	µg/kg	1400000	n	5700000		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Chloroform	67663	8260B	µg/kg	320	c	1400	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Chloromethane	74873	8260B	µg/kg	11000	n	46000	n	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
cis-1,2-Dichloroethene	156592	8260B	µg/kg	16000	n	230000	n	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
cis-1,3-Dichloropropene	10061015	8260B	µg/kg	NBA		NBA		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Cyclohexane	110827	8260B	µg/kg	650000	n	2700000		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Dibromochloromethane	124481	8260B	µg/kg	8300	c	39000	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Dibromomethane	74953	8260B	µg/kg	2400	n	9900	n	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Dichlorodifluoromethane	75718	8260B	µg/kg	8700	n	37000	n	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Ethylbenzene	100414	8260B	µg/kg	5800	c	25000	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Freon TF	76131	8260B	µg/kg	4000000	n	17000000		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Hexachlorobutadiene	87683	8260B	µg/kg	1200	c	5300	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Isobutyl alcohol	78831	8260B	µg/kg	2300000	n	35000000		NBA	280	U	330	U	310	U	320	U	290	U
Isopropylbenzene	98828	8260B	µg/kg	190000	n	990000		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
m&p-Xylene	179601231	8260B	µg/kg	58000	n	250000	n	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Methyl acetate	79209	8260B	µg/kg	7800000	n	120000000	s	NBA	3.6	J	1.7	J	16	J	22		15	
Methyl iodide	74884	8260B	µg/kg	NBA		NBA		NBA	5.6	U	6.6	U	6.1	U	1.5	J	5.8	U
Methyl t-butyl ether	1634044	8260B	µg/kg	47000	c	210000	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Methylcyclohexane	108872	8260B	µg/kg	NBA		NBA		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Methylene Chloride	75092	8260B	µg/kg	35000	n	320000	n	NBA	5.6	U	6.6	U	6.1	UJ	6.5	U	5.8	U
Naphthalene	91203	8260B	µg/kg	3800	c	17000	c	NBA	5.6	U	6.6	U	6.1	UJ	6.5	U	5.8	U
n-Butylbenzene	104518	8260B	µg/kg	390000	n	5800000		NBA	5.6	U	0.45	J	0.58	J	0.64	J	5.8	U
n-Propylbenzene	103651	8260B	µg/kg	380000	n	2400000		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
o-Xylene	95476	8260B	µg/kg	65000	n	280000	n	NBA	0.099	J	6.6	U	6.1	U	6.5	U	5.8	U
sec-Butylbenzene	135988	8260B	µg/kg	780000	n	12000000		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Styrene	100425	8260B	µg/kg	600000	n	3500000		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
tert-Butylbenzene	98066	8260B	µg/kg	780000	n	12000000		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Tetrachloroethene	127184	8260B	µg/kg	8100	n	39000	n	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Tetrahydrofuran	109999	8260B	µg/kg	1800000	n	9400000	n	NBA	56	U	66	U	61	U	65	U	58	U
Toluene	108883	8260B	µg/kg	490000	n	4700000		NBA	5.6	U	6.6	U	6.1	U	0.3	J	5.8	U
trans-1,2-Dichloroethene	156605	8260B	µg/kg	160000	n	2300000		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
trans-1,3-Dichloropropene	10061026	8260B	µg/kg	NBA		NBA		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Trichloroethene	79016	8260B	µg/kg	410	n	1900	n	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB10-0002		LO58-SB10-0507		LO58-SB11-0001		LO58-SB11-0810		LO58-SB12-0001	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/3/2012		10/3/2012		10/3/2012		10/3/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	CAS Number	Method	Units	Residential[a]		Industrial[b]		Ecological[c]										
Trichlorofluoromethane	75694	8260B	µg/kg	2300000	n	35000000		NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Vinyl acetate	108054	8260B	µg/kg	91000	n	380000	n	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Vinyl chloride	75014	8260B	µg/kg	59	c	1700	c	NBA	5.6	U	6.6	U	6.1	U	6.5	U	5.8	U
Xylenes, Total	1330207	8260B	µg/kg	58000	n	250000	n	NBA	0.099	J	6.6	U	6.1	U	6.5	U	5.8	U
1,1'-Biphenyl	92524	8270C PAH	µg/kg	4700	n	20000	n	NBA	0.72	U	0.75	U	0.79	U	0.79	U	0.76	U
1-Methylnaphthalene	90120	8270C PAH	µg/kg	18000	c	73000	c	NBA	0.72	U	0.75	U	0.25	J	0.79	U	0.21	J
1-Methylphenanthrene	832699	8270C PAH	µg/kg	NBA		NBA		NBA	0.72	U	0.75	U	4.6		0.79	U	1.4	
2,3,5-Trimethylnaphthalene	2245387	8270C PAH	µg/kg	NBA		NBA		NBA	0.72	U	0.75	U	0.79	U	0.79	U	0.76	U
2,6-Dimethylnaphthalene	581420	8270C PAH	µg/kg	NBA		NBA		NBA	0.72	U	0.75	U	0.2	J	0.79	U	0.76	U
2-Methylnaphthalene	91576	8270C PAH	µg/kg	24000	n	300000	n	NBA	0.72	U	0.75	U	0.37	J	0.79	U	0.22	J
Acenaphthene	83329	8270C PAH	µg/kg	360000	n	4500000	n	NBA	0.72	U	0.75	U	0.79	U	0.79	U	0.76	U
Acenaphthylene	208968	8270C PAH	µg/kg	360000	n	4500000	n	NBA	0.72	U	0.75	U	0.51	J	0.79	U	0.44	J
Anthracene	120127	8270C PAH	µg/kg	1800000	n	23000000	n	NBA	0.72	U	0.75	U	0.36	J	0.79	U	0.3	J
Benzo[a]anthracene	56553	8270C PAH	µg/kg	160	c	2900	c	NBA	0.43	J	0.75	U	3.6		0.79	U	3.4	
Benzo[a]pyrene	50328	8270C PAH	µg/kg	16	c	290	c	NBA	0.41	J	0.75	U	4.1		0.79	U	3.4	
Benzo[b]fluoranthene	205992	8270C PAH	µg/kg	160	c	2900	c	NBA	0.82		0.32	J	5.3		0.34	J	6.7	
Benzo[e]pyrene	192972	8270C PAH	µg/kg	NBA		NBA		NBA	0.79		0.75	U	4.4		0.79	U	4.2	
Benzo[g,h,i]perylene	191242	8270C PAH	µg/kg	3800	c	17000	c	NBA	0.37	J	0.75	U	2.6		0.79	U	1.6	
Benzo[k]fluoranthene	207089	8270C PAH	µg/kg	1600	c	29000	c	NBA	0.56	J	0.75	U	4.4		0.79	U	4.5	
Chrysene	218019	8270C PAH	µg/kg	16000	c	290000	c	NBA	0.72		0.75	U	5.5		0.79	U	4.8	
Dibenzo[a,h]anthracene	53703	8270C PAH	µg/kg	16	c	290	c	NBA	0.72	U	0.75	U	1		0.79	U	0.76	
Dibenzothiophene	132650	8270C PAH	µg/kg	78000	n	1200000	n	NBA	0.72	U	0.75	U	0.3	J	0.79	U	0.26	J
Fluoranthene	206440	8270C PAH	µg/kg	240000	n	3000000	n	NBA	1.2		0.75	U	9.5		0.79	U	8.5	
Fluorene	86737	8270C PAH	µg/kg	240000	n	3000000	n	NBA	0.72	U	0.75	U	0.37	J	0.79	U	0.28	J
Indeno[1,2,3-cd]pyrene	193395	8270C PAH	µg/kg	160	c	2900	c	NBA	0.52	J	0.75	U	3.9		0.79	U	2.7	
Naphthalene	91203	8270C PAH	µg/kg	3800	c	17000	c	NBA	0.72	U	0.75	U	0.79	U	0.79	U	0.76	U
Perylene	198550	8270C PAH	µg/kg	NBA		NBA		NBA	0.72	U	0.75	U	1		0.79	U	0.82	
Phenanthrene	85018	8270C PAH	µg/kg	1800000	n	23000000	n	NBA	0.64	J	0.75	U	4.4		0.79	U	4	
Pyrene	129000	8270C PAH	µg/kg	180000	n	2300000	n	NBA	0.92		0.75	U	7.2		0.79	U	7.1	
1,1'-Biphenyl	92524	8270D	µg/kg	4700	n	20000	n	NBA	360	U	370	U	390	U	390	U	370	U
1,2,4,5-Tetrachlorobenzene	95943	8270D	µg/kg	2300	n	35000	n	NBA	360	U	370	U	390	U	390	U	370	U
1,2,4-Trichlorobenzene	120821	8270D	µg/kg	5800	n	26000	n	NBA	360	U	370	U	390	U	390	U	370	U
1,2-Dichlorobenzene	95501	8270D	µg/kg	180000	n	930000	n	NBA	360	U	370	U	390	U	390	U	370	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB10-0002		LO58-SB10-0507		LO58-SB11-0001		LO58-SB11-0810		LO58-SB12-0001	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/3/2012		10/3/2012		10/3/2012		10/3/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
1,3-Dichlorobenzene	541731	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	390	U	390	U	370	U
1,4-Dichlorobenzene	106467	8270D	µg/kg	2600	c	11000	c	NBA	360	U	370	U	390	U	390	U	370	U
1-Methylnaphthalene	90120	8270D	µg/kg	18000	c	73000	c	NBA	360	U	370	U	390	U	390	U	370	U
2,2'-oxybis[1-chloropropane]	108601	8270D	µg/kg	310000	n	4700000		NBA	360	U	370	U	390	U	390	U	370	U
2,3,4,6-Tetrachlorophenol	58902	8270D	µg/kg	190000	n	2500000	n	NBA	360	U	370	U	390	U	390	U	370	U
2,4,5-Trichlorophenol	95954	8270D	µg/kg	630000	n	8200000	n	NBA	900	U	930	U	970	U	980	U	940	U
2,4,6-Trichlorophenol	88062	8270D	µg/kg	6300	n	82000	n	NBA	360	U	370	U	390	U	390	U	370	U
2,4-Dichlorophenol	120832	8270D	µg/kg	19000	n	250000	n	NBA	360	U	370	U	390	U	390	U	370	U
2,4-Dimethylphenol	105679	8270D	µg/kg	130000	n	1600000	n	NBA	360	U	370	U	390	U	390	U	370	U
2,4-Dinitrophenol	51285	8270D	µg/kg	13000	n	160000	n	NBA	900	U	930	U	970	U	980	U	940	U
2,4-Dinitrotoluene	121142	8270D	µg/kg	1700	c	7400	c	NBA	360	U	370	U	390	U	390	U	370	U
2,6-Dichlorophenol	87650	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	390	U	390	U	370	U
2,6-Dinitrotoluene	606202	8270D	µg/kg	360	c	1500	c	NBA	360	U	370	U	390	U	390	U	370	U
2-Chloronaphthalene	91587	8270D	µg/kg	480000	n	6000000	n	NBA	360	U	370	U	390	U	390	U	370	U
2-Chlorophenol	95578	8270D	µg/kg	39000	n	580000	n	NBA	360	U	370	U	390	U	390	U	370	U
2-Methylnaphthalene	91576	8270D	µg/kg	24000	n	300000	n	NBA	360	U	370	U	390	U	390	U	370	U
2-Methylphenol	95487	8270D	µg/kg	320000	n	4100000	n	NBA	360	U	370	U	390	U	390	U	370	U
2-Nitroaniline	88744	8270D	µg/kg	63000	n	800000	n	NBA	900	U	930	U	970	U	980	U	940	U
2-Nitrophenol	88755	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	390	U	390	U	370	U
3 & 4 Methylphenol	15831104	8270D	µg/kg	NBA		NBA		NBA	720	U	750	U	790	U	790	U	760	U
3,3'-Dichlorobenzidine	91941	8270D	µg/kg	1200	c	5100	c	NBA	360	U	370	U	390	U	390	U	370	U
3-Nitroaniline	99092	8270D	µg/kg	NBA		NBA		NBA	900	U	930	U	970	U	980	U	940	U
4,6-Dinitro-2-methylphenol	534521	8270D	µg/kg	510	n	6600	n	NBA	900	U	930	U	970	U	980	U	940	U
4-Bromophenyl phenyl ether	101553	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	390	U	390	U	370	U
4-Chloro-3-methylphenol	59507	8270D	µg/kg	630000	n	8200000	n	NBA	360	U	370	U	390	U	390	U	370	U
4-Chloroaniline	106478	8270D	µg/kg	2700	c	11000	c	NBA	360	U	370	U	390	U	390	U	370	U
4-Chlorophenyl phenyl ether	7005723	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	390	U	390	U	370	U
4-Nitroaniline	100016	8270D	µg/kg	25000	n	110000	c	NBA	900	U	930	U	970	U	980	U	940	U
4-Nitrophenol	100027	8270D	µg/kg	NBA		NBA		NBA	900	U	930	U	970	U	980	U	940	U
Acenaphthene	83329	8270D	µg/kg	360000	n	4500000	n	NBA	360	U	370	U	390	U	390	U	370	U
Acenaphthylene	208968	8270D	µg/kg	360000	n	4500000	n	NBA	360	U	370	U	390	U	390	U	370	U
Acetophenone	98862	8270D	µg/kg	780000	n	12000000		NBA	360	U	370	U	390	U	390	U	370	U
Aniline	62533	8270D	µg/kg	44000	n	400000	c	NBA	900	U	930	U	970	U	980	U	940	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB10-0002		LO58-SB10-0507		LO58-SB11-0001		LO58-SB11-0810		LO58-SB12-0001	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/3/2012		10/3/2012		10/3/2012		10/3/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	CAS Number	Method	Units	Residential[a]		Industrial[b]		Ecological[c]										
Anthracene	120127	8270D	µg/kg	1800000	n	23000000	n	NBA	360	U	370	U	390	U	390	U	370	U
Atrazine	1912249	8270D	µg/kg	2400	c	10000	c	NBA	360	U	370	U	390	U	390	U	370	U
Azobenzene	103333	8270D	µg/kg	5600	c	26000	c	NBA	360	U	370	U	390	U	390	U	370	U
Benzaldehyde	100527	8270D	µg/kg	170000	c	820000	c	NBA	360	U	370	U	390	U	390	U	370	U
Benzidine	92875	8270D	µg/kg	0.53	c	10	c	NBA		R		R		R		R		R
Benzo[a]anthracene	56553	8270D	µg/kg	160	c	2900	c	NBA	360	U	370	U	390	U	390	U	370	U
Benzo[a]pyrene	50328	8270D	µg/kg	16	c	290	c	NBA	360	U	370	U	390	U	390	U	370	U
Benzo[b]fluoranthene	205992	8270D	µg/kg	160	c	2900	c	NBA	360	U	370	U	390	U	390	U	370	U
Benzo[e]pyrene	192972	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	390	U	390	U	370	U
Benzo[g,h,i]perylene	191242	8270D	µg/kg	3800	c	17000	c	NBA	360	U	370	U	390	U	390	U	370	U
Benzo[k]fluoranthene	207089	8270D	µg/kg	1600	c	29000	c	NBA	360	U	370	U	390	U	390	U	370	U
Benzoic acid	65850	8270D	µg/kg	25000000	n	330000000		NBA	900	U	930	U	970	U	980	U	940	U
Benzyl alcohol	100516	8270D	µg/kg	630000	n	8200000	n	NBA	360	U	370	U	390	U	390	U	370	U
Bis(2-chloroethoxy)methane	111911	8270D	µg/kg	19000	n	250000	n	NBA	360	U	370	U	390	U	390	U	370	U
Bis(2-chloroethyl)ether	111444	8270D	µg/kg	230	c	1000	c	NBA	360	U	370	U	390	U	390	U	370	U
Bis(2-ethylhexyl) phthalate	117817	8270D	µg/kg	39000	c	160000	c	NBA	360	U	370	U	390	U	390	U	370	U
Butyl benzyl phthalate	85687	8270D	µg/kg	290000	c	1200000	c	NBA	360	U	370	U	390	U	390	U	370	U
Caprolactam	105602	8270D	µg/kg	3100000	n	40000000	n	NBA	360	U	370	U	390	U	390	U	370	U
Carbazole	86748	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	390	U	390	U	370	U
Chrysene	218019	8270D	µg/kg	16000	c	290000	c	NBA	360	U	370	U	390	U	390	U	370	U
Dibenzo[a,h]anthracene	53703	8270D	µg/kg	16	c	290	c	NBA	360	U	370	U	390	U	390	U	370	U
Dibenzofuran	132649	8270D	µg/kg	7300	n	100000	n	NBA	360	U	370	U	390	U	390	U	370	U
Diethyl phthalate	84662	8270D	µg/kg	5100000	n	66000000	n	NBA	360	U	370	U	390	U	390	U	370	U
Dimethyl phthalate	131113	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	390	U	390	U	370	U
Di-n-butyl phthalate	84742	8270D	µg/kg	630000	n	8200000	n	NBA	360	U	370	U	390	U	390	U	370	U
Di-n-octyl phthalate	117840	8270D	µg/kg	63000	n	820000	n	NBA	360	U	370	U	390	U	390	U	370	U
Fluoranthene	206440	8270D	µg/kg	240000	n	3000000	n	NBA	360	U	370	U	390	U	390	U	370	U
Fluorene	86737	8270D	µg/kg	240000	n	3000000	n	NBA	360	U	370	U	390	U	390	U	370	U
Hexachlorobenzene	118741	8270D	µg/kg	210	c	960	c	NBA	360	U	370	U	390	U	390	U	370	U
Hexachlorobutadiene	87683	8270D	µg/kg	1200	c	5300	c	NBA	360	U	370	U	390	U	390	U	370	U
Hexachlorocyclopentadiene	77474	8270D	µg/kg	180	n	750	n	NBA	360	U	370	U	390	U	390	U	370	U
Hexachloroethane	67721	8270D	µg/kg	1800	c	8000	c	NBA	360	U	370	U	390	U	390	U	370	U
Indeno[1,2,3-cd]pyrene	193395	8270D	µg/kg	160	c	2900	c	NBA	360	U	370	U	390	U	390	U	370	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB10-0002		LO58-SB10-0507		LO58-SB11-0001		LO58-SB11-0810		LO58-SB12-0001	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/3/2012		10/3/2012		10/3/2012		10/3/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Isophorone	78591	8270D	µg/kg	570000	c	2400000	c	NBA	360	U	370	U	390	U	390	U	370	U
Naphthalene	91203	8270D	µg/kg	3800	c	17000	c	NBA	360	U	370	U	390	U	390	U	370	U
Nitrobenzene	98953	8270D	µg/kg	5100	c	22000	c	NBA	360	U	370	U	390	U	390	U	370	U
N-Nitrosodimethylamine	62759	8270D	µg/kg	2	c	34	c	NBA	360	U	370	U	390	U	390	U	370	U
N-Nitrosodi-n-propylamine	621647	8270D	µg/kg	78	c	330	c	NBA	360	U	370	U	390	U	390	U	370	U
N-Nitrosodiphenylamine	86306	8270D	µg/kg	110000	c	470000	c	NBA	420	U	430	U	450	U	460	U	440	U
Pentachlorophenol	87865	8270D	µg/kg	1000	c	4000	c	NBA	900	U	930	U	970	U	980	U	940	U
Perylene	198550	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	390	U	390	U	370	U
Phenanthrene	85018	8270D	µg/kg	1800000	n	23000000	n	NBA	360	U	370	U	390	U	390	U	370	U
Phenol	108952	8270D	µg/kg	1900000	n	25000000	n	NBA	360	U	370	U	390	U	390	U	370	U
Pyrene	129000	8270D	µg/kg	180000	n	2300000	n	NBA	360	U	370	U	390	U	390	U	370	U
Pyridine	110861	8270D	µg/kg	7800	n	120000	n	NBA	360	U	370	U	390	U	390	U	370	U

[a] Regional Screening Level (RSL) Residential Soil Table (May 2016).

[b] Regional Screening Level (RSL) Industrial Soil Table (May 2016).

[c] As per QAPP.

Bold values indicate exceedance of residential RSL.

Highlghted values indicate exceedance of industrial RSL or eco benchmark.

All trip blank analytes measured under method SW8260.

µg/kg = Micrograms per kilograms.

C = Cancer based, target risk equals 1E-06.

J = Result is <RL but >=MDL and the concentration is an approximate value.

mg/kg = Milligram per kilogram.

NBA = No benchmark available.

NC = Noncancer based, target hazard quotient equals 0.1.

R=Rejected; result not valid due to quality control failure.

U = Not detected.

UJ = Not detected. SQL is <RL but >=MDL and the SQL is an approximate value.

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB12-0810		LO58-SB13-0002		LO58-SB13-0810		LO58-SB13R-0910		LO58-SB-DUP-03	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		DUP OF SB13R-0910	
								Sample Date	10/4/2012		10/4/2012		10/4/2012		10/4/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	CAS Number	Method	Units	Residential[a]		Industrial[b]		Ecological[c]										
Percent Solids	DEP1005	D4643	%	NBA		NBA		NBA	92		88.1		80.6		77		76.8	
2-Methylnaphthalene	91576	MADEP EPH	µg/kg	24000	n	300000	n	NBA										
Acenaphthene	83329	MADEP EPH	µg/kg	360000	n	4500000	n	NBA										
Acenaphthylene	208968	MADEP EPH	µg/kg	360000	n	4500000	n	NBA										
Anthracene	120127	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA										
Benzo[a]anthracene	56553	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Benzo[a]pyrene	50328	MADEP EPH	µg/kg	16	c	290	c	NBA										
Benzo[b]fluoranthene	205992	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Benzo[g,h,i]perylene	191242	MADEP EPH	µg/kg	3800	c	17000	c	NBA										
Benzo[k]fluoranthene	207089	MADEP EPH	µg/kg	1600	c	29000	c	NBA										
C11-C22 Aromatic Hydrocarbons	EPH4	MADEP EPH	µg/kg	NBA		NBA		NBA	28500	U	31500	U	32500	U	33000	U	32300	U
C19-C36 Aliphatic Hydrocarbons	EPH3	MADEP EPH	µg/kg	NBA		NBA		NBA	28500	U	31500	U	32500	U	33000	U	32300	U
C9-C18 Aliphatic Hydrocarbons	EPH2	MADEP EPH	µg/kg	NBA		NBA		NBA	28500	U	31500	U	32500	U	33000	U	32300	U
Chrysene	218019	MADEP EPH	µg/kg	16000	c	290000	c	NBA										
Dibenzo[a,h]anthracene	53703	MADEP EPH	µg/kg	16	c	290	c	NBA										
Fluoranthene	206440	MADEP EPH	µg/kg	240000	n	3000000	n	NBA										
Fluorene	86737	MADEP EPH	µg/kg	240000	n	3000000	n	NBA										
Indeno[1,2,3-cd]pyrene	193395	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Naphthalene	91203	MADEP EPH	µg/kg	3800	c	17000	c	NBA										
Phenanthrene	85018	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA										
Pyrene	129000	MADEP EPH	µg/kg	180000	n	2300000	n	NBA										
Unadjusted C11-C22 Aromatics	EPH1	MADEP EPH	µg/kg	NBA		NBA		NBA	28500	U	31500	U	32500	U	33000	U	32300	U
C5-C8 Aliphatics Hydrocarbons	VPH3	MADEP VPH	µg/kg	NBA		NBA		NBA	2370	U	2540	U	2810	U	2810	U	2620	U
C9-C10 Aromatic Hydrocarbons	VPH5	MADEP VPH	µg/kg	NBA		NBA		NBA	593	U	393	J	702	U	702	U	656	U
C9-C12 Aliphatic Hydrocarbons	VPH4	MADEP VPH	µg/kg	NBA		NBA		NBA	2370	U	2540	U	2810	U	2810	U	2620	U
Unadjusted C5-C8 Aliphatics	VPH1	MADEP VPH	µg/kg	NBA		NBA		NBA	2370	U	2540	U	2810	U	2810	U	2620	U
Unadjusted C9-C12 Aliphatics	VPH2	MADEP VPH	µg/kg	NBA		NBA		NBA	2370	U	2540	U	2810	U	2810	U	2620	U
Aluminum	7429905	6010C	mg/kg	7700	n	110000	n	NBA	**11800**		**16400**		**18800**		**13400**		**17200**	
Antimony	7440360	6010C	mg/kg	3.1	n	47	n	NBA	0.45	J	4.6	U	9.3	U	29.8	U	9.9	U
Arsenic	7440382	6010C	mg/kg	0.68	c	3	cR	NBA	**7.1**		**7**		**4.1**		**6.5**		**5.3**	J
Barium	7440393	6010C	mg/kg	1500	n	22000	n	NBA	37.7		29.2		49.7	J	36.2	J	52.7	J
Beryllium	7440417	6010C	mg/kg	16	n	230	n	NBA	0.57		0.5		1.3	J	0.92	J	1.2	J
Cadmium	7440439	6010C	mg/kg	7.1	n	98	n	NBA	0.089	J	0.12	J	0.77	U	2.5	U	0.13	J

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB12-0810		LO58-SB13-0002		LO58-SB13-0810		LO58-SB13R-0910		LO58-SB-DUP-03	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		DUP OF SB13R-0910	
								Sample Date	10/4/2012		10/4/2012		10/4/2012		10/4/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**		**Ecological[c]**										
Calcium	7440702	6010C	mg/kg	NBA		NBA		NBA	2020		797		8300		3130	J	12300	J
Chromium	7440473	6010C	mg/kg	0.3	c	6.3	c	NBA	**25.2**		**28.6**		**33.6**		**39.9**		**34.7**	
Cobalt	7440484	6010C	mg/kg	2.3	n	35	n	NBA	**11.7**		**12.4**		**14.5**		**16.4**	J	**15**	J
Copper	7440508	6010C	mg/kg	310	n	4700	n	NBA	23.5		26		21.8		16.6		19.3	
Iron	7439896	6010C	mg/kg	5500	n	82000	n	NBA	**28500**		**29300**		**31500**		**30400**		**34100**	
Lead	7439921	6010C	mg/kg	400		800		NBA	18.2		17.3		16.9		15.3		23.3	J
Magnesium	7439954	6010C	mg/kg	NBA		NBA		NBA	6230		8220		13000		9540		12200	J
Manganese	7439965	6010C	mg/kg	180	n	2600	n	NBA	**584**		**566**		**463**		**518**		**561**	
Nickel	7440020	6010C	mg/kg	150	n	2200	n	NBA	35.2		39		55.4		64.2		58.1	J
Potassium	7440097	6010C	mg/kg	NBA		NBA		NBA	839		611		1090	J	800	J	997	J
Selenium	7782492	6010C	mg/kg	39	n	580	n	NBA	1.8	J	2.2	J	5.4	U	17.4	U	5.8	U
Silver	7440224	6010C	mg/kg	39	n	580	n	NBA	0.77	U	0.77	U	1.5	U	2	U	1.7	U
Sodium	7440235	6010C	mg/kg	NBA		NBA		NBA	37	J	29.3	J	36	J	22.5	J	2070	U
Thallium	7440280	6010C	mg/kg	0.078	n	1.2	n	NBA	1.9	U	1.9	U	1.9	U	2.5	U	2.1	U
Vanadium	7440622	6010C	mg/kg	39	n	580	n	NBA	20.3		27.5		17.8		15.6		16.9	J
Zinc	7440666	6010C	mg/kg	2300	n	35000	n	NBA	57.7		50.9		62.3		60.3		57	
Mercury	7439976	7471B	mg/kg	1.1	n	4.6		NBA	0.042		0.034	J	0.052		0.0041	J	0.015	J
PCB-1016	12674112	8082A	µg/kg	410	n	5100	n	NBA	18	U	20	U	20	U	22	U	23	U
PCB-1221	11104282	8082A	µg/kg	200	c	830	c	NBA	18	U	20	U	20	U	22	U	23	U
PCB-1232	11141165	8082A	µg/kg	170	c	720	c	NBA	18	U	20	U	20	U	22	U	23	U
PCB-1242	53469219	8082A	µg/kg	230	c	950	c	NBA	18	U	20	U	20	U	22	U	23	U
PCB-1248	12672296	8082A	µg/kg	230	c	950	c	NBA	18	U	20	U	20	U	22	U	23	U
PCB-1254	11097691	8082A	µg/kg	120	n	970	c	NBA	18	U	20	U	20	U	22	U	23	U
PCB-1260	11096825	8082A	µg/kg	240	c	990	c	NBA	18	U	20	U	20	U	22	U	23	U
PCB-1262	37324235	8082A	µg/kg	NBA		NBA		NBA	18	U	20	U	20	U	22	U	23	U
PCB-1268	11100144	8082A	µg/kg	NBA		NBA		NBA	18	U	20	U	20	U	22	U	23	U
1,1,1,2-Tetrachloroethane	630206	8260B	µg/kg	2000	c	8800	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,1,1-Trichloroethane	71556	8260B	µg/kg	810000	n	3600000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,1,2,2-Tetrachloroethane	79345	8260B	µg/kg	600	c	2700	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,1,2-Trichloroethane	79005	8260B	µg/kg	150	n	630	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,1-Dichloroethane	75343	8260B	µg/kg	3600	c	16000	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,1-Dichloroethene	75354	8260B	µg/kg	23000	n	100000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,1-Dichloropropene	563586	8260B	µg/kg	NBA		NBA		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB12-0810		LO58-SB13-0002		LO58-SB13-0810		LO58-SB13R-0910		LO58-SB-DUP-03	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		DUP OF SB13R-0910	
								Sample Date	10/4/2012		10/4/2012		10/4/2012		10/4/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
1,2,3-Trichlorobenzene	87616	8260B	µg/kg	6300	n	93000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,2,3-Trichloropropane	96184	8260B	µg/kg	5.1	c	110	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,2,4-Trichlorobenzene	120821	8260B	µg/kg	5800	n	26000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,2,4-Trimethylbenzene	95636	8260B	µg/kg	5800	n	24000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,2-Dibromo-3-Chloropropane	96128	8260B	µg/kg	5.3	c	64	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,2-Dibromoethane	106934	8260B	µg/kg	36	c	160	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,2-Dichlorobenzene	95501	8260B	µg/kg	180000	n	930000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,2-Dichloroethane	107062	8260B	µg/kg	460	c	2000	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,2-Dichloroethene, Total	540590	8260B	µg/kg	NBA		NBA		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,2-Dichloropropane	78875	8260B	µg/kg	1000	c	4400	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,3,5-Trimethylbenzene	108678	8260B	µg/kg	78000	n	1200000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,3-Dichlorobenzene	541731	8260B	µg/kg	NBA		NBA		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,3-Dichloropropane	142289	8260B	µg/kg	160000	n	2300000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,4-Dichlorobenzene	106467	8260B	µg/kg	2600	c	11000	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,4-Dioxane	123911	8260B	µg/kg	5300	c	24000	c	NBA	280	U	280	U	370	U	380	U	320	U
2,2-Dichloropropane	594207	8260B	µg/kg	NBA		NBA		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
2-Butanone	78933	8260B	µg/kg	2700000	n	19000000	n	NBA	5.7	U	8.4		16		12		12	
2-Chloroethyl vinyl ether	110758	8260B	µg/kg	NBA		NBA		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
2-Chlorotoluene	95498	8260B	µg/kg	160000	n	2300000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
2-Hexanone	591786	8260B	µg/kg	20000	n	130000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
4-Chlorotoluene	106434	8260B	µg/kg	160000	n	2300000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
4-Isopropyltoluene	99876	8260B	µg/kg	NBA		NBA		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
4-Methyl-2-pentanone	108101	8260B	µg/kg	3300000	n	14000000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Acetone	67641	8260B	µg/kg	6100000	n	67000000	n	NBA	45		220		230		190		230	
Benzene	71432	8260B	µg/kg	1200	c	5100	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Bromobenzene	108861	8260B	µg/kg	29000	n	180000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Bromochloromethane	74975	8260B	µg/kg	15000	n	63000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Bromodichloromethane	75274	8260B	µg/kg	290	c	1300	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Bromoform	75252	8260B	µg/kg	19000	c	86000	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Bromomethane	74839	8260B	µg/kg	680	n	3000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Carbon disulfide	75150	8260B	µg/kg	77000	n	350000	n	NBA	5.7	U	5.5	U	7.4	U	0.9	J	0.93	J
Carbon tetrachloride	56235	8260B	µg/kg	650	c	2900	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Chlorobenzene	108907	8260B	µg/kg	28000	n	130000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB12-0810		LO58-SB13-0002		LO58-SB13-0810		LO58-SB13R-0910		LO58-SB-DUP-03	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		DUP OF SB13R-0910	
								Sample Date	10/4/2012		10/4/2012		10/4/2012		10/4/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Chloroethane	75003	8260B	µg/kg	1400000	n	5700000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Chloroform	67663	8260B	µg/kg	320	c	1400	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Chloromethane	74873	8260B	µg/kg	11000	n	46000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
cis-1,2-Dichloroethene	156592	8260B	µg/kg	16000	n	230000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
cis-1,3-Dichloropropene	10061015	8260B	µg/kg	NBA		NBA		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Cyclohexane	110827	8260B	µg/kg	650000	n	2700000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Dibromochloromethane	124481	8260B	µg/kg	8300	c	39000	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Dibromomethane	74953	8260B	µg/kg	2400	n	9900	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Dichlorodifluoromethane	75718	8260B	µg/kg	8700	n	37000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Ethylbenzene	100414	8260B	µg/kg	5800	c	25000	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Freon TF	76131	8260B	µg/kg	4000000	n	17000000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Hexachlorobutadiene	87683	8260B	µg/kg	1200	c	5300	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Isobutyl alcohol	78831	8260B	µg/kg	2300000	n	35000000		NBA	280	U	280	U	370	U	380	U	320	U
Isopropylbenzene	98828	8260B	µg/kg	190000	n	990000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
m&p-Xylene	179601231	8260B	µg/kg	58000	n	250000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Methyl acetate	79209	8260B	µg/kg	7800000	n	120000000	s	NBA	5.7	U	9.6		2.7	J	11		13	
Methyl iodide	74884	8260B	µg/kg	NBA		NBA		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Methyl t-butyl ether	1634044	8260B	µg/kg	47000	c	210000	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Methylcyclohexane	108872	8260B	µg/kg	NBA		NBA		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Methylene Chloride	75092	8260B	µg/kg	35000	n	320000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Naphthalene	91203	8260B	µg/kg	3800	c	17000	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
n-Butylbenzene	104518	8260B	µg/kg	390000	n	5800000		NBA	5.7	U	5.5	U	0.75	J	7.5	U	6.4	U
n-Propylbenzene	103651	8260B	µg/kg	380000	n	2400000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
o-Xylene	95476	8260B	µg/kg	65000	n	280000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
sec-Butylbenzene	135988	8260B	µg/kg	780000	n	12000000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Styrene	100425	8260B	µg/kg	600000	n	3500000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
tert-Butylbenzene	98066	8260B	µg/kg	780000	n	12000000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Tetrachloroethene	127184	8260B	µg/kg	8100	n	39000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Tetrahydrofuran	109999	8260B	µg/kg	1800000	n	9400000	n	NBA	57	U	55	U	74	U	75	U	64	U
Toluene	108883	8260B	µg/kg	490000	n	4700000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
trans-1,2-Dichloroethene	156605	8260B	µg/kg	160000	n	2300000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
trans-1,3-Dichloropropene	10061026	8260B	µg/kg	NBA		NBA		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Trichloroethene	79016	8260B	µg/kg	410	n	1900	n	NBA	5.7	U	5.5	U	7.4	U	11		9.8	

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB12-0810		LO58-SB13-0002		LO58-SB13-0810		LO58-SB13R-0910		LO58-SB-DUP-03	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		DUP OF SB13R-0910	
								Sample Date	10/4/2012		10/4/2012		10/4/2012		10/4/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**		**Ecological[c]**										
Trichlorofluoromethane	75694	8260B	µg/kg	2300000	n	35000000		NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Vinyl acetate	108054	8260B	µg/kg	91000	n	380000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Vinyl chloride	75014	8260B	µg/kg	59	c	1700	c	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
Xylenes, Total	1330207	8260B	µg/kg	58000	n	250000	n	NBA	5.7	U	5.5	U	7.4	U	7.5	U	6.4	U
1,1'-Biphenyl	92524	8270C PAH	µg/kg	4700	n	20000	n	NBA	0.73	U	0.74	U	0.82	U	0.86	U	0.85	U
1-Methylnaphthalene	90120	8270C PAH	µg/kg	18000	c	73000	c	NBA	0.73	U	0.27	J	0.82	U	0.86	U	0.85	U
1-Methylphenanthrene	832699	8270C PAH	µg/kg	NBA		NBA		NBA	0.73	U	2.2		0.82	U	0.86	U	0.85	U
2,3,5-Trimethylnaphthalene	2245387	8270C PAH	µg/kg	NBA		NBA		NBA	0.73	U	0.74	U	0.82	U	0.86	U	0.85	U
2,6-Dimethylnaphthalene	581420	8270C PAH	µg/kg	NBA		NBA		NBA	0.73	U	0.74	U	0.82	U	0.86	U	0.85	U
2-Methylnaphthalene	91576	8270C PAH	µg/kg	24000	n	300000	n	NBA	0.73	U	0.3	J	0.82	U	0.86	U	0.85	U
Acenaphthene	83329	8270C PAH	µg/kg	360000	n	4500000	n	NBA	0.73	U	0.74	U	0.82	U	0.86	U	0.85	U
Acenaphthylene	208968	8270C PAH	µg/kg	360000	n	4500000	n	NBA	0.73	U	0.67	J	0.82	U	0.86	U	0.85	U
Anthracene	120127	8270C PAH	µg/kg	1800000	n	23000000	n	NBA	0.73	U	0.41	J	0.82	U	0.86	U	0.85	U
Benzo[a]anthracene	56553	8270C PAH	µg/kg	160	c	2900	c	NBA	0.73	U	4.7		0.82	U	0.86	U	0.85	U
Benzo[a]pyrene	50328	8270C PAH	µg/kg	16	c	290	c	NBA	0.73	U	5.6		0.82	U	0.86	U	0.85	U
Benzo[b]fluoranthene	205992	8270C PAH	µg/kg	160	c	2900	c	NBA	0.71	J	9.1		0.54	J	0.53	J	0.64	J
Benzo[e]pyrene	192972	8270C PAH	µg/kg	NBA		NBA		NBA	0.34	J	5.4		0.82	U	0.24	J	0.36	J
Benzo[g,h,i]perylene	191242	8270C PAH	µg/kg	3800	c	17000	c	NBA	0.73	U	2.2		0.82	U	0.23	J	0.85	U
Benzo[k]fluoranthene	207089	8270C PAH	µg/kg	1600	c	29000	c	NBA	0.73	U	6.2		0.82	U	0.86	U	0.85	U
Chrysene	218019	8270C PAH	µg/kg	16000	c	290000	c	NBA	0.47	J	6.6		0.82	U	0.86	U	0.22	J
Dibenzo[a,h]anthracene	53703	8270C PAH	µg/kg	16	c	290	c	NBA	0.73	U	1.1		0.82	U	0.86	U	0.85	U
Dibenzothiophene	132650	8270C PAH	µg/kg	78000	n	1200000	n	NBA	0.73	U	0.34	J	0.82	U	0.86	U	0.85	U
Fluoranthene	206440	8270C PAH	µg/kg	240000	n	3000000	n	NBA	0.73	U	11		0.82	U	0.86	U	0.85	U
Fluorene	86737	8270C PAH	µg/kg	240000	n	3000000	n	NBA	0.73	U	0.38	J	0.82	U	0.86	U	0.85	U
Indeno[1,2,3-cd]pyrene	193395	8270C PAH	µg/kg	160	c	2900	c	NBA	0.73	U	3.7		0.82	U	0.86	U	0.85	U
Naphthalene	91203	8270C PAH	µg/kg	3800	c	17000	c	NBA	0.73	U	0.74	U	0.82	U	0.86	U	0.85	U
Perylene	198550	8270C PAH	µg/kg	NBA		NBA		NBA	0.73	U	1.2		0.82	U	0.86	U	0.85	U
Phenanthrene	85018	8270C PAH	µg/kg	1800000	n	23000000	n	NBA	0.6	J	5.5		0.29	J	0.86	U	0.3	J
Pyrene	129000	8270C PAH	µg/kg	180000	n	2300000	n	NBA	0.21	J	10		0.82	U	0.86	U	0.23	J
1,1'-Biphenyl	92524	8270D	µg/kg	4700	n	20000	n	NBA	360	U	370	U	400	U	420	U	420	U
1,2,4,5-Tetrachlorobenzene	95943	8270D	µg/kg	2300	n	35000	n	NBA	360	U	370	U	400	U	420	U	420	U
1,2,4-Trichlorobenzene	120821	8270D	µg/kg	5800	n	26000	n	NBA	360	U	370	U	400	U	420	U	420	U
1,2-Dichlorobenzene	95501	8270D	µg/kg	180000	n	930000		NBA	360	U	370	U	400	U	420	U	420	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB12-0810		LO58-SB13-0002		LO58-SB13-0810		LO58-SB13R-0910		LO58-SB-DUP-03	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		DUP OF SB13R-0910	
								Sample Date	10/4/2012		10/4/2012		10/4/2012		10/4/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**		**Ecological[c]**										
1,3-Dichlorobenzene	541731	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	400	U	420	U	420	U
1,4-Dichlorobenzene	106467	8270D	µg/kg	2600	c	11000	c	NBA	360	U	370	U	400	U	420	U	420	U
1-Methylnaphthalene	90120	8270D	µg/kg	18000	c	73000	c	NBA	360	U	370	U	400	U	420	U	420	U
2,2'-oxybis[1-chloropropane]	108601	8270D	µg/kg	310000	n	4700000		NBA	360	U	370	U	400	U	420	U	420	U
2,3,4,6-Tetrachlorophenol	58902	8270D	µg/kg	190000	n	2500000	n	NBA	360	U	370	U	400	U	420	U	420	U
2,4,5-Trichlorophenol	95954	8270D	µg/kg	630000	n	8200000	n	NBA	900	U	920	U	1000	U	1100	U	1100	U
2,4,6-Trichlorophenol	88062	8270D	µg/kg	6300	n	82000	n	NBA	360	U	370	U	400	U	420	U	420	U
2,4-Dichlorophenol	120832	8270D	µg/kg	19000	n	250000	n	NBA	360	U	370	U	400	U	420	U	420	U
2,4-Dimethylphenol	105679	8270D	µg/kg	130000	n	1600000	n	NBA	360	U	370	U	400	U	420	U	420	U
2,4-Dinitrophenol	51285	8270D	µg/kg	13000	n	160000	n	NBA	900	U	920	U	1000	U	1100	U	1100	U
2,4-Dinitrotoluene	121142	8270D	µg/kg	1700	c	7400	c	NBA	360	U	370	U	400	U	420	U	420	U
2,6-Dichlorophenol	87650	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	400	U	420	U	420	U
2,6-Dinitrotoluene	606202	8270D	µg/kg	360	c	1500	c	NBA	360	U	370	U	400	U	420	U	420	U
2-Chloronaphthalene	91587	8270D	µg/kg	480000	n	6000000	n	NBA	360	U	370	U	400	U	420	U	420	U
2-Chlorophenol	95578	8270D	µg/kg	39000	n	580000	n	NBA	360	U	370	U	400	U	420	U	420	U
2-Methylnaphthalene	91576	8270D	µg/kg	24000	n	300000	n	NBA	360	U	370	U	400	U	420	U	420	U
2-Methylphenol	95487	8270D	µg/kg	320000	n	4100000	n	NBA	360	U	370	U	400	U	420	U	420	U
2-Nitroaniline	88744	8270D	µg/kg	63000	n	800000	n	NBA	900	U	920	U	1000	U	1100	U	1100	U
2-Nitrophenol	88755	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	400	U	420	U	420	U
3 & 4 Methylphenol	15831104	8270D	µg/kg	NBA		NBA		NBA	730	U	740	U	820	U	860	U	850	U
3,3'-Dichlorobenzidine	91941	8270D	µg/kg	1200	c	5100	c	NBA	360	U	370	U	400	U	420	U	420	U
3-Nitroaniline	99092	8270D	µg/kg	NBA		NBA		NBA	900	U	920	U	1000	U	1100	U	1100	U
4,6-Dinitro-2-methylphenol	534521	8270D	µg/kg	510	n	6600	n	NBA	900	U	920	U	1000	U	1100	U	1100	U
4-Bromophenyl phenyl ether	101553	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	400	U	420	U	420	U
4-Chloro-3-methylphenol	59507	8270D	µg/kg	630000	n	8200000	n	NBA	360	U	370	U	400	U	420	U	420	U
4-Chloroaniline	106478	8270D	µg/kg	2700	c	11000	c	NBA	360	U	370	U	400	U	420	U	420	U
4-Chlorophenyl phenyl ether	7005723	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	400	U	420	U	420	U
4-Nitroaniline	100016	8270D	µg/kg	25000	n	110000	c	NBA	900	U	920	U	1000	U	1100	U	1100	U
4-Nitrophenol	100027	8270D	µg/kg	NBA		NBA		NBA	900	U	920	U	1000	U	1100	U	1100	U
Acenaphthene	83329	8270D	µg/kg	360000	n	4500000	n	NBA	360	U	370	U	400	U	420	U	420	U
Acenaphthylene	208968	8270D	µg/kg	360000	n	4500000	n	NBA	360	U	370	U	400	U	420	U	420	U
Acetophenone	98862	8270D	µg/kg	780000	n	12000000		NBA	360	U	370	U	400	U	420	U	420	U
Aniline	62533	8270D	µg/kg	44000	n	400000	c	NBA	900	U	920	U	1000	U	1100	U	1100	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB12-0810		LO58-SB13-0002		LO58-SB13-0810		LO58-SB13R-0910		LO58-SB-DUP-03	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		DUP OF SB13R-0910	
								Sample Date	10/4/2012		10/4/2012		10/4/2012		10/4/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Anthracene	120127	8270D	µg/kg	1800000	n	23000000	n	NBA	360	U	370	U	400	U	420	U	420	U
Atrazine	1912249	8270D	µg/kg	2400	c	10000	c	NBA	360	U	370	U	400	U	420	U	420	U
Azobenzene	103333	8270D	µg/kg	5600	c	26000	c	NBA	360	U	370	U	400	U	420	U	420	U
Benzaldehyde	100527	8270D	µg/kg	170000	c	820000	c	NBA	360	U	370	U	400	U	420	U	420	U
Benzidine	92875	8270D	µg/kg	0.53	c	10	c	NBA		R		R		R		R		R
Benzo[a]anthracene	56553	8270D	µg/kg	160	c	2900	c	NBA	360	U	370	U	400	U	420	U	420	U
Benzo[a]pyrene	50328	8270D	µg/kg	16	c	290	c	NBA	360	U	370	U	400	U	420	U	420	U
Benzo[b]fluoranthene	205992	8270D	µg/kg	160	c	2900	c	NBA	360	U	370	U	400	U	420	U	420	U
Benzo[e]pyrene	192972	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	400	U	420	U	420	U
Benzo[g,h,i]perylene	191242	8270D	µg/kg	3800	c	17000	c	NBA	360	U	370	U	400	U	420	U	420	U
Benzo[k]fluoranthene	207089	8270D	µg/kg	1600	c	29000	c	NBA	360	U	370	U	400	U	420	U	420	U
Benzoic acid	65850	8270D	µg/kg	25000000	n	330000000		NBA	900	U	920	U	1000	U	1100	U	1100	U
Benzyl alcohol	100516	8270D	µg/kg	630000	n	8200000	n	NBA	360	U	370	U	400	U	420	U	420	U
Bis(2-chloroethoxy)methane	111911	8270D	µg/kg	19000	n	250000	n	NBA	360	U	370	U	400	U	420	U	420	U
Bis(2-chloroethyl)ether	111444	8270D	µg/kg	230	c	1000	c	NBA	360	U	370	U	400	U	420	U	420	U
Bis(2-ethylhexyl) phthalate	117817	8270D	µg/kg	39000	c	160000	c	NBA	360	U	370	U	400	U	420	U	420	U
Butyl benzyl phthalate	85687	8270D	µg/kg	290000	c	1200000	c	NBA	360	U	370	U	400	U	420	U	420	U
Caprolactam	105602	8270D	µg/kg	3100000	n	40000000	n	NBA	360	U	370	U	400	U	420	U	420	U
Carbazole	86748	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	400	U	420	U	420	U
Chrysene	218019	8270D	µg/kg	16000	c	290000	c	NBA	360	U	370	U	400	U	420	U	420	U
Dibenzo[a,h]anthracene	53703	8270D	µg/kg	16	c	290	c	NBA	360	U	370	U	400	U	420	U	420	U
Dibenzofuran	132649	8270D	µg/kg	7300	n	100000	n	NBA	360	U	370	U	400	U	420	U	420	U
Diethyl phthalate	84662	8270D	µg/kg	5100000	n	66000000	n	NBA	360	U	370	U	400	U	420	U	420	U
Dimethyl phthalate	131113	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	400	U	420	U	420	U
Di-n-butyl phthalate	84742	8270D	µg/kg	630000	n	8200000	n	NBA	360	U	370	U	400	U	420	U	420	U
Di-n-octyl phthalate	117840	8270D	µg/kg	63000	n	820000	n	NBA	360	U	370	U	400	U	420	U	420	U
Fluoranthene	206440	8270D	µg/kg	240000	n	3000000	n	NBA	360	U	370	U	400	U	420	U	420	U
Fluorene	86737	8270D	µg/kg	240000	n	3000000	n	NBA	360	U	370	U	400	U	420	U	420	U
Hexachlorobenzene	118741	8270D	µg/kg	210	c	960	c	NBA	360	U	370	U	400	U	420	U	420	U
Hexachlorobutadiene	87683	8270D	µg/kg	1200	c	5300	c	NBA	360	U	370	U	400	U	420	U	420	U
Hexachlorocyclopentadiene	77474	8270D	µg/kg	180	n	750	n	NBA	360	U	370	U	400	U	420	U	420	U
Hexachloroethane	67721	8270D	µg/kg	1800	c	8000	c	NBA	360	U	370	U	400	U	420	U	420	U
Indeno[1,2,3-cd]pyrene	193395	8270D	µg/kg	160	c	2900	c	NBA	360	U	370	U	400	U	420	U	420	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	**LO58-SB12-0810**		**LO58-SB13-0002**		**LO58-SB13-0810**		**LO58-SB13R-0910**		**LO58-SB-DUP-03**	
								Sample Description	**Soil Bore**		**Soil Bore**		**Soil Bore**		**Soil Bore**		**DUP OF SB13R-0910**	
								Sample Date	**10/4/2012**		**10/4/2012**		**10/4/2012**		**10/4/2012**		**10/4/2012**	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Isophorone	78591	8270D	µg/kg	570000	c	2400000	c	NBA	360	U	370	U	400	U	420	U	420	U
Naphthalene	91203	8270D	µg/kg	3800	c	17000	c	NBA	360	U	370	U	400	U	420	U	420	U
Nitrobenzene	98953	8270D	µg/kg	5100	c	22000	c	NBA	360	U	370	U	400	U	420	U	420	U
N-Nitrosodimethylamine	62759	8270D	µg/kg	2	c	34	c	NBA	360	U	370	U	400	U	420	U	420	U
N-Nitrosodi-n-propylamine	621647	8270D	µg/kg	78	c	330	c	NBA	360	U	370	U	400	U	420	U	420	U
N-Nitrosodiphenylamine	86306	8270D	µg/kg	110000	c	470000	c	NBA	420	U	430	U	470	U	500	U	490	U
Pentachlorophenol	87865	8270D	µg/kg	1000	c	4000	c	NBA	900	U	920	U	1000	U	1100	U	1100	U
Perylene	198550	8270D	µg/kg	NBA		NBA		NBA	360	U	370	U	400	U	420	U	420	U
Phenanthrene	85018	8270D	µg/kg	1800000	n	23000000	n	NBA	360	U	370	U	400	U	420	U	420	U
Phenol	108952	8270D	µg/kg	1900000	n	25000000	n	NBA	360	U	370	U	400	U	420	U	420	U
Pyrene	129000	8270D	µg/kg	180000	n	2300000	n	NBA	360	U	370	U	400	U	420	U	420	U
Pyridine	110861	8270D	µg/kg	7800	n	120000	n	NBA	360	U	370	U	400	U	420	U	420	U

[a] Regional Screening Level (RSL) Residential Soil Table (May 2016).

[b] Regional Screening Level (RSL) Industrial Soil Table (May 2016).

[c] As per QAPP.

Bold values indicate exceedance of residential RSL.

Highlghted values indicate exceedance of industrial RSL or eco benchmark.

All trip blank analytes measured under method SW8260.

µg/kg = Micrograms per kilograms.

C = Cancer based, target risk equals 1E-06.

J = Result is <RL but >=MDL and the concentration is an approximate value.

mg/kg = Milligram per kilogram.

NBA = No benchmark available.

NC = Noncancer based, target hazard quotient equals 0.1.

R=Rejected; result not valid due to quality control failure.

U = Not detected.

UJ = Not detected. SQL is <RL but >=MDL and the SQL is an approximate value.

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	**LO58-SB14-0001**		**LO58-SB14-0608**		**LO58-SB15-0001**		**LO58-SB15-0406**		**LO58-SB55R-0004**	
								Sample Description	**Soil Bore**		**Soil Bore**		**Soil Bore**		**Soil Bore**		**Soil Bore**	
								Sample Date	**10/2/2012**		**10/2/2012**		**10/2/2012**		**10/2/2012**		**10/4/2012**	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**		**Ecological[c]**										
Percent Solids	DEP1005	D4643	%	NBA		NBA		NBA	83.3		91.9		85.4		83.3		92.6	
2-Methylnaphthalene	91576	MADEP EPH	µg/kg	24000	n	300000	n	NBA										
Acenaphthene	83329	MADEP EPH	µg/kg	360000	n	4500000	n	NBA										
Acenaphthylene	208968	MADEP EPH	µg/kg	360000	n	4500000	n	NBA										
Anthracene	120127	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA										
Benzo[a]anthracene	56553	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Benzo[a]pyrene	50328	MADEP EPH	µg/kg	16	c	290	c	NBA										
Benzo[b]fluoranthene	205992	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Benzo[g,h,i]perylene	191242	MADEP EPH	µg/kg	3800	c	17000	c	NBA										
Benzo[k]fluoranthene	207089	MADEP EPH	µg/kg	1600	c	29000	c	NBA										
C11-C22 Aromatic Hydrocarbons	EPH4	MADEP EPH	µg/kg	NBA		NBA		NBA	30800	U	27600	U	30800	U	30100	U	27300	U
C19-C36 Aliphatic Hydrocarbons	EPH3	MADEP EPH	µg/kg	NBA		NBA		NBA	57900		22000	J	30800	U	30100	U	27300	U
C9-C18 Aliphatic Hydrocarbons	EPH2	MADEP EPH	µg/kg	NBA		NBA		NBA	30800	U	27600	U	30800	U	30100	U	27300	U
Chrysene	218019	MADEP EPH	µg/kg	16000	c	290000	c	NBA										
Dibenzo[a,h]anthracene	53703	MADEP EPH	µg/kg	16	c	290	c	NBA										
Fluoranthene	206440	MADEP EPH	µg/kg	240000	n	3000000	n	NBA										
Fluorene	86737	MADEP EPH	µg/kg	240000	n	3000000	n	NBA										
Indeno[1,2,3-cd]pyrene	193395	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Naphthalene	91203	MADEP EPH	µg/kg	3800	c	17000	c	NBA										
Phenanthrene	85018	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA										
Pyrene	129000	MADEP EPH	µg/kg	180000	n	2300000	n	NBA										
Unadjusted C11-C22 Aromatics	EPH1	MADEP EPH	µg/kg	NBA		NBA		NBA	30800	U	27600	U	30800	U	30100	U	27300	U
C5-C8 Aliphatics Hydrocarbons	VPH3	MADEP VPH	µg/kg	NBA		NBA		NBA	3020	U	2330	U	3060	U	2950	U	2070	U
C9-C10 Aromatic Hydrocarbons	VPH5	MADEP VPH	µg/kg	NBA		NBA		NBA	755	U	582	U	765	U	737	U	518	U
C9-C12 Aliphatic Hydrocarbons	VPH4	MADEP VPH	µg/kg	NBA		NBA		NBA	3020	U	2330	U	3060	U	2950	U	2070	U
Unadjusted C5-C8 Aliphatics	VPH1	MADEP VPH	µg/kg	NBA		NBA		NBA	3020	U	2330	U	3060	U	2950	U	2070	U
Unadjusted C9-C12 Aliphatics	VPH2	MADEP VPH	µg/kg	NBA		NBA		NBA	3020	U	2330	U	3060	U	2950	U	2070	U
Aluminum	7429905	6010C	mg/kg	7700	n	110000		NBA	**18100**		**13900**		**18000**		**13700**		**8670**	
Antimony	7440360	6010C	mg/kg	3.1	n	47	n	NBA	0.61	J	0.5	J	0.6	J	4.5	U	3.7	UJ
Arsenic	7440382	6010C	mg/kg	0.68	c	3	cR	NBA	**7.7**	J	**9.7**	J	**11.1**	J	**7.5**	J	**3.9**	J
Barium	7440393	6010C	mg/kg	1500	n	22000	n	NBA	30.6		40.6		37.2		40.2		28.9	
Beryllium	7440417	6010C	mg/kg	16	n	230	n	NBA	0.51		0.52		0.52		0.97		0.43	
Cadmium	7440439	6010C	mg/kg	7.1	n	98	n	NBA	0.12	J	0.11	J	0.14	J	0.13	J	0.057	J

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB14-0001		LO58-SB14-0608		LO58-SB15-0001		LO58-SB15-0406		LO58-SB55R-0004	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Calcium	7440702	6010C	mg/kg	NBA		NBA		NBA	702	J	5050	J	571	J	817	J	123000	
Chromium	7440473	6010C	mg/kg	0.3	c	6.3	c	NBA	**28.8**	J	**27.5**	J	**30.2**	J	**25**	J	**18.3**	J
Cobalt	7440484	6010C	mg/kg	2.3	n	35	n	NBA	**12.3**		**11.2**		**13.5**		**12.3**		**7.2**	J
Copper	7440508	6010C	mg/kg	310	n	4700	n	NBA	39.1	J	21.5	J	41.8	J	19.4	J	14.8	
Iron	7439896	6010C	mg/kg	5500	n	82000	n	NBA	**28400**	J	**29600**	J	**32100**	J	**28600**	J	**17800**	
Lead	7439921	6010C	mg/kg	400		800		NBA	15.5		17.1		16		18.9		11.3	J
Magnesium	7439954	6010C	mg/kg	NBA		NBA		NBA	6790		7440		7220		7750		6030	J
Manganese	7439965	6010C	mg/kg	180	n	2600	n	NBA	**549**		**513**		**615**		**564**		**364**	
Nickel	7440020	6010C	mg/kg	150	n	2200	n	NBA	34.6		36.3		35.9		42.9		28.2	J
Potassium	7440097	6010C	mg/kg	NBA		NBA		NBA	643		828		662		729		566	
Selenium	7782492	6010C	mg/kg	39	n	580	n	NBA	2.9	U	2.1	U	2.6	U	2.6	U	0.88	J
Silver	7440224	6010C	mg/kg	39	n	580	n	NBA	0.82	U	0.59	U	0.73	U	0.75	U	0.61	U
Sodium	7440235	6010C	mg/kg	NBA		NBA		NBA	36.5	J	42.1	J	29.5	J	25.8	J	32.7	J
Thallium	7440280	6010C	mg/kg	0.078	n	1.2	n	NBA	2	U	**0.24**	J	1.8	U	1.9	U	1.5	U
Vanadium	7440622	6010C	mg/kg	39	n	580	n	NBA	22.2	J	22.1	J	25.9	J	14.4	J	11.1	J
Zinc	7440666	6010C	mg/kg	2300	n	35000	n	NBA	50		56.5		61.1		50.8		38.2	
Mercury	7439976	7471B	mg/kg	1.1	n	4.6		NBA	0.085	J	0.1	J	0.029	J	0.097	J	0.033	U
PCB-1016	12674112	8082A	µg/kg	410	n	5100	n	NBA	20	U	18	U	19	U	20	U	18	U
PCB-1221	11104282	8082A	µg/kg	200	c	830	c	NBA	20	U	18	U	19	U	20	U	18	U
PCB-1232	11141165	8082A	µg/kg	170	c	720	c	NBA	20	U	18	U	19	U	20	U	18	U
PCB-1242	53469219	8082A	µg/kg	230	c	950	c	NBA	20	U	18	U	19	U	20	U	18	U
PCB-1248	12672296	8082A	µg/kg	230	c	950	c	NBA	20	U	18	U	19	U	20	U	18	U
PCB-1254	11097691	8082A	µg/kg	120	n	970	c	NBA	20	U	18	U	19	U	20	U	18	U
PCB-1260	11096825	8082A	µg/kg	240	c	990	c	NBA	20	U	18	U	19	U	20	U	18	U
PCB-1262	37324235	8082A	µg/kg	NBA		NBA		NBA	20	U	18	U	19	U	20	U	18	U
PCB-1268	11100144	8082A	µg/kg	NBA		NBA		NBA	20	U	18	U	19	U	20	U	18	U
1,1,1,2-Tetrachloroethane	630206	8260B	µg/kg	2000	c	8800	c	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
1,1,1-Trichloroethane	71556	8260B	µg/kg	810000	n	3600000		NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
1,1,2,2-Tetrachloroethane	79345	8260B	µg/kg	600	c	2700	c	NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
1,1,2-Trichloroethane	79005	8260B	µg/kg	150	n	630	n	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
1,1-Dichloroethane	75343	8260B	µg/kg	3600	c	16000	c	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
1,1-Dichloroethene	75354	8260B	µg/kg	23000	n	100000	n	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
1,1-Dichloropropene	563586	8260B	µg/kg	NBA		NBA		NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB14-0001		LO58-SB14-0608		LO58-SB15-0001		LO58-SB15-0406		LO58-SB55R-0004	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	CAS Number	Method	Units	Residential[a]		Industrial[b]		Ecological[c]										
1,2,3-Trichlorobenzene	87616	8260B	µg/kg	6300	n	93000	n	NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
1,2,3-Trichloropropane	96184	8260B	µg/kg	5.1	c	110	c	NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
1,2,4-Trichlorobenzene	120821	8260B	µg/kg	5800	n	26000	n	NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
1,2,4-Trimethylbenzene	95636	8260B	µg/kg	5800	n	24000	n	NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
1,2-Dibromo-3-Chloropropane	96128	8260B	µg/kg	5.3	c	64	c	NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
1,2-Dibromoethane	106934	8260B	µg/kg	36	c	160	c	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
1,2-Dichlorobenzene	95501	8260B	µg/kg	180000	n	930000		NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
1,2-Dichloroethane	107062	8260B	µg/kg	460	c	2000	c	NBA	7.8	U	4	U	5.6	U	6.4	U	5.2	U
1,2-Dichloroethene, Total	540590	8260B	µg/kg	NBA		NBA		NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
1,2-Dichloropropane	78875	8260B	µg/kg	1000	c	4400	c	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
1,3,5-Trimethylbenzene	108678	8260B	µg/kg	78000	n	1200000		NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
1,3-Dichlorobenzene	541731	8260B	µg/kg	NBA		NBA		NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
1,3-Dichloropropane	142289	8260B	µg/kg	160000	n	2300000		NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
1,4-Dichlorobenzene	106467	8260B	µg/kg	2600	c	11000	c	NBA	3.6	J	0.99	J	5.6	UJ	6.4	U	5.2	UJ
1,4-Dioxane	123911	8260B	µg/kg	5300	c	24000	c	NBA	390	U	200	U	280	UJ	320	U	260	UJ
2,2-Dichloropropane	594207	8260B	µg/kg	NBA		NBA		NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
2-Butanone	78933	8260B	µg/kg	2700000	n	19000000	n	NBA	9.1		4	U	16		23		5.2	UJ
2-Chloroethyl vinyl ether	110758	8260B	µg/kg	NBA		NBA		NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	UJ
2-Chlorotoluene	95498	8260B	µg/kg	160000	n	2300000		NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
2-Hexanone	591786	8260B	µg/kg	20000	n	130000	n	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
4-Chlorotoluene	106434	8260B	µg/kg	160000	n	2300000		NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
4-Isopropyltoluene	99876	8260B	µg/kg	NBA		NBA		NBA	0.33	J	4	U	5.6	UJ	6.4	U	5.2	UJ
4-Methyl-2-pentanone	108101	8260B	µg/kg	3300000	n	14000000		NBA	7.8	U	4	U	5.6	U	6.4	U	5.2	U
Acetone	67641	8260B	µg/kg	6100000	n	67000000	n	NBA	340		21		270		340		65	J
Benzene	71432	8260B	µg/kg	1200	c	5100	c	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
Bromobenzene	108861	8260B	µg/kg	29000	n	180000	n	NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
Bromochloromethane	74975	8260B	µg/kg	15000	n	63000	n	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
Bromodichloromethane	75274	8260B	µg/kg	290	c	1300	c	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
Bromoform	75252	8260B	µg/kg	19000	c	86000	c	NBA	7.8	U	4	U	5.6	U	6.4	U	5.2	U
Bromomethane	74839	8260B	µg/kg	680	n	3000	n	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	UJ
Carbon disulfide	75150	8260B	µg/kg	77000	n	350000	n	NBA	7.8	U	4	U	5.6	U	6.4	U	5.2	U
Carbon tetrachloride	56235	8260B	µg/kg	650	c	2900	c	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
Chlorobenzene	108907	8260B	µg/kg	28000	n	130000	n	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB14-0001		LO58-SB14-0608		LO58-SB15-0001		LO58-SB15-0406		LO58-SB55R-0004	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Chloroethane	75003	8260B	µg/kg	1400000	n	5700000		NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
Chloroform	67663	8260B	µg/kg	320	c	1400	c	NBA	7.8	U	4	U	5.6	U	6.4	U	5.2	U
Chloromethane	74873	8260B	µg/kg	11000	n	46000	n	NBA	7.8	U	4	U	5.6	U	6.4	U	5.2	UJ
cis-1,2-Dichloroethene	156592	8260B	µg/kg	16000	n	230000	n	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
cis-1,3-Dichloropropene	10061015	8260B	µg/kg	NBA		NBA		NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	UJ
Cyclohexane	110827	8260B	µg/kg	650000	n	2700000		NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
Dibromochloromethane	124481	8260B	µg/kg	8300	c	39000	c	NBA	7.8	U	4	U	5.6	U	6.4	U	5.2	U
Dibromomethane	74953	8260B	µg/kg	2400	n	9900	n	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
Dichlorodifluoromethane	75718	8260B	µg/kg	8700	n	37000	n	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	UJ
Ethylbenzene	100414	8260B	µg/kg	5800	c	25000	c	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
Freon TF	76131	8260B	µg/kg	4000000	n	17000000		NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
Hexachlorobutadiene	87683	8260B	µg/kg	1200	c	5300	c	NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
Isobutyl alcohol	78831	8260B	µg/kg	2300000	n	35000000		NBA	390	U	200	U	280	UJ	320	U	260	UJ
Isopropylbenzene	98828	8260B	µg/kg	190000	n	990000		NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
m&p-Xylene	179601231	8260B	µg/kg	58000	n	250000	n	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
Methyl acetate	79209	8260B	µg/kg	7800000	n	120000000	s	NBA	7.8	U	4	U	35	J	22	J	3.5	J
Methyl iodide	74884	8260B	µg/kg	NBA		NBA		NBA	1.1	J	4	U	1.9	J	3	J	5.2	U
Methyl t-butyl ether	1634044	8260B	µg/kg	47000	c	210000	c	NBA	7.8	U	4	U	5.6	U	6.4	U	5.2	U
Methylcyclohexane	108872	8260B	µg/kg	NBA		NBA		NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
Methylene Chloride	75092	8260B	µg/kg	35000	n	320000	n	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
Naphthalene	91203	8260B	µg/kg	3800	c	17000	c	NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	U
n-Butylbenzene	104518	8260B	µg/kg	390000	n	5800000		NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
n-Propylbenzene	103651	8260B	µg/kg	380000	n	2400000		NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
o-Xylene	95476	8260B	µg/kg	65000	n	280000	n	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	UJ
sec-Butylbenzene	135988	8260B	µg/kg	780000	n	12000000		NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
Styrene	100425	8260B	µg/kg	600000	n	3500000		NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	UJ
tert-Butylbenzene	98066	8260B	µg/kg	780000	n	12000000		NBA	7.8	UJ	4	U	5.6	UJ	6.4	U	5.2	UJ
Tetrachloroethene	127184	8260B	µg/kg	8100	n	39000	n	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
Tetrahydrofuran	109999	8260B	µg/kg	1800000	n	9400000	n	NBA	78	U	40	U	56	UJ	64	U	52	UJ
Toluene	108883	8260B	µg/kg	490000	n	4700000		NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
trans-1,2-Dichloroethene	156605	8260B	µg/kg	160000	n	2300000		NBA	7.8	U	4	U	5.6	U	6.4	U	5.2	U
trans-1,3-Dichloropropene	10061026	8260B	µg/kg	NBA		NBA		NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
Trichloroethene	79016	8260B	µg/kg	410	n	1900	n	NBA	7.8	U	0.82	J	5.6	UJ	6.4	U	5.2	U

Table A.2-4

Soil Data

LO-58

Caribou, Maine

								Sample Point ID	LO58-SB14-0001		LO58-SB14-0608		LO58-SB15-0001		LO58-SB15-0406		LO58-SB55R-0004	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	CAS Number	Method	Units	Residential[a]		Industrial[b]		Ecological[c]										
Trichlorofluoromethane	75694	8260B	µg/kg	2300000	n	35000000		NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
Vinyl acetate	108054	8260B	µg/kg	91000	n	380000	n	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	UJ
Vinyl chloride	75014	8260B	µg/kg	59	c	1700	c	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
Xylenes, Total	1330207	8260B	µg/kg	58000	n	250000	n	NBA	7.8	U	4	U	5.6	UJ	6.4	U	5.2	U
1,1'-Biphenyl	92524	8270C PAH	µg/kg	4700	n	20000	n	NBA	0.8	U	0.72	U	0.78	U	0.8	U	0.72	U
1-Methylnaphthalene	90120	8270C PAH	µg/kg	18000	c	73000	c	NBA	0.26	J	0.72	U	0.33	J	0.8	U	0.72	U
1-Methylphenanthrene	832699	8270C PAH	µg/kg	NBA		NBA		NBA	2.4		0.72	U	3.3		0.8	U	0.26	J
2,3,5-Trimethylnaphthalene	2245387	8270C PAH	µg/kg	NBA		NBA		NBA	0.8	U	0.72	U	0.78	U	0.8	U	0.72	U
2,6-Dimethylnaphthalene	581420	8270C PAH	µg/kg	NBA		NBA		NBA	0.8	U	0.72	U	0.78	U	0.8	U	0.2	J
2-Methylnaphthalene	91576	8270C PAH	µg/kg	24000	n	300000	n	NBA	0.25	J	0.72	U	0.35	J	0.2	J	0.25	J
Acenaphthene	83329	8270C PAH	µg/kg	360000	n	4500000	n	NBA	0.8	U	0.72	U	0.23	J	0.8	U	0.72	U
Acenaphthylene	208968	8270C PAH	µg/kg	360000	n	4500000	n	NBA	0.77	J	0.72	U	1.3		0.8	U	0.72	U
Anthracene	120127	8270C PAH	µg/kg	1800000	n	23000000	n	NBA	0.4	J	0.72	U	0.71	J	0.8	U	0.26	J
Benzo[a]anthracene	56553	8270C PAH	µg/kg	160	c	2900	c	NBA	4.2		0.72	U	8.7		0.8	U	1.4	
Benzo[a]pyrene	50328	8270C PAH	µg/kg	16	c	290	c	NBA	4.7		0.72	U	9.3	J	0.8	U	1.1	
Benzo[b]fluoranthene	205992	8270C PAH	µg/kg	160	c	2900	c	NBA	6.9		0.36	J	17	J	0.41	J	1.8	
Benzo[e]pyrene	192972	8270C PAH	µg/kg	NBA		NBA		NBA	4.6		0.72	U	11	J	0.24	J	1.3	
Benzo[g,h,i]perylene	191242	8270C PAH	µg/kg	3800	c	17000	c	NBA	2.5		0.72	U	4.2		0.8	U	0.57	J
Benzo[k]fluoranthene	207089	8270C PAH	µg/kg	1600	c	29000	c	NBA	4.5		0.72	U	11	J	0.8	U	1.1	
Chrysene	218019	8270C PAH	µg/kg	16000	c	290000	c	NBA	5.9		0.22	J	12	J	0.8	U	1.5	
Dibenzo[a,h]anthracene	53703	8270C PAH	µg/kg	16	c	290	c	NBA	1.3		0.72	U	2.2		0.8	U	0.25	J
Dibenzothiophene	132650	8270C PAH	µg/kg	78000	n	1200000	n	NBA	0.33	J	0.72	U	0.59	J	0.8	U	0.72	U
Fluoranthene	206440	8270C PAH	µg/kg	240000	n	3000000	n	NBA	10		0.72	U		R		R	2.2	
Fluorene	86737	8270C PAH	µg/kg	240000	n	3000000	n	NBA	0.43	J	0.72	U	0.48	J	0.8	U	0.72	U
Indeno[1,2,3-cd]pyrene	193395	8270C PAH	µg/kg	160	c	2900	c	NBA	4		0.72	U	7.4		0.8	U	0.63	J
Naphthalene	91203	8270C PAH	µg/kg	3800	c	17000	c	NBA	0.8	U	0.72	U	0.78	U	0.8	U	0.72	U
Perylene	198550	8270C PAH	µg/kg	NBA		NBA		NBA	1		0.72	U	2		0.8	U	0.35	J
Phenanthrene	85018	8270C PAH	µg/kg	1800000	n	23000000	n	NBA	5.2		0.33	J	9.3	J	0.28	J	1.4	
Pyrene	129000	8270C PAH	µg/kg	180000	n	2300000	n	NBA	9.4		0.72	U		R		R	2.3	
1,1'-Biphenyl	92524	8270D	µg/kg	4700	n	20000	n	NBA	390	U	360	U	390	U	390	U	350	U
1,2,4,5-Tetrachlorobenzene	95943	8270D	µg/kg	2300	n	35000	n	NBA	390	U	360	U	390	U	390	U	350	U
1,2,4-Trichlorobenzene	120821	8270D	µg/kg	5800	n	26000	n	NBA	390	U	360	U	390	U	390	U	350	U
1,2-Dichlorobenzene	95501	8270D	µg/kg	180000	n	930000	n	NBA	390	U	360	U	390	U	390	U	350	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB14-0001		LO58-SB14-0608		LO58-SB15-0001		LO58-SB15-0406		LO58-SB55R-0004	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
1,3-Dichlorobenzene	541731	8270D	µg/kg	NBA		NBA		NBA	390	U	360	U	390	U	390	U	350	U
1,4-Dichlorobenzene	106467	8270D	µg/kg	2600	c	11000	c	NBA	390	U	360	U	390	U	390	U	350	U
1-Methylnaphthalene	90120	8270D	µg/kg	18000	c	73000	c	NBA	390	U	360	U	390	U	390	U	350	U
2,2'-oxybis[1-chloropropane]	108601	8270D	µg/kg	310000	n	4700000		NBA	390	U	360	U	390	U	390	U	350	U
2,3,4,6-Tetrachlorophenol	58902	8270D	µg/kg	190000	n	2500000	n	NBA	390	U	360	U	390	U	390	U	350	U
2,4,5-Trichlorophenol	95954	8270D	µg/kg	630000	n	8200000	n	NBA	990	U	900	U	970	U	990	U	890	U
2,4,6-Trichlorophenol	88062	8270D	µg/kg	6300	n	82000	n	NBA	390	U	360	U	390	U	390	U	350	U
2,4-Dichlorophenol	120832	8270D	µg/kg	19000	n	250000	n	NBA	390	U	360	U	390	U	390	U	350	U
2,4-Dimethylphenol	105679	8270D	µg/kg	130000	n	1600000	n	NBA	390	U	360	U	390	U	390	U	350	U
2,4-Dinitrophenol	51285	8270D	µg/kg	13000	n	160000	n	NBA	990	U	900	U	970	U	990	U	890	U
2,4-Dinitrotoluene	121142	8270D	µg/kg	1700	c	7400	c	NBA	390	U	360	U	390	U	390	U	350	U
2,6-Dichlorophenol	87650	8270D	µg/kg	NBA		NBA		NBA	390	U	360	U	390	U	390	U	350	U
2,6-Dinitrotoluene	606202	8270D	µg/kg	360	c	1500	c	NBA	390	U	360	U	390	U	390	U	350	U
2-Chloronaphthalene	91587	8270D	µg/kg	480000	n	6000000	n	NBA	390	U	360	U	390	U	390	U	350	U
2-Chlorophenol	95578	8270D	µg/kg	39000	n	580000	n	NBA	390	U	360	U	390	U	390	U	350	U
2-Methylnaphthalene	91576	8270D	µg/kg	24000	n	300000	n	NBA	390	U	360	U	390	U	390	U	350	U
2-Methylphenol	95487	8270D	µg/kg	320000	n	4100000	n	NBA	390	U	360	U	390	U	390	U	350	U
2-Nitroaniline	88744	8270D	µg/kg	63000	n	800000	n	NBA	990	U	900	U	970	U	990	U	890	U
2-Nitrophenol	88755	8270D	µg/kg	NBA		NBA		NBA	390	U	360	U	390	U	390	U	350	U
3 & 4 Methylphenol	15831104	8270D	µg/kg	NBA		NBA		NBA	800	U	720	U	780	U	800	U	720	U
3,3'-Dichlorobenzidine	91941	8270D	µg/kg	1200	c	5100	c	NBA	390	U	360	U	390	U	390	U	350	U
3-Nitroaniline	99092	8270D	µg/kg	NBA		NBA		NBA	990	U	900	U	970	U	990	U	890	U
4,6-Dinitro-2-methylphenol	534521	8270D	µg/kg	510	n	6600	n	NBA	990	U	900	U	970	U	990	U	890	U
4-Bromophenyl phenyl ether	101553	8270D	µg/kg	NBA		NBA		NBA	390	U	360	U	390	U	390	U	350	U
4-Chloro-3-methylphenol	59507	8270D	µg/kg	630000	n	8200000	n	NBA	390	U	360	U	390	U	390	U	350	U
4-Chloroaniline	106478	8270D	µg/kg	2700	c	11000	c	NBA	390	U	360	U	390	U	390	U	350	U
4-Chlorophenyl phenyl ether	7005723	8270D	µg/kg	NBA		NBA		NBA	390	U	360	U	390	U	390	U	350	U
4-Nitroaniline	100016	8270D	µg/kg	25000	n	110000	c	NBA	990	U	900	U	970	U	990	U	890	U
4-Nitrophenol	100027	8270D	µg/kg	NBA		NBA		NBA	990	U	900	U	970	U	990	U	890	UJ
Acenaphthene	83329	8270D	µg/kg	360000	n	4500000	n	NBA	390	U	360	U	390	U	390	U	350	U
Acenaphthylene	208968	8270D	µg/kg	360000	n	4500000	n	NBA	390	U	360	U	390	U	390	U	350	U
Acetophenone	98862	8270D	µg/kg	780000	n	12000000		NBA	390	U	360	U	390	U	390	U	350	U
Aniline	62533	8270D	µg/kg	44000	n	400000	c	NBA	990	U	900	U	970	UJ	990	U	890	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB14-0001		LO58-SB14-0608		LO58-SB15-0001		LO58-SB15-0406		LO58-SB55R-0004	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Anthracene	120127	8270D	µg/kg	1800000	n	23000000	n	NBA	390	U	360	U	390	U	390	U	350	U
Atrazine	1912249	8270D	µg/kg	2400	c	10000	c	NBA	390	U	360	U	390	U	390	U	350	U
Azobenzene	103333	8270D	µg/kg	5600	c	26000	c	NBA	390	U	360	U	390	U	390	U	350	U
Benzaldehyde	100527	8270D	µg/kg	170000	c	820000	c	NBA	390	U	360	U	390	U	390	U	350	U
Benzidine	92875	8270D	µg/kg	0.53	c	10	c	NBA		R		R		R		R		R
Benzo[a]anthracene	56553	8270D	µg/kg	160	c	2900	c	NBA	390	U	360	U	390	U	390	U	350	U
Benzo[a]pyrene	50328	8270D	µg/kg	16	c	290	c	NBA	390	U	360	U	390	U	390	U	350	U
Benzo[b]fluoranthene	205992	8270D	µg/kg	160	c	2900	c	NBA	390	U	360	U	390	U	390	U	350	U
Benzo[e]pyrene	192972	8270D	µg/kg	NBA		NBA		NBA	390	U	360	U	390	U	390	U	350	U
Benzo[g,h,i]perylene	191242	8270D	µg/kg	3800	c	17000	c	NBA	390	U	360	U	390	UJ	390	U	350	U
Benzo[k]fluoranthene	207089	8270D	µg/kg	1600	c	29000	c	NBA	390	U	360	U	390	U	390	U	350	U
Benzoic acid	65850	8270D	µg/kg	25000000	n	330000000		NBA	990	U	900	U	970	U	990	U	890	U
Benzyl alcohol	100516	8270D	µg/kg	630000	n	8200000	n	NBA	390	UJ	360	UJ	390	UJ	390	UJ	350	UJ
Bis(2-chloroethoxy)methane	111911	8270D	µg/kg	19000	n	250000	n	NBA	390	U	360	U	390	U	390	U	350	U
Bis(2-chloroethyl)ether	111444	8270D	µg/kg	230	c	1000	c	NBA	390	U	360	U	390	U	390	U	350	U
Bis(2-ethylhexyl) phthalate	117817	8270D	µg/kg	39000	c	160000	c	NBA	390	U	25	J	390	U	390	U	350	U
Butyl benzyl phthalate	85687	8270D	µg/kg	290000	c	1200000	c	NBA	390	U	360	U	390	U	390	U	350	U
Caprolactam	105602	8270D	µg/kg	3100000	n	40000000	n	NBA	390	U	360	U	390	U	390	U	350	U
Carbazole	86748	8270D	µg/kg	NBA		NBA		NBA	390	U	360	U	390	U	390	U	350	U
Chrysene	218019	8270D	µg/kg	16000	c	290000	c	NBA	390	U	360	U	390	U	390	U	350	U
Dibenzo[a,h]anthracene	53703	8270D	µg/kg	16	c	290	c	NBA	390	U	360	U	390	U	390	U	350	U
Dibenzofuran	132649	8270D	µg/kg	7300	n	100000	n	NBA	390	U	360	U	390	U	390	U	350	U
Diethyl phthalate	84662	8270D	µg/kg	5100000	n	66000000	n	NBA	390	U	360	U	390	U	390	U	350	U
Dimethyl phthalate	131113	8270D	µg/kg	NBA		NBA		NBA	390	U	360	U	390	U	390	U	350	U
Di-n-butyl phthalate	84742	8270D	µg/kg	630000	n	8200000	n	NBA	390	U	360	U	390	U	390	U	350	U
Di-n-octyl phthalate	117840	8270D	µg/kg	63000	n	820000	n	NBA	390	U	360	U	390	U	390	U	350	U
Fluoranthene	206440	8270D	µg/kg	240000	n	3000000	n	NBA	390	U	360	U	20	J	390	U	350	U
Fluorene	86737	8270D	µg/kg	240000	n	3000000	n	NBA	390	U	360	U	390	U	390	U	350	U
Hexachlorobenzene	118741	8270D	µg/kg	210	c	960	c	NBA	390	U	360	U	390	U	390	U	350	U
Hexachlorobutadiene	87683	8270D	µg/kg	1200	c	5300	c	NBA	390	U	360	U	390	U	390	U	350	U
Hexachlorocyclopentadiene	77474	8270D	µg/kg	180	n	750	n	NBA	390	U	360	U	390	U	390	U	350	U
Hexachloroethane	67721	8270D	µg/kg	1800	c	8000	c	NBA	390	U	360	U	390	U	390	U	350	U
Indeno[1,2,3-cd]pyrene	193395	8270D	µg/kg	160	c	2900	c	NBA	390	U	360	U	390	U	390	U	350	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB14-0001		LO58-SB14-0608		LO58-SB15-0001		LO58-SB15-0406		LO58-SB55R-0004	
								Sample Description	Soil Bore		Soil Bore		Soil Bore		Soil Bore		Soil Bore	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/4/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Isophorone	78591	8270D	µg/kg	570000	c	2400000	c	NBA	390	U	360	U	390	U	390	U	350	U
Naphthalene	91203	8270D	µg/kg	3800	c	17000	c	NBA	390	U	360	U	390	U	390	U	350	U
Nitrobenzene	98953	8270D	µg/kg	5100	c	22000	c	NBA	390	U	360	U	390	U	390	U	350	U
N-Nitrosodimethylamine	62759	8270D	µg/kg	2	c	34	c	NBA	390	U	360	U	390	U	390	U	350	U
N-Nitrosodi-n-propylamine	621647	8270D	µg/kg	78	c	330	c	NBA	390	U	360	U	390	U	390	U	350	U
N-Nitrosodiphenylamine	86306	8270D	µg/kg	110000	c	470000	c	NBA	460	U	420	U	450	U	460	U	410	U
Pentachlorophenol	87865	8270D	µg/kg	1000	c	4000	c	NBA	990	U	900	U	970	U	990	U	890	U
Perylene	198550	8270D	µg/kg	NBA		NBA		NBA	390	U	360	U	390	U	390	U	350	U
Phenanthrene	85018	8270D	µg/kg	1800000	n	23000000	n	NBA	390	U	360	U	390	U	390	U	350	U
Phenol	108952	8270D	µg/kg	1900000	n	25000000	n	NBA	390	U	360	U	390	U	390	U	350	U
Pyrene	129000	8270D	µg/kg	180000	n	2300000	n	NBA	390	U	360	U	22	J	390	U	350	U
Pyridine	110861	8270D	µg/kg	7800	n	120000	n	NBA	390	U	360	U	390	U	390	U	350	U

[a] Regional Screening Level (RSL) Residential Soil Table (May 2016).

[b] Regional Screening Level (RSL) Industrial Soil Table (May 2016).

[c] As per QAPP.

Bold values indicate exceedance of residential RSL.

Highlghted values indicate exceedance of industrial RSL or eco benchmark.

All trip blank analytes measured under method SW8260.

µg/kg = Micrograms per kilograms.

C = Cancer based, target risk equals 1E-06.

J = Result is <RL but >=MDL and the concentration is an approximate value.

mg/kg = Milligram per kilogram.

NBA = No benchmark available.

NC = Noncancer based, target hazard quotient equals 0.1.

R=Rejected; result not valid due to quality control failure.

U = Not detected.

UJ = Not detected. SQL is <RL but >=MDL and the SQL is an approximate value.

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SS01-100212		LO58-SS02-100212		LO58-SB-TB01		LO58-SB-TB02		LO58-SB-TB03	
								Sample Description	Surface Soil		Surface Soil		Trip Blank		Trip Blank		Trip Blank	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	CAS Number	Method	Units	Residential[a]		Industrial[b]		Ecological[c]										
Percent Solids	DEP1005	D4643	%	NBA		NBA		NBA	85		81.6							
2-Methylnaphthalene	91576	MADEP EPH	µg/kg	24000	n	300000	n	NBA										
Acenaphthene	83329	MADEP EPH	µg/kg	360000	n	4500000	n	NBA										
Acenaphthylene	208968	MADEP EPH	µg/kg	360000	n	4500000	n	NBA										
Anthracene	120127	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA										
Benzo[a]anthracene	56553	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Benzo[a]pyrene	50328	MADEP EPH	µg/kg	16	c	290	c	NBA										
Benzo[b]fluoranthene	205992	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Benzo[g,h,i]perylene	191242	MADEP EPH	µg/kg	3800	c	17000	c	NBA										
Benzo[k]fluoranthene	207089	MADEP EPH	µg/kg	1600	c	29000	c	NBA										
C11-C22 Aromatic Hydrocarbons	EPH4	MADEP EPH	µg/kg	NBA		NBA		NBA										
C19-C36 Aliphatic Hydrocarbons	EPH3	MADEP EPH	µg/kg	NBA		NBA		NBA										
C9-C18 Aliphatic Hydrocarbons	EPH2	MADEP EPH	µg/kg	NBA		NBA		NBA										
Chrysene	218019	MADEP EPH	µg/kg	16000	c	290000	c	NBA										
Dibenzo[a,h]anthracene	53703	MADEP EPH	µg/kg	16	c	290	c	NBA										
Fluoranthene	206440	MADEP EPH	µg/kg	240000	n	3000000	n	NBA										
Fluorene	86737	MADEP EPH	µg/kg	240000	n	3000000	n	NBA										
Indeno[1,2,3-cd]pyrene	193395	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Naphthalene	91203	MADEP EPH	µg/kg	3800	c	17000	c	NBA										
Phenanthrene	85018	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA										
Pyrene	129000	MADEP EPH	µg/kg	180000	n	2300000	n	NBA										
Unadjusted C11-C22 Aromatics	EPH1	MADEP EPH	µg/kg	NBA		NBA		NBA										
C5-C8 Aliphatics Hydrocarbons	VPH3	MADEP VPH	µg/kg	NBA		NBA		NBA										
C9-C10 Aromatic Hydrocarbons	VPH5	MADEP VPH	µg/kg	NBA		NBA		NBA										
C9-C12 Aliphatic Hydrocarbons	VPH4	MADEP VPH	µg/kg	NBA		NBA		NBA										
Unadjusted C5-C8 Aliphatics	VPH1	MADEP VPH	µg/kg	NBA		NBA		NBA										
Unadjusted C9-C12 Aliphatics	VPH2	MADEP VPH	µg/kg	NBA		NBA		NBA										
Aluminum	7429905	6010C	mg/kg	7700	n	110000		NBA										
Antimony	7440360	6010C	mg/kg	3.1	n	47	n	NBA										
Arsenic	7440382	6010C	mg/kg	0.68	c	3	cR	NBA										
Barium	7440393	6010C	mg/kg	1500	n	22000	n	NBA										
Beryllium	7440417	6010C	mg/kg	16	n	230	n	NBA										
Cadmium	7440439	6010C	mg/kg	7.1	n	98	n	NBA										

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SS01-100212		LO58-SS02-100212		LO58-SB-TB01		LO58-SB-TB02		LO58-SB-TB03	
								Sample Description	Surface Soil		Surface Soil		Trip Blank		Trip Blank		Trip Blank	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**		**Ecological[c]**										
Calcium	7440702	6010C	mg/kg	NBA		NBA		NBA										
Chromium	7440473	6010C	mg/kg	0.3	c	6.3	c	NBA										
Cobalt	7440484	6010C	mg/kg	2.3	n	35	n	NBA										
Copper	7440508	6010C	mg/kg	310	n	4700	n	NBA										
Iron	7439896	6010C	mg/kg	5500	n	82000	n	NBA										
Lead	7439921	6010C	mg/kg	400		800		NBA										
Magnesium	7439954	6010C	mg/kg	NBA		NBA		NBA										
Manganese	7439965	6010C	mg/kg	180	n	2600	n	NBA										
Nickel	7440020	6010C	mg/kg	150	n	2200	n	NBA										
Potassium	7440097	6010C	mg/kg	NBA		NBA		NBA										
Selenium	7782492	6010C	mg/kg	39	n	580	n	NBA										
Silver	7440224	6010C	mg/kg	39	n	580	n	NBA										
Sodium	7440235	6010C	mg/kg	NBA		NBA		NBA										
Thallium	7440280	6010C	mg/kg	0.078	n	1.2	n	NBA										
Vanadium	7440622	6010C	mg/kg	39	n	580	n	NBA										
Zinc	7440666	6010C	mg/kg	2300	n	35000	n	NBA										
Mercury	7439976	7471B	mg/kg	1.1	n	4.6		NBA										
PCB-1016	12674112	8082A	µg/kg	410	n	5100	n	NBA	19	U	21	U						
PCB-1221	11104282	8082A	µg/kg	200	c	830	c	NBA	19	U	21	U						
PCB-1232	11141165	8082A	µg/kg	170	c	720	c	NBA	19	U	21	U						
PCB-1242	53469219	8082A	µg/kg	230	c	950	c	NBA	19	U	21	U						
PCB-1248	12672296	8082A	µg/kg	230	c	950	c	NBA	19	U	21	U						
PCB-1254	11097691	8082A	µg/kg	120	n	970	c	NBA	19	U	21	U						
PCB-1260	11096825	8082A	µg/kg	240	c	990	c	NBA	19	U	49							
PCB-1262	37324235	8082A	µg/kg	NBA		NBA		NBA	19	U	21	U						
PCB-1268	11100144	8082A	µg/kg	NBA		NBA		NBA	19	U	21	U						
1,1,1,2-Tetrachloroethane	630206	8260B	µg/kg	2000	c	8800	c	NBA					1	U	1	U	1	U
1,1,1-Trichloroethane	71556	8260B	µg/kg	810000	n	3600000		NBA					1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	79345	8260B	µg/kg	600	c	2700	c	NBA					1	U	1	U	1	U
1,1,2-Trichloroethane	79005	8260B	µg/kg	150	n	630	n	NBA					1	U	1	U	1	U
1,1-Dichloroethane	75343	8260B	µg/kg	3600	c	16000	c	NBA					1	U	1	U	1	U
1,1-Dichloroethene	75354	8260B	µg/kg	23000	n	100000	n	NBA					1	U	1	U	1	U
1,1-Dichloropropene	563586	8260B	µg/kg	NBA		NBA		NBA					1	U	1	U	1	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SS01-100212		LO58-SS02-100212		LO58-SB-TB01		LO58-SB-TB02		LO58-SB-TB03	
								Sample Description	Surface Soil		Surface Soil		Trip Blank		Trip Blank		Trip Blank	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	CAS Number	Method	Units	Residential[a]		Industrial[b]		Ecological[c]										
1,2,3-Trichlorobenzene	87616	8260B	µg/kg	6300	n	93000	n	NBA					1	U	1	U	1	U
1,2,3-Trichloropropane	96184	8260B	µg/kg	5.1	c	110	c	NBA					1	U	1	U	1	U
1,2,4-Trichlorobenzene	120821	8260B	µg/kg	5800	n	26000	n	NBA					1	U	1	U	1	U
1,2,4-Trimethylbenzene	95636	8260B	µg/kg	5800	n	24000	n	NBA					1	U	1	U	1	U
1,2-Dibromo-3-Chloropropane	96128	8260B	µg/kg	5.3	c	64	c	NBA					1	U	1	U	1	U
1,2-Dibromoethane	106934	8260B	µg/kg	36	c	160	c	NBA					1	U	1	U	1	U
1,2-Dichlorobenzene	95501	8260B	µg/kg	180000	n	930000		NBA					1	U	1	U	1	U
1,2-Dichloroethane	107062	8260B	µg/kg	460	c	2000	c	NBA					1	U	1	U	1	U
1,2-Dichloroethene, Total	540590	8260B	µg/kg	NBA		NBA		NBA					1	U	1	U	1	U
1,2-Dichloropropane	78875	8260B	µg/kg	1000	c	4400	c	NBA					1	U	1	U	1	U
1,3,5-Trimethylbenzene	108678	8260B	µg/kg	78000	n	1200000		NBA					1	U	1	U	1	U
1,3-Dichlorobenzene	541731	8260B	µg/kg	NBA		NBA		NBA					1	U	1	U	1	U
1,3-Dichloropropane	142289	8260B	µg/kg	160000	n	2300000		NBA					1	U	1	U	1	U
1,4-Dichlorobenzene	106467	8260B	µg/kg	2600	c	11000	c	NBA					1	U	1	U	1	U
1,4-Dioxane	123911	8260B	µg/kg	5300	c	24000	c	NBA					50	U	50	U	50	U
2,2-Dichloropropane	594207	8260B	µg/kg	NBA		NBA		NBA					1	U	1	U	1	U
2-Butanone	78933	8260B	µg/kg	2700000	n	19000000	n	NBA					5	U	5	U	5	U
2-Chloroethyl vinyl ether	110758	8260B	µg/kg	NBA		NBA		NBA					1	U	1	U	1	U
2-Chlorotoluene	95498	8260B	µg/kg	160000	n	2300000		NBA					1	U	1	U	1	U
2-Hexanone	591786	8260B	µg/kg	20000	n	130000	n	NBA					5	U	5	U	5	U
4-Chlorotoluene	106434	8260B	µg/kg	160000	n	2300000		NBA					1	U	1	U	1	U
4-Isopropyltoluene	99876	8260B	µg/kg	NBA		NBA		NBA					1	U	1	U	1	U
4-Methyl-2-pentanone	108101	8260B	µg/kg	3300000	n	14000000		NBA					5	U	5	U	5	U
Acetone	67641	8260B	µg/kg	6100000	n	67000000	n	NBA					5	U	5	U	5	U
Benzene	71432	8260B	µg/kg	1200	c	5100	c	NBA					1	U	1	U	1	U
Bromobenzene	108861	8260B	µg/kg	29000	n	180000	n	NBA					1	U	1	U	1	U
Bromochloromethane	74975	8260B	µg/kg	15000	n	63000	n	NBA					1	U	1	U	1	U
Bromodichloromethane	75274	8260B	µg/kg	290	c	1300	c	NBA					1	U	1	U	1	U
Bromoform	75252	8260B	µg/kg	19000	c	86000	c	NBA					1	U	1	U	1	U
Bromomethane	74839	8260B	µg/kg	680	n	3000	n	NBA					1	U	1	U	1	U
Carbon disulfide	75150	8260B	µg/kg	77000	n	350000	n	NBA					1	U	1	U	1	U
Carbon tetrachloride	56235	8260B	µg/kg	650	c	2900	c	NBA					1	U	1	U	1	U
Chlorobenzene	108907	8260B	µg/kg	28000	n	130000	n	NBA					1	U	1	U	1	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SS01-100212		LO58-SS02-100212		LO58-SB-TB01		LO58-SB-TB02		LO58-SB-TB03	
								Sample Description	Surface Soil		Surface Soil		Trip Blank		Trip Blank		Trip Blank	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**		**Ecological[c]**										
Chloroethane	75003	8260B	µg/kg	1400000	n	5700000		NBA					1	U	1	U	1	U
Chloroform	67663	8260B	µg/kg	320	c	1400	c	NBA					1	U	1	U	1	U
Chloromethane	74873	8260B	µg/kg	11000	n	46000	n	NBA					1	U	1	U	1	U
cis-1,2-Dichloroethene	156592	8260B	µg/kg	16000	n	230000	n	NBA					1	U	1	U	1	U
cis-1,3-Dichloropropene	10061015	8260B	µg/kg	NBA		NBA		NBA					1	U	1	U	1	U
Cyclohexane	110827	8260B	µg/kg	650000	n	2700000		NBA					1	U	1	U	1	U
Dibromochloromethane	124481	8260B	µg/kg	8300	c	39000	c	NBA					1	U	1	U	1	U
Dibromomethane	74953	8260B	µg/kg	2400	n	9900	n	NBA					1	U	1	U	1	U
Dichlorodifluoromethane	75718	8260B	µg/kg	8700	n	37000	n	NBA					1	U	1	U	1	U
Ethylbenzene	100414	8260B	µg/kg	5800	c	25000	c	NBA					1	U	1	U	1	U
Freon TF	76131	8260B	µg/kg	4000000	n	17000000		NBA					1	U	1	U	1	U
Hexachlorobutadiene	87683	8260B	µg/kg	1200	c	5300	c	NBA					1	U	1	U	1	U
Isobutyl alcohol	78831	8260B	µg/kg	2300000	n	35000000		NBA					50	U	50	U	50	U
Isopropylbenzene	98828	8260B	µg/kg	190000	n	990000		NBA					1	U	1	U	1	U
m&p-Xylene	179601231	8260B	µg/kg	58000	n	250000	n	NBA					1	U	1	U	1	U
Methyl acetate	79209	8260B	µg/kg	7800000	n	120000000	s	NBA					1	UJ	1	UJ	1	U
Methyl iodide	74884	8260B	µg/kg	NBA		NBA		NBA					1	U	1	U	1	U
Methyl t-butyl ether	1634044	8260B	µg/kg	47000	c	210000	c	NBA					1	U	1	U	1	U
Methylcyclohexane	108872	8260B	µg/kg	NBA		NBA		NBA					1	U	1	U	1	U
Methylene Chloride	75092	8260B	µg/kg	35000	n	320000	n	NBA					0.47	J	0.5	J	0.5	J
Naphthalene	91203	8260B	µg/kg	3800	c	17000	c	NBA					0.41	J	0.34	J	1	U
n-Butylbenzene	104518	8260B	µg/kg	390000	n	5800000		NBA					1	U	1	U	1	U
n-Propylbenzene	103651	8260B	µg/kg	380000	n	2400000		NBA					1	U	1	U	1	U
o-Xylene	95476	8260B	µg/kg	65000	n	280000	n	NBA					1	U	1	U	1	U
sec-Butylbenzene	135988	8260B	µg/kg	780000	n	12000000		NBA					1	U	1	U	1	U
Styrene	100425	8260B	µg/kg	600000	n	3500000		NBA					1	U	1	U	1	U
tert-Butylbenzene	98066	8260B	µg/kg	780000	n	12000000		NBA					1	U	1	U	1	U
Tetrachloroethene	127184	8260B	µg/kg	8100	n	39000	n	NBA					1	U	1	U	1	U
Tetrahydrofuran	109999	8260B	µg/kg	1800000	n	9400000	n	NBA					14	U	14	U	14	U
Toluene	108883	8260B	µg/kg	490000	n	4700000		NBA					1	U	1	U	1	U
trans-1,2-Dichloroethene	156605	8260B	µg/kg	160000	n	2300000		NBA					1	U	1	U	1	U
trans-1,3-Dichloropropene	10061026	8260B	µg/kg	NBA		NBA		NBA					1	U	1	U	1	U
Trichloroethene	79016	8260B	µg/kg	410	n	1900	n	NBA					1	U	1	U	1	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	**LO58-SS01-100212**		**LO58-SS02-100212**		**LO58-SB-TB01**		**LO58-SB-TB02**		**LO58-SB-TB03**	
								Sample Description	**Surface Soil**		**Surface Soil**		**Trip Blank**		**Trip Blank**		**Trip Blank**	
								Sample Date	**10/2/2012**		**10/2/2012**		**10/2/2012**		**10/2/2012**		**10/2/2012**	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Trichlorofluoromethane	75694	8260B	µg/kg	2300000	n	35000000		NBA					1	U	1	U	1	U
Vinyl acetate	108054	8260B	µg/kg	91000	n	380000	n	NBA					1	U	1	U	1	U
Vinyl chloride	75014	8260B	µg/kg	59	c	1700	c	NBA					1	U	1	U	1	U
Xylenes, Total	1330207	8260B	µg/kg	58000	n	250000	n	NBA					1	U	1	U	1	U
1,1'-Biphenyl	92524	8270C PAH	µg/kg	4700	n	20000	n	NBA										
1-Methylnaphthalene	90120	8270C PAH	µg/kg	18000	c	73000	c	NBA										
1-Methylphenanthrene	832699	8270C PAH	µg/kg	NBA		NBA		NBA										
2,3,5-Trimethylnaphthalene	2245387	8270C PAH	µg/kg	NBA		NBA		NBA										
2,6-Dimethylnaphthalene	581420	8270C PAH	µg/kg	NBA		NBA		NBA										
2-Methylnaphthalene	91576	8270C PAH	µg/kg	24000	n	300000	n	NBA										
Acenaphthene	83329	8270C PAH	µg/kg	360000	n	4500000	n	NBA										
Acenaphthylene	208968	8270C PAH	µg/kg	360000	n	4500000	n	NBA										
Anthracene	120127	8270C PAH	µg/kg	1800000	n	23000000	n	NBA										
Benzo[a]anthracene	56553	8270C PAH	µg/kg	160	c	2900	c	NBA										
Benzo[a]pyrene	50328	8270C PAH	µg/kg	16	c	290	c	NBA										
Benzo[b]fluoranthene	205992	8270C PAH	µg/kg	160	c	2900	c	NBA										
Benzo[e]pyrene	192972	8270C PAH	µg/kg	NBA		NBA		NBA										
Benzo[g,h,i]perylene	191242	8270C PAH	µg/kg	3800	c	17000	c	NBA										
Benzo[k]fluoranthene	207089	8270C PAH	µg/kg	1600	c	29000	c	NBA										
Chrysene	218019	8270C PAH	µg/kg	16000	c	290000	c	NBA										
Dibenzo[a,h]anthracene	53703	8270C PAH	µg/kg	16	c	290	c	NBA										
Dibenzothiophene	132650	8270C PAH	µg/kg	78000	n	1200000	n	NBA										
Fluoranthene	206440	8270C PAH	µg/kg	240000	n	3000000	n	NBA										
Fluorene	86737	8270C PAH	µg/kg	240000	n	3000000	n	NBA										
Indeno[1,2,3-cd]pyrene	193395	8270C PAH	µg/kg	160	c	2900	c	NBA										
Naphthalene	91203	8270C PAH	µg/kg	3800	c	17000	c	NBA										
Perylene	198550	8270C PAH	µg/kg	NBA		NBA		NBA										
Phenanthrene	85018	8270C PAH	µg/kg	1800000	n	23000000	n	NBA										
Pyrene	129000	8270C PAH	µg/kg	180000	n	2300000	n	NBA										
1,1'-Biphenyl	92524	8270D	µg/kg	4700	n	20000	n	NBA										
1,2,4,5-Tetrachlorobenzene	95943	8270D	µg/kg	2300	n	35000	n	NBA										
1,2,4-Trichlorobenzene	120821	8270D	µg/kg	5800	n	26000	n	NBA										
1,2-Dichlorobenzene	95501	8270D	µg/kg	180000	n	930000		NBA										

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SS01-100212		LO58-SS02-100212		LO58-SB-TB01		LO58-SB-TB02		LO58-SB-TB03	
								Sample Description	Surface Soil		Surface Soil		Trip Blank		Trip Blank		Trip Blank	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**		**Ecological[c]**										
1,3-Dichlorobenzene	541731	8270D	µg/kg	NBA		NBA		NBA										
1,4-Dichlorobenzene	106467	8270D	µg/kg	2600	c	11000	c	NBA										
1-Methylnaphthalene	90120	8270D	µg/kg	18000	c	73000	c	NBA										
2,2'-oxybis[1-chloropropane]	108601	8270D	µg/kg	310000	n	4700000		NBA										
2,3,4,6-Tetrachlorophenol	58902	8270D	µg/kg	190000	n	2500000	n	NBA										
2,4,5-Trichlorophenol	95954	8270D	µg/kg	630000	n	8200000	n	NBA										
2,4,6-Trichlorophenol	88062	8270D	µg/kg	6300	n	82000	n	NBA										
2,4-Dichlorophenol	120832	8270D	µg/kg	19000	n	250000	n	NBA										
2,4-Dimethylphenol	105679	8270D	µg/kg	130000	n	1600000	n	NBA										
2,4-Dinitrophenol	51285	8270D	µg/kg	13000	n	160000	n	NBA										
2,4-Dinitrotoluene	121142	8270D	µg/kg	1700	c	7400	c	NBA										
2,6-Dichlorophenol	87650	8270D	µg/kg	NBA		NBA		NBA										
2,6-Dinitrotoluene	606202	8270D	µg/kg	360	c	1500	c	NBA										
2-Chloronaphthalene	91587	8270D	µg/kg	480000	n	6000000	n	NBA										
2-Chlorophenol	95578	8270D	µg/kg	39000	n	580000	n	NBA										
2-Methylnaphthalene	91576	8270D	µg/kg	24000	n	300000	n	NBA										
2-Methylphenol	95487	8270D	µg/kg	320000	n	4100000	n	NBA										
2-Nitroaniline	88744	8270D	µg/kg	63000	n	800000	n	NBA										
2-Nitrophenol	88755	8270D	µg/kg	NBA		NBA		NBA										
3 & 4 Methylphenol	15831104	8270D	µg/kg	NBA		NBA		NBA										
3,3'-Dichlorobenzidine	91941	8270D	µg/kg	1200	c	5100	c	NBA										
3-Nitroaniline	99092	8270D	µg/kg	NBA		NBA		NBA										
4,6-Dinitro-2-methylphenol	534521	8270D	µg/kg	510	n	6600	n	NBA										
4-Bromophenyl phenyl ether	101553	8270D	µg/kg	NBA		NBA		NBA										
4-Chloro-3-methylphenol	59507	8270D	µg/kg	630000	n	8200000	n	NBA										
4-Chloroaniline	106478	8270D	µg/kg	2700	c	11000	c	NBA										
4-Chlorophenyl phenyl ether	7005723	8270D	µg/kg	NBA		NBA		NBA										
4-Nitroaniline	100016	8270D	µg/kg	25000	n	110000	c	NBA										
4-Nitrophenol	100027	8270D	µg/kg	NBA		NBA		NBA										
Acenaphthene	83329	8270D	µg/kg	360000	n	4500000	n	NBA										
Acenaphthylene	208968	8270D	µg/kg	360000	n	4500000	n	NBA										
Acetophenone	98862	8270D	µg/kg	780000	n	12000000		NBA										
Aniline	62533	8270D	µg/kg	44000	n	400000	c	NBA										

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SS01-100212		LO58-SS02-100212		LO58-SB-TB01		LO58-SB-TB02		LO58-SB-TB03	
								Sample Description	Surface Soil		Surface Soil		Trip Blank		Trip Blank		Trip Blank	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Anthracene	120127	8270D	µg/kg	1800000	n	23000000	n	NBA										
Atrazine	1912249	8270D	µg/kg	2400	c	10000	c	NBA										
Azobenzene	103333	8270D	µg/kg	5600	c	26000	c	NBA										
Benzaldehyde	100527	8270D	µg/kg	170000	c	820000	c	NBA										
Benzidine	92875	8270D	µg/kg	0.53	c	10	c	NBA										
Benzo[a]anthracene	56553	8270D	µg/kg	160	c	2900	c	NBA										
Benzo[a]pyrene	50328	8270D	µg/kg	16	c	290	c	NBA										
Benzo[b]fluoranthene	205992	8270D	µg/kg	160	c	2900	c	NBA										
Benzo[e]pyrene	192972	8270D	µg/kg	NBA		NBA		NBA										
Benzo[g,h,i]perylene	191242	8270D	µg/kg	3800	c	17000	c	NBA										
Benzo[k]fluoranthene	207089	8270D	µg/kg	1600	c	29000	c	NBA										
Benzoic acid	65850	8270D	µg/kg	25000000	n	330000000		NBA										
Benzyl alcohol	100516	8270D	µg/kg	630000	n	8200000	n	NBA										
Bis(2-chloroethoxy)methane	111911	8270D	µg/kg	19000	n	250000	n	NBA										
Bis(2-chloroethyl)ether	111444	8270D	µg/kg	230	c	1000	c	NBA										
Bis(2-ethylhexyl) phthalate	117817	8270D	µg/kg	39000	c	160000	c	NBA										
Butyl benzyl phthalate	85687	8270D	µg/kg	290000	c	1200000	c	NBA										
Caprolactam	105602	8270D	µg/kg	3100000	n	40000000	n	NBA										
Carbazole	86748	8270D	µg/kg	NBA		NBA		NBA										
Chrysene	218019	8270D	µg/kg	16000	c	290000	c	NBA										
Dibenzo[a,h]anthracene	53703	8270D	µg/kg	16	c	290	c	NBA										
Dibenzofuran	132649	8270D	µg/kg	7300	n	100000	n	NBA										
Diethyl phthalate	84662	8270D	µg/kg	5100000	n	66000000	n	NBA										
Dimethyl phthalate	131113	8270D	µg/kg	NBA		NBA		NBA										
Di-n-butyl phthalate	84742	8270D	µg/kg	630000	n	8200000	n	NBA										
Di-n-octyl phthalate	117840	8270D	µg/kg	63000	n	820000	n	NBA										
Fluoranthene	206440	8270D	µg/kg	240000	n	3000000	n	NBA										
Fluorene	86737	8270D	µg/kg	240000	n	3000000	n	NBA										
Hexachlorobenzene	118741	8270D	µg/kg	210	c	960	c	NBA										
Hexachlorobutadiene	87683	8270D	µg/kg	1200	c	5300	c	NBA										
Hexachlorocyclopentadiene	77474	8270D	µg/kg	180	n	750	n	NBA										
Hexachloroethane	67721	8270D	µg/kg	1800	c	8000	c	NBA										
Indeno[1,2,3-cd]pyrene	193395	8270D	µg/kg	160	c	2900	c	NBA										

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SS01-100212		LO58-SS02-100212		LO58-SB-TB01		LO58-SB-TB02		LO58-SB-TB03	
								Sample Description	Surface Soil		Surface Soil		Trip Blank		Trip Blank		Trip Blank	
								Sample Date	10/2/2012		10/2/2012		10/2/2012		10/2/2012		10/2/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Isophorone	78591	8270D	µg/kg	570000	c	2400000	c	NBA										
Naphthalene	91203	8270D	µg/kg	3800	c	17000	c	NBA										
Nitrobenzene	98953	8270D	µg/kg	5100	c	22000	c	NBA										
N-Nitrosodimethylamine	62759	8270D	µg/kg	2	c	34	c	NBA										
N-Nitrosodi-n-propylamine	621647	8270D	µg/kg	78	c	330	c	NBA										
N-Nitrosodiphenylamine	86306	8270D	µg/kg	110000	c	470000	c	NBA										
Pentachlorophenol	87865	8270D	µg/kg	1000	c	4000	c	NBA										
Perylene	198550	8270D	µg/kg	NBA		NBA		NBA										
Phenanthrene	85018	8270D	µg/kg	1800000	n	23000000	n	NBA										
Phenol	108952	8270D	µg/kg	1900000	n	25000000	n	NBA										
Pyrene	129000	8270D	µg/kg	180000	n	2300000	n	NBA										
Pyridine	110861	8270D	µg/kg	7800	n	120000	n	NBA										

[a] Regional Screening Level (RSL) Residential Soil Table (May 2016).

[b] Regional Screening Level (RSL) Industrial Soil Table (May 2016).

[c] As per QAPP.

Bold values indicate exceedance of residential RSL.

Highlghted values indicate exceedance of industrial RSL or eco benchmark.

All trip blank analytes measured under method SW8260.

µg/kg = Micrograms per kilograms.

C = Cancer based, target risk equals 1E-06.

J = Result is <RL but >=MDL and the concentration is an approximate value.

mg/kg = Milligram per kilogram.

NBA = No benchmark available.

NC = Noncancer based, target hazard quotient equals 0.1.

R=Rejected; result not valid due to quality control failure.

U = Not detected.

UJ = Not detected. SQL is <RL but >=MDL and the SQL is an approximate value.

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB-TB04		LO58-BK01-0001		LO58-BK02-0001		LO58-BK-DUP-01		LO58-BK03-0001	
								Sample Description	Trip Blank		Background		Background		DUP OF BK02-0001		Background	
								Sample Date	10/2/2012		10/3/2012		10/3/2012		10/3/2012		10/3/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**		**Ecological[c]**										
Percent Solids	DEP1005	D4643	%	NBA		NBA		NBA			76		72.9		73.3		79.8	
2-Methylnaphthalene	91576	MADEP EPH	µg/kg	24000	n	300000	n	NBA										
Acenaphthene	83329	MADEP EPH	µg/kg	360000	n	4500000	n	NBA										
Acenaphthylene	208968	MADEP EPH	µg/kg	360000	n	4500000	n	NBA										
Anthracene	120127	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA										
Benzo[a]anthracene	56553	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Benzo[a]pyrene	50328	MADEP EPH	µg/kg	16	c	290	c	NBA										
Benzo[b]fluoranthene	205992	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Benzo[g,h,i]perylene	191242	MADEP EPH	µg/kg	3800	c	17000	c	NBA										
Benzo[k]fluoranthene	207089	MADEP EPH	µg/kg	1600	c	29000	c	NBA										
C11-C22 Aromatic Hydrocarbons	EPH4	MADEP EPH	µg/kg	NBA		NBA		NBA			34500	U	36100	U	35700	U	32500	U
C19-C36 Aliphatic Hydrocarbons	EPH3	MADEP EPH	µg/kg	NBA		NBA		NBA			34500	U	36100	U	35700	U	32500	U
C9-C18 Aliphatic Hydrocarbons	EPH2	MADEP EPH	µg/kg	NBA		NBA		NBA			34500	U	36100	U	35700	U	32500	U
Chrysene	218019	MADEP EPH	µg/kg	16000	c	290000	c	NBA										
Dibenzo[a,h]anthracene	53703	MADEP EPH	µg/kg	16	c	290	c	NBA										
Fluoranthene	206440	MADEP EPH	µg/kg	240000	n	3000000	n	NBA										
Fluorene	86737	MADEP EPH	µg/kg	240000	n	3000000	n	NBA										
Indeno[1,2,3-cd]pyrene	193395	MADEP EPH	µg/kg	160	c	2900	c	NBA										
Naphthalene	91203	MADEP EPH	µg/kg	3800	c	17000	c	NBA										
Phenanthrene	85018	MADEP EPH	µg/kg	1800000	n	23000000	n	NBA										
Pyrene	129000	MADEP EPH	µg/kg	180000	n	2300000	n	NBA										
Unadjusted C11-C22 Aromatics	EPH1	MADEP EPH	µg/kg	NBA		NBA		NBA			34500	U	36100	U	35700	U	32500	U
C5-C8 Aliphatics Hydrocarbons	VPH3	MADEP VPH	µg/kg	NBA		NBA		NBA			3140	U	3680	U	4020	U	3040	U
C9-C10 Aromatic Hydrocarbons	VPH5	MADEP VPH	µg/kg	NBA		NBA		NBA			784	U	919	U	1000	U	761	U
C9-C12 Aliphatic Hydrocarbons	VPH4	MADEP VPH	µg/kg	NBA		NBA		NBA			3140	U	3680	U	4020	U	3040	U
Unadjusted C5-C8 Aliphatics	VPH1	MADEP VPH	µg/kg	NBA		NBA		NBA			3140	U	3680	U	4020	U	3040	U
Unadjusted C9-C12 Aliphatics	VPH2	MADEP VPH	µg/kg	NBA		NBA		NBA			3140	U	3680	U	4020	U	3040	U
Aluminum	7429905	6010C	mg/kg	7700	n	110000		NBA			**17500**		**16400**		**15000**		**17700**	
Antimony	7440360	6010C	mg/kg	3.1	n	47	n	NBA			0.59	J	0.55	J	0.55	J	1.1	J
Arsenic	7440382	6010C	mg/kg	0.68	c	3	cR	NBA			**14.8**		**14**		**14.6**		**22.4**	
Barium	7440393	6010C	mg/kg	1500	n	22000	n	NBA			57.7		63.2		57.2		65	
Beryllium	7440417	6010C	mg/kg	16	n	230	n	NBA			0.42	J	0.38	J	0.37	J	0.45	
Cadmium	7440439	6010C	mg/kg	7.1	n	98	n	NBA			0.3	J	0.23	J	0.37	J	0.21	J

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB-TB04		LO58-BK01-0001		LO58-BK02-0001		LO58-BK-DUP-01		LO58-BK03-0001	
								Sample Description	Trip Blank		Background		Background		DUP OF BK02-0001		Background	
								Sample Date	10/2/2012		10/3/2012		10/3/2012		10/3/2012		10/3/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Calcium	7440702	6010C	mg/kg	NBA		NBA		NBA			1040		1060		930		732	
Chromium	7440473	6010C	mg/kg	0.3	c	6.3	c	NBA			**37.6**		**40.3**		**26**		**31.8**	
Cobalt	7440484	6010C	mg/kg	2.3	n	35	n	NBA			**11.8**		**9.1**		**13.9**		**11.4**	
Copper	7440508	6010C	mg/kg	310	n	4700	n	NBA			75.3		79.8		72.1		119	
Iron	7439896	6010C	mg/kg	5500	n	82000	n	NBA			**28800**		**27700**		**29200**		**33100**	
Lead	7439921	6010C	mg/kg	400		800		NBA			31.4		22.9		36.3		22.9	
Magnesium	7439954	6010C	mg/kg	NBA		NBA		NBA			4800		4480		4060		5000	
Manganese	7439965	6010C	mg/kg	180	n	2600	n	NBA			**1390**		**655**	J	**1610**	J	**920**	
Nickel	7440020	6010C	mg/kg	150	n	2200	n	NBA			26.4		25.5		22		29.3	
Potassium	7440097	6010C	mg/kg	NBA		NBA		NBA			959		915		980		964	
Selenium	7782492	6010C	mg/kg	39	n	580	n	NBA			1.6	J	2.1	J	1.7	J	2	J
Silver	7440224	6010C	mg/kg	39	n	580	n	NBA			1	U	0.96	U	0.12	J	0.79	U
Sodium	7440235	6010C	mg/kg	NBA		NBA		NBA			25	J	25.2	J	25	J	25.6	J
Thallium	7440280	6010C	mg/kg	0.078	n	1.2	n	NBA			2.6	U	2.4	U	2.1	U	2	U
Vanadium	7440622	6010C	mg/kg	39	n	580	n	NBA			35.4		30.9		37.6		32	
Zinc	7440666	6010C	mg/kg	2300	n	35000	n	NBA			76.5		72		64.4		76.6	
Mercury	7439976	7471B	mg/kg	1.1	n	4.6		NBA			0.014	J	0.18		0.19		0.13	
PCB-1016	12674112	8082A	µg/kg	410	n	5100	n	NBA			22	U	24	U	23	U	21	U
PCB-1221	11104282	8082A	µg/kg	200	c	830	c	NBA			22	U	24	U	23	U	21	U
PCB-1232	11141165	8082A	µg/kg	170	c	720	c	NBA			22	U	24	U	23	U	21	U
PCB-1242	53469219	8082A	µg/kg	230	c	950	c	NBA			22	U	24	U	23	U	21	U
PCB-1248	12672296	8082A	µg/kg	230	c	950	c	NBA			22	U	24	U	23	U	21	U
PCB-1254	11097691	8082A	µg/kg	120	n	970	c	NBA			22	U	24	U	23	U	21	U
PCB-1260	11096825	8082A	µg/kg	240	c	990	c	NBA			22	U	24	U	23	U	21	U
PCB-1262	37324235	8082A	µg/kg	NBA		NBA		NBA			22	U	24	U	23	U	21	U
PCB-1268	11100144	8082A	µg/kg	NBA		NBA		NBA			22	U	24	U	23	U	21	U
1,1,1,2-Tetrachloroethane	630206	8260B	µg/kg	2000	c	8800	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,1,1-Trichloroethane	71556	8260B	µg/kg	810000	n	3600000		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,1,2,2-Tetrachloroethane	79345	8260B	µg/kg	600	c	2700	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,1,2-Trichloroethane	79005	8260B	µg/kg	150	n	630	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,1-Dichloroethane	75343	8260B	µg/kg	3600	c	16000	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,1-Dichloroethene	75354	8260B	µg/kg	23000	n	100000	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,1-Dichloropropene	563586	8260B	µg/kg	NBA		NBA		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB-TB04		LO58-BK01-0001		LO58-BK02-0001		LO58-BK-DUP-01		LO58-BK03-0001	
								Sample Description	Trip Blank		Background		Background		DUP OF BK02-0001		Background	
								Sample Date	10/2/2012		10/3/2012		10/3/2012		10/3/2012		10/3/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
1,2,3-Trichlorobenzene	87616	8260B	µg/kg	6300	n	93000	n	NBA	1	U	7.3	U	8.6	U	8.7	UJ	5.8	U
1,2,3-Trichloropropane	96184	8260B	µg/kg	5.1	c	110	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,2,4-Trichlorobenzene	120821	8260B	µg/kg	5800	n	26000	n	NBA	1	U	7.3	U	8.6	UJ	8.7	UJ	5.8	U
1,2,4-Trimethylbenzene	95636	8260B	µg/kg	5800	n	24000	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,2-Dibromo-3-Chloropropane	96128	8260B	µg/kg	5.3	c	64	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,2-Dibromoethane	106934	8260B	µg/kg	36	c	160	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,2-Dichlorobenzene	95501	8260B	µg/kg	180000	n	930000		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,2-Dichloroethane	107062	8260B	µg/kg	460	c	2000	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,2-Dichloroethene, Total	540590	8260B	µg/kg	NBA		NBA		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,2-Dichloropropane	78875	8260B	µg/kg	1000	c	4400	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,3,5-Trimethylbenzene	108678	8260B	µg/kg	78000	n	1200000		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,3-Dichlorobenzene	541731	8260B	µg/kg	NBA		NBA		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,3-Dichloropropane	142289	8260B	µg/kg	160000	n	2300000		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,4-Dichlorobenzene	106467	8260B	µg/kg	2600	c	11000	c	NBA	1	U	7.3	U	8.6	UJ	8.7	U	5.8	U
1,4-Dioxane	123911	8260B	µg/kg	5300	c	24000	c	NBA	50	U	360	U	430	U	440	U	290	U
2,2-Dichloropropane	594207	8260B	µg/kg	NBA		NBA		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
2-Butanone	78933	8260B	µg/kg	2700000	n	19000000	n	NBA	5	U	40		35	J	44	J	23	
2-Chloroethyl vinyl ether	110758	8260B	µg/kg	NBA		NBA		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
2-Chlorotoluene	95498	8260B	µg/kg	160000	n	2300000		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
2-Hexanone	591786	8260B	µg/kg	20000	n	130000	n	NBA	5	U	7.3	U	8.6	U	8.7	U	5.8	U
4-Chlorotoluene	106434	8260B	µg/kg	160000	n	2300000		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
4-Isopropyltoluene	99876	8260B	µg/kg	NBA		NBA		NBA	1	U	3.4	J	8.6	U	8.7	U	5.8	U
4-Methyl-2-pentanone	108101	8260B	µg/kg	3300000	n	14000000		NBA	5	U	20		26	J	21	J	5.8	U
Acetone	67641	8260B	µg/kg	6100000	n	67000000	n	NBA	5	U	570		640	J	570	J	380	
Benzene	71432	8260B	µg/kg	1200	c	5100	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Bromobenzene	108861	8260B	µg/kg	29000	n	180000	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Bromochloromethane	74975	8260B	µg/kg	15000	n	63000	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Bromodichloromethane	75274	8260B	µg/kg	290	c	1300	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Bromoform	75252	8260B	µg/kg	19000	c	86000	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Bromomethane	74839	8260B	µg/kg	680	n	3000	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Carbon disulfide	75150	8260B	µg/kg	77000	n	350000	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Carbon tetrachloride	56235	8260B	µg/kg	650	c	2900	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Chlorobenzene	108907	8260B	µg/kg	28000	n	130000	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB-TB04		LO58-BK01-0001		LO58-BK02-0001		LO58-BK-DUP-01		LO58-BK03-0001	
								Sample Description	Trip Blank		Background		Background		DUP OF BK02-0001		Background	
								Sample Date	10/2/2012		10/3/2012		10/3/2012		10/3/2012		10/3/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Chloroethane	75003	8260B	µg/kg	1400000	n	5700000		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Chloroform	67663	8260B	µg/kg	320	c	1400	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Chloromethane	74873	8260B	µg/kg	11000	n	46000	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
cis-1,2-Dichloroethene	156592	8260B	µg/kg	16000	n	230000	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
cis-1,3-Dichloropropene	10061015	8260B	µg/kg	NBA		NBA		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Cyclohexane	110827	8260B	µg/kg	650000	n	2700000		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Dibromochloromethane	124481	8260B	µg/kg	8300	c	39000	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Dibromomethane	74953	8260B	µg/kg	2400	n	9900	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Dichlorodifluoromethane	75718	8260B	µg/kg	8700	n	37000	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Ethylbenzene	100414	8260B	µg/kg	5800	c	25000	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Freon TF	76131	8260B	µg/kg	4000000	n	17000000		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Hexachlorobutadiene	87683	8260B	µg/kg	1200	c	5300	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Isobutyl alcohol	78831	8260B	µg/kg	2300000	n	35000000		NBA	50	U	360	U	430	U	440	U	290	U
Isopropylbenzene	98828	8260B	µg/kg	190000	n	990000		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
m&p-Xylene	179601231	8260B	µg/kg	58000	n	250000	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Methyl acetate	79209	8260B	µg/kg	7800000	n	120000000	s	NBA	1	U	180		1300	J	290	J	52	
Methyl iodide	74884	8260B	µg/kg	NBA		NBA		NBA	1	U	1.5	J	1.1	J	1.7	J	2.4	J
Methyl t-butyl ether	1634044	8260B	µg/kg	47000	c	210000	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Methylcyclohexane	108872	8260B	µg/kg	NBA		NBA		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Methylene Chloride	75092	8260B	µg/kg	35000	n	320000	n	NBA	0.46	J	7.3	U	8.6	UJ	8.7	UJ	5.8	U
Naphthalene	91203	8260B	µg/kg	3800	c	17000	c	NBA	1	U	7.3	U	8.6	UJ	8.7	UJ	5.8	U
n-Butylbenzene	104518	8260B	µg/kg	390000	n	5800000		NBA	1	U	0.66	J	0.77	J	8.7	U	5.8	U
n-Propylbenzene	103651	8260B	µg/kg	380000	n	2400000		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
o-Xylene	95476	8260B	µg/kg	65000	n	280000	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
sec-Butylbenzene	135988	8260B	µg/kg	780000	n	12000000		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Styrene	100425	8260B	µg/kg	600000	n	3500000		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
tert-Butylbenzene	98066	8260B	µg/kg	780000	n	12000000		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Tetrachloroethene	127184	8260B	µg/kg	8100	n	39000	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Tetrahydrofuran	109999	8260B	µg/kg	1800000	n	9400000	n	NBA	14	U	73	U	86	U	87	U	58	U
Toluene	108883	8260B	µg/kg	490000	n	4700000		NBA	1	U	0.45	J	0.19	J	8.7	U	5.8	U
trans-1,2-Dichloroethene	156605	8260B	µg/kg	160000	n	2300000		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
trans-1,3-Dichloropropene	10061026	8260B	µg/kg	NBA		NBA		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Trichloroethene	79016	8260B	µg/kg	410	n	1900	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB-TB04		LO58-BK01-0001		LO58-BK02-0001		LO58-BK-DUP-01		LO58-BK03-0001	
								Sample Description	Trip Blank		Background		Background		DUP OF BK02-0001		Background	
								Sample Date	10/2/2012		10/3/2012		10/3/2012		10/3/2012		10/3/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Trichlorofluoromethane	75694	8260B	µg/kg	2300000	n	35000000		NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Vinyl acetate	108054	8260B	µg/kg	91000	n	380000	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Vinyl chloride	75014	8260B	µg/kg	59	c	1700	c	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
Xylenes, Total	1330207	8260B	µg/kg	58000	n	250000	n	NBA	1	U	7.3	U	8.6	U	8.7	U	5.8	U
1,1'-Biphenyl	92524	8270C PAH	µg/kg	4700	n	20000	n	NBA			1.8	U	3	U	2.2	U	1.2	U
1-Methylnaphthalene	90120	8270C PAH	µg/kg	18000	c	73000	c	NBA			0.82	J	1	J	0.63	J	0.67	J
1-Methylphenanthrene	832699	8270C PAH	µg/kg	NBA		NBA		NBA			13		18		14		6.1	
2,3,5-Trimethylnaphthalene	2245387	8270C PAH	µg/kg	NBA		NBA		NBA			1.2	J	1.3	J	0.87	J	0.74	J
2,6-Dimethylnaphthalene	581420	8270C PAH	µg/kg	NBA		NBA		NBA			0.55	J	3	U	2.2	U	0.44	J
2-Methylnaphthalene	91576	8270C PAH	µg/kg	24000	n	300000	n	NBA			0.77	J	0.89	J	0.58	J	0.57	J
Acenaphthene	83329	8270C PAH	µg/kg	360000	n	4500000	n	NBA			1	J	1.2	J	1.1	J	0.44	J
Acenaphthylene	208968	8270C PAH	µg/kg	360000	n	4500000	n	NBA			3.6		3.2		2.8		2.6	
Anthracene	120127	8270C PAH	µg/kg	1800000	n	23000000	n	NBA			2.7		3.1		2.6		1.4	
Benzo[a]anthracene	56553	8270C PAH	µg/kg	160	c	2900	c	NBA			31		31		31		18	
Benzo[a]pyrene	50328	8270C PAH	µg/kg	16	c	290	c	NBA			**33**		**41**		**37**		15	
Benzo[b]fluoranthene	205992	8270C PAH	µg/kg	160	c	2900	c	NBA			49		59		51		30	
Benzo[e]pyrene	192972	8270C PAH	µg/kg	NBA		NBA		NBA			31		37		31		18	
Benzo[g,h,i]perylene	191242	8270C PAH	µg/kg	3800	c	17000	c	NBA			16		19		14		8.6	
Benzo[k]fluoranthene	207089	8270C PAH	µg/kg	1600	c	29000	c	NBA			33		41		36		20	
Chrysene	218019	8270C PAH	µg/kg	16000	c	290000	c	NBA			42		41		41		26	
Dibenzo[a,h]anthracene	53703	8270C PAH	µg/kg	16	c	290	c	NBA			6.8		8.1		7.1		3.7	
Dibenzothiophene	132650	8270C PAH	µg/kg	78000	n	1200000	n	NBA			2.1		2.7	J	2	J	1.5	
Fluoranthene	206440	8270C PAH	µg/kg	240000	n	3000000	n	NBA			81		96		76		45	
Fluorene	86737	8270C PAH	µg/kg	240000	n	3000000	n	NBA			1.8		2.1	J	1.6	J	1.3	
Indeno[1,2,3-cd]pyrene	193395	8270C PAH	µg/kg	160	c	2900	c	NBA			24		29		23		14	
Naphthalene	91203	8270C PAH	µg/kg	3800	c	17000	c	NBA			1.8	U	3	U	2.2	U	1.2	U
Perylene	198550	8270C PAH	µg/kg	NBA		NBA		NBA			7.8		9.8		8.4		3.8	
Phenanthrene	85018	8270C PAH	µg/kg	1800000	n	23000000	n	NBA			35		44		33		23	
Pyrene	129000	8270C PAH	µg/kg	180000	n	2300000	n	NBA			68		75		62		39	
1,1'-Biphenyl	92524	8270D	µg/kg	4700	n	20000	n	NBA			430	U	440	U	440	U	420	U
1,2,4,5-Tetrachlorobenzene	95943	8270D	µg/kg	2300	n	35000	n	NBA			430	U	440	U	440	U	420	U
1,2,4-Trichlorobenzene	120821	8270D	µg/kg	5800	n	26000	n	NBA			430	U	440	U	440	U	420	U
1,2-Dichlorobenzene	95501	8270D	µg/kg	180000	n	930000		NBA			430	U	440	U	440	U	420	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	**LO58-SB-TB04**		**LO58-BK01-0001**		**LO58-BK02-0001**		**LO58-BK-DUP-01**		**LO58-BK03-0001**	
								Sample Description	**Trip Blank**		**Background**		**Background**		**DUP OF BK02-0001**		**Background**	
								Sample Date	**10/2/2012**		**10/3/2012**		**10/3/2012**		**10/3/2012**		**10/3/2012**	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**		**Ecological[c]**										
1,3-Dichlorobenzene	541731	8270D	µg/kg	NBA		NBA		NBA			430	U	440	U	440	U	420	U
1,4-Dichlorobenzene	106467	8270D	µg/kg	2600	c	11000	c	NBA			430	U	440	U	440	U	420	U
1-Methylnaphthalene	90120	8270D	µg/kg	18000	c	73000	c	NBA			430	U	440	U	440	U	420	U
2,2'-oxybis[1-chloropropane]	108601	8270D	µg/kg	310000	n	4700000		NBA			430	U	440	U	440	U	420	U
2,3,4,6-Tetrachlorophenol	58902	8270D	µg/kg	190000	n	2500000	n	NBA			430	U	440	U	440	U	420	U
2,4,5-Trichlorophenol	95954	8270D	µg/kg	630000	n	8200000	n	NBA			1100	U	1100	U	1100	U	1000	U
2,4,6-Trichlorophenol	88062	8270D	µg/kg	6300	n	82000	n	NBA			430	U	440	U	440	U	420	U
2,4-Dichlorophenol	120832	8270D	µg/kg	19000	n	250000	n	NBA			430	U	440	U	440	U	420	U
2,4-Dimethylphenol	105679	8270D	µg/kg	130000	n	1600000	n	NBA			430	U	440	U	440	U	420	U
2,4-Dinitrophenol	51285	8270D	µg/kg	13000	n	160000	n	NBA			1100	U	1100	U	1100	U	1000	U
2,4-Dinitrotoluene	121142	8270D	µg/kg	1700	c	7400	c	NBA			430	U	440	U	440	U	420	U
2,6-Dichlorophenol	87650	8270D	µg/kg	NBA		NBA		NBA			430	U	440	U	440	U	420	U
2,6-Dinitrotoluene	606202	8270D	µg/kg	360	c	1500	c	NBA			430	U	440	U	440	U	420	U
2-Chloronaphthalene	91587	8270D	µg/kg	480000	n	6000000	n	NBA			430	U	440	U	440	U	420	U
2-Chlorophenol	95578	8270D	µg/kg	39000	n	580000	n	NBA			430	U	440	U	440	U	420	U
2-Methylnaphthalene	91576	8270D	µg/kg	24000	n	300000	n	NBA			430	U	440	U	440	U	420	U
2-Methylphenol	95487	8270D	µg/kg	320000	n	4100000	n	NBA			430	U	440	U	440	U	420	U
2-Nitroaniline	88744	8270D	µg/kg	63000	n	800000	n	NBA			1100	U	1100	U	1100	U	1000	U
2-Nitrophenol	88755	8270D	µg/kg	NBA		NBA		NBA			430	U	440	U	440	U	420	U
3 & 4 Methylphenol	15831104	8270D	µg/kg	NBA		NBA		NBA			880	U	900	U	890	U	850	U
3,3'-Dichlorobenzidine	91941	8270D	µg/kg	1200	c	5100	c	NBA			430	U	440	U	440	U	420	U
3-Nitroaniline	99092	8270D	µg/kg	NBA		NBA		NBA			1100	U	1100	U	1100	U	1000	U
4,6-Dinitro-2-methylphenol	534521	8270D	µg/kg	510	n	6600	n	NBA			1100	U	1100	U	1100	U	1000	U
4-Bromophenyl phenyl ether	101553	8270D	µg/kg	NBA		NBA		NBA			430	U	440	U	440	U	420	U
4-Chloro-3-methylphenol	59507	8270D	µg/kg	630000	n	8200000	n	NBA			430	U	440	U	440	U	420	U
4-Chloroaniline	106478	8270D	µg/kg	2700	c	11000	c	NBA			430	U	440	U	440	U	420	U
4-Chlorophenyl phenyl ether	7005723	8270D	µg/kg	NBA		NBA		NBA			430	U	440	U	440	U	420	U
4-Nitroaniline	100016	8270D	µg/kg	25000	n	110000	c	NBA			1100	U	1100	U	1100	U	1000	U
4-Nitrophenol	100027	8270D	µg/kg	NBA		NBA		NBA			1100	U	1100	U	1100	U	1000	U
Acenaphthene	83329	8270D	µg/kg	360000	n	4500000	n	NBA			430	U	440	U	440	U	420	U
Acenaphthylene	208968	8270D	µg/kg	360000	n	4500000	n	NBA			430	U	440	U	440	U	420	U
Acetophenone	98862	8270D	µg/kg	780000	n	12000000		NBA			430	U	440	U	440	U	420	U
Aniline	62533	8270D	µg/kg	44000	n	400000	c	NBA			1100	U	1100	U	1100	U	1000	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	**LO58-SB-TB04**		**LO58-BK01-0001**		**LO58-BK02-0001**		**LO58-BK-DUP-01**		**LO58-BK03-0001**	
								Sample Description	**Trip Blank**		**Background**		**Background**		**DUP OF BK02-0001**		**Background**	
								Sample Date	**10/2/2012**		**10/3/2012**		**10/3/2012**		**10/3/2012**		**10/3/2012**	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential[a]**		**Industrial[b]**		**Ecological[c]**										
Anthracene	120127	8270D	µg/kg	1800000	n	23000000	n	NBA			430	U	440	U	440	U	420	U
Atrazine	1912249	8270D	µg/kg	2400	c	10000	c	NBA			430	U	440	U	440	U	420	U
Azobenzene	103333	8270D	µg/kg	5600	c	26000	c	NBA			430	U	440	U	440	U	420	U
Benzaldehyde	100527	8270D	µg/kg	170000	c	820000	c	NBA			430	U	440	U	440	U	420	U
Benzidine	92875	8270D	µg/kg	0.53	c	10	c	NBA				R		R		R		R
Benzo[a]anthracene	56553	8270D	µg/kg	160	c	2900	c	NBA			29	J	34	J	31	J	17	J
Benzo[a]pyrene	50328	8270D	µg/kg	16	c	290	c	NBA			**36**	J	**44**	J	**42**	J	**23**	J
Benzo[b]fluoranthene	205992	8270D	µg/kg	160	c	2900	c	NBA			52	J	41	J	53	J	30	J
Benzo[e]pyrene	192972	8270D	µg/kg	NBA		NBA		NBA			35	J	39	J	39	J	25	J
Benzo[g,h,i]perylene	191242	8270D	µg/kg	3800	c	17000	c	NBA			430	U	440	U	440	U	420	U
Benzo[k]fluoranthene	207089	8270D	µg/kg	1600	c	29000	c	NBA			430	U	59	J	49	J	420	U
Benzoic acid	65850	8270D	µg/kg	25000000	n	330000000		NBA			1100	U	1100	U	1100	U	1000	U
Benzyl alcohol	100516	8270D	µg/kg	630000	n	8200000	n	NBA			430	U	440	U	440	U	420	U
Bis(2-chloroethoxy)methane	111911	8270D	µg/kg	19000	n	250000	n	NBA			430	U	440	U	440	U	420	U
Bis(2-chloroethyl)ether	111444	8270D	µg/kg	230	c	1000	c	NBA			430	U	440	U	440	U	420	U
Bis(2-ethylhexyl) phthalate	117817	8270D	µg/kg	39000	c	160000	c	NBA			430	U	440	U	440	U	420	U
Butyl benzyl phthalate	85687	8270D	µg/kg	290000	c	1200000	c	NBA			45	J	440	U	440	U	420	U
Caprolactam	105602	8270D	µg/kg	3100000	n	40000000	n	NBA			430	U	440	U	440	U	420	U
Carbazole	86748	8270D	µg/kg	NBA		NBA		NBA			430	U	440	U	440	U	420	U
Chrysene	218019	8270D	µg/kg	16000	c	290000	c	NBA			55	J	59	J	56	J	34	J
Dibenzo[a,h]anthracene	53703	8270D	µg/kg	16	c	290	c	NBA			430	U	440	U	440	U	420	U
Dibenzofuran	132649	8270D	µg/kg	7300	n	100000	n	NBA			430	U	440	U	440	U	420	U
Diethyl phthalate	84662	8270D	µg/kg	5100000	n	66000000	n	NBA			430	U	440	U	440	U	420	U
Dimethyl phthalate	131113	8270D	µg/kg	NBA		NBA		NBA			430	U	440	U	440	U	420	U
Di-n-butyl phthalate	84742	8270D	µg/kg	630000	n	8200000	n	NBA			430	U	440	U	440	U	420	U
Di-n-octyl phthalate	117840	8270D	µg/kg	63000	n	820000	n	NBA			430	U	440	U	440	U	420	U
Fluoranthene	206440	8270D	µg/kg	240000	n	3000000	n	NBA			61	J	74	J	65	J	42	J
Fluorene	86737	8270D	µg/kg	240000	n	3000000	n	NBA			430	U	440	U	440	U	420	U
Hexachlorobenzene	118741	8270D	µg/kg	210	c	960	c	NBA			430	U	440	U	440	U	420	U
Hexachlorobutadiene	87683	8270D	µg/kg	1200	c	5300	c	NBA			430	U	440	U	440	U	420	U
Hexachlorocyclopentadiene	77474	8270D	µg/kg	180	n	750	n	NBA			430	U	440	U	440	U	420	U
Hexachloroethane	67721	8270D	µg/kg	1800	c	8000	c	NBA			430	U	440	U	440	U	420	U
Indeno[1,2,3-cd]pyrene	193395	8270D	µg/kg	160	c	2900	c	NBA			430	U	440	U	440	U	420	U

Table A.2-4
Soil Data
LO-58
Caribou, Maine

								Sample Point ID	LO58-SB-TB04		LO58-BK01-0001		LO58-BK02-0001		LO58-BK-DUP-01		LO58-BK03-0001	
								Sample Description	Trip Blank		Background		Background		DUP OF BK02-0001		Background	
								Sample Date	10/2/2012		10/3/2012		10/3/2012		10/3/2012		10/3/2012	
				Screening Toxicity Value														
Analyte	**CAS Number**	**Method**	**Units**	**Residential**[a]		**Industrial**[b]		**Ecological**[c]										
Isophorone	78591	8270D	µg/kg	570000	c	2400000	c	NBA			430	U	440	U	440	U	420	U
Naphthalene	91203	8270D	µg/kg	3800	c	17000	c	NBA			430	U	440	U	440	U	420	U
Nitrobenzene	98953	8270D	µg/kg	5100	c	22000	c	NBA			430	U	440	U	440	U	420	U
N-Nitrosodimethylamine	62759	8270D	µg/kg	2	c	34	c	NBA			430	U	440	U	440	U	420	U
N-Nitrosodi-n-propylamine	621647	8270D	µg/kg	78	c	330	c	NBA			430	U	440	U	440	U	420	U
N-Nitrosodiphenylamine	86306	8270D	µg/kg	110000	c	470000	c	NBA			510	U	520	U	520	U	490	U
Pentachlorophenol	87865	8270D	µg/kg	1000	c	4000	c	NBA			1100	U	1100	U	1100	U	1000	U
Perylene	198550	8270D	µg/kg	NBA		NBA		NBA			430	U	440	U	440	U	420	U
Phenanthrene	85018	8270D	µg/kg	1800000	n	23000000	n	NBA			39	J	49	J	39	J	30	J
Phenol	108952	8270D	µg/kg	1900000	n	25000000	n	NBA			430	U	440	U	440	U	420	U
Pyrene	129000	8270D	µg/kg	180000	n	2300000	n	NBA			71	J	98	J	77	J	43	J
Pyridine	110861	8270D	µg/kg	7800	n	120000	n	NBA			430	U	440	U	440	U	420	U

[a] Regional Screening Level (RSL) Residential Soil Table (May 2016).

[b] Regional Screening Level (RSL) Industrial Soil Table (May 2016).

[c] As per QAPP.

Bold values indicate exceedance of residential RSL.

Highlghted values indicate exceedance of industrial RSL or eco benchmark.

All trip blank analytes measured under method SW8260.

µg/kg = Micrograms per kilograms.

C = Cancer based, target risk equals 1E-06.

J = Result is <RL but >=MDL and the concentration is an approximate value.

mg/kg = Milligram per kilogram.

NBA = No benchmark available.

NC = Noncancer based, target hazard quotient equals 0.1.

R=Rejected; result not valid due to quality control failure.

U = Not detected.

UJ = Not detected. SQL is <RL but >=MDL and the SQL is an approximate value.

Table A.2-5
Sediment Data
LO-58
Caribou, Maine

						Sample Point ID	**LO58-SD01-042112**		**LO58-SD02-042112**		**LO58-SD-DUP-01**		**LO58-SD03-042112**	
						Sample Description	**SD01**		**SD02**		**DUP OF SD02**		**SD03**	
						Sample Date	**4/21/2012**		**4/21/2012**		**4/21/2012**		**4/21/2012**	
				Screening Toxicity Value										
Analyte	**CAS Number**	**Method**	**Units**	**Human Health**[a]		**Ecological**[b]								
Percent Solids	DEP1005	D4643	%	-		-	58.1		59.6		59.5		68.9	
Total Organic Carbon	DEP2001	E415.1	mg/Kg	NBA		10000	**64700**		**57900**		**60600**		**32800**	
C11-C22 Aromatic Hydrocarbons	EPH4	MADEP EPH	µg/kg	NBA		NBA	45400	U	41700	U	43300	U	39600	U
C19-C36 Aliphatic Hydrocarbons	EPH3	MADEP EPH	µg/kg	NBA		NBA	45400	U	41700	U	43300	U	39600	U
C9-C18 Aliphatic Hydrocarbons	EPH2	MADEP EPH	µg/kg	NBA		NBA	45400	U	41700	U	43300	U	39600	U
Unadjusted C11-C22 Aromatics	EPH1	MADEP EPH	µg/kg	NBA		NBA	45400	U	41700	U	43300	U	39600	U
C5-C8 Aliphatics Hydrocarbons	VPH3	MADEP VPH	µg/kg	NBA		NBA	5280	U	5120	U	4640	U	4120	U
C9-C10 Aromatic Hydrocarbons	VPH5	MADEP VPH	µg/kg	NBA		NBA	1320	U	1280	U	1160	U	1030	U
C9-C12 Aliphatic Hydrocarbons	VPH4	MADEP VPH	µg/kg	NBA		NBA	5280	U	5120	U	4640	U	4120	U
Unadjusted C5-C8 Aliphatics	VPH1	MADEP VPH	µg/kg	NBA		NBA	5280	U	5120	U	4640	U	4120	U
Unadjusted C9-C12 Aliphatics	VPH2	MADEP VPH	µg/kg	NBA		NBA	5280	U	5120	U	4640	U	4120	U
Aluminum	7429905	6010C	mg/Kg	77000	n	14000	**22200**		**21100**		**21400**		**17300**	
Antimony	7440360	6010C	mg/Kg	31	n	2	16.8	UJ	8.3	UJ	0.68	J	6.7	UJ
Arsenic	7440382	6010C	mg/Kg	6.8	n	9.79	**18.7**		**24**		**23.8**		**16.8**	
Barium	7440393	6010C	mg/Kg	15000	n	20	**100**		**85.1**		**83.9**		**68.4**	
Beryllium	7440417	6010C	mg/Kg	160	n	NBA	0.77	J	0.61	J	0.62		0.57	
Cadmium	7440439	6010C	mg/Kg	71	n	0.99	0.37	J	0.5	J	0.53	J	0.46	J
Calcium	7440702	6010C	mg/Kg	NBA		NBA	6480	J	4800	J	4800	J	7610	J
Chromium	7440473	6010C	mg/Kg	3	n	43.4	**33.5**	J	**31.6**	J	**31.6**	J	**29.6**	J
Cobalt	7440484	6010C	mg/Kg	23	n	50	9	J	9.1	J	9.4	J	10.7	J
Copper	7440508	6010C	mg/Kg	3100	n	31.6	**66.9**		**71.4**		**73.1**		**47.4**	
Iron	7439896	6010C	mg/Kg	55000	n	20000	**30100**		**30200**		**30700**		**31500**	
Lead	7439921	6010C	mg/Kg	400	n	35.8	22.8		28.9		30.1		29.2	
Magnesium	7439954	6010C	mg/Kg	NBA		NBA	5590	J	6100	J	6350	J	7450	J
Manganese	7439965	6010C	mg/Kg	1800	n	460	**898**	J	**512**	J	**514**	J	**697**	J
Nickel	7440020	6010C	mg/Kg	1500	n	22.7	**32**	J	**32**	J	**32.9**	J	**34.9**	J
Potassium	7440097	6010C	mg/Kg	NBA		NBA	1190	J	1240	J	1100	J	844	J
Selenium	7782492	6010C	mg/Kg	390	n	2	9.8	U	4.9	U	4.2	U	1.3	J
Silver	7440224	6010C	mg/Kg	390	n	0.5	2.8	U	1.4	U	1.2	U	1.1	U
Sodium	7440235	6010C	mg/Kg	NBA		NBA	103	J	99	J	96.3	J	120	J

Table A.2-5
Sediment Data
LO-58
Caribou, Maine

						Sample Point ID	**LO58-SD01-042112**		**LO58-SD02-042112**		**LO58-SD-DUP-01**		**LO58-SD03-042112**	
						Sample Description	**SD01**		**SD02**		**DUP OF SD02**		**SD03**	
						Sample Date	**4/21/2012**		**4/21/2012**		**4/21/2012**		**4/21/2012**	
				Screening Toxicity Value										
Analyte	**CAS Number**	**Method**	**Units**	**Human Health[a]**		**Ecological[b]**								
Thallium	7440280	6010C	mg/Kg	0.78	n	NBA	3.5	U	3.5	U	3	U	2.8	U
Vanadium	7440622	6010C	mg/Kg	390	n	NBA	28.7		30.1		29.5		27.6	
Zinc	7440666	6010C	mg/Kg	23000	n	121	117		**123**		**125**		**132**	
Mercury	7439976	7471B	mg/Kg	11	n	0.18	**0.31**		**0.22**		**0.23**		0.15	
PCB-1016	12674112	8082A	µg/Kg	4100	n	59.8	29	U	29	U	28	U	24	U
PCB-1221	11104282	8082A	µg/Kg	2000	n	59.8	29	U	29	U	28	U	24	U
PCB-1232	11141165	8082A	µg/Kg	1700	n	59.8	29	U	29	U	28	U	24	U
PCB-1242	53469219	8082A	µg/Kg	2300	n	59.8	29	U	29	U	28	U	24	U
PCB-1248	12672296	8082A	µg/Kg	2300	n	59.8	29	U	29	U	28	U	24	U
PCB-1254	11097691	8082A	µg/Kg	1200	n	59.8	29	U	29	U	28	U	24	U
PCB-1260	11096825	8082A	µg/Kg	2400	n	59.8	29	U	20	J	20	J	36	
PCB-1262	37324235	8082A	µg/Kg	NBA		NBA	29	U	29	U	28	U	24	U
PCB-1268	11100144	8082A	µg/Kg	NBA		NBA	29	U	29	U	28	U	24	U
1,1,1,2-Tetrachloroethane	630206	8260B	µg/Kg	20000	n	NBA	9.6	U	9.2	U	9	U	8.4	U
1,1,1-Trichloroethane	71556	8260B	µg/Kg	8100000	n	170	9.6	U	9.2	U	9	U	8.4	U
1,1,2,2-Tetrachloroethane	79345	8260B	µg/Kg	6000	n	940	9.6	U	9.2	U	9	U	8.4	U
1,1,2-Trichloroethane	79005	8260B	µg/Kg	1500	n	1240	9.6	U	9.2	U	9	U	8.4	U
1,1-Dichloroethane	75343	8260B	µg/Kg	36000	n	0.575	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
1,1-Dichloroethene	75354	8260B	µg/Kg	230000	n	31	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
1,1-Dichloropropene	563586	8260B	µg/Kg	NBA		NBA	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
1,2,3-Trichlorobenzene	87616	8260B	µg/Kg	63000	n	858	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
1,2,3-Trichloropropane	96184	8260B	µg/Kg	51	n	NBA	9.6	U	9.2	U	9	U	8.4	U
1,2,4-Trichlorobenzene	120821	8260B	µg/Kg	58000	n	9200	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
1,2,4-Trimethylbenzene	95636	8260B	µg/Kg	58000	n	NBA	9.6	U	9.2	U	9	U	8.4	U
1,2-Dibromo-3-Chloropropane	96128	8260B	µg/Kg	53	n	NBA	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
1,2-Dibromoethane	106934	8260B	µg/Kg	360	n	NBA	9.6	U	9.2	U	9	U	8.4	U
1,2-Dichlorobenzene	95501	8260B	µg/Kg	1800000	n	340	9.6	U	9.2	U	9	U	8.4	U
1,2-Dichloroethane	107062	8260B	µg/Kg	4600	n	260	9.6	U	9.2	U	9	U	8.4	U
1,2-Dichloroethene, Total	540590	8260B	µg/Kg	NBA		NBA	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
1,2-Dichloropropane	78875	8260B	µg/Kg	10000	n	333	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ

Table A.2-5
Sediment Data
LO-58
Caribou, Maine

						Sample Point ID	LO58-SD01-042112		LO58-SD02-042112		LO58-SD-DUP-01		LO58-SD03-042112	
						Sample Description	SD01		SD02		DUP OF SD02		SD03	
						Sample Date	4/21/2012		4/21/2012		4/21/2012		4/21/2012	
				Screening Toxicity Value										
Analyte	**CAS Number**	**Method**	**Units**	**Human Health[a]**		**Ecological[b]**								
1,3,5-Trimethylbenzene	108678	8260B	µg/Kg	780000	n	NBA	9.6	U	9.2	U	9	U	8.4	U
1,3-Dichlorobenzene	541731	8260B	µg/Kg	NBA		1700	9.6	U	9.2	U	9	U	8.4	U
1,3-Dichloropropane	142289	8260B	µg/Kg	1600000	n	NBA	9.6	U	9.2	U	9	U	8.4	U
1,4-Dichlorobenzene	106467	8260B	µg/Kg	26000	n	350	9.6	U	9.2	U	9	U	8.4	U
1,4-Dioxane	123911	8260B	µg/Kg	53000	n	NBA	480	UJ	460	UJ	450	UJ	420	UJ
2,2-Dichloropropane	594207	8260B	µg/Kg	NBA		NBA	9.6	U	9.2	U	9	U	8.4	U
2-Butanone	78933	8260B	µg/Kg	27000000	n	42.4	9.6	U	9.2	U	9	U	8.4	U
2-Chloroethyl vinyl ether	110758	8260B	µg/Kg	NBA		NBA	9.6	U	9.2	U	9	U	8.4	U
2-Chlorotoluene	95498	8260B	µg/Kg	1600000	n	NBA	9.6	U	9.2	U	9	U	8.4	U
2-Hexanone	591786	8260B	µg/Kg	200000	n	58.2	9.6	U	9.2	U	9	U	8.4	U
4-Isopropyltoluene	99876	8260B	µg/Kg	NBA		NBA	9.6	U	9.2	U	9	U	8.4	U
4-Methyl-2-pentanone	108101	8260B	µg/Kg	33000000	n	25.1	9.6	U	9.2	U	9	U	8.4	U
Acetone	67641	8260B	µg/Kg	61000000	n	9.9	**15**	J	7.3	J	**16**	J	**17**	J
Benzene	71432	8260B	µg/Kg	12000	n	57	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Bromobenzene	108861	8260B	µg/Kg	290000	n	NBA	9.6	U	9.2	U	9	U	8.4	U
Bromochloromethane	74975	8260B	µg/Kg	150000	n	NBA	9.6	U	9.2	U	9	U	8.4	U
Bromodichloromethane	75274	8260B	µg/Kg	2900	n	NBA	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Bromoform	75252	8260B	µg/Kg	190000	n	650	9.6	U	9.2	U	9	U	8.4	U
Bromomethane	74839	8260B	µg/Kg	6800	n	1.37	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Carbon disulfide	75150	8260B	µg/Kg	770000	n	0.851	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Carbon tetrachloride	56235	8260B	µg/Kg	6500	n	1200	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Chlorobenzene	108907	8260B	µg/Kg	280000	n	820	9.6	U	9.2	U	9	U	8.4	U
Dibromochloromethane	124481	8260B	µg/Kg	83000	n	NBA	9.6	U	9.2	U	9	U	8.4	U
Chloroethane	75003	8260B	µg/Kg	14000000	n	NBA	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Chloroform	67663	8260B	µg/Kg	3200	n	121	9.6	UJ	9.2	UJ	0.96	J	0.96	J
Chloromethane	74873	8260B	µg/Kg	110000	n	NBA	9.6	U	9.2	U	9	U	8.4	U
cis-1,2-Dichloroethene	156592	8260B	µg/Kg	160000	n	NBA	9.6	U	9.2	U	9	U	8.4	U
cis-1,3-Dichloropropene	10061015	8260B	µg/Kg	NBA		NBA	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Cyclohexane	110827	8260B	µg/Kg	6500000	n	NBA	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Dibromomethane	74953	8260B	µg/Kg	24000	n	NBA	9.6	U	9.2	U	9	U	8.4	U

Table A.2-5
Sediment Data
LO-58
Caribou, Maine

						Sample Point ID	LO58-SD01-042112		LO58-SD02-042112		LO58-SD-DUP-01		LO58-SD03-042112	
						Sample Description	SD01		SD02		DUP OF SD02		SD03	
						Sample Date	4/21/2012		4/21/2012		4/21/2012		4/21/2012	
				Screening Toxicity Value										
Analyte	CAS Number	Method	Units	Human Health[a]		Ecological[b]								
Dichlorodifluoromethane	75718	8260B	µg/Kg	87000	n	NBA	9.6	U	9.2	U	9	U	8.4	U
Ethylbenzene	100414	8260B	µg/Kg	58000	n	3600	9.6	U	9.2	U	9	U	8.4	U
Freon TF	76131	8260B	µg/Kg	40000000	n	NBA	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Hexachlorobutadiene	87683	8260B	µg/Kg	12000	n	26.5	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Methyl iodide	74884	8260B	µg/Kg	NBA		NBA	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Isobutyl alcohol	78831	8260B	µg/Kg	23000000	n	NBA	480	UJ	460	UJ	450	UJ	420	UJ
Isopropylbenzene	98828	8260B	µg/Kg	1900000	n	86	9.6	U	9.2	U	9	U	8.4	U
m&p-Xylene	179601231	8260B	µg/Kg	NBA		NBA	9.6	U	9.2	U	9	U	8.4	U
Methyl acetate	79209	8260B	µg/Kg	78000000	n	NBA	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Methylcyclohexane	108872	8260B	µg/Kg	NBA		NBA	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Methyl t-butyl ether	1634044	8260B	µg/Kg	470000	n	NBA	9.6	U	9.2	U	9	U	8.4	U
Methylene Chloride	75092	8260B	µg/Kg	350000	n	159	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Naphthalene	91203	8260B	µg/Kg	38000	n	480	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
n-Butylbenzene	104518	8260B	µg/Kg	3900000	n	NBA	0.43	J	9.2	UJ	9	UJ	8.4	UJ
n-Propylbenzene	103651	8260B	µg/Kg	3800000	n	NBA	9.6	U	9.2	U	9	U	8.4	U
o-Xylene	95476	8260B	µg/Kg	650000	n	NBA	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
4-Chlorotoluene	106434	8260B	µg/Kg	1600000	n	NBA	9.6	U	9.2	U	9	U	8.4	U
sec-Butylbenzene	135988	8260B	µg/Kg	7800000	n	NBA	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Styrene	100425	8260B	µg/Kg	6000000	n	559	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
tert-Butylbenzene	98066	8260B	µg/Kg	7800000	n	NBA	9.6	U	9.2	U	9	U	8.4	U
Tetrachloroethene	127184	8260B	µg/Kg	81000	n	530	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Tetrahydrofuran	109999	8260B	µg/Kg	18000000	n	NBA	96	U	92	U	90	U	84	U
Toluene	108883	8260B	µg/Kg	4900000	n	670	9.6	U	9.2	U	9	U	8.4	U
trans-1,2-Dichloroethene	156605	8260B	µg/Kg	1600000	n	1050	9.6	U	9.2	U	9	U	8.4	U
trans-1,3-Dichloropropene	10061026	8260B	µg/Kg	NBA		NBA	9.6	U	9.2	U	9	U	8.4	U
Trichloroethene	79016	8260B	µg/Kg	4100	n	1600	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Trichlorofluoromethane	75694	8260B	µg/Kg	23000000	n	NBA	9.6	U	9.2	U	9	U	8.4	U
Vinyl acetate	108054	8260B	µg/Kg	910000	n	NBA		R		R		R		R
Vinyl chloride	75014	8260B	µg/Kg	590	n	202	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ
Xylenes, Total	1330207	8260B	µg/Kg	580000	n	433	9.6	UJ	9.2	UJ	9	UJ	8.4	UJ

Table A.2-5
Sediment Data
LO-58
Caribou, Maine

						Sample Point ID	**LO58-SD01-042112**		**LO58-SD02-042112**		**LO58-SD-DUP-01**		**LO58-SD03-042112**	
						Sample Description	**SD01**		**SD02**		**DUP OF SD02**		**SD03**	
						Sample Date	**4/21/2012**		**4/21/2012**		**4/21/2012**		**4/21/2012**	
				Screening Toxicity Value										
Analyte	**CAS Number**	**Method**	**Units**	**Human Health^a**		**Ecological^b**								
1,1'-Biphenyl	92524	8270C PAH	µg/Kg	47000	n	NBA	9.7	U	11	U	3.3	J	24	U
1-Methylnaphthalene	90120	8270C PAH	µg/Kg	180000	n	NBA	3.4	J	4	J	3.8	J	9.6	J
1-Methylphenanthrene	832699	8270C PAH	µg/Kg	NBA		NBA	33		42		40		120	
2,3,5-Trimethylnaphthalene	2245387	8270C PAH	µg/Kg	NBA		NBA	3.1	J	3.8	J	2.9	J	12	J
2,6-Dimethylnaphthalene	581420	8270C PAH	µg/Kg	NBA		NBA	9.7	U	2.8	J	11	U	9.3	J
2-Methylnaphthalene	91576	8270C PAH	µg/Kg	240000	n	20.2	3.4	J	4.5	J	4.6	J	11	J
Acenaphthene	83329	8270C PAH	µg/Kg	3600000	n	620	9.7	U	5.3	J	5	J	12	J
Acenaphthylene	208968	8270C PAH	µg/Kg	NBA		5.9	**19**	J	**16**	J	**22**	J	**26**	J
Anthracene	120127	8270C PAH	µg/Kg	18000000	n	57.2	9.4	J	13	J	13	J	52	J
Benzo[a]anthracene	56553	8270C PAH	µg/Kg	1600	n	108	**150**		**220**		**200**		**570**	
Benzo[a]pyrene	50328	8270C PAH	µg/Kg	160	n	150	**170**		**240**		**210**		**490**	
Benzo[b]fluoranthene	205992	8270C PAH	µg/Kg	1600	n	10400	270		390		330		760	
Benzo[e]pyrene	192972	8270C PAH	µg/Kg	NBA		NBA	140		200		170		390	
Benzo[g,h,i]perylene	191242	8270C PAH	µg/Kg	NBA		170	160		170		150		**340**	
Benzo[k]fluoranthene	207089	8270C PAH	µg/Kg	16000	n	240	85		120		100		**250**	
Chrysene	218019	8270C PAH	µg/Kg	160000	n	166	**170**		**230**		**210**		**530**	
Dibenz(a,h)anthracene	53703	8270C PAH	µg/Kg	160	n	33	**44**		**46**		**45**		**100**	
Dibenzothiophene	132650	8270C PAH	µg/Kg	780000	n	NBA	7.6	J	9.5	J	8.8	J	30	J
Fluoranthene	206440	8270C PAH	µg/Kg	2400000	n	2900	300		410		360		970	
Fluorene	86737	8270C PAH	µg/Kg	2400000	n	540	7.7	J	9.5	J	9	J	29	J
Indeno[1,2,3-cd]pyrene	193395	8270C PAH	µg/Kg	1600	n	200	140		150		140		**310**	
Naphthalene	91203	8270C PAH	µg/Kg	38000	n	480	3.9	J	4.8	J	5.1	J	8.8	J
Perylene	198550	8270C PAH	µg/Kg	NBA		NBA	39		59		50		130	
Phenanthrene	85018	8270C PAH	µg/Kg	NBA		850	130		170		150		500	
Pyrene	129000	8270C PAH	µg/Kg	1800000	n	195	**290**		**440**		**410**		**1100**	
1,1'-Biphenyl	92524	8270D	µg/Kg	47000	n	NBA	560	U	560	U	550	U	490	U
1,2,4,5-Tetrachlorobenzene	95943	8270D	µg/Kg	23000	n	NBA	560	U	560	U	550	U	490	U
1,2,4-Trichlorobenzene	120821	8270D	µg/Kg	58000	n	9200	560	U	560	U	550	U	490	U
1,2-Dichlorobenzene	95501	8270D	µg/Kg	1800000	n	340	560	U	560	U	550	U	490	U
1,3-Dichlorobenzene	541731	8270D	µg/Kg	NBA		1700	560	U	560	U	550	U	490	U

Table A.2-5
Sediment Data
LO-58
Caribou, Maine

						Sample Point ID	**LO58-SD01-042112**		**LO58-SD02-042112**		**LO58-SD-DUP-01**		**LO58-SD03-042112**	
						Sample Description	**SD01**		**SD02**		**DUP OF SD02**		**SD03**	
						Sample Date	**4/21/2012**		**4/21/2012**		**4/21/2012**		**4/21/2012**	
				Screening Toxicity Value										
Analyte	**CAS Number**	**Method**	**Units**	**Human Health**[a]		**Ecological**[b]								
1,4-Dichlorobenzene	106467	8270D	µg/Kg	26000	n	350	560	U	560	U	550	U	490	U
1-Methylnaphthalene	90120	8270D	µg/Kg	180000	n	NBA	560	UJ	560	UJ	550	UJ	19	J
2,3,4,6-Tetrachlorophenol	58902	8270D	µg/Kg	1900000	n	NBA	560	U	560	U	550	U	490	U
2,4,5-Trichlorophenol	95954	8270D	µg/Kg	6300000	n	NBA	1400	U	1400	U	1400	U	1200	U
2,4,6-Trichlorophenol	88062	8270D	µg/Kg	63000	n	213	560	U	560	U	550	U	490	U
2,4-Dichlorophenol	120832	8270D	µg/Kg	190000	n	117	560	U	560	U	550	U	490	U
2,4-Dimethylphenol	105679	8270D	µg/Kg	1300000	n	29	560	U	560	U	550	U	490	U
2,4-Dinitrophenol	51285	8270D	µg/Kg	130000	n	6.21	1400	U	1400	U	1400	U	1200	U
2,4-Dinitrotoluene	121142	8270D	µg/Kg	17000	n	41.6	560	U	560	U	550	U	490	U
2,6-Dichlorophenol	87650	8270D	µg/Kg	NBA		NBA	560	U	560	U	550	U	490	U
2,6-Dinitrotoluene	606202	8270D	µg/Kg	3600	n	39.8	560	U	560	U	550	U	490	U
2-Chloronaphthalene	91587	8270D	µg/Kg	4800000	n	417	560	U	560	U	550	U	490	U
2-Chlorophenol	95578	8270D	µg/Kg	390000	n	31.2	560	U	560	U	550	U	490	U
2-Methylnaphthalene	91576	8270D	µg/Kg	240000	n	20.2	560	U	560	U	550	U	490	U
2-Methylphenol	95487	8270D	µg/Kg	3200000	n	55.4	560	U	560	U	550	U	490	U
2-Nitroaniline	88744	8270D	µg/Kg	630000	n	NBA	1400	U	1400	U	1400	U	1200	U
2-Nitrophenol	88755	8270D	µg/Kg	NBA		NBA	560	U	560	U	550	U	490	U
3 & 4 Methylphenol	15831104	8270D	µg/Kg	NBA		NBA	1100	U	1100	U	1100	U	990	U
3,3'-Dichlorobenzidine	91941	8270D	µg/Kg	12000	n	127		R		R		R		R
3-Nitroaniline	99092	8270D	µg/Kg	NBA		NBA		R		R		R		R
4,6-Dinitro-2-methylphenol	534521	8270D	µg/Kg	5100	n	104	1400	U	1400	U	1400	U	1200	U
4-Bromophenyl phenyl ether	101553	8270D	µg/Kg	NBA		1300	560	U	560	U	550	U	490	U
4-Chloro-3-methylphenol	59507	8270D	µg/Kg	6300000	n	388	560	UJ	560	UJ	550	UJ	490	UJ
4-Chloroaniline	106478	8270D	µg/Kg	27000	n	146		R		R		R		R
4-Chlorophenyl phenyl ether	7005723	8270D	µg/Kg	NBA		NBA	560	U	560	U	550	U	490	U
4-Nitroaniline	100016	8270D	µg/Kg	250000	n	NBA	1400	UJ	1400	UJ	1400	UJ	1200	UJ
4-Nitrophenol	100027	8270D	µg/Kg	NBA		NBA	1400	U	1400	U	1400	U	1200	U
Acenaphthene	83329	8270D	µg/Kg	3600000	n	620	560	U	560	U	550	U	19	J
Acenaphthylene	208968	8270D	µg/Kg	NBA		5.9	560	U	560	U	550	U	**38**	J
Acetophenone	98862	8270D	µg/Kg	7800000	n	NBA	560	U	560	U	550	U	490	U

Table A.2-5
Sediment Data
LO-58
Caribou, Maine

						Sample Point ID	LO58-SD01-042112		LO58-SD02-042112		LO58-SD-DUP-01		LO58-SD03-042112	
						Sample Description	SD01		SD02		DUP OF SD02		SD03	
						Sample Date	4/21/2012		4/21/2012		4/21/2012		4/21/2012	
				Screening Toxicity Value										
Analyte	**CAS Number**	**Method**	**Units**	**Human Health**[a]		**Ecological**[b]								
Aniline	62533	8270D	µg/Kg	440000	n	NBA		R		R		R		R
Anthracene	120127	8270D	µg/Kg	18000000	n	57.2	560	U	560	U	550	U	**150**	J
Atrazine	1912249	8270D	µg/Kg	24000	n	NBA	560	U	560	U	550	U	490	U
Azobenzene	103333	8270D	µg/Kg	56000	n	NBA	560	U	560	U	550	U	490	U
Benzaldehyde	100527	8270D	µg/Kg	1700000	n	NBA	560	U	560	U	550	U	490	U
Benzidine	92875	8270D	µg/Kg	5.3	n	1.7		R		R		R		R
Benzo[a]anthracene	56553	8270D	µg/Kg	1600	n	108	**150**	J	**220**	J	**210**	J	**870**	
Benzo[a]pyrene	50328	8270D	µg/Kg	160	n	150	**180**	J	**290**	J	**280**	J	**830**	
Benzo[b]fluoranthene	205992	8270D	µg/Kg	1600	n	10400	230	J	270	J	310	J	740	
Benzo[e]pyrene	192972	8270D	µg/Kg	NBA		NBA	180	J	270	J	250	J	680	
Benzo[g,h,i]perylene	191242	8270D	µg/Kg	NBA		170	120	J	**230**	J	**190**	J	**620**	
Benzo[k]fluoranthene	207089	8270D	µg/Kg	16000	n	240	180	J	**330**	J	**260**	J	**870**	
Benzoic acid	65850	8270D	µg/Kg	250000000	n	650	1400	U	1400	U	1400	U	1200	U
Benzyl alcohol	100516	8270D	µg/Kg	6300000	n	1.04	560	U	560	U	550	U	490	U
Bis(2-chloroethoxy)methane	111911	8270D	µg/Kg	190000	n	NBA	560	U	560	U	550	U	490	U
Bis(2-chloroethyl)ether	111444	8270D	µg/Kg	2300	n	3520	560	U	560	U	550	U	490	U
2,2'-oxybis[1-chloropropane]	108601	8270D	µg/Kg	3100000	n	NBA	560	UJ	560	UJ	550	UJ	490	UJ
Bis(2-ethylhexyl) phthalate	117817	8270D	µg/Kg	390000	n	180	560	U	560	U	52	J	88	J
Butyl benzyl phthalate	85687	8270D	µg/Kg	2900000	n	11000	560	U	560	U	550	U	40	J
Caprolactam	105602	8270D	µg/Kg	31000000	n	NBA	560	UJ	560	UJ	550	UJ	490	UJ
Carbazole	86748	8270D	µg/Kg	NBA		NBA	560	U	560	U	550	U	35	J
Chrysene	218019	8270D	µg/Kg	160000	n	166	**250**	J	**330**	J	**320**	J	**1100**	
Dibenz(a,h)anthracene	53703	8270D	µg/Kg	160	n	33	560	U	560	U	550	U	**160**	J
Dibenzofuran	132649	8270D	µg/Kg	73000	n	2000	560	U	560	U	550	U	490	U
Diethyl phthalate	84662	8270D	µg/Kg	51000000	n	630	560	U	560	U	550	U	490	U
Dimethyl phthalate	131113	8270D	µg/Kg	NBA		NBA	560	U	560	U	550	U	490	U
Di-n-butyl phthalate	84742	8270D	µg/Kg	6300000	n	11000	560	U	560	U	550	U	490	U
Di-n-octyl phthalate	117840	8270D	µg/Kg	630000	n	40600	560	U	560	U	550	U	88	J
Fluoranthene	206440	8270D	µg/Kg	2400000	n	2900	180	J	310	J	290	J	1300	J
Fluorene	86737	8270D	µg/Kg	2400000	n	540	560	U	560	U	550	U	61	J

Table A.2-5
Sediment Data
LO-58
Caribou, Maine

						Sample Point ID	LO58-SD01-042112		LO58-SD02-042112		LO58-SD-DUP-01		LO58-SD03-042112	
						Sample Description	SD01		SD02		DUP OF SD02		SD03	
						Sample Date	4/21/2012		4/21/2012		4/21/2012		4/21/2012	
				Screening Toxicity Value										
Analyte	**CAS Number**	**Method**	**Units**	**Human Health**[a]		**Ecological**[b]								
Hexachlorobenzene	118741	8270D	µg/Kg	2100	n	20	560	U	560	U	550	U	490	U
Hexachlorobutadiene	87683	8270D	µg/Kg	12000	n	26.5	560	U	560	U	550	U	490	U
Hexachlorocyclopentadiene	77474	8270D	µg/Kg	1800	n	NBA	560	U	560	U	550	U	490	U
Hexachloroethane	67721	8270D	µg/Kg	18000	n	1000	560	UJ	560	UJ	550	UJ	490	UJ
Indeno[1,2,3-cd]pyrene	193395	8270D	µg/Kg	1600	n	200	560	U	190	J	170	J	**550**	
Isophorone	78591	8270D	µg/Kg	5700000	n	432	560	U	560	U	550	U	490	U
Naphthalene	91203	8270D	µg/Kg	38000	n	480	560	U	560	U	550	U	490	U
Nitrobenzene	98953	8270D	µg/Kg	51000	n	145	560	U	560	U	550	U	490	U
N-Nitrosodimethylamine	62759	8270D	µg/Kg	20	n	NBA	560	U	560	U	550	U	490	U
N-Nitrosodi-n-propylamine	621647	8270D	µg/Kg	780	n	NBA	560	U	560	U	550	U	490	U
N-Nitrosodiphenylamine	86306	8270D	µg/Kg	1100000	n	2680	650	U	650	U	650	U	570	U
Pentachlorophenol	87865	8270D	µg/Kg	10000	n	504	1400	U	1400	U	1400	U	1200	U
Perylene	198550	8270D	µg/Kg	NBA		NBA	43	J	81	J	74	J	220	J
Phenanthrene	85018	8270D	µg/Kg	NBA		850	130	J	200	J	200	J	**1200**	J
Phenol	108952	8270D	µg/Kg	19000000	n	420	560	UJ	560	UJ	550	UJ	490	UJ
Pyrene	129000	8270D	µg/Kg	1800000	n	195	**470**	J	**570**		**610**		**2500**	
Pyridine	110861	8270D	µg/Kg	78000	n	NBA	560	U	560	U	550	U	490	U

[a] Regional Screening Level (RSL) Residential Soil Table (May 2016).

[b] As per QAPP.

[c] See Table A.2-2 for associated October trip blank results.

Bold values indicate exceedance of residential RSL or ecological RSL.

µg/kg = Micrograms per kilogram.

C = Cancer based, target risk equals 1E-05.

J = Result is <RL but >=MDL and the concentration is an approximate value.

mg/kg = Milligram per kilogram.

NBA = No benchmark available.

NC = Noncancer based, target hazard quotient equals 1.0.

U = Not detected.

UJ = Not detected. SQL is <RL but >=MDL and the SQL is an approximate value.

Table A.2-5
Sediment Data
LO-58
Caribou, Maine

						Sample Point ID	LO58-TB-01		LO58-SD01-100712		LO58-SD02-100712		LO58-SD03-100712	
						Sample Description	Trip Blank (µg/L)		SD01		SD02		SD03	
						Sample Date	4/22/2012		10/7/2012		10/7/2012		10/7/2012	
				Screening Toxicity Value										
Analyte	CAS Number	Method	Units	Human Health[a]		Ecological[b]								
Percent Solids	DEP1005	D4643	%	-		-			58.1		59.6		68.9	
Total Organic Carbon	DEP2001	E415.1	mg/Kg	NBA		10000								
C11-C22 Aromatic Hydrocarbons	EPH4	MADEP EPH	µg/kg	NBA		NBA								
C19-C36 Aliphatic Hydrocarbons	EPH3	MADEP EPH	µg/kg	NBA		NBA								
C9-C18 Aliphatic Hydrocarbons	EPH2	MADEP EPH	µg/kg	NBA		NBA								
Unadjusted C11-C22 Aromatics	EPH1	MADEP EPH	µg/kg	NBA		NBA								
C5-C8 Aliphatics Hydrocarbons	VPH3	MADEP VPH	µg/kg	NBA		NBA								
C9-C10 Aromatic Hydrocarbons	VPH5	MADEP VPH	µg/kg	NBA		NBA								
C9-C12 Aliphatic Hydrocarbons	VPH4	MADEP VPH	µg/kg	NBA		NBA								
Unadjusted C5-C8 Aliphatics	VPH1	MADEP VPH	µg/kg	NBA		NBA								
Unadjusted C9-C12 Aliphatics	VPH2	MADEP VPH	µg/kg	NBA		NBA								
Aluminum	7429905	6010C	mg/Kg	77000	n	14000								
Antimony	7440360	6010C	mg/Kg	31	n	2								
Arsenic	7440382	6010C	mg/Kg	6.8	n	9.79								
Barium	7440393	6010C	mg/Kg	15000	n	20								
Beryllium	7440417	6010C	mg/Kg	160	n	NBA								
Cadmium	7440439	6010C	mg/Kg	71	n	0.99								
Calcium	7440702	6010C	mg/Kg	NBA		NBA								
Chromium	7440473	6010C	mg/Kg	3	n	43.4								
Cobalt	7440484	6010C	mg/Kg	23	n	50								
Copper	7440508	6010C	mg/Kg	3100	n	31.6								
Iron	7439896	6010C	mg/Kg	55000	n	20000								
Lead	7439921	6010C	mg/Kg	400	n	35.8								
Magnesium	7439954	6010C	mg/Kg	NBA		NBA								
Manganese	7439965	6010C	mg/Kg	1800	n	460								
Nickel	7440020	6010C	mg/Kg	1500	n	22.7								
Potassium	7440097	6010C	mg/Kg	NBA		NBA								
Selenium	7782492	6010C	mg/Kg	390	n	2								
Silver	7440224	6010C	mg/Kg	390	n	0.5								
Sodium	7440235	6010C	mg/Kg	NBA		NBA								

Table A.2-5
Sediment Data
LO-58
Caribou, Maine

						Sample Point ID	LO58-TB-01		LO58-SD01-100712		LO58-SD02-100712		LO58-SD03-100712	
						Sample Description	Trip Blank (µg/L)		SD01		SD02		SD03	
						Sample Date	4/22/2012		10/7/2012		10/7/2012		10/7/2012	
				Screening Toxicity Value										
Analyte	**CAS Number**	**Method**	**Units**	**Human Health[a]**		**Ecological[b]**								
Thallium	7440280	6010C	mg/Kg	0.78	n	NBA								
Vanadium	7440622	6010C	mg/Kg	390	n	NBA								
Zinc	7440666	6010C	mg/Kg	23000	n	121								
Mercury	7439976	7471B	mg/Kg	11	n	0.18								
PCB-1016	12674112	8082A	µg/Kg	4100	n	59.8								
PCB-1221	11104282	8082A	µg/Kg	2000	n	59.8								
PCB-1232	11141165	8082A	µg/Kg	1700	n	59.8								
PCB-1242	53469219	8082A	µg/Kg	2300	n	59.8								
PCB-1248	12672296	8082A	µg/Kg	2300	n	59.8								
PCB-1254	11097691	8082A	µg/Kg	1200	n	59.8								
PCB-1260	11096825	8082A	µg/Kg	2400	n	59.8								
PCB-1262	37324235	8082A	µg/Kg	NBA		NBA								
PCB-1268	11100144	8082A	µg/Kg	NBA		NBA								
1,1,1,2-Tetrachloroethane	630206	8260B	µg/Kg	20000	n	NBA	1	U	12	U	11	U	5.8	UJ
1,1,1-Trichloroethane	71556	8260B	µg/Kg	8100000	n	170	1	U	12	U	11	U	5.8	UJ
1,1,2,2-Tetrachloroethane	79345	8260B	µg/Kg	6000	n	940	1	U	12	U	11	U	5.8	UJ
1,1,2-Trichloroethane	79005	8260B	µg/Kg	1500	n	1240	1	U	12	U	11	U	5.8	UJ
1,1-Dichloroethane	75343	8260B	µg/Kg	36000	n	0.575	1	U	12	U	11	U	5.8	UJ
1,1-Dichloroethene	75354	8260B	µg/Kg	230000	n	31	1	U	12	U	11	U	5.8	UJ
1,1-Dichloropropene	563586	8260B	µg/Kg	NBA		NBA	1	U	12	U	11	U	5.8	UJ
1,2,3-Trichlorobenzene	87616	8260B	µg/Kg	63000	n	858	1	U	12	UJ	11	UJ	5.8	UJ
1,2,3-Trichloropropane	96184	8260B	µg/Kg	51	n	NBA	1	U	12	U	11	U	5.8	UJ
1,2,4-Trichlorobenzene	120821	8260B	µg/Kg	58000	n	9200	1	U	12	UJ	11	UJ	5.8	UJ
1,2,4-Trimethylbenzene	95636	8260B	µg/Kg	58000	n	NBA	1	U	12	UJ	11	UJ	5.8	UJ
1,2-Dibromo-3-Chloropropane	96128	8260B	µg/Kg	53	n	NBA	1	UJ	12	U	11	U	5.8	UJ
1,2-Dibromoethane	106934	8260B	µg/Kg	360	n	NBA	1	U	12	U	11	U	5.8	UJ
1,2-Dichlorobenzene	95501	8260B	µg/Kg	1800000	n	340	1	U	12	UJ	11	UJ	5.8	UJ
1,2-Dichloroethane	107062	8260B	µg/Kg	4600	n	260	1	UJ	12	U	11	U	5.8	UJ
1,2-Dichloroethene, Total	540590	8260B	µg/Kg	NBA		NBA	1	U	12	U	11	U	5.8	UJ
1,2-Dichloropropane	78875	8260B	µg/Kg	10000	n	333	1	U	12	U	11	U	5.8	UJ

Table A.2-5
Sediment Data
LO-58
Caribou, Maine

						Sample Point ID	**LO58-TB-01**		**LO58-SD01-100712**		**LO58-SD02-100712**		**LO58-SD03-100712**	
						Sample Description	**Trip Blank (µg/L)**		**SD01**		**SD02**		**SD03**	
						Sample Date	**4/22/2012**		**10/7/2012**		**10/7/2012**		**10/7/2012**	
				Screening Toxicity Value										
Analyte	**CAS Number**	**Method**	**Units**	**Human Health[a]**		**Ecological[b]**								
1,3,5-Trimethylbenzene	108678	8260B	µg/Kg	780000	n	NBA	1	U	12	U	11	U	5.8	UJ
1,3-Dichlorobenzene	541731	8260B	µg/Kg	NBA		1700	1	U	12	UJ	11	UJ	5.8	UJ
1,3-Dichloropropane	142289	8260B	µg/Kg	1600000	n	NBA	1	U	12	U	11	U	5.8	UJ
1,4-Dichlorobenzene	106467	8260B	µg/Kg	26000	n	350	1	U	12	UJ	11	UJ	5.8	UJ
1,4-Dioxane	123911	8260B	µg/Kg	53000	n	NBA	50	U	620	U	530	U	290	UJ
2,2-Dichloropropane	594207	8260B	µg/Kg	NBA		NBA	1	U	12	U	11	U	5.8	UJ
2-Butanone	78933	8260B	µg/Kg	27000000	n	42.4	5	U	41		33	J	35	J
2-Chloroethyl vinyl ether	110758	8260B	µg/Kg	NBA		NBA	1	U	12	U	11	U	5.8	UJ
2-Chlorotoluene	95498	8260B	µg/Kg	1600000	n	NBA	1	U	12	U	11	U	5.8	UJ
2-Hexanone	591786	8260B	µg/Kg	200000	n	58.2	5	U	**97**		11	U	5.8	UJ
4-Isopropyltoluene	99876	8260B	µg/Kg	NBA		NBA	1	U	0.78	J	0.35	J	2.3	J
4-Methyl-2-pentanone	108101	8260B	µg/Kg	33000000	n	25.1	5	U	12	U	6.5	J	6.6	J
Acetone	67641	8260B	µg/Kg	61000000	n	9.9	5	U	**530**		**410**	J	**390**	J
Benzene	71432	8260B	µg/Kg	12000	n	57	1	U	12	U	11	U	5.8	UJ
Bromobenzene	108861	8260B	µg/Kg	290000	n	NBA	1	U	12	UJ	11	UJ	5.8	UJ
Bromochloromethane	74975	8260B	µg/Kg	150000	n	NBA	1	U	12	U	11	U	5.8	UJ
Bromodichloromethane	75274	8260B	µg/Kg	2900	n	NBA	1	U	12	U	11	U	5.8	UJ
Bromoform	75252	8260B	µg/Kg	190000	n	650	1	U	12	U	11	U	5.8	UJ
Bromomethane	74839	8260B	µg/Kg	6800	n	1.37	1	U	12	U	11	U	5.8	UJ
Carbon disulfide	75150	8260B	µg/Kg	770000	n	0.851	1	U	12	U	11	U	**0.88**	J
Carbon tetrachloride	56235	8260B	µg/Kg	6500	n	1200	1	U	12	U	11	U	5.8	UJ
Chlorobenzene	108907	8260B	µg/Kg	280000	n	820	1	U	12	U	11	U	5.8	UJ
Dibromochloromethane	124481	8260B	µg/Kg	83000	n	NBA	1	U	12	U	11	U	5.8	UJ
Chloroethane	75003	8260B	µg/Kg	14000000	n	NBA	1	U	12	UJ	11	UJ	5.8	UJ
Chloroform	67663	8260B	µg/Kg	3200	n	121	1	U	12	U	11	U	5.8	UJ
Chloromethane	74873	8260B	µg/Kg	110000	n	NBA	1	U	12	U	11	U	5.8	UJ
cis-1,2-Dichloroethene	156592	8260B	µg/Kg	160000	n	NBA	1	U	12	U	11	U	5.8	UJ
cis-1,3-Dichloropropene	10061015	8260B	µg/Kg	NBA		NBA	1	U	12	U	11	U	5.8	UJ
Cyclohexane	110827	8260B	µg/Kg	6500000	n	NBA	1	U	12	U	11	U	5.8	UJ
Dibromomethane	74953	8260B	µg/Kg	24000	n	NBA	1	U	12	U	11	U	5.8	UJ

Table A.2-5
Sediment Data
LO-58
Caribou, Maine

						Sample Point ID	LO58-TB-01		LO58-SD01-100712		LO58-SD02-100712		LO58-SD03-100712	
						Sample Description	Trip Blank (µg/L)		SD01		SD02		SD03	
						Sample Date	4/22/2012		10/7/2012		10/7/2012		10/7/2012	
				Screening Toxicity Value										
Analyte	**CAS Number**	**Method**	**Units**	**Human Health[a]**		**Ecological[b]**								
Dichlorodifluoromethane	75718	8260B	µg/Kg	87000	n	NBA	1	U	12	U	11	U	5.8	UJ
Ethylbenzene	100414	8260B	µg/Kg	58000	n	3600	1	U	12	U	11	U	5.8	UJ
Freon TF	76131	8260B	µg/Kg	40000000	n	NBA	1	U	12	U	11	U	5.8	UJ
Hexachlorobutadiene	87683	8260B	µg/Kg	12000	n	26.5	1	U	12	U	11	U	5.8	UJ
Methyl iodide	74884	8260B	µg/Kg	NBA		NBA	1	U	4.5	J	3	J	2.1	J
Isobutyl alcohol	78831	8260B	µg/Kg	23000000	n	NBA	50	U	620	U	530	U	290	UJ
Isopropylbenzene	98828	8260B	µg/Kg	1900000	n	86	1	U	12	U	11	U	5.8	UJ
m&p-Xylene	179601231	8260B	µg/Kg	NBA		NBA	1	U	12	U	11	U	5.8	UJ
Methyl acetate	79209	8260B	µg/Kg	78000000	n	NBA	1	U	12		180	J	110	J
Methylcyclohexane	108872	8260B	µg/Kg	NBA		NBA	1	U	12	U	11	U	5.8	UJ
Methyl t-butyl ether	1634044	8260B	µg/Kg	470000	n	NBA	1	U	12	U	11	U	5.8	UJ
Methylene Chloride	75092	8260B	µg/Kg	350000	n	159	1	U	12	U	11	U	5.8	UJ
Naphthalene	91203	8260B	µg/Kg	38000	n	480	1	U	12	UJ	11	UJ	5.8	UJ
n-Butylbenzene	104518	8260B	µg/Kg	3900000	n	NBA	1	U	12	UJ	11	UJ	5.8	UJ
n-Propylbenzene	103651	8260B	µg/Kg	3800000	n	NBA	1	U	12	U	11	U	5.8	UJ
o-Xylene	95476	8260B	µg/Kg	650000	n	NBA	1	U	12	U	11	U	5.8	UJ
4-Chlorotoluene	106434	8260B	µg/Kg	1600000	n	NBA	1	U	12	UJ	11	UJ	5.8	UJ
sec-Butylbenzene	135988	8260B	µg/Kg	7800000	n	NBA	1	U	12	U	11	U	5.8	UJ
Styrene	100425	8260B	µg/Kg	6000000	n	559	1	U	2.2	J	11	U	5.8	UJ
tert-Butylbenzene	98066	8260B	µg/Kg	7800000	n	NBA	1	U	12	U	11	U	5.8	UJ
Tetrachloroethene	127184	8260B	µg/Kg	81000	n	530	1	U	12	U	11	U	5.8	UJ
Tetrahydrofuran	109999	8260B	µg/Kg	18000000	n	NBA	14	U	120	U	110	U	58	UJ
Toluene	108883	8260B	µg/Kg	4900000	n	670	1	U	0.84	J	0.63	J	2.4	J
trans-1,2-Dichloroethene	156605	8260B	µg/Kg	1600000	n	1050	1	U	12	U	11	U	5.8	UJ
trans-1,3-Dichloropropene	10061026	8260B	µg/Kg	NBA		NBA	1	U	12	U	11	U	5.8	UJ
Trichloroethene	79016	8260B	µg/Kg	4100	n	1600	1	U	12	U	11	U	5.8	UJ
Trichlorofluoromethane	75694	8260B	µg/Kg	23000000	n	NBA	1	U	12	U	11	U	5.8	UJ
Vinyl acetate	108054	8260B	µg/Kg	910000	n	NBA	1	U	12	U	11	U	5.8	UJ
Vinyl chloride	75014	8260B	µg/Kg	590	n	202	1	U	12	U	11	U	5.8	UJ
Xylenes, Total	1330207	8260B	µg/Kg	580000	n	433	1	U	12	U	11	U	5.8	UJ

Table A.2-5
Sediment Data
LO-58
Caribou, Maine

						Sample Point ID	LO58-TB-01		LO58-SD01-100712		LO58-SD02-100712		LO58-SD03-100712	
						Sample Description	Trip Blank (µg/L)		SD01		SD02		SD03	
						Sample Date	4/22/2012		10/7/2012		10/7/2012		10/7/2012	
				Screening Toxicity Value										
Analyte	CAS Number	Method	Units	Human Health[a]		Ecological[b]								
1,1'-Biphenyl	92524	8270C PAH	µg/Kg	47000	n	NBA								
1-Methylnaphthalene	90120	8270C PAH	µg/Kg	180000	n	NBA								
1-Methylphenanthrene	832699	8270C PAH	µg/Kg	NBA		NBA								
2,3,5-Trimethylnaphthalene	2245387	8270C PAH	µg/Kg	NBA		NBA								
2,6-Dimethylnaphthalene	581420	8270C PAH	µg/Kg	NBA		NBA								
2-Methylnaphthalene	91576	8270C PAH	µg/Kg	240000	n	20.2								
Acenaphthene	83329	8270C PAH	µg/Kg	3600000	n	620								
Acenaphthylene	208968	8270C PAH	µg/Kg	NBA		5.9								
Anthracene	120127	8270C PAH	µg/Kg	18000000	n	57.2								
Benzo[a]anthracene	56553	8270C PAH	µg/Kg	1600	n	108								
Benzo[a]pyrene	50328	8270C PAH	µg/Kg	160	n	150								
Benzo[b]fluoranthene	205992	8270C PAH	µg/Kg	1600	n	10400								
Benzo[e]pyrene	192972	8270C PAH	µg/Kg	NBA		NBA								
Benzo[g,h,i]perylene	191242	8270C PAH	µg/Kg	NBA		170								
Benzo[k]fluoranthene	207089	8270C PAH	µg/Kg	16000	n	240								
Chrysene	218019	8270C PAH	µg/Kg	160000	n	166								
Dibenz(a,h)anthracene	53703	8270C PAH	µg/Kg	160	n	33								
Dibenzothiophene	132650	8270C PAH	µg/Kg	780000	n	NBA								
Fluoranthene	206440	8270C PAH	µg/Kg	2400000	n	2900								
Fluorene	86737	8270C PAH	µg/Kg	2400000	n	540								
Indeno[1,2,3-cd]pyrene	193395	8270C PAH	µg/Kg	1600	n	200								
Naphthalene	91203	8270C PAH	µg/Kg	38000	n	480								
Perylene	198550	8270C PAH	µg/Kg	NBA		NBA								
Phenanthrene	85018	8270C PAH	µg/Kg	NBA		850								
Pyrene	129000	8270C PAH	µg/Kg	1800000	n	195								
1,1'-Biphenyl	92524	8270D	µg/Kg	47000	n	NBA								
1,2,4,5-Tetrachlorobenzene	95943	8270D	µg/Kg	23000	n	NBA								
1,2,4-Trichlorobenzene	120821	8270D	µg/Kg	58000	n	9200								
1,2-Dichlorobenzene	95501	8270D	µg/Kg	1800000	n	340								
1,3-Dichlorobenzene	541731	8270D	µg/Kg	NBA		1700								

Table A.2-5
Sediment Data
LO-58
Caribou, Maine

						Sample Point ID	LO58-TB-01		LO58-SD01-100712		LO58-SD02-100712		LO58-SD03-100712	
						Sample Description	Trip Blank (µg/L)		SD01		SD02		SD03	
						Sample Date	4/22/2012		10/7/2012		10/7/2012		10/7/2012	
				Screening Toxicity Value										
Analyte	**CAS Number**	**Method**	**Units**	**Human Health**[a]		**Ecological**[b]								
1,4-Dichlorobenzene	106467	8270D	µg/Kg	26000	n	350								
1-Methylnaphthalene	90120	8270D	µg/Kg	180000	n	NBA								
2,3,4,6-Tetrachlorophenol	58902	8270D	µg/Kg	1900000	n	NBA								
2,4,5-Trichlorophenol	95954	8270D	µg/Kg	6300000	n	NBA								
2,4,6-Trichlorophenol	88062	8270D	µg/Kg	63000	n	213								
2,4-Dichlorophenol	120832	8270D	µg/Kg	190000	n	117								
2,4-Dimethylphenol	105679	8270D	µg/Kg	1300000	n	29								
2,4-Dinitrophenol	51285	8270D	µg/Kg	130000	n	6.21								
2,4-Dinitrotoluene	121142	8270D	µg/Kg	17000	n	41.6								
2,6-Dichlorophenol	87650	8270D	µg/Kg	NBA		NBA								
2,6-Dinitrotoluene	606202	8270D	µg/Kg	3600	n	39.8								
2-Chloronaphthalene	91587	8270D	µg/Kg	4800000	n	417								
2-Chlorophenol	95578	8270D	µg/Kg	390000	n	31.2								
2-Methylnaphthalene	91576	8270D	µg/Kg	240000	n	20.2								
2-Methylphenol	95487	8270D	µg/Kg	3200000	n	55.4								
2-Nitroaniline	88744	8270D	µg/Kg	630000	n	NBA								
2-Nitrophenol	88755	8270D	µg/Kg	NBA		NBA								
3 & 4 Methylphenol	15831104	8270D	µg/Kg	NBA		NBA								
3,3'-Dichlorobenzidine	91941	8270D	µg/Kg	12000	n	127								
3-Nitroaniline	99092	8270D	µg/Kg	NBA		NBA								
4,6-Dinitro-2-methylphenol	534521	8270D	µg/Kg	5100	n	104								
4-Bromophenyl phenyl ether	101553	8270D	µg/Kg	NBA		1300								
4-Chloro-3-methylphenol	59507	8270D	µg/Kg	6300000	n	388								
4-Chloroaniline	106478	8270D	µg/Kg	27000	n	146								
4-Chlorophenyl phenyl ether	7005723	8270D	µg/Kg	NBA		NBA								
4-Nitroaniline	100016	8270D	µg/Kg	250000	n	NBA								
4-Nitrophenol	100027	8270D	µg/Kg	NBA		NBA								
Acenaphthene	83329	8270D	µg/Kg	3600000	n	620								
Acenaphthylene	208968	8270D	µg/Kg	NBA		5.9								
Acetophenone	98862	8270D	µg/Kg	7800000	n	NBA								

Table A.2-5
Sediment Data
LO-58
Caribou, Maine

						Sample Point ID	LO58-TB-01		LO58-SD01-100712		LO58-SD02-100712		LO58-SD03-100712	
						Sample Description	Trip Blank (µg/L)		SD01		SD02		SD03	
						Sample Date	4/22/2012		10/7/2012		10/7/2012		10/7/2012	
				Screening Toxicity Value										
Analyte	CAS Number	Method	Units	Human Health[a]		Ecological[b]								
Aniline	62533	8270D	µg/Kg	440000	n	NBA								
Anthracene	120127	8270D	µg/Kg	18000000	n	57.2								
Atrazine	1912249	8270D	µg/Kg	24000	n	NBA								
Azobenzene	103333	8270D	µg/Kg	56000	n	NBA								
Benzaldehyde	100527	8270D	µg/Kg	1700000	n	NBA								
Benzidine	92875	8270D	µg/Kg	5.3	n	1.7								
Benzo[a]anthracene	56553	8270D	µg/Kg	1600	n	108								
Benzo[a]pyrene	50328	8270D	µg/Kg	160	n	150								
Benzo[b]fluoranthene	205992	8270D	µg/Kg	1600	n	10400								
Benzo[e]pyrene	192972	8270D	µg/Kg	NBA		NBA								
Benzo[g,h,i]perylene	191242	8270D	µg/Kg	NBA		170								
Benzo[k]fluoranthene	207089	8270D	µg/Kg	16000	n	240								
Benzoic acid	65850	8270D	µg/Kg	250000000	n	650								
Benzyl alcohol	100516	8270D	µg/Kg	6300000	n	1.04								
Bis(2-chloroethoxy)methane	111911	8270D	µg/Kg	190000	n	NBA								
Bis(2-chloroethyl)ether	111444	8270D	µg/Kg	2300	n	3520								
2,2'-oxybis[1-chloropropane]	108601	8270D	µg/Kg	3100000	n	NBA								
Bis(2-ethylhexyl) phthalate	117817	8270D	µg/Kg	390000	n	180								
Butyl benzyl phthalate	85687	8270D	µg/Kg	2900000	n	11000								
Caprolactam	105602	8270D	µg/Kg	31000000	n	NBA								
Carbazole	86748	8270D	µg/Kg	NBA		NBA								
Chrysene	218019	8270D	µg/Kg	160000	n	166								
Dibenz(a,h)anthracene	53703	8270D	µg/Kg	160	n	33								
Dibenzofuran	132649	8270D	µg/Kg	73000	n	2000								
Diethyl phthalate	84662	8270D	µg/Kg	51000000	n	630								
Dimethyl phthalate	131113	8270D	µg/Kg	NBA		NBA								
Di-n-butyl phthalate	84742	8270D	µg/Kg	6300000	n	11000								
Di-n-octyl phthalate	117840	8270D	µg/Kg	630000	n	40600								
Fluoranthene	206440	8270D	µg/Kg	2400000	n	2900								
Fluorene	86737	8270D	µg/Kg	2400000	n	540								

Table A.2-5
Sediment Data
LO-58
Caribou, Maine

						Sample Point ID	LO58-TB-01		LO58-SD01-100712		LO58-SD02-100712		LO58-SD03-100712	
						Sample Description	Trip Blank (µg/L)		SD01		SD02		SD03	
						Sample Date	4/22/2012		10/7/2012		10/7/2012		10/7/2012	
				Screening Toxicity Value										
Analyte	**CAS Number**	**Method**	**Units**	**Human Health[a]**		**Ecological[b]**								
Hexachlorobenzene	118741	8270D	µg/Kg	2100	n	20								
Hexachlorobutadiene	87683	8270D	µg/Kg	12000	n	26.5								
Hexachlorocyclopentadiene	77474	8270D	µg/Kg	1800	n	NBA								
Hexachloroethane	67721	8270D	µg/Kg	18000	n	1000								
Indeno[1,2,3-cd]pyrene	193395	8270D	µg/Kg	1600	n	200								
Isophorone	78591	8270D	µg/Kg	5700000	n	432								
Naphthalene	91203	8270D	µg/Kg	38000	n	480								
Nitrobenzene	98953	8270D	µg/Kg	51000	n	145								
N-Nitrosodimethylamine	62759	8270D	µg/Kg	20	n	NBA								
N-Nitrosodi-n-propylamine	621647	8270D	µg/Kg	780	n	NBA								
N-Nitrosodiphenylamine	86306	8270D	µg/Kg	1100000	n	2680								
Pentachlorophenol	87865	8270D	µg/Kg	10000	n	504								
Perylene	198550	8270D	µg/Kg	NBA		NBA								
Phenanthrene	85018	8270D	µg/Kg	NBA		850								
Phenol	108952	8270D	µg/Kg	19000000	n	420								
Pyrene	129000	8270D	µg/Kg	1800000	n	195								
Pyridine	110861	8270D	µg/Kg	78000	n	NBA								

[a] Regional Screening Level (RSL) Residential Soil Table (May 2016).

[b] As per QAPP.

[c] See Table A.2-2 for associated October trip blank results.

Bold values indicate exceedance of residential RSL or ecological RSL.

µg/kg = Micrograms per kilogram.

C = Cancer based, target risk equals 1E-05.

J = Result is <RL but >=MDL and the concentration is an approximate value.

mg/kg = Milligram per kilogram.

NBA = No benchmark available.

NC = Noncancer based, target hazard quotient equals 1.0.

U = Not detected.

UJ = Not detected. SQL is <RL but >=MDL and the SQL is an approximate value.

Table A.2-6
Investigation Derived Waste Data
LO-58
Caribou, Maine

Sample Point ID		L058-1DW01-100712		L058-1DW02-100712		L058-1DW03-100712		L058-1DW04-100712	
Sample Date		10/8/2012		10/8/2012		10/8/2012		10/8/2012	
Analysis	**Units**								
Flashpoint	DEG F	>180		>180		>180		>180	
Percent Solids	%	90.7		90.9		90.5		89.7	
pH	STU	7.76	HF	7.82	HF	7.82	HF	7.94	HF

HF = Field parameter with a holding time of 15 minutes.

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APPENDIX B

SOIL BORING LOGS

BORING LOG

Project:	Former Nike Battery LO-58
Location:	300 Van Buren Road, Caribou, ME
Nobis Project No.:	83910.02
Boring No.:	MW-06
Boring Location:	See Site Plan
N: 1173928.10	E: 1106370.10
Checked by:	J. Doherty
Date Start:	April 20, 2012
Date Finish:	April 20, 2012

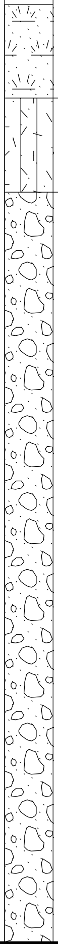
Contractor:	County Environmental Engineers, Inc
Driller:	N. Hersey
Nobis Rep.:	E. Johnson
Rig Type / Model:	Geoprobe
Hammer Type:	
Hammer Hoist:	N/A
Ground Surface Elev.:	535.5
Datum:	NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

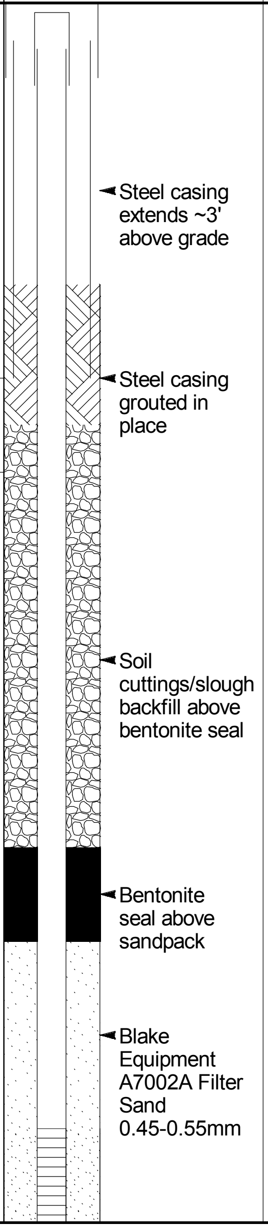
Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
-2									
-1									
0									
	S-1	32	0-4				TOPSOIL	S-1A (10"): Brown, ORGANIC SOIL with sand (OL/OH), Silty loam, organics/grass observed, moist, (TOPSOIL).	
1					0.1		534.5 / 1.0	S-1B (9"): Brown, sandy SILT with gravel (ML), fine SILT, some Gravel, little fine to medium Sand, rock fragments at 10". Wet material 17"-19", moist, (SUBSOIL).	
							SUBSOIL		
2							533.5 / 2.0	S-1C (7"): Dense, grayish brown, SILT (ML), Fine SILT and Clay. Rock fragments 24"-26", moist, (GLACIAL TILL).	
					0.4			S-1D (6"): Dense, grayish brown, SILT (ML), SILT and fine to coarse Sand. Some rock fragments, moist to wet, (GLACIAL TILL).	
3					0.7				
4									
	S-2	36	4-8					S-2A (6"): Reddish, grayish brown, well-graded SAND with silt (SW-SM), fine to coarse SAND and Silt. Collapse material, moist.	
5								S-2B (24"): Dense, grayish brown, SILT (ML), fine SILT and Clay, little gravel, little rock (slate) encountered, trace fine to coarse Sand, moist, wet lenses 8"-12", 17"-20", (GLACIAL TILL).	
6									
					0		GLACIAL TILL		
7								S-2C (6"): Grayish brown, gravelly SILT with sand (ML), CLAY, some Silt, little Gravel, moist, (GLACIAL TILL).	
8									
	S-3	48	8-12					S-3A (12"): Dense, grayish brown, SILT (ML), fine SILT and Clay, little Gravel, moist to wet, (GLACIAL TILL).	
9									
								S-3B (36"): Dense, grayish brown, SILT (ML), fine SILT and Clay, little Gravel (slate), trace fine to coarse Sand, very tight, moist, (GLACIAL TILL).	
10									



WELL DETAIL



Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:
1) No analytical soil samples obtained from soil cuttings.
2) Soil cuttings screened using a ppbRAE VOC monitor.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Engineering a Sustainable Future

Project: Former Nike Battery LO-58

Location: 300 Van Buren Road, Caribou, ME

Nobis Project No.: 83910.02

Boring No.: **B-01**

Boring Location: See Site Plan

N: 1173544.00 E: 1106523.20

Checked by: J. Doherty

Date Start: October 1, 2012

Date Finish: October 1, 2012

Contractor: County Environmental Engineers, Inc.

Driller: N. Hersey

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe

Hammer Type:

Hammer Hoist: N/A

Ground Surface Elev.: 573.1

Datum: NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
	S-1	40	0-4					TOPSOIL 572.6 / 0.5	S-1A (6"): Brown, ORGANIC SOIL (OL/OH), moist, (TOPSOIL).	
1					0.5				S-1B (24"): Light brown, well-graded SAND with silt and gravel (SW-SM), dry, (FILL).	
					0.5					
2					0.4			FILL		
					0.3			570.6 / 2.5		
3					0.3				S-1C (10"): Grayish brown, gravelly SILT (ML), moist, (GLACIAL TILL).	
4										
	S-2	42	4-8						S-2: Grayish brown, gravelly SILT (ML), small lenses of dense gravelly silt and clay, moist, (GLACIAL TILL).	
5					0.3					
					0.3			GLACIAL TILL		
6					0.2					
					0.3					
7					0.3					
								565.6 / 7.5	Boring refusal at 7.5'. Boring terminated due to rig refusal.	
8									Boring terminated at 7.5 feet.	
9										
10										
11										
12										
13										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Soil samples were obtained from 0'-2' and 5.5'-7.5' for laboratory analysis of VOCs, VPH, EPH, SVOCs, PCBs, PAHs, Metals, and Mercury.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

Nobis
Engineering a Sustainable Future

BORING LOG

Project: Former Nike Battery LO-58

Location: 300 Van Buren Road, Caribou, ME
Nobis Project No.: 83910.02

Boring No.: **B-02**
Boring Location: See Site Plan
N: 1173523.70 E: 1106552.20
Checked by: J. Doherty
Date Start: October 1, 2012
Date Finish: October 1, 2012

Contractor: County Environmental Engineers, Inc.
Driller: N. Hersey
Nobis Rep.: E. Johnson

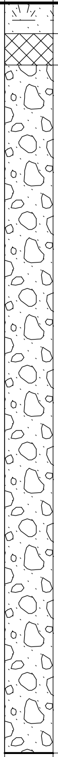
Rig Type / Model: Geoprobe
Hammer Type:
Hammer Hoist: N/A

Ground Surface Elev.: 573.6
Datum: NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION				PID (ppm)	Ground Water	LITHOLOGY		SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
	Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.			Graphic	Stratum Elev. / Depth (ft.)		
	S-1	36	0-4					TOPSOIL 573.3 / 0.3	S-1A (4"): Brown, ORGANIC SOIL (OL/OH), moist, (TOPSOIL).	
1					0.4			FILL 572.9 / 0.7	S-1B (4"): Brown, well-graded SAND with silt and gravel (SW-SM), moist, (FILL). S-1C (28"): Reddish gray/brown, gravelly SILT (ML), little clay, moist, (GLACIAL TILL).	
					0.3					
2					0.3					
					0.2					
3					0.3					
4										
	S-2	38	4-8					GLACIAL TILL	S-2: Reddish gray/brown, gravelly SILT (ML), little clay, color changing to grayish brown, moist, wet 5.5'-6', (GLACIAL TILL).	
5					0.3					
					0.3					
6					0.3					
					0.3					
7					0.3					
					0.3					
8								565.6 / 8.0	Boring refusal at 8'. Boring terminated due to rig refusal.	
									Boring terminated at 8 feet.	
9										
10										
11										
12										
13										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:
1) Soil samples were obtained from 0'-2' and 6'-8' for laboratory analysis of VOCs, VPH, EPH, SVOCs, PCBs, PAHs, Metals, and Mercury.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Project: Former Nike Battery LO-58

Location: 300 Van Buren Road, Caribou, ME

Nobis Project No.: 83910.02

Boring No.: **B-03**

Boring Location: See Site Plan

N: 1173549.50 E: 1106588.00

Checked by: J. Doherty

Date Start: October 1, 2012

Date Finish: October 1, 2012

Contractor: County Environmental Engineers, Inc.

Driller: N. Hersey

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe

Hammer Type:

Hammer Hoist: N/A

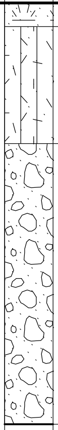
Ground Surface Elev.: 574.1

Datum: NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION				PID (ppm)	Ground Water	LITHOLOGY		SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
	Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.			Graphic	Stratum Elev. / Depth (ft.)		
	S-1	42	0-4					TOPSOIL 573.9 / 0.3	S-1A (3"): Brown, ORGANIC SOIL (OL/OH), moist, (TOPSOIL). S-1B (15"): Olive brown, gravelly SILT with sand (ML), wet, (SUBSOIL).	
1					0.5			SUBSOIL		
					0.5			572.6 / 1.5		
2					0.4				S-1C (24"): Very dense, gray, silty GRAVEL (GM), rock shards observed, dry to moist, (GLACIAL TILL).	
					0.3					
3					0.3			GLACIAL TILL		
					0.3					
4					0.3					
	S-2	6	4-8					569.6 / 4.5	S-2: Rock shards observed, dry, (BEDROCK). Boring refusal at 4.5'. Boring terminated due to rig refusal.	
5									Boring terminated at 4.5 feet.	
6										
7										
8										
9										
10										
11										
12										
13										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Soil samples were obtained from 0'-2' and 2.5'-4.5' for laboratory analysis of VOCs, VPH, EPH, SVOCs, PCBs, PAHs, Metals, and Mercury.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

Engineering a Sustainable Future

BORING LOG

Project: Former Nike Battery LO-58

Location: 300 Van Buren Road, Caribou, ME

Nobis Project No.: 83910.02

Boring No.: **B-04**

Boring Location: See Site Plan

N: 1173486.00 E: 1106820.00

Checked by: J. Doherty

Date Start: October 1, 2012

Date Finish: October 1, 2012

Contractor: County Environmental Engineers, Inc.

Driller: N. Hersey

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe

Hammer Type:

Hammer Hoist: N/A

Ground Surface Elev.: 587.1

Datum: NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
	S-1	32	0-4					ASPHALT 586.6 / 0.5	S-1A (6"): Moss/asphalt.	
1					0.2				S-1B (26"): Dense, gray to orange/brown, silty GRAVEL (GM), moist, (GLACIAL TILL).	
2					0.2					
3					0.2					
4										
	S-2	42	4-8					GLACIAL TILL	S-2A (24"): Dense, gray, silty GRAVEL (GM), moist, (GLACIAL TILL).	
5					0.3					
					0.2					
6					0.3					
									S-2B (18"): Dense, light grayish brown, silty GRAVEL (GM), some stone shards, ample fragments observed 7'-8', dry.	
7										
8					0.3			579.1 / 8.0	Boring refusal at 8'. Boring terminated due to rig refusal.	
					0.2				Boring terminated at 8 feet.	
9										
10										
11										
12										
13										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Soil samples were obtained from 0'-2' and 6'-8' for laboratory analysis of VOCs, VPH, EPH, SVOCs, PCBs, PAHs, Metals, and Mercury.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

Engineering a Sustainable Future

BORING LOG

Project: Former Nike Battery LO-58

Location: 300 Van Buren Road, Caribou, ME

Nobis Project No.: 83910.02

Boring No.: **B-05**

Boring Location: See Site Plan

N: 1173402.00 E: 1107056.60

Checked by: J. Doherty

Date Start: October 1, 2012

Date Finish: October 1, 2012

Contractor: County Environmental Engineers, Inc

Driller: N. Hersey

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe

Hammer Type:

Hammer Hoist: N/A

Ground Surface Elev.: 589.1

Datum: NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
	S-1	32	0-4					ASPHALT 588.8 / 0.3	S-1A (4"): (ASPHALT). S-1B (28"): Brownish gray, silty GRAVEL (GM), little clay, moist.	
1					0.4					
					0.3					
2					0.3					
					0.3			GLACIAL TILL		
3					0.3					
4										
	S-2	6	4-8					584.6 / 4.5	S-2 (6"): Rock shards and dust, trace till observed at the top, dry, Boring refusal at 4.5'. Boring terminated due to rig refusal.	
5					2.6				Boring terminated at 4.5 feet.	
6										
7										
8										
9										
10										
11										
12										
13										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Soil samples were obtained from 0'-2' and 2.5'-4.5' for laboratory analysis of VOCs, VPH, EPH, SVOCs, PCBs, PAHs, Metals, and Mercury.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

Nobis
Engineering a Sustainable Future

BORING LOG

Project: Former Nike Battery LO-58

Location: 300 Van Buren Road, Caribou, ME
Nobis Project No.: 83910.02

Boring No.: **B-06**
Boring Location: See Site Plan
N: 1173404.30 E: 1107226.50
Checked by: J. Doherty
Date Start: October 2, 2012
Date Finish: October 2, 2012

Contractor: County Environmental Engineers, Inc.
Driller: N. Hersey
Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe
Hammer Type:
Hammer Hoist: N/A

Ground Surface Elev.: 584.8
Datum: NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
	S-1	30	0-4					TOPSOIL 584.5 / 0.3	S-1A (4"): Brown, ORGANIC SOIL (OL/OH), moist, (TOPSOIL). S-1B (12"): Gray, silty GRAVEL (GM), moist, (SUBSOIL).	
1					1.5					
					0.4					
2					0.2				S-1C (14"): Brown, gravelly SILT (ML), some clay, moist to wet, (GLACIAL TILL).	
					0.2					
3										
								GLACIAL TILL		
4										
	S-2	30	4-8						S-2: Grayish brown, silty GRAVEL (GM), rock dust at bottom 6", moist to dry, (GLACIAL TILL).	
5					0.4					
					0.3					
6								578.8 / 6.0	Boring refusal at 6'. Boring terminated due to rig refusal.	
					0.4				Boring terminated at 6 feet.	
7										
8										
9										
10										
11										
12										
13										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:
1) Soil samples were obtained from 0'-2' and 4'-6' for laboratory analysis of VOCs, VPH, EPH, SVOCs, PCBs, PAHs, Metals, and Mercury.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis
Engineering a Sustainable Future

Project: Former Nike Battery LO-58
Location: 300 Van Buren Road, Caribou, ME
Nobis Project No.: 83910.02

Boring No.: **B-07**
Boring Location: See Site Plan
N: 1173531.30 E: 1107115.10
Checked by: J. Doherty
Date Start: October 2, 2012
Date Finish: October 2, 2012

Contractor: County Environmental Engineers, In
Driller: N. Hersey
Nobis Rep.: E. Johnson

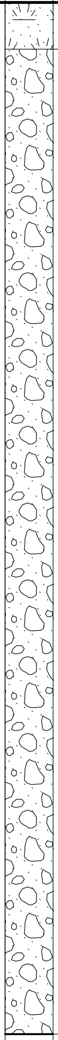
Rig Type / Model: Geoprobe
Hammer Type:
Hammer Hoist: N/A

Ground Surface Elev.: 580.9
Datum: NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time



Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
	S-1	30	0-4					TOPSOIL 580.4 / 0.5	S-1A (8"): Brown, ORGANIC SOIL (OL/OH), gray rock 6"-8", moist, (TOPSOIL).	
1					0.5				S-1B (22"): Brown, gravelly SILT (ML), several rocks encountered, moist, (GLACIAL TILL).	
					0.7					
2					0.4					
					0.3					
3										
4										
	S-2	18	4-8						S-2 (18"): Reddish brown, gravelly SILT (ML), moist, (GLACIAL TILL).	
5					0.2					
					0.2					
6					0.2			GLACIAL TILL		
7										
8										
	S-3	30	8-12						S-3A (24"): Reddish brown, gravelly SILT (ML), moist, bottom 2" wet, (GLACIAL TILL).	
9					0.5					
					0.4					
10					1.2					
					0.6				S-3B (6"): Rock shards and dust, dry.	
11								569.9 / 11.0	Boring refusal at 11'. Boring terminated due to rig refusal.	
									Boring terminated at 11 feet.	
12										
13										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:
1) Soil samples were obtained from 0'-2' and 9'-11' for laboratory analysis of VOCs, VPH, EPH, SVOCs, PCBs, PAHs, Metals, and Mercury.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Nobis
Engineering a Sustainable Future

Project: Former Nike Battery LO-58
Location: 300 Van Buren Road, Caribou, ME
Nobis Project No.: 83910.02

Boring No.: **B-08**
Boring Location: See Site Plan
N: 1173619.60 E: 1107210.20
Checked by: J. Doherty
Date Start: October 2, 2012
Date Finish: October 2, 2012

Contractor: County Environmental Engineers, Inc.
Driller: N. Hersey
Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe
Hammer Type:
Hammer Hoist: N/A

Ground Surface Elev.: 569.9
Datum: NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION				PID (ppm)	Ground Water	LITHOLOGY		SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
	Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.			Graphic	Stratum Elev. / Depth (ft.)		
	S-1	20	0-4					TOPSOIL 569.6 / 0.3	S-1A (4"): Brown, ORGANIC SOIL (OL/OH), moist, (TOPSOIL). S-1B (16"): Dense, brown, gravelly elastic SILT (MH), poorly sorted, moist, (GLACIAL TILL).	
1					0.1					
					0.2					
2					0.1					
3										
4										
	S-2	48	4-8					GLACIAL TILL	S-2A (24"): Dense, brown, gravelly elastic SILT (MH), poorly sorted, moist, (GLACIAL TILL).	
5					0					
					0					
6					0					
					0				S-2B (24"): Brownish gray, silty GRAVEL (GM), rock lenses, dry, (GLACIAL TILL).	
7					0					
					0					
8					0			561.9 / 8.0	Boring refusal at 8'. Boring terminated due to rig refusal.	
	S-3	6	8-12		0				Boring terminated at 8 feet.	
9										
10										
11										
12										
13										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:
1) Soil samples were obtained from 0'-1' and 6'-8' for laboratory analysis of VOCs, VPH, EPH, SVOCs, PCBs, PAHs, Metals, and Mercury.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Project:	Former Nike Battery LO-58
Location:	300 Van Buren Road, Caribou, ME
Nobis Project No.:	83910.02
Boring No.:	B-09
Boring Location:	See Site Plan
N: 1173796.40	E: 1107059.10
Checked by:	J. Doherty
Date Start:	October 2, 2012
Date Finish:	October 2, 2012
Contractor:	County Environmental Engineers, Inc.
Driller:	N. Hersey
Nobis Rep.:	E. Johnson
Rig Type / Model:	Geoprobe
Hammer Type:	
Hammer Hoist:	N/A
Ground Surface Elev.:	563.7
Datum:	NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
	S-1	32	0-4					TOPSOIL 563.4 / 0.3	S-1A (4"): Brown, ORGANIC SOIL (OL/OH), moist, (TOPSOIL). S-1B (28"): Very dense, dark grayish brown, gravelly SILT (ML), several rocks encountered, moist, (GLACIAL TILL).	
1					0.5					
					0.4					
2					0.4					
					0					
3					0					
								GLACIAL TILL		
4										
	S-2	22	4-8						S-2: Light brown, well-graded SAND with silt and gravel (SW-SM), dry to moist, (GLACIAL TILL).	
5					0					
					0					
6					0			557.7 / 6.0	Boring refusal at 6'. Boring terminated due to rig refusal.	
									Boring terminated at 6 feet.	
7										
8										
9										
10										
11										
12										
13										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Soil samples were obtained from 0'-2' and 4'-6' for laboratory analysis of VOCs, VPH, EPH, SVOCs, PCBs, PAHs, Metals, and Mercury.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Project: Former Nike Battery LO-58

Location: 300 Van Buren Road, Caribou, ME

Nobis Project No.: 83910.02

Boring No.: **B-10**

Boring Location: See Site Plan

N: 1173833.00 E: 1106967.40

Checked by: J. Doherty

Date Start: October 2, 2012

Date Finish: October 2, 2012

Contractor: County Environmental Engineers, Inc.

Driller: N. Hersey

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe

Hammer Type:

Hammer Hoist: N/A

Ground Surface Elev.: 565.6

Datum: NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
	S-1	32	0-4					565.4 / 0.2 TOPSOIL	S-1A (2"): Brown, ORGANIC SOIL (OL/OH), moist, (TOPSOIL). S-1B (30"): Brown to grayish brown, gravelly SILT (ML), trace fine sand, moist to wet, (GLACIAL TILL).	
1					0.8					
					1.8					
2					0.6					
					0.2					
3					0.1					
4								GLACIAL TILL		
	S-2	40	4-8						S-2A (24"): Brown to grayish brown, gravelly SILT (ML), trace fine sand, moist to wet, (GLACIAL TILL).	
5					0					
					0					
6					0					
					0.1				S-2B (16"): Gray, weathered rock, small lenses of silty gravel, dry, (GLACIAL TILL).	
7								558.6 / 7.0	Boring refusal at 7'. Boring terminated due to rig refusal.	
									Boring terminated at 7 feet.	
8										
9										
10										
11										
12										
13										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Soil samples were obtained from 0'-2' and 5'-7' for laboratory analysis of VOCs, VPH, EPH, SVOCs, PCBs, PAHs, Metals, and Mercury.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Project: Former Nike Battery LO-58

Location: 300 Van Buren Road, Caribou, ME

Nobis Project No.: 83910.02

Boring No.: **B-11**

Boring Location: See Site Plan

N: 1173746.90 E: 1106746.00

Checked by: J. Doherty

Date Start: October 2, 2012

Date Finish: October 2, 2012

Contractor: County Environmental Engineers, Inc.

Driller: N. Hersey

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe

Hammer Type:

Hammer Hoist: N/A

Ground Surface Elev.: 573.4

Datum: NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
	S-1	40	0-4				TOPSOIL 572.9 / 0.5	S-1A (6"): Brown, ORGANIC SOIL (OL/OH), moist, (TOPSOIL).	
1					0.2			S-1B (30"): Light brown, well-graded SAND with silt and gravel (SW-SM), dry, (FILL).	
					0.2				
2					0.2		FILL		
					0.1				
3					0.1		570.4 / 3.0		
					0.1			S-1C (4"): Dense, grayish brown, gravelly SILT (ML), moist, (GLACIAL TILL).	
4									
	S-2	48	4-8					S-2: Grayish brown to reddish brown, gravelly SILT (ML), several rocks encountered, moist, (GLACIAL TILL).	
5					0				
					0				
6					0				
					0		GLACIAL TILL		
7					0				
					0				
8					0				
	S-3	24	8-12					S-3A (12"): Grayish brown to reddish brown, gravelly SILT (ML), several rocks encountered, moist, (GLACIAL TILL).	
9					1.1				
					0.7			S-3B (12"): Gray, rock shards/dust, thin lenses of till, dry, (GLACIAL TILL).	
10					0.3		563.4 / 10.0	Boring refusal at 10'. Boring terminated due to rig refusal.	
					0.2			Boring terminated at 10 feet.	
11									
12									
13									

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Soil samples were obtained from 0'-1' and 8'-10' for laboratory analysis of VOCs, VPH, EPH, SVOCs, PCBs, PAHs, Metals, and Mercury.

BORING LOG

Project: Former Nike Battery LO-58

Location: 300 Van Buren Road, Caribou, ME

Nobis Project No.: 83910.02

Boring No.: **B-12**

Boring Location: See Site Plan

N: 1173857.60 E: 1106538.90

Checked by: J. Doherty

Date Start: October 3, 2012

Date Finish: October 3, 2012

Contractor: County Environmental Engineers, Inc.

Driller: N. Hersey

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe

Hammer Type:

Hammer Hoist: N/A

Ground Surface Elev.: 551.8

Datum: NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
	S-1	32	0-4					TOPSOIL 551.1 / 0.7	S-1A (8"): Brown, ORGANIC SOIL (OL/OH), moist, (TOPSOIL).	
1					0.1				S-1B (24"): Dense, grayish brown, gravelly SILT (ML), trace fine sand, moist, wet 18"-20", (GLACIAL TILL).	
					0.2					
2					0					
					0					
3					0					
4										
	S-2	34	4-8						S-2: Dense, brown, gravelly SILT (ML), some clay lenses 15"-18", 24"-27", several rocks encountered, moist, (GLACIAL TILL).	
5					0					
					0					
6					0					
					0			GLACIAL TILL		
7					0					
8										
	S-3	42	8-12						S-3: Dense, grayish brown, gravelly SILT (ML), several rocks encountered, moist, several thin wet lenses adjacent to rocks, (GLACIAL TILL).	
9					0					
					0					
10					0					
					0					
11					0					
					0					
12								539.8 / 12.0		
									Boring terminated at 12 feet.	
13										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Soil samples were obtained from 0'-1' and 8'-10' for laboratory analysis of VOCs, VPH, EPH, SVOCs, PCBs, PAHs, Metals, and Mercury.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BOREHOLE LOG - NOBIS GINT DATA TEMPLATE OCT 7 2011.GDT - 5/16/13 13:10 - O:\ACTIVE\83910 AVATAR USACE HTRW\83910.02 FORMER NIKE LO58 SITE\TECHNICAL DATA\BORING LOGS\83910.02 FALL BORING LOGS.GPJ

Nobis
Engineering a Sustainable Future

BORING LOG

Project: Former Nike Battery LO-58

Location: 300 Van Buren Road, Caribou, ME

Nobis Project No.: 83910.02

Boring No.: **B-13**

Boring Location: See Site Plan

N: 1173795.50 E: 1106456.90

Checked by: J. Doherty

Date Start: October 3, 2012

Date Finish: October 3, 2012

Contractor: County Environmental Engineers, Inc.

Driller: N. Hersey

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe

Hammer Type:

Hammer Hoist: N/A

Ground Surface Elev.: 552

Datum: NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
	S-1	36	0-4					TOPSOIL 551.5 / 0.5	S-1A (6"): Brown, ORGANIC SOIL (OL/OH), some organics, moist, (TOPSOIL).	
1					0.1				S-1B (14"): Light reddish brown, well-graded SAND with silt and gravel (SW-SM), reworked native till, moist, (GLACIAL TILL).	
					0					
2					0.2				S-1C (16"): Very dense, grayish brown, gravelly SILT (ML), dry to moist, (GLACIAL TILL).	
					0					
3					0					
4										
	S-2	26	4-8						S-2A (14"): Dense, grayish brown, gravelly SILT (ML), rock lense 12"-14", dry to moist, (GLACIAL TILL).	
5					0.2					
					0				S-2B (12"): Olive/grayish brown, gravelly SILT (ML), clay lense 20"-23", moist, (GLACIAL TILL).	
6					0.1					
					0			GLACIAL TILL		
7										
8										
	S-3	34	8-12						S-3A (18"): Olive/grayish brown, gravelly SILT (ML), clay lense 20"-23", moist, (GLACIAL TILL).	
9					0.2					
					0.1					
10					0.1				S-3B (16"): Brownish gray, silty GRAVEL (GM), moist, (GLACIAL TILL).	
					0.1					
11					0					
12								540.0 / 12.0		
									Boring terminated at 12 feet.	
13										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Soil samples were obtained from 0'-2' and 8'-10' for laboratory analysis of VOCs, VPH, EPH, SVOCs, PCBs, PAHs, Metals, and Mercury.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Project: Former Nike Battery LO-58

Location: 300 Van Buren Road, Caribou, ME

Nobis Project No.: 83910.02

Boring No.: **B-14**

Boring Location: See Site Plan

N: 1173587.10 E: 1106405.00

Checked by: J. Doherty

Date Start: October 1, 2012

Date Finish: October 1, 2012

Contractor: County Environmental Engineers, Inc

Driller: N. Hersey

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe

Hammer Type:

Hammer Hoist: N/A

Ground Surface Elev.: 563.8

Datum: NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION: Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY: Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
	S-1	36	0-4						S-1A (18"): Brown, ORGANIC SOIL (OL/OH), fine to medium Sand, some Silt, little organics (TOPSOIL), moist.	
1					0.2			TOPSOIL		
								562.3 / 1.5		
2					0.2				S-1B (18"): Dense, grayish brown, gravelly SILT (ML), (GLACIAL TILL), dry to moist.	
					0.3					
3					0.3					
4										
	S-2	48	4-8						S-2A (26"): Dense, grayish brown, gravelly SILT (ML), (GLACIAL TILL), moist.	
5					0.1			GLACIAL TILL		
6					0.2					
									S-2B (18"): Dense, grayish brown, gravelly SILT (ML), less gravel than above(GLACIAL TILL), wet.	
7										
8					0.2				S-2C (4"): Dense, rock shards and gravelly SILT (ML), dry.	
	S-3	12	8-12		0.3			555.3 / 8.5	S-3A (6"): Collapse material, gravelly SILT (ML), moist.	
9									S-3B (6"): Rock shards and dust, dry, Boring refusal at 8.5'. Boring terminated due to rig refusal. Boring terminated at 8.5 feet.	
10										
11										
12										
13										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Soil samples were obtained from 0'-1' and 6'-8' for laboratory analysis of VOCs, VPH, EPH, SVOCs, PCBs, PAHs, Metals, and Mercury.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Project: Former Nike Battery LO-58

Location: 300 Van Buren Road, Caribou, ME

Nobis Project No.: 83910.02

Boring No.: **B-15**

Boring Location: See Site Plan

N: 1173291.70 E: 1106670.40

Checked by: J. Doherty

Date Start: October 1, 2012

Date Finish: October 1, 2012

Contractor: County Environmental Engineers, Inc.

Driller: N. Hersey

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe

Hammer Type:

Hammer Hoist: N/A

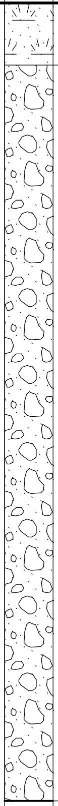
Ground Surface Elev.: 599.4

Datum: NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time



Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
	S-1	12	0-4				TOPSOIL 598.7 / 0.7	S-1A (8"): Brown, ORGANIC SOIL (OL/OH), fine Sand and Silt, some organics, moist, (TOPSOIL).	
1					0.2			S-1B (4"): Dense, grayish brown, silty GRAVEL (GM), moist, wet at top, (GLACIAL TILL).	
					0.1				
2									
3									
4									
	S-2	34	4-8					S-2 (34"): Dense, reddish, gray/brown, gravelly SILT (ML), trace clay, moist, wet lenses, (GLACIAL TILL).	
5					0.4		GLACIAL TILL		
					0.1				
6					0.1				
					0.1				
7									
					0.1				
8									
	S-3	12	8-12				590.9 / 8.5	S-3A (6"): Dense, reddish, gray/brown, gravelly SILT (ML), trace clay, moist, wet lenses, (GLACIAL TILL).	
9								S-3B (6"): Weathered bedrock shards and dust, rock in toe, dry, (BEDROCK). Boring refusal at 8.5'. Boring terminated due to rig refusal. Boring terminated at 8.5 feet.	
10									
11									
12									
13									

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Soil samples were obtained from 0'-1' and 4'-6' for laboratory analysis of VOCs, VPH, EPH, SVOCs, PCBs, PAHs, Metals, and Mercury.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Project: Former Nike Battery LO-58
Location: 300 Van Buren Road, Caribou, ME
Nobis Project No.: 83910.02

Boring No.: **MW-06**
Boring Location: See Site Plan
N: 1173928.10 E: 1106370.10
Checked by: J. Doherty
Date Start: April 20, 2012
Date Finish: April 20, 2012

Contractor: County Environmental Engineers, Inc.
Driller: N. Hersey
Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe
Hammer Type:
Hammer Hoist: N/A

Ground Surface Elev.: 535.5
Datum: NGVD 88

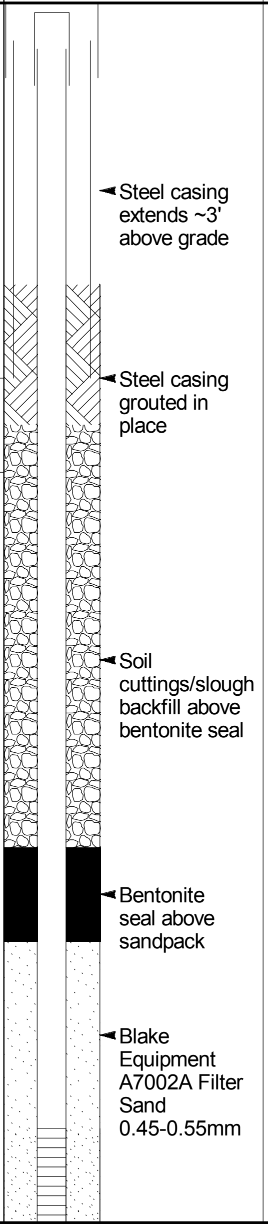
	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)
-2								
-1								
0								
	S-1	32	0-4				TOPSOIL	S-1A (10"): Brown, ORGANIC SOIL with sand (OL/OH), Silty loam, organics/grass observed, moist, (TOPSOIL).
1					0.1		534.5 / 1.0	S-1B (9"): Brown, sandy SILT with gravel (ML), fine SILT, some Gravel, little fine to medium Sand, rock fragments at 10". Wet material 17"-19", moist, (SUBSOIL).
2							SUBSOIL 533.5 / 2.0	S-1C (7"): Dense, grayish brown, SILT (ML), Fine SILT and Clay. Rock fragments 24"-26", moist, (GLACIAL TILL).
					0.4			S-1D (6"): Dense, grayish brown, SILT (ML), SILT and fine to coarse Sand. Some rock fragments, moist to wet, (GLACIAL TILL).
3					0.7			
4								
	S-2	36	4-8					S-2A (6"): Reddish, grayish brown, well-graded SAND with silt (SW-SM), fine to coarse SAND and Silt. Collapse material, moist.
5								S-2B (24"): Dense, grayish brown, SILT (ML), fine SILT and Clay, little gravel, little rock (slate) encountered, trace fine to coarse Sand, moist, wet lenses 8"-12", 17"-20", (GLACIAL TILL).
6							GLACIAL TILL	
					0			
7								S-2C (6"): Grayish brown, gravelly SILT with sand (ML), CLAY, some Silt, little Gravel, moist, (GLACIAL TILL).
8								
	S-3	48	8-12					S-3A (12"): Dense, grayish brown, SILT (ML), fine SILT and Clay, little Gravel, moist to wet, (GLACIAL TILL).
9								S-3B (36"): Dense, grayish brown, SILT (ML), fine SILT and Clay, little Gravel (slate), trace fine to coarse Sand, very tight, moist, (GLACIAL TILL).
10								

WELL DETAIL



Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:
1) No analytical soil samples obtained from soil cuttings.
2) Soil cuttings screened using a ppbRAE VOC monitor.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Project: Former Nike Battery LO-58

Location: 300 Van Buren Road, Caribou, ME

Nobis Project No.: 83910.02

Boring No.: **MW-06**

Boring Location: See Site Plan

N: 1173928.10 E: 1106370.10

Checked by: J. Doherty

Date Start: April 20, 2012

Date Finish: April 20, 2012

Contractor: County Environmental Engineers, Inc.

Driller: N. Hersey

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe

Hammer Type:

Hammer Hoist: N/A

Ground Surface Elev.: 535.5

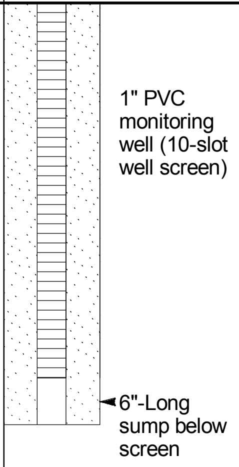
Datum: NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	WELL DETAIL	NOTES
					0.3						
11											
12											
	S-4	32	12-16						S-4A (2"): Grayish brown, collapse material, wet silt. S-4B (22"): Grayish brown, SILT (ML), fine SILT and Clay, little Gravel, wet, (GLACIAL TILL).		
13								GLACIAL TILL			
					0.3						
14									S-4C (8"): Very dense, grayish brown, SILT (ML), fine SILT and Clay, little Gravel. Slate fragments in toe, dry, (GLACIAL TILL). Boring refusal at 16' bgs, extremely slow advance in last 6" soil. Boring terminated due to refusal. Shallow overburden groundwater encountered predominantly ~9' bgs and 12'-14' bgs and in first 2' of top/subsoil.		
15											
16								519.5 / 16.0			
									Boring terminated at 16 feet.		
17											
18											
19											
20											
21											
22											
23											



Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:
1) No analytical soil samples obtained from soil cuttings.
2) Soil cuttings screened using a ppbRAE VOC monitor.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BORING LOG

Project: Former Nike Battery LO-58

Location: 300 Van Buren Road, Caribou, ME

Nobis Project No.: 83910.02

Boring No.: **SB-13R**

Boring Location: See Site Plan

N: 1173601.70 E: 1106880.20

Checked by: J. Doherty

Date Start: October 3, 2012

Date Finish: October 3, 2012

Contractor: County Environmental Engineers, Inc.

Driller: N. Hersey

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe

Hammer Type:

Hammer Hoist: N/A

Ground Surface Elev.: 586.7

Datum: NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	 Rec (in.)	 Depth (ft.)	 Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	 Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
	S-1	32	0-4					ASPHALT 586.4 / 0.3	S-1A (4"): Black, (ASPHALT).	
1					0.2				S-1B (20"): Brown, well-graded SAND with silt and gravel (SW-SM), trace rocks encountered, moist, (FILL).	
					0.1			FILL		
2					0.3			584.7 / 2.0		
					0.1				S-1C (8"): Olive brown, poorly-graded SAND (SP), moist, (SUBSOIL).	
3					0					
4										
	S-2	30	4-8						S-2A (16"): Dense, brown, gravelly SILT (ML), some fine Sand, moist, (GLACIAL TILL).	
5					0.1					
					0					
6					0.2				S-2B (14"): Dense, grayish brown, silty GRAVEL (GM), wet at top 2", dry remaining, many rocky lenses, (GLACIAL TILL).	
					0.1			GLACIAL TILL		
7										
8										
	S-3	30	8-12						S-3A (4"): Collapse material, gravelly silt, moist.	
9					0.2				S-3B (24"): Dense, reddish brown, gravelly SILT (ML), some clay lenses, moist, (GLACIAL TILL).	
					0.2				S-3C (2"): Gray, rock shards and dust.	
10					0.1					
					0			576.2 / 10.5	Boring refusal at 10.5'. Boring terminated due to rig refusal.	
11									Boring terminated at 10.5 feet.	
12										
13										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Soil samples were obtained from 9'-9.5' for laboratory analysis of VOCs, VPH, EPH, SVOCs, PCBs, PAHs, Metals, and Mercury.

Soil descriptions and gradation percentagesare based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

Engineering a Sustainable Future

BORING LOG

Project: Former Nike Battery LO-58

Location: 300 Van Buren Road, Caribou, ME

Nobis Project No.: 83910.02

Boring No.: **SB-55R**

Boring Location: See Site Plan

N: 1173356.50 E: 1106947.50

Checked by: J. Doherty

Date Start: October 3, 2012

Date Finish: October 3, 2012

Contractor: County Environmental Engineers, Inc.

Driller: N. Hersey

Nobis Rep.: E. Johnson

Rig Type / Model: Geoprobe

Hammer Type:

Hammer Hoist: N/A

Ground Surface Elev.: 589.2

Datum: NGVD 88

	Drilling Method	Sampler
Type	Geoprobe	Macro-Core Liners
Size ID (in.)	1.5	1-3/8
Advancement	Push	Push

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time

Depth (ft.)	SAMPLE INFORMATION Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	PID (ppm)	Ground Water	LITHOLOGY Graphic	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified ASTM)	NOTES
	S-1	32	0-4					ASPHALT 589.0 / 0.3	S-1A (3"): Black, (ASPHALT).	
								Subbase 588.7 / 0.5	S-1B (2"): Grayish black, Subgrade material, coarse gravel, moist, (ASPHALT). S-1C (19"): Dark grayish brown, well-graded GRAVEL with silt and sand (GW-GM), moist, (FILL).	
1					0					
					0.1			FILL		
2					0			587.2 / 2.0		
					0.1				S-1D (2"): Brownish gray, silty GRAVEL (GM), moist, (GLACIAL TILL). S-1E (6"): Gray, rock shards, small lenses of silty gravel and rock, dry, (GLACIAL TILL).	
3					0.1			GLACIAL TILL		
4								585.2 / 4.0		
									Boring refusal at 4'. Boring terminated due to rig refusal. Boring terminated at 4 feet.	
5										
6										
7										
8										
9										
10										
11										
12										
13										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Soil samples were obtained from 0'-4' for laboratory analysis of VOCs, VPH, EPH, SVOCs, PCBs, PAHs, Metals, and Mercury.

APPENDIX C

HUMAN HEALTH RISK ASSESSMENT PROUCL OUTPUT

Appendix C.1-1
Surface Soil ProUCL Output - Launcher Area
LO-58
Caribou, ME

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ALUMINUM

                                          General Statistics
              Number of Valid Observations  18                  Number of Distinct Observations  15

              Raw Statistics                                    Log-transformed Statistics
                                   Minimum  13500                         Minimum of Log Data  9.51
                                   Maximum  25600                         Maximum of Log Data  10.15
                                      Mean  16881                            Mean of log Data  9.723
                            Geometric Mean  16702                              SD of log Data  0.146
                                    Median  16150
                                        SD  2706
                         Std. Error of Mean  637.8
                   Coefficient of Variation  0.16
                                   Skewness  1.952

                                        Relevant UCL Statistics
          Normal Distribution Test                              Lognormal Distribution Test
                Shapiro Wilk Test Statistic  0.819                    Shapiro Wilk Test Statistic  0.892
                Shapiro Wilk Critical Value  0.897                    Shapiro Wilk Critical Value  0.897
      Data not Normal at 5% Significance Level                Data not Lognormal at 5% Significance Level

          Assuming Normal Distribution                          Assuming Lognormal Distribution
                        95% Student's-t UCL  17990                                  95% H-UCL  17962
      95% UCLs (Adjusted for Skewness)                               95% Chebyshev (MVUE) UCL  19406
            95% Adjusted-CLT UCL (Chen-1995)  18243                97.5% Chebyshev (MVUE) UCL  20504
          95% Modified-t UCL (Johnson-1978)  18039                   99% Chebyshev (MVUE) UCL  22659

          Gamma Distribution Test                                   Data Distribution
                     k star (bias corrected)  39.32   Data appear Gamma Distributed at 5% Significance Level
                                 Theta Star  429.3
                                MLE of Mean  16881
                  MLE of Standard Deviation  2692
                                    nu star  1415
           Approximate Chi Square Value (.05)  1329                 Nonparametric Statistics
              Adjusted Level of Significance  0.0357                                95% CLT UCL  17930
                     Adjusted Chi Square Value  1321                          95% Jackknife UCL  17990
                                                                     95% Standard Bootstrap UCL  17909
              Anderson-Darling Test Statistic  0.664                       95% Bootstrap-t UCL  18378
            Anderson-Darling 5% Critical Value  0.738                  95% Hall's Bootstrap UCL  22970
           Kolmogorov-Smirnov Test Statistic  0.186                95% Percentile Bootstrap UCL  18006
          Kolmogorov-Smirnov 5% Critical Value  0.203                      95% BCA Bootstrap UCL  18294
  Data appear Gamma Distributed at 5% Significance Level           95% Chebyshev(Mean, Sd) UCL  19661
                                                                 97.5% Chebyshev(Mean, Sd) UCL  20864
          Assuming Gamma Distribution                              99% Chebyshev(Mean, Sd) UCL  23227
     95% Approximate Gamma UCL (Use when n >= 40)  17977
       95% Adjusted Gamma UCL (Use when n < 40)  18087

             Potential UCL to Use                               Use 95% Approximate Gamma UCL  17977

   Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
       These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
             and Singh and Singh (2003).   For additional insight, the user may want to consult a statistician.
```

Appendix C.1-1
Surface Soil ProUCL Output - Launcher Area
LO-58
Caribou, ME

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ARSENIC

                                          General Statistics
             Number of Valid Observations  18                      Number of Distinct Observations  17

            Raw Statistics                                       Log-transformed Statistics
                                  Minimum  4.8                              Minimum of Log Data  1.569
                                  Maximum  22.4                             Maximum of Log Data  3.109
                                     Mean  9.156                               Mean of log Data  2.138
                           Geometric Mean  8.48                                  SD of log Data  0.379
                                   Median  7.85
                                       SD  4.255
                        Std. Error of Mean  1.003
                  Coefficient of Variation  0.465
                                 Skewness  2.085

                                          Relevant UCL Statistics
          Normal Distribution Test                                Lognormal Distribution Test
                Shapiro Wilk Test Statistic  0.774                  Shapiro Wilk Test Statistic  0.919
                Shapiro Wilk Critical Value  0.897                  Shapiro Wilk Critical Value  0.897
      Data not Normal at 5% Significance Level             Data appear Lognormal at 5% Significance Level

        Assuming Normal Distribution                             Assuming Lognormal Distribution
                       95% Student's-t UCL  10.9                                    95% H-UCL  10.87
       95% UCLs (Adjusted for Skewness)                             95% Chebyshev (MVUE) UCL  12.68
          95% Adjusted-CLT UCL (Chen-1995)  11.33                  97.5% Chebyshev (MVUE) UCL  14.24
         95% Modified-t UCL (Johnson-1978)  10.98                    99% Chebyshev (MVUE) UCL  17.31

          Gamma Distribution Test                                       Data Distribution
                     k star (bias corrected)  5.611    Data Follow Appr. Gamma Distribution at 5% Significance Level
                                 Theta Star  1.632
                                MLE of Mean  9.156
                  MLE of Standard Deviation  3.865
                                    nu star  202
             Approximate Chi Square Value (.05)  170.1                  Nonparametric Statistics
               Adjusted Level of Significance  0.0357                              95% CLT UCL  10.81
                     Adjusted Chi Square Value  167.3                         95% Jackknife UCL  10.9
                                                                      95% Standard Bootstrap UCL  10.77
              Anderson-Darling Test Statistic  0.875                       95% Bootstrap-t UCL  11.97
             Anderson-Darling 5% Critical Value  0.742                  95% Hall's Bootstrap UCL  12.73
            Kolmogorov-Smirnov Test Statistic  0.2                  95% Percentile Bootstrap UCL  10.92
           Kolmogorov-Smirnov 5% Critical Value  0.204                        95% BCA Bootstrap UCL  11.4
 Data follow Appr. Gamma Distribution at 5% Significance Level       95% Chebyshev(Mean, Sd) UCL  13.53
                                                                   97.5% Chebyshev(Mean, Sd) UCL  15.42
          Assuming Gamma Distribution                               99% Chebyshev(Mean, Sd) UCL  19.13
    95% Approximate Gamma UCL (Use when n >= 40)  10.87
       95% Adjusted Gamma UCL (Use when n < 40)  11.05

            Potential UCL to Use                                Use 95% Approximate Gamma UCL  10.87

     Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
         These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
                 and Singh and Singh (2003).   For additional insight, the user may want to consult a statistician.
```

BENZO(A)PYRENE

General Statistics

Number of Valid Data	18	Number of Detected Data	17
Number of Distinct Detected Data	16	Number of Non-Detect Data	1
		Percent Non-Detects	5.56%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.00019	Minimum Detected	-8.568
Maximum Detected	0.17	Maximum Detected	-1.772
Mean of Detected	0.0197	Mean of Detected	-5.157
SD of Detected	0.0404	SD of Detected	1.748
Minimum Non-Detect	0.00079	Minimum Non-Detect	-7.143
Maximum Non-Detect	0.00079	Maximum Non-Detect	-7.143

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.482	Shapiro Wilk Test Statistic	0.95
5% Shapiro Wilk Critical Value	0.892	5% Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.0186	Mean	-5.306
SD	0.0394	SD	1.809
95% DL/2 (t) UCL	0.0347	95% H-Stat (DL/2) UCL	0.146
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.0115	Mean in Log Scale	-5.297
SD	0.0453	SD in Log Scale	1.796
95% MLE (t) UCL	0.03	Mean in Original Scale	0.0186
95% MLE (Tiku) UCL	0.0298	SD in Original Scale	0.0394
		95% t UCL	0.0347
		95% Percentile Bootstrap UCL	0.0358
		95% BCA Bootstrap UCL	0.0459
		95% H UCL	0.14
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.463	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	0.0424		
nu star	15.75		
A-D Test Statistic	0.665	**Nonparametric Statistics**	
5% A-D Critical Value	0.797	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.797	Mean	0.0186
5% K-S Critical Value	0.221	SD	0.0383
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.00931
		95% KM (t) UCL	0.0348
Assuming Gamma Distribution		95% KM (z) UCL	0.0339
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.0347
Minimum	0.000001	95% KM (bootstrap t) UCL	0.0743
Maximum	0.17	95% KM (BCA) UCL	0.0355
Mean	0.0186	95% KM (Percentile Bootstrap) UCL	0.0356
Median	0.0054	95% KM (Chebyshev) UCL	0.0591
SD	0.0394	97.5% KM (Chebyshev) UCL	0.0767
k star	0.369	99% KM (Chebyshev) UCL	0.111
Theta star	0.0503		
Nu star	13.29	**Potential UCLs to Use**	
AppChi2	6.09	95% KM (Chebyshev) UCL	0.0591
95% Gamma Approximate UCL (Use when n >= 40)	0.0405		
95% Adjusted Gamma UCL (Use when n < 40)	0.0438		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

```
CHROMIUM

                                          General Statistics
              Number of Valid Observations  18                     Number of Distinct Observations  16

           Raw Statistics                                          Log-transformed Statistics
                                   Minimum  28.2                              Minimum of Log Data  3.339
                                   Maximum  56.3                              Maximum of Log Data  4.031
                                      Mean  32.78                                Mean of log Data  3.475
                            Geometric Mean  32.31                                  SD of log Data  0.165
                                    Median  31
                                        SD  6.526
                         Std. Error of Mean  1.538
                   Coefficient of Variation  0.199
                                  Skewness  3.013

                                          Relevant UCL Statistics
        Normal Distribution Test                                  Lognormal Distribution Test
                Shapiro Wilk Test Statistic  0.639                     Shapiro Wilk Test Statistic  0.73
                Shapiro Wilk Critical Value  0.897                     Shapiro Wilk Critical Value  0.897
    Data not Normal at 5% Significance Level                  Data not Lognormal at 5% Significance Level

         Assuming Normal Distribution                              Assuming Lognormal Distribution
                      95% Student's-t UCL  35.46                                       95% H-UCL  35.14
      95% UCLs (Adjusted for Skewness)                                95% Chebyshev (MVUE) UCL  38.28
        95% Adjusted-CLT UCL (Chen-1995)  36.48                     97.5% Chebyshev (MVUE) UCL  40.68
       95% Modified-t UCL (Johnson-1978)  35.64                       99% Chebyshev (MVUE) UCL  45.4

        Gamma Distribution Test                                            Data Distribution
                    k star (bias corrected)  29.01            Data do not follow a Discernable Distribution (0.05)
                                 Theta Star  1.13
                                MLE of Mean  32.78
                  MLE of Standard Deviation  6.086
                                    nu star  1044
            Approximate Chi Square Value (.05)  970.3                   Nonparametric Statistics
               Adjusted Level of Significance  0.0357                                95% CLT UCL  35.31
                   Adjusted Chi Square Value  963.5                            95% Jackknife UCL  35.46
                                                                      95% Standard Bootstrap UCL  35.18
              Anderson-Darling Test Statistic  1.577                         95% Bootstrap-t UCL  38.37
            Anderson-Darling 5% Critical Value  0.739                     95% Hall's Bootstrap UCL  45.56
           Kolmogorov-Smirnov Test Statistic  0.209                   95% Percentile Bootstrap UCL  35.43
          Kolmogorov-Smirnov 5% Critical Value  0.203                          95% BCA Bootstrap UCL  37.1
 Data not Gamma Distributed at 5% Significance Level                   95% Chebyshev(Mean, Sd) UCL  39.49
                                                                     97.5% Chebyshev(Mean, Sd) UCL  42.39
         Assuming Gamma Distribution                                   99% Chebyshev(Mean, Sd) UCL  48.09
  95% Approximate Gamma UCL (Use when n >= 40)  35.28
     95% Adjusted Gamma UCL (Use when n < 40)  35.53

           Potential UCL to Use                                         Use 95% Student's-t UCL  35.46
                                                                           or 95% Modified-t UCL  35.64

  Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
     These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
                 and Singh and Singh (2003).   For additional insight, the user may want to consult a statistician.
```

Appendix C.1-1
Surface Soil ProUCL Output - Launcher Area
LO-58
Caribou, ME

```
COBALT

                                             General Statistics
                Number of Valid Observations  18                          Number of Distinct Observations  18

                Raw Statistics                                        Log-transformed Statistics
                                     Minimum  9.7                                  Minimum of Log Data  2.272
                                     Maximum  19.6                                 Maximum of Log Data  2.976
                                        Mean  12.22                                   Mean of log Data  2.49
                              Geometric Mean  12.06                                     SD of log Data  0.163
                                      Median  11.7
                                          SD  2.241
                           Std. Error of Mean  0.528
                     Coefficient of Variation  0.183
                                    Skewness  2.146

                                           Relevant UCL Statistics
            Normal Distribution Test                                 Lognormal Distribution Test
                 Shapiro Wilk Test Statistic  0.802                         Shapiro Wilk Test Statistic  0.888
                 Shapiro Wilk Critical Value  0.897                         Shapiro Wilk Critical Value  0.897
      Data not Normal at 5% Significance Level                   Data not Lognormal at 5% Significance Level

         Assuming Normal Distribution                                Assuming Lognormal Distribution
                         95% Student's-t UCL  13.14                                         95% H-UCL  13.1
       95% UCLs (Adjusted for Skewness)                                     95% Chebyshev (MVUE) UCL  14.27
           95% Adjusted-CLT UCL (Chen-1995)  13.38                         97.5% Chebyshev (MVUE) UCL  15.15
         95% Modified-t UCL (Johnson-1978)  13.19                            99% Chebyshev (MVUE) UCL  16.9

            Gamma Distribution Test                                          Data Distribution
                     k star (bias corrected)  31.03         Data appear Gamma Distributed at 5% Significance Level
                                  Theta Star  0.394
                                 MLE of Mean  12.22
                   MLE of Standard Deviation  2.194
                                     nu star  1117
            Approximate Chi Square Value (.05)  1040                     Nonparametric Statistics
                Adjusted Level of Significance  0.0357                                   95% CLT UCL  13.09
                       Adjusted Chi Square Value  1033                              95% Jackknife UCL  13.14
                                                                         95% Standard Bootstrap UCL  13.07
                Anderson-Darling Test Statistic  0.619                            95% Bootstrap-t UCL  13.64
              Anderson-Darling 5% Critical Value  0.739                       95% Hall's Bootstrap UCL  17.44
             Kolmogorov-Smirnov Test Statistic  0.141                     95% Percentile Bootstrap UCL  13.12
            Kolmogorov-Smirnov 5% Critical Value  0.203                          95% BCA Bootstrap UCL  13.34
  Data appear Gamma Distributed at 5% Significance Level                    95% Chebyshev(Mean, Sd) UCL  14.52
                                                                        97.5% Chebyshev(Mean, Sd) UCL  15.52
         Assuming Gamma Distribution                                        99% Chebyshev(Mean, Sd) UCL  17.48
     95% Approximate Gamma UCL (Use when n >= 40)  13.12
         95% Adjusted Gamma UCL (Use when n < 40)  13.21

            Potential UCL to Use                                       Use 95% Approximate Gamma UCL  13.12

    Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
        These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
               and Singh and Singh (2003).   For additional insight, the user may want to consult a statistician.
```

Appendix C.1-1
Surface Soil ProUCL Output - Launcher Area
LO-58
Caribou, ME

IRON

General Statistics			
Number of Valid Observations	18	Number of Distinct Observations	17
Raw Statistics		**Log-transformed Statistics**	
Minimum	28400	Minimum of Log Data	10.25
Maximum	49300	Maximum of Log Data	10.81
Mean	32189	Mean of log Data	10.37
Geometric Mean	31927	SD of log Data	0.125
Median	31225		
SD	4708		
Std. Error of Mean	1110		
Coefficient of Variation	0.146		
Skewness	3.105		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.638	Shapiro Wilk Test Statistic	0.716
Shapiro Wilk Critical Value	0.897	Shapiro Wilk Critical Value	0.897
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	34119	95% H-UCL	33927
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	36306
95% Adjusted-CLT UCL (Chen-1995)	34882	97.5% Chebyshev (MVUE) UCL	38098
95% Modified-t UCL (Johnson-1978)	34255	99% Chebyshev (MVUE) UCL	41619
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	51.12	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	629.6		
MLE of Mean	32189		
MLE of Standard Deviation	4502		
nu star	1840		
Approximate Chi Square Value (.05)	1742	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0357	95% CLT UCL	34014
Adjusted Chi Square Value	1733	95% Jackknife UCL	34119
		95% Standard Bootstrap UCL	33973
Anderson-Darling Test Statistic	1.72	95% Bootstrap-t UCL	37002
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	42560
Kolmogorov-Smirnov Test Statistic	0.26	95% Percentile Bootstrap UCL	34208
Kolmogorov-Smirnov 5% Critical Value	0.203	95% BCA Bootstrap UCL	35017
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	37026
		97.5% Chebyshev(Mean, Sd) UCL	39119
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	43231
95% Approximate Gamma UCL (Use when n >= 40)	34012		
95% Adjusted Gamma UCL (Use when n < 40)	34192		
Potential UCL to Use		Use 95% Student's-t UCL	34119
		or 95% Modified-t UCL	34255

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Appendix C.1-1
Surface Soil ProUCL Output - Launcher Area
LO-58
Caribou, ME

```
MANGANESE

                                             General Statistics
                  Number of Valid Observations  18                     Number of Distinct Observations  18

             Raw Statistics                                        Log-transformed Statistics
                                       Minimum  464                            Minimum of Log Data  6.14
                                       Maximum  1610                           Maximum of Log Data  7.384
                                          Mean  712.7                             Mean of log Data  6.506
                                Geometric Mean  668.9                               SD of log Data  0.338
                                        Median  615.5
                                            SD  308.8
                             Std. Error of Mean  72.79
                      Coefficient of Variation  0.433
                                      Skewness  2.209

                                           Relevant UCL Statistics
          Normal Distribution Test                                  Lognormal Distribution Test
                    Shapiro Wilk Test Statistic  0.691                  Shapiro Wilk Test Statistic  0.817
                    Shapiro Wilk Critical Value  0.897                  Shapiro Wilk Critical Value  0.897
      Data not Normal at 5% Significance Level               Data not Lognormal at 5% Significance Level

         Assuming Normal Distribution                              Assuming Lognormal Distribution
                          95% Student's-t UCL  839.3                                  95% H-UCL  826.6
       95% UCLs (Adjusted for Skewness)                                95% Chebyshev (MVUE) UCL  955.3
          95% Adjusted-CLT UCL (Chen-1995)  872.9                    97.5% Chebyshev (MVUE) UCL  1063
         95% Modified-t UCL (Johnson-1978)  845.7                      99% Chebyshev (MVUE) UCL  1275

          Gamma Distribution Test                                       Data Distribution
                      k star (bias corrected)  6.744          Data do not follow a Discernable Distribution (0.05)
                                  Theta Star  105.7
                                 MLE of Mean  712.7
                   MLE of Standard Deviation  274.4
                                     nu star  242.8
            Approximate Chi Square Value (.05)  207.7                  Nonparametric Statistics
                Adjusted Level of Significance  0.0357                              95% CLT UCL  832.4
                       Adjusted Chi Square Value  204.6                       95% Jackknife UCL  839.3
                                                                      95% Standard Bootstrap UCL  829.8
                 Anderson-Darling Test Statistic  1.575                      95% Bootstrap-t UCL  1025
               Anderson-Darling 5% Critical Value  0.741                  95% Hall's Bootstrap UCL  1432
              Kolmogorov-Smirnov Test Statistic  0.28              95% Percentile Bootstrap UCL  839.6
             Kolmogorov-Smirnov 5% Critical Value  0.204                   95% BCA Bootstrap UCL  869.8
   Data not Gamma Distributed at 5% Significance Level                  95% Chebyshev(Mean, Sd) UCL  1030
                                                                    97.5% Chebyshev(Mean, Sd) UCL  1167
          Assuming Gamma Distribution                                  99% Chebyshev(Mean, Sd) UCL  1437
    95% Approximate Gamma UCL (Use when n >= 40)  833.1
        95% Adjusted Gamma UCL (Use when n < 40)  845.7

            Potential UCL to Use                                       Use 95% Student's-t UCL  839.3
                                                                          or 95% Modified-t UCL  845.7

    Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
       These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
                 and Singh and Singh (2003).   For additional insight, the user may want to consult a statistician.
```

Appendix C.1-2
Total Soil ProUCL Output - Entire Site
LO-58
Caribou, ME

```
ALUMINUM

                                              General Statistics
                   Number of Valid Observations  27                     Number of Distinct Observations  24

                Raw Statistics                                      Log-transformed Statistics
                                       Minimum  8670                             Minimum of Log Data  9.068
                                       Maximum  29900                            Maximum of Log Data  10.31
                                          Mean  16247                               Mean of log Data  9.671
                                Geometric Mean  15850                                 SD of log Data  0.225
                                        Median  15800
                                            SD  3836
                             Std. Error of Mean  738.3
                      Coefficient of Variation  0.236
                                      Skewness  1.491

                                            Relevant UCL Statistics
          Normal Distribution Test                                  Lognormal Distribution Test
                    Shapiro Wilk Test Statistic  0.885                  Shapiro Wilk Test Statistic  0.948
                    Shapiro Wilk Critical Value  0.923                  Shapiro Wilk Critical Value  0.923
       Data not Normal at 5% Significance Level              Data appear Lognormal at 5% Significance Level

          Assuming Normal Distribution                              Assuming Lognormal Distribution
                          95% Student's-t UCL  17506                                    95% H-UCL  17583
      95% UCLs (Adjusted for Skewness)                                 95% Chebyshev (MVUE) UCL  19338
            95% Adjusted-CLT UCL (Chen-1995)  17688                  97.5% Chebyshev (MVUE) UCL  20677
          95% Modified-t UCL (Johnson-1978)  17542                    99% Chebyshev (MVUE) UCL  23309

          Gamma Distribution Test                                          Data Distribution
                      k star (bias corrected)  18.14       Data appear Gamma Distributed at 5% Significance Level
                                   Theta Star  895.6
                                  MLE of Mean  16247
                      MLE of Standard Deviation  3815
                                      nu star  979.6
                 Approximate Chi Square Value (.05)  907.9                  Nonparametric Statistics
                  Adjusted Level of Significance  0.0401                                95% CLT UCL  17461
                        Adjusted Chi Square Value  903.5                          95% Jackknife UCL  17506
                                                                          95% Standard Bootstrap UCL  17476
                  Anderson-Darling Test Statistic  0.512                        95% Bootstrap-t UCL  17845
               Anderson-Darling 5% Critical Value  0.744                     95% Hall's Bootstrap UCL  18405
              Kolmogorov-Smirnov Test Statistic  0.12                  95% Percentile Bootstrap UCL  17487
             Kolmogorov-Smirnov 5% Critical Value  0.168                         95% BCA Bootstrap UCL  17699
  Data appear Gamma Distributed at 5% Significance Level                  95% Chebyshev(Mean, Sd) UCL  19465
                                                                         97.5% Chebyshev(Mean, Sd) UCL  20858
          Assuming Gamma Distribution                                      99% Chebyshev(Mean, Sd) UCL  23593
     95% Approximate Gamma UCL (Use when n >= 40)  17529
        95% Adjusted Gamma UCL (Use when n < 40)  17614

            Potential UCL to Use                                      Use 95% Approximate Gamma UCL  17529

     Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
       These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
                 and Singh and Singh (2003).   For additional insight, the user may want to consult a statistician.
```

Appendix C.1-2
Total Soil ProUCL Output - Entire Site
LO-58
Caribou, ME

ARSENIC

General Statistics			
Number of Valid Observations	27	Number of Distinct Observations	23
Raw Statistics		**Log-transformed Statistics**	
Minimum	3	Minimum of Log Data	1.099
Maximum	11.1	Maximum of Log Data	2.407
Mean	6.756	Mean of log Data	1.867
Geometric Mean	6.466	SD of log Data	0.312
Median	7		
SD	1.936		
Std. Error of Mean	0.373		
Coefficient of Variation	0.287		
Skewness	0.0628		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.986	Shapiro Wilk Test Statistic	0.957
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	7.391	95% H-UCL	7.592
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	8.579
95% Adjusted-CLT UCL (Chen-1995)	7.373	97.5% Chebyshev (MVUE) UCL	9.36
95% Modified-t UCL (Johnson-1978)	7.392	99% Chebyshev (MVUE) UCL	10.89
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	10.32	**Data appear Normal at 5% Significance Level**	
Theta Star	0.655		
MLE of Mean	6.756		
MLE of Standard Deviation	2.103		
nu star	557.3		
Approximate Chi Square Value (.05)	503.6	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0401	95% CLT UCL	7.368
Adjusted Chi Square Value	500.3	95% Jackknife UCL	7.391
		95% Standard Bootstrap UCL	7.357
Anderson-Darling Test Statistic	0.336	95% Bootstrap-t UCL	7.416
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	7.375
Kolmogorov-Smirnov Test Statistic	0.105	95% Percentile Bootstrap UCL	7.333
Kolmogorov-Smirnov 5% Critical Value	0.168	95% BCA Bootstrap UCL	7.381
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.38
		97.5% Chebyshev(Mean, Sd) UCL	9.082
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	10.46
95% Approximate Gamma UCL (Use when n >= 40)	7.477		
95% Adjusted Gamma UCL (Use when n < 40)	7.525		
Potential UCL to Use		Use 95% Student's-t UCL	7.391

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Appendix C.1-2
Total Soil ProUCL Output - Entire Site
LO-58
Caribou, ME

```
BENZO(A)ANTHRACENE

                                          General Statistics
                    Number of Valid Data       27                      Number of Detected Data       18
         Number of Distinct Detected Data      17                    Number of Non-Detect Data        9
                                                                          Percent Non-Detects    33.33%

                  Raw Statistics                                 Log-transformed Statistics
                        Minimum Detected   0.0002                             Minimum Detected   -8.517
                        Maximum Detected     0.17                             Maximum Detected   -1.772
                        Mean of Detected    0.013                             Mean of Detected   -5.896
                          SD of Detected   0.0394                               SD of Detected    1.552
                       Minimum Non-Detect  0.00071                           Minimum Non-Detect   -7.25
                       Maximum Non-Detect 0.000855                           Maximum Non-Detect  -7.064

Note: Data have multiple DLs - Use of KM Method is recommended          Number treated as Non-Detect     13
For all methods (except KM, DL/2, and ROS Methods),                       Number treated as Detected     14
Observations < Largest ND are treated as NDs                        Single DL Non-Detect Percentage  48.15%

                                            UCL Statistics
     Normal Distribution Test with Detected Values Only          Lognormal Distribution Test with Detected Values Only
                    Shapiro Wilk Test Statistic    0.329                 Shapiro Wilk Test Statistic  0.946
                   5% Shapiro Wilk Critical Value  0.897              5% Shapiro Wilk Critical Value  0.897
        Data not Normal at 5% Significance Level                 Data appear Lognormal at 5% Significance Level

             Assuming Normal Distribution                              Assuming Lognormal Distribution
                       DL/2 Substitution Method                                 DL/2 Substitution Method
                                        Mean  0.00883                                             Mean  -6.552
                                          SD   0.0324                                               SD   1.572
                            95% DL/2 (t) UCL   0.0195                             95%  H-Stat (DL/2) UCL  0.0138

         Maximum Likelihood Estimate(MLE) Method    N/A                                   Log ROS Method
             MLE yields a negative mean                                               Mean in Log Scale  -6.575
                                                                                        SD in Log Scale   1.597
                                                                                  Mean in Original Scale 0.00882
                                                                                    SD in Original Scale  0.0324
                                                                                               95% t UCL  0.0195
                                                                          95% Percentile Bootstrap UCL    0.0211
                                                                                 95% BCA Bootstrap UCL     0.028
                                                                                               95% H-UCL  0.0144

     Gamma Distribution Test with Detected Values Only              Data Distribution Test with Detected Values Only
                        k star (bias corrected)   0.387           Data appear Lognormal at 5% Significance Level
                                    Theta Star   0.0338
                                       nu star    13.92

                             A-D Test Statistic    1.923                   Nonparametric Statistics
                            5% A-D Critical Value  0.817                         Kaplan-Meier (KM) Method
                              K-S Test Statistic   0.817                                             Mean  0.00884
                            5% K-S Critical Value  0.217                                               SD   0.0318
    Data not Gamma Distributed at 5% Significance Level                                       SE of Mean   0.0063
                                                                                          95% KM (t) UCL   0.0196
             Assuming Gamma Distribution                                                  95% KM (z) UCL   0.0192
      Gamma ROS Statistics using Extrapolated Data                                  95% KM (jackknife) UCL  0.0195
                                       Minimum  0.000001                            95% KM (bootstrap t) UCL  0.116
                                       Maximum      0.17                                  95% KM (BCA) UCL   0.0209
                                          Mean    0.0087                   95% KM (Percentile Bootstrap) UCL  0.021
                                        Median    0.0011                            95% KM (Chebyshev) UCL   0.0363
                                            SD    0.0325                          97.5% KM (Chebyshev) UCL   0.0482
                                        k star     0.198                            99% KM (Chebyshev) UCL   0.0715
                                    Theta star     0.044
                                       Nu star     10.69                      Potential UCLs to Use
                                      AppChi2      4.376                            99% KM (Chebyshev) UCL   0.0715
      95% Gamma Approximate UCL (Use when n >= 40)  0.0212
         95% Adjusted Gamma UCL (Use when n < 40)   0.0226
Note: DL/2 is not a recommended method.

    Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
       These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
                             For additional insight, the user may want to consult a statistician.
```

Appendix C.1-2
Total Soil ProUCL Output - Entire Site
LO-58
Caribou, ME

BENZO(A)PYRENE

	General Statistics		
Number of Valid Data	27	Number of Detected Data	18
Number of Distinct Detected Data	17	Number of Non-Detect Data	9
		Percent Non-Detects	33.33%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.00019	Minimum Detected	-8.568
Maximum Detected	0.17	Maximum Detected	-1.772
Mean of Detected	0.0134	Mean of Detected	-5.873
SD of Detected	0.0394	SD of Detected	1.597
Minimum Non-Detect	0.00071	Minimum Non-Detect	-7.25
Maximum Non-Detect	0.000855	Maximum Non-Detect	-7.064
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	13
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	14
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	48.15%
	UCL Statistics		
Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.34	Shapiro Wilk Test Statistic	0.952
5% Shapiro Wilk Critical Value	0.897	5% Shapiro Wilk Critical Value	0.897
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.00906	Mean	-6.537
SD	0.0325	SD	1.608
95% DL/2 (t) UCL	0.0197	95% H-Stat (DL/2) UCL	0.0154
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-6.576
		SD in Log Scale	1.647
		Mean in Original Scale	0.00905
		SD in Original Scale	0.0325
		95% t UCL	0.0197
		95% Percentile Bootstrap UCL	0.0212
		95% BCA Bootstrap UCL	0.0283
		95% H-UCL	0.0166
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.386	**Data appear Lognormal at 5% Significance Level**	
Theta Star	0.0347		
nu star	13.89		
A-D Test Statistic	1.769	**Nonparametric Statistics**	
5% A-D Critical Value	0.817	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.817	Mean	0.00907
5% K-S Critical Value	0.217	SD	0.0319
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.00631
		95% KM (t) UCL	0.0198
Assuming Gamma Distribution		95% KM (z) UCL	0.0194
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.0197
Minimum	0.000001	95% KM (bootstrap t) UCL	0.111
Maximum	0.17	95% KM (BCA) UCL	0.0213
Mean	0.00893	95% KM (Percentile Bootstrap) UCL	0.0212
Median	0.0011	95% KM (Chebyshev) UCL	0.0366
SD	0.0325	97.5% KM (Chebyshev) UCL	0.0485
k star	0.197	99% KM (Chebyshev) UCL	0.0719
Theta star	0.0452		
Nu star	10.66	**Potential UCLs to Use**	
AppChi2	4.361	99% KM (Chebyshev) UCL	0.0719
95% Gamma Approximate UCL (Use when n >= 40)	0.0218		
95% Adjusted Gamma UCL (Use when n < 40)	0.0232		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Appendix C.1-2
Total Soil ProUCL Output - Entire Site
LO-58
Caribou, ME

BENZO(B)FLUORANTHENE

	General Statistics		
Number of Valid Observations	27	Number of Distinct Observations	26
Raw Statistics		**Log-transformed Statistics**	
Minimum	0.0003	Minimum of Log Data	-8.112
Maximum	0.21	Maximum of Log Data	-1.561
Mean	0.0118	Mean of log Data	-6.17
Geometric Mean	0.00209	SD of log Data	1.65
Median	0.0018		
SD	0.04		
Std. Error of Mean	0.0077		
Coefficient of Variation	3.39		
Skewness	5.028		
	Relevant UCL Statistics		
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.292	Shapiro Wilk Test Statistic	0.91
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.0249	95% H-UCL	0.0251
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0203
95% Adjusted-CLT UCL (Chen-1995)	0.0324	97.5% Chebyshev (MVUE) UCL	0.0258
95% Modified-t UCL (Johnson-1978)	0.0262	99% Chebyshev (MVUE) UCL	0.0368
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.365	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	0.0324		
MLE of Mean	0.0118		
MLE of Standard Deviation	0.0195		
nu star	19.71		
Approximate Chi Square Value (.05)	10.64	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0401	95% CLT UCL	0.0245
Adjusted Chi Square Value	10.21	95% Jackknife UCL	0.0249
		95% Standard Bootstrap UCL	0.0238
Anderson-Darling Test Statistic	2.467	95% Bootstrap-t UCL	0.105
Anderson-Darling 5% Critical Value	0.834	95% Hall's Bootstrap UCL	0.07
Kolmogorov-Smirnov Test Statistic	0.249	95% Percentile Bootstrap UCL	0.0268
Kolmogorov-Smirnov 5% Critical Value	0.181	95% BCA Bootstrap UCL	0.0357
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0454
		97.5% Chebyshev(Mean, Sd) UCL	0.0599
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0885
95% Approximate Gamma UCL (Use when n >= 40)	0.0219		
95% Adjusted Gamma UCL (Use when n < 40)	0.0228		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	0.0454

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Appendix C.1-2
Total Soil ProUCL Output - Entire Site
LO-58
Caribou, ME

CHROMIUM

General Statistics

Number of Valid Observations	27	Number of Distinct Observations	25

Raw Statistics		**Log-transformed Statistics**	
Minimum	18.3	Minimum of Log Data	2.907
Maximum	61.4	Maximum of Log Data	4.117
Mean	32.71	Mean of log Data	3.459
Geometric Mean	31.78	SD of log Data	0.237
Median	30.2		
SD	8.652		
Std. Error of Mean	1.665		
Coefficient of Variation	0.265		
Skewness	1.819		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.832	Shapiro Wilk Test Statistic	0.927
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	35.55	95% H-UCL	35.51
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	39.21
95% Adjusted-CLT UCL (Chen-1995)	36.07	97.5% Chebyshev (MVUE) UCL	42.05
95% Modified-t UCL (Johnson-1978)	35.65	99% Chebyshev (MVUE) UCL	47.62
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	15.68	**Data Follow Appr. Gamma Distribution at 5% Significance Level**	
Theta Star	2.087		
MLE of Mean	32.71		
MLE of Standard Deviation	8.261		
nu star	846.5		
Approximate Chi Square Value (.05)	780	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0401	95% CLT UCL	35.45
Adjusted Chi Square Value	775.9	95% Jackknife UCL	35.55
		95% Standard Bootstrap UCL	35.39
Anderson-Darling Test Statistic	0.984	95% Bootstrap-t UCL	36.93
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	38.14
Kolmogorov-Smirnov Test Statistic	0.149	95% Percentile Bootstrap UCL	35.52
Kolmogorov-Smirnov 5% Critical Value	0.168	95% BCA Bootstrap UCL	36.04
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	39.97
		97.5% Chebyshev(Mean, Sd) UCL	43.11
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	49.28
95% Approximate Gamma UCL (Use when n >= 40)	35.5		
95% Adjusted Gamma UCL (Use when n < 40)	35.69		
Potential UCL to Use		Use 95% Approximate Gamma UCL	35.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Appendix C.1-2
Total Soil ProUCL Output - Entire Site
LO-58
Caribou, ME

```
COBALT

                                                General Statistics
                  Number of Valid Observations  27                  Number of Distinct Observations  24

         Raw Statistics                                          Log-transformed Statistics
                                       Minimum  7.2                                 Minimum of Log Data  1.974
                                       Maximum  21                                  Maximum of Log Data  3.045
                                          Mean  12.84                                  Mean of log Data  2.528
                                Geometric Mean  12.53                                    SD of log Data  0.223
                                        Median  12.4
                                            SD  2.922
                             Std. Error of Mean  0.562
                       Coefficient of Variation  0.228
                                      Skewness  0.879

                                              Relevant UCL Statistics
       Normal Distribution Test                                  Lognormal Distribution Test
                   Shapiro Wilk Test Statistic  0.949                       Shapiro Wilk Test Statistic  0.982
                   Shapiro Wilk Critical Value  0.923                       Shapiro Wilk Critical Value  0.923
   Data appear Normal at 5% Significance Level                 Data appear Lognormal at 5% Significance Level

       Assuming Normal Distribution                              Assuming Lognormal Distribution
                          95% Student's-t UCL  13.8                                        95% H-UCL  13.89
     95% UCLs (Adjusted for Skewness)                                    95% Chebyshev (MVUE) UCL  15.26
             95% Adjusted-CLT UCL (Chen-1995)  13.87                          97.5% Chebyshev (MVUE) UCL  16.31
           95% Modified-t UCL (Johnson-1978)  13.81                             99% Chebyshev (MVUE) UCL  18.37

       Gamma Distribution Test                                           Data Distribution
                        k star (bias corrected)  18.68              Data appear Normal at 5% Significance Level
                                    Theta Star  0.687
                                   MLE of Mean  12.84
                       MLE of Standard Deviation  2.97
                                       nu star  1009
                Approximate Chi Square Value (.05)  936.1                Nonparametric Statistics
                  Adjusted Level of Significance  0.0401                                      95% CLT UCL  13.76
                       Adjusted Chi Square Value  931.6                                 95% Jackknife UCL  13.8
                                                                             95% Standard Bootstrap UCL  13.75
                   Anderson-Darling Test Statistic  0.288                           95% Bootstrap-t UCL  13.92
                 Anderson-Darling 5% Critical Value  0.744                        95% Hall's Bootstrap UCL  14
                 Kolmogorov-Smirnov Test Statistic  0.121                      95% Percentile Bootstrap UCL  13.73
               Kolmogorov-Smirnov 5% Critical Value  0.168                             95% BCA Bootstrap UCL  13.84
 Data appear Gamma Distributed at 5% Significance Level                      95% Chebyshev(Mean, Sd) UCL  15.29
                                                                           97.5% Chebyshev(Mean, Sd) UCL  16.35
       Assuming Gamma Distribution                                           99% Chebyshev(Mean, Sd) UCL  18.43
   95% Approximate Gamma UCL (Use when n >= 40)  13.84
       95% Adjusted Gamma UCL (Use when n < 40)  13.9

       Potential UCL to Use                                              Use 95% Student's-t UCL  13.8

 Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
   These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
           and Singh and Singh (2003).   For additional insight, the user may want to consult a statistician.
```

Appendix C.1-2
Total Soil ProUCL Output - Entire Site
LO-58
Caribou, ME

```
DIBENZO(A,H)ANTHRACENE


                                                 General Statistics
                       Number of Valid Data         27                          Number of Detected Data         14
              Number of Distinct Detected Data      14                      Number of Non-Detect Data           13
                                                                                  Percent Non-Detects       48.15%


                  Raw Statistics                                        Log-transformed Statistics
                          Minimum Detected     0.00025                               Minimum Detected       -8.294
                          Maximum Detected       0.035                               Maximum Detected       -3.352
                           Mean of Detected    0.00362                               Mean of Detected       -6.753
                             SD of Detected    0.00909                                 SD of Detected        1.232
                        Minimum Non-Detect     0.00071                             Minimum Non-Detect        -7.25
                        Maximum Non-Detect    0.000855                             Maximum Non-Detect       -7.064

Note: Data have multiple DLs - Use of KM Method is recommended              Number treated as Non-Detect        19
For all methods (except KM, DL/2, and ROS Methods),                             Number treated as Detected         8
Observations < Largest ND are treated as NDs                             Single DL Non-Detect Percentage    70.37%

                                                    UCL Statistics
        Normal Distribution Test with Detected Values Only          Lognormal Distribution Test with Detected Values Only
                     Shapiro Wilk Test Statistic       0.383                    Shapiro Wilk Test Statistic        0.864
                   5% Shapiro Wilk Critical Value      0.874                 5% Shapiro Wilk Critical Value        0.874
             Data not Normal at 5% Significance Level               Data not Lognormal at 5% Significance Level

               Assuming Normal Distribution                                Assuming Lognormal Distribution
                      DL/2 Substitution Method                                         DL/2 Substitution Method
                                          Mean     0.00206                                                 Mean       -7.295
                                            SD     0.00664                                                   SD        1.043
                             95% DL/2 (t) UCL      0.00424                               95%  H-Stat (DL/2) UCL      0.00198

       Maximum Likelihood Estimate(MLE) Method         N/A                                       Log ROS Method
              MLE yields a negative mean                                                       Mean in Log Scale      -7.382
                                                                                                 SD in Log Scale       1.119
                                                                                           Mean in Original Scale    0.00203
                                                                                             SD in Original Scale    0.00664
                                                                                                        95% t UCL    0.00422
                                                                                   95% Percentile Bootstrap UCL      0.00458
                                                                                          95% BCA Bootstrap UCL        0.006
                                                                                                        95% H-UCL     0.0021

        Gamma Distribution Test with Detected Values Only                Data Distribution Test with Detected Values Only
                          k star (bias corrected)      0.482             Data do not follow a Discernable Distribution (0.05)
                                       Theta Star     0.0075
                                          nu star       13.5

                                A-D Test Statistic     1.964                     Nonparametric Statistics
                               5% A-D Critical Value   0.788                             Kaplan-Meier (KM) Method
                                K-S Test Statistic     0.788                                                   Mean    0.00207
                               5% K-S Critical Value   0.241                                                     SD    0.00651
       Data not Gamma Distributed at 5% Significance Level                                               SE of Mean     0.0013
                                                                                                     95% KM (t) UCL    0.00429
               Assuming Gamma Distribution                                                           95% KM (z) UCL    0.00421
           Gamma ROS Statistics using Extrapolated Data                                       95% KM (jackknife) UCL   0.00425
                                          Minimum   0.000001                                 95% KM (bootstrap t) UCL   0.0228
                                          Maximum      0.035                                       95% KM (BCA) UCL    0.00476
                                             Mean    0.00188                        95% KM (Percentile Bootstrap) UCL  0.00455
                                           Median    0.00025                                 95% KM (Chebyshev) UCL    0.00774
                                               SD    0.00669                               97.5% KM (Chebyshev) UCL     0.0102
                                           k star      0.195                                99% KM (Chebyshev) UCL      0.015
                                       Theta star    0.00963
                                          Nu star      10.51                             Potential UCLs to Use
                                          AppChi2      4.265                               97.5% KM (Chebyshev) UCL     0.0102
         95% Gamma Approximate UCL (Use when n >= 40)  0.00462
            95% Adjusted Gamma UCL (Use when n < 40)   0.00491
Note: DL/2 is not a recommended method.

      Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
       These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
                                   For additional insight, the user may want to consult a statistician.
```

Appendix C.1-2
Total Soil ProUCL Output - Entire Site
LO-58
Caribou, ME

```
IRON

                                            General Statistics
                 Number of Valid Observations  27                    Number of Distinct Observations  25

                    Raw Statistics                                  Log-transformed Statistics
                                      Minimum  17800                              Minimum of Log Data  9.787
                                      Maximum  49300                              Maximum of Log Data  10.81
                                         Mean  31381                                 Mean of log Data  10.34
                               Geometric Mean  30977                                   SD of log Data  0.166
                                       Median  31400
                                           SD  5178
                            Std. Error of Mean  996.6
                      Coefficient of Variation  0.165
                                     Skewness  1.029

                                          Relevant UCL Statistics
                 Normal Distribution Test                              Lognormal Distribution Test
                   Shapiro Wilk Test Statistic  0.848                     Shapiro Wilk Test Statistic  0.854
                   Shapiro Wilk Critical Value  0.923                     Shapiro Wilk Critical Value  0.923
          Data not Normal at 5% Significance Level                Data not Lognormal at 5% Significance Level

               Assuming Normal Distribution                          Assuming Lognormal Distribution
                         95% Student's-t UCL  33081                                       95% H-UCL  33236
             95% UCLs (Adjusted for Skewness)                             95% Chebyshev (MVUE) UCL  35773
              95% Adjusted-CLT UCL (Chen-1995)  33232                   97.5% Chebyshev (MVUE) UCL  37670
           95% Modified-t UCL (Johnson-1978)  33114                       99% Chebyshev (MVUE) UCL  41397

                 Gamma Distribution Test                                     Data Distribution
                       k star (bias corrected)  34.46         Data do not follow a Discernable Distribution (0.05)
                                   Theta Star  910.5
                                  MLE of Mean  31381
                     MLE of Standard Deviation  5345
                                      nu star  1861
                Approximate Chi Square Value (.05)  1762                  Nonparametric Statistics
                  Adjusted Level of Significance  0.0401                                  95% CLT UCL  33021
                       Adjusted Chi Square Value  1756                              95% Jackknife UCL  33081
                                                                          95% Standard Bootstrap UCL  32948
                 Anderson-Darling Test Statistic  1.369                         95% Bootstrap-t UCL  33320
               Anderson-Darling 5% Critical Value  0.744                       95% Hall's Bootstrap UCL  34365
              Kolmogorov-Smirnov Test Statistic  0.189                    95% Percentile Bootstrap UCL  32965
             Kolmogorov-Smirnov 5% Critical Value  0.168                          95% BCA Bootstrap UCL  33228
   Data not Gamma Distributed at 5% Significance Level                    95% Chebyshev(Mean, Sd) UCL  35726
                                                                        97.5% Chebyshev(Mean, Sd) UCL  37605
               Assuming Gamma Distribution                                  99% Chebyshev(Mean, Sd) UCL  41298
      95% Approximate Gamma UCL (Use when n >= 40)  33148
         95% Adjusted Gamma UCL (Use when n < 40)  33264

                  Potential UCL to Use                                       Use 95% Student's-t UCL  33081
                                                                                 or 95% Modified-t UCL  33114

    Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
       These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
                    and Singh and Singh (2003).   For additional insight, the user may want to consult a statistician.
```

Appendix C.1-2
Total Soil ProUCL Output - Entire Site
LO-58
Caribou, ME

MANGANESE

General Statistics			
Number of Valid Observations	27	Number of Distinct Observations	27
Raw Statistics		**Log-transformed Statistics**	
Minimum	327	Minimum of Log Data	5.79
Maximum	897	Maximum of Log Data	6.799
Mean	563.7	Mean of log Data	6.308
Geometric Mean	549	SD of log Data	0.236
Median	564		
SD	131.2		
Std. Error of Mean	25.26		
Coefficient of Variation	0.233		
Skewness	0.475		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.97	Shapiro Wilk Test Statistic	0.974
Shapiro Wilk Critical Value	0.923	Shapiro Wilk Critical Value	0.923
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	606.7	95% H-UCL	613.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	676.8
95% Adjusted-CLT UCL (Chen-1995)	607.7	97.5% Chebyshev (MVUE) UCL	725.7
95% Modified-t UCL (Johnson-1978)	607.1	99% Chebyshev (MVUE) UCL	821.6
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	17.01	**Data appear Normal at 5% Significance Level**	
Theta Star	33.13		
MLE of Mean	563.7		
MLE of Standard Deviation	136.6		
nu star	918.8		
Approximate Chi Square Value (.05)	849.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0401	95% CLT UCL	605.2
Adjusted Chi Square Value	845.2	95% Jackknife UCL	606.7
		95% Standard Bootstrap UCL	604.4
Anderson-Darling Test Statistic	0.252	95% Bootstrap-t UCL	610.2
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	612
Kolmogorov-Smirnov Test Statistic	0.111	95% Percentile Bootstrap UCL	604.1
Kolmogorov-Smirnov 5% Critical Value	0.168	95% BCA Bootstrap UCL	605.4
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	673.8
		97.5% Chebyshev(Mean, Sd) UCL	721.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	815
95% Approximate Gamma UCL (Use when n >= 40)	609.7		
95% Adjusted Gamma UCL (Use when n < 40)	612.8		
Potential UCL to Use		Use 95% Student's-t UCL	606.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Appendix C.1-2
Total Soil ProUCL Output - Entire Site
LO-58
Caribou, ME

```
THALLIUM

                                         General Statistics
                Number of Valid Data         27                         Number of Detected Data        4
       Number of Distinct Detected Data       4                     Number of Non-Detect Data         23
                                                                         Percent Non-Detects      85.19%

                Raw Statistics                                  Log-transformed Statistics
                   Minimum Detected        0.24                             Minimum Detected      -1.427
                   Maximum Detected         0.6                             Maximum Detected      -0.511
                   Mean of Detected       0.443                             Mean of Detected      -0.868
                     SD of Detected       0.151                               SD of Detected       0.394
                  Minimum Non-Detect        1.5                           Minimum Non-Detect       0.405
                  Maximum Non-Detect        2.5                           Maximum Non-Detect       0.916

Note: Data have multiple DLs - Use of KM Method is recommended    Number treated as Non-Detect          27
For all methods (except KM, DL/2, and ROS Methods),                  Number treated as Detected           0
Observations < Largest ND are treated as NDs                   Single DL Non-Detect Percentage     100.00%

                       Warning:  There are only 4 Distinct Detected Values in this data
                  Note:  It should be noted that even though bootstrap may be performed on this data set
                        the resulting calculations may not be reliable enough to draw conclusions

              It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

                                            UCL Statistics
      Normal Distribution Test with Detected Values Only        Lognormal Distribution Test with Detected Values Only
                 Shapiro Wilk Test Statistic      0.961                  Shapiro Wilk Test Statistic         0.9
                5% Shapiro Wilk Critical Value    0.748                5% Shapiro Wilk Critical Value      0.748
        Data appear Normal at 5% Significance Level               Data appear Lognormal at 5% Significance Level

            Assuming Normal Distribution                            Assuming Lognormal Distribution
                   DL/2 Substitution Method                                DL/2 Substitution Method
                                       Mean       0.899                                          Mean     -0.153
                                         SD       0.226                                            SD      0.349
                            95% DL/2 (t) UCL      0.973                       95%  H-Stat (DL/2) UCL      1.035

      Maximum Likelihood Estimate(MLE) Method       N/A                                Log ROS Method
         MLE method failed to converge properly                                     Mean in Log Scale     -0.868
                                                                                      SD in Log Scale      0.285
                                                                               Mean in Original Scale      0.436
                                                                                 SD in Original Scale      0.122
                                                                                            95% t UCL      0.476
                                                                          95% Percentile Bootstrap UCL     0.474
                                                                                95% BCA Bootstrap UCL      0.476
                                                                                            95% H-UCL      0.484

      Gamma Distribution Test with Detected Values Only            Data Distribution Test with Detected Values Only
                       k star (bias corrected)    2.577              Data appear Normal at 5% Significance Level
                                    Theta Star    0.172
                                       nu star    20.62

                             A-D Test Statistic    0.341                      Nonparametric Statistics
                            5% A-D Critical Value  0.657                         Kaplan-Meier (KM) Method
                             K-S Test Statistic    0.657                                             Mean      0.443
                            5% K-S Critical Value  0.395                                               SD       0.13
    Data appear Gamma Distributed at 5% Significance Level                                 SE of Mean     0.0753
                                                                                         95% KM (t) UCL      0.571
              Assuming Gamma Distribution                                                95% KM (z) UCL      0.566
        Gamma ROS Statistics using Extrapolated Data                              95% KM (jackknife) UCL     0.588
                                        Minimum    0.202                       95% KM (bootstrap t) UCL      0.576
                                        Maximum    0.626                                95% KM (BCA) UCL     0.556
                                           Mean    0.447              95% KM (Percentile Bootstrap) UCL      0.563
                                         Median    0.458                        95% KM (Chebyshev) UCL      0.771
                                             SD    0.113                      97.5% KM (Chebyshev) UCL      0.913
                                         k star     12.3                        99% KM (Chebyshev) UCL      1.192
                                     Theta star   0.0363
                                        Nu star    664.2                  Potential UCLs to Use
                                        AppChi2    605.4                                95% KM (t) UCL      0.571
          95% Gamma Approximate UCL (Use when n >= 40)   0.49         95% KM (Percentile Bootstrap) UCL      0.563
            95% Adjusted Gamma UCL (Use when n < 40)     N/A
Note: DL/2 is not a recommended method.
          Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
            These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
                                For additional insight, the user may want to consult a statistician.
```

Appendix C.1-3
Groundwater ProUCL Output - AMAC Building Area
LO-58
Caribou, ME

```
CIS-1,2-DICHLOROETHENE

                                           General Statistics
                  Number of Valid Observations  13                      Number of Distinct Observations  13

               Raw Statistics                                        Log-transformed Statistics
                                       Minimum  0.185                             Minimum of Log Data  -1.687
                                       Maximum  8.9                               Maximum of Log Data  2.186
                                          Mean  2.371                                Mean of log Data  0.371
                                Geometric Mean  1.449                                  SD of log Data  1.052
                                        Median  1.3
                                            SD  2.578
                             Std. Error of Mean  0.715
                       Coefficient of Variation  1.087
                                      Skewness  1.728

                                         Relevant UCL Statistics
           Normal Distribution Test                                  Lognormal Distribution Test
                    Shapiro Wilk Test Statistic  0.763                    Shapiro Wilk Test Statistic  0.968
                    Shapiro Wilk Critical Value  0.866                    Shapiro Wilk Critical Value  0.866
       Data not Normal at 5% Significance Level                Data appear Lognormal at 5% Significance Level

         Assuming Normal Distribution                              Assuming Lognormal Distribution
                          95% Student's-t UCL  3.646                                     95% H-UCL  6.151
      95% UCLs (Adjusted for Skewness)                                       95% Chebyshev (MVUE) UCL  5.643
                95% Adjusted-CLT UCL (Chen-1995)  3.914                      97.5% Chebyshev (MVUE) UCL  7.058
              95% Modified-t UCL (Johnson-1978)  3.703                        99% Chebyshev (MVUE) UCL  9.837

           Gamma Distribution Test                                          Data Distribution
                          k star (bias corrected)  0.939     Data appear Gamma Distributed at 5% Significance Level
                                       Theta Star  2.526
                                      MLE of Mean  2.371
                        MLE of Standard Deviation  2.448
                                          nu star  24.4
                  Approximate Chi Square Value (.05)  14.15                  Nonparametric Statistics
                     Adjusted Level of Significance  0.0301                                 95% CLT UCL  3.547
                           Adjusted Chi Square Value  13.05                            95% Jackknife UCL  3.646
                                                                        95% Standard Bootstrap UCL  3.5
                     Anderson-Darling Test Statistic  0.493                        95% Bootstrap-t UCL  4.518
                   Anderson-Darling 5% Critical Value  0.755                     95% Hall's Bootstrap UCL  3.868
                   Kolmogorov-Smirnov Test Statistic  0.199                95% Percentile Bootstrap UCL  3.658
                  Kolmogorov-Smirnov 5% Critical Value  0.242                      95% BCA Bootstrap UCL  3.762
 Data appear Gamma Distributed at 5% Significance Level                     95% Chebyshev(Mean, Sd) UCL  5.488
                                                                        97.5% Chebyshev(Mean, Sd) UCL  6.837
          Assuming Gamma Distribution                                       99% Chebyshev(Mean, Sd) UCL  9.486
       95% Approximate Gamma UCL (Use when n >= 40)  4.088
           95% Adjusted Gamma UCL (Use when n < 40)  4.433

           Potential UCL to Use                                     Use 95% Approximate Gamma UCL  4.088

   Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
     These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
              and Singh and Singh (2003).   For additional insight, the user may want to consult a statistician.
```

Appendix C.1-3
Groundwater ProUCL Output - AMAC Building Area
LO-58
Caribou, ME

```
TRICHLOROETHENE

                                                General Statistics
                  Number of Valid Observations  13                       Number of Distinct Observations  12

          Raw Statistics                                          Log-transformed Statistics
                                       Minimum  2                                   Minimum of Log Data  0.693
                                       Maximum  7.25                                Maximum of Log Data  1.981
                                          Mean  4.927                                  Mean of log Data  1.548
                                Geometric Mean  4.701                                    SD of log Data  0.336
                                        Median  4.6
                                            SD  1.452
                             Std. Error of Mean  0.403
                       Coefficient of Variation  0.295
                                       Skewness  -0.0997

                                               Relevant UCL Statistics
        Normal Distribution Test                                   Lognormal Distribution Test
                    Shapiro Wilk Test Statistic  0.958                      Shapiro Wilk Test Statistic  0.9
                    Shapiro Wilk Critical Value  0.866                      Shapiro Wilk Critical Value  0.866
   Data appear Normal at 5% Significance Level                Data appear Lognormal at 5% Significance Level

        Assuming Normal Distribution                               Assuming Lognormal Distribution
                          95% Student's-t UCL  5.645                                       95% H-UCL  6.006
      95% UCLs (Adjusted for Skewness)                                    95% Chebyshev (MVUE) UCL  6.99
             95% Adjusted-CLT UCL (Chen-1995)  5.577                    97.5% Chebyshev (MVUE) UCL  7.872
           95% Modified-t UCL (Johnson-1978)  5.643                      99% Chebyshev (MVUE) UCL  9.604

        Gamma Distribution Test                                             Data Distribution
                       k star (bias corrected)  8.38            Data appear Normal at 5% Significance Level
                                    Theta Star  0.588
                                   MLE of Mean  4.927
                     MLE of Standard Deviation  1.702
                                       nu star  217.9
               Approximate Chi Square Value (.05)  184.7                      Nonparametric Statistics
                  Adjusted Level of Significance  0.0301                                    95% CLT UCL  5.589
                      Adjusted Chi Square Value  180.4                                95% Jackknife UCL  5.645
                                                                          95% Standard Bootstrap UCL  5.571
                 Anderson-Darling Test Statistic  0.355                            95% Bootstrap-t UCL  5.626
                Anderson-Darling 5% Critical Value  0.734                         95% Hall's Bootstrap UCL  5.624
              Kolmogorov-Smirnov Test Statistic  0.138                     95% Percentile Bootstrap UCL  5.546
             Kolmogorov-Smirnov 5% Critical Value  0.237                              95% BCA Bootstrap UCL  5.562
 Data appear Gamma Distributed at 5% Significance Level                   95% Chebyshev(Mean, Sd) UCL  6.682
                                                                        97.5% Chebyshev(Mean, Sd) UCL  7.441
        Assuming Gamma Distribution                                        99% Chebyshev(Mean, Sd) UCL  8.933
      95% Approximate Gamma UCL (Use when n >= 40)  5.811
          95% Adjusted Gamma UCL (Use when n < 40)  5.952

          Potential UCL to Use                                               Use 95% Student's-t UCL  5.645

   Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
       These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
                and Singh and Singh (2003).   For additional insight, the user may want to consult a statistician.

                                    Note: For highly negative-skewed data, confidence limits
                                   (e.g., Chen, Johnson, Lognormal, and Gamma) may not be
                                        reliable.  Chen's and Johnson's methods provide
                                           adjustments for positvely skewed data sets.
```

Appendix C.1-4
Groundwater ProUCL Output - Launcher Area
LO-58
Caribou, ME

1,2,4-TRIMETHYLBENZENE

General Statistics

Number of Valid Data	23	Number of Detected Data	5
Number of Distinct Detected Data	4	Number of Non-Detect Data	18
		Percent Non-Detects	78.26%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.12	Minimum Detected	-2.12
Maximum Detected	28.5	Maximum Detected	3.35
Mean of Detected	5.876	Mean of Detected	-0.602
SD of Detected	12.65	SD of Detected	2.245
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	1	Maximum Non-Detect	0

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	22
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	95.65%

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.558	Shapiro Wilk Test Statistic	0.711
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.517	Mean	-1.095
SD	5.883	SD	1.027
95% DL/2 (t) UCL	3.623	95% H-Stat (DL/2) UCL	0.993
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.228
		SD in Log Scale	1.614
		Mean in Original Scale	1.717
		SD in Original Scale	5.877
		95% t UCL	3.821
		95% Percentile Bootstrap UCL	4.17
		95% BCA Bootstrap UCL	5.439
		95% H-UCL	3.499

Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.25	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	23.5		
nu star	2.501		
A-D Test Statistic	1.048	**Nonparametric Statistics**	
5% A-D Critical Value	0.742	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.742	Mean	1.45
5% K-S Critical Value	0.381	SD	5.768
Data not Gamma Distributed at 5% Significance Level		SE of Mean	1.345
		95% KM (t) UCL	3.759
Assuming Gamma Distribution		95% KM (z) UCL	3.662
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	3.563
Minimum	0.000001	95% KM (bootstrap t) UCL	56.57
Maximum	28.5	95% KM (BCA) UCL	3.93
Mean	3.583	95% KM (Percentile Bootstrap) UCL	3.947
Median	0.16	95% KM (Chebyshev) UCL	7.313
SD	7.073	97.5% KM (Chebyshev) UCL	9.85
k star	0.129	99% KM (Chebyshev) UCL	14.83
Theta star	27.79		
Nu star	5.93	**Potential UCLs to Use**	
AppChi2	1.604	99% KM (Chebyshev) UCL	14.83
95% Gamma Approximate UCL (Use when n >= 40)	13.24		
95% Adjusted Gamma UCL (Use when n < 40)	14.68		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

For additional insight, the user may want to consult a statistician.

Appendix C.1-4
Groundwater ProUCL Output - Launcher Area
LO-58
Caribou, ME

```
TRICHLOROETHENE

                                              General Statistics
                       Number of Valid Data      23                Number of Detected Data      13
              Number of Distinct Detected Data   10            Number of Non-Detect Data      10
                                                                  Percent Non-Detects  43.48%

          Raw Statistics                                  Log-transformed Statistics
                          Minimum Detected     0.18                      Minimum Detected  -1.715
                          Maximum Detected     0.8                       Maximum Detected  -0.223
                           Mean of Detected    0.368                      Mean of Detected  -1.051
                             SD of Detected    0.142                        SD of Detected   0.324
                         Minimum Non-Detect    0.5                     Minimum Non-Detect  -0.693
                         Maximum Non-Detect    1                       Maximum Non-Detect   0

Note: Data have multiple DLs - Use of KM Method is recommended     Number treated as Non-Detect      23
For all methods (except KM, DL/2, and ROS Methods),                    Number treated as Detected       0
Observations < Largest ND are treated as NDs                     Single DL Non-Detect Percentage  100.00%

                                              UCL Statistics
    Normal Distribution Test with Detected Values Only     Lognormal Distribution Test with Detected Values Only
                    Shapiro Wilk Test Statistic  0.696                Shapiro Wilk Test Statistic   0.837
                 5% Shapiro Wilk Critical Value  0.866             5% Shapiro Wilk Critical Value   0.866
       Data not Normal at 5% Significance Level              Data not Lognormal at 5% Significance Level
            Assuming Normal Distribution                          Assuming Lognormal Distribution
                      DL/2 Substitution Method                               DL/2 Substitution Method
                                          Mean   0.36                                        Mean  -1.076
                                            SD   0.134                                         SD   0.332
                              95% DL/2 (t) UCL   0.408                      95%  H-Stat (DL/2) UCL   0.41

     Maximum Likelihood Estimate(MLE) Method     N/A                                  Log ROS Method
        MLE method failed to converge properly                                 Mean in Log Scale  -1.067
                                                                                 SD in Log Scale   0.276
                                                                           Mean in Original Scale   0.358
                                                                             SD in Original Scale   0.116
                                                                                       95% t UCL   0.399
                                                                      95% Percentile Bootstrap UCL   0.397
                                                                             95% BCA Bootstrap UCL   0.416
                                                                                       95% H-UCL   0.398
    Gamma Distribution Test with Detected Values Only          Data Distribution Test with Detected Values Only
                        k star (bias corrected)  7.465        Data do not follow a Discernable Distribution (0.05)
                                    Theta Star   0.0494
                                       nu star   194.1

                             A-D Test Statistic  1.104                 Nonparametric Statistics
                           5% A-D Critical Value 0.734                      Kaplan-Meier (KM) Method
                             K-S Test Statistic  0.734                                        Mean   0.357
                           5% K-S Critical Value 0.237                                          SD   0.119
    Data not Gamma Distributed at 5% Significance Level                                SE of Mean   0.03
                                                                                    95% KM (t) UCL   0.409
            Assuming Gamma Distribution                                             95% KM (z) UCL   0.406
        Gamma ROS Statistics using Extrapolated Data                         95% KM (jackknife) UCL   0.409
                                        Minimum  0.18                        95% KM (bootstrap t) UCL   0.431
                                        Maximum  0.8                                95% KM (BCA) UCL   0.408
                                           Mean  0.368               95% KM (Percentile Bootstrap) UCL   0.407
                                         Median  0.353                         95% KM (Chebyshev) UCL   0.488
                                             SD  0.117                       97.5% KM (Chebyshev) UCL   0.544
                                         k star  10.81                         99% KM (Chebyshev) UCL   0.655
                                     Theta star  0.034
                                        Nu star  497.4                     Potential UCLs to Use
                                        AppChi2  446.7                                 95% KM (t) UCL   0.409
        95% Gamma Approximate UCL (Use when n >= 40)  0.409                    95% KM (% Bootstrap) UCL   0.407
          95% Adjusted Gamma UCL (Use when n < 40)  0.413
Note: DL/2 is not a recommended method.
     Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
        These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
                              For additional insight, the user may want to consult a statistician.
```

Appendix C.1-5
Groundwater ProUCL Output - Entire Site
LO-58
Caribou, ME

```
1,2,4-TRIMETHYLBENZENE

                                           General Statistics
                      Number of Valid Data        36                    Number of Detected Data        5
           Number of Distinct Detected Data        4                Number of Non-Detect Data       31
                                                                          Percent Non-Detects   86.11%

              Raw Statistics                                  Log-transformed Statistics
                         Minimum Detected       0.12                      Minimum Detected    -2.12
                         Maximum Detected       28.5                      Maximum Detected     3.35
                         Mean of Detected      5.876                      Mean of Detected   -0.602
                           SD of Detected      12.65                        SD of Detected    2.245
                       Minimum Non-Detect        0.5                    Minimum Non-Detect   -0.693
                       Maximum Non-Detect          1                    Maximum Non-Detect        0

Note: Data have multiple DLs - Use of KM Method is recommended       Number treated as Non-Detect       35
For all methods (except KM, DL/2, and ROS Methods),                      Number treated as Detected        1
Observations < Largest ND are treated as NDs                     Single DL Non-Detect Percentage   97.22%

                          Warning:  There are only 4 Distinct Detected Values in this data
                    Note:  It should be noted that even though bootstrap may be performed on this data set
                          the resulting calculations may not be reliable enough to draw conclusions

                 It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

                                             UCL Statistics
    Normal Distribution Test with Detected Values Only      Lognormal Distribution Test with Detected Values Only
               Shapiro Wilk Test Statistic      0.558               Shapiro Wilk Test Statistic    0.711
             5% Shapiro Wilk Critical Value      0.762             5% Shapiro Wilk Critical Value    0.762
       Data not Normal at 5% Significance Level                Data not Lognormal at 5% Significance Level

         Assuming Normal Distribution                              Assuming Lognormal Distribution
                    DL/2 Substitution Method                               DL/2 Substitution Method
                                        Mean      1.066                                        Mean   -1.181
                                          SD      4.704                                          SD     0.83
                           95% DL/2 (t) UCL      2.391                           95%  H-Stat (DL/2) UCL     0.59

     Maximum Likelihood Estimate(MLE) Method        N/A                                Log ROS Method
       MLE method failed to converge properly                                     Mean in Log Scale   -1.309
                                                                                    SD in Log Scale    1.597
                                                                              Mean in Original Scale    1.338
                                                                                SD in Original Scale    4.729
                                                                                          95% t UCL    2.669
                                                                       95% Percentile Bootstrap UCL     2.87
                                                                              95% BCA Bootstrap UCL    3.701
                                                                                          95% H-UCL    2.258

    Gamma Distribution Test with Detected Values Only          Data Distribution Test with Detected Values Only
                     k star (bias corrected)       0.25     Data do not follow a Discernable Distribution (0.05)
                                 Theta Star       23.5
                                    nu star      2.501

                          A-D Test Statistic      1.048                Nonparametric Statistics
                         5% A-D Critical Value      0.742                      Kaplan-Meier (KM) Method
                          K-S Test Statistic      0.742                                       Mean    1.006
                         5% K-S Critical Value      0.381                                         SD    4.648
    Data not Gamma Distributed at 5% Significance Level                               SE of Mean    0.867
                                                                                    95% KM (t) UCL    2.471
         Assuming Gamma Distribution                                              95% KM (z) UCL    2.432
       Gamma ROS Statistics using Extrapolated Data                          95% KM (jackknife) UCL    2.336
                                    Minimum   0.000001                      95% KM (bootstrap t) UCL    24.11
                                    Maximum       28.5                            95% KM (BCA) UCL    2.599
                                       Mean      3.705          95% KM (Percentile Bootstrap) UCL    2.595
                                     Median       0.06                     95% KM (Chebyshev) UCL    4.785
                                         SD      6.793                   97.5% KM (Chebyshev) UCL    6.421
                                     k star      0.115                     99% KM (Chebyshev) UCL    9.633
                                 Theta star      32.32
                                    Nu star      8.255              Potential UCLs to Use
                                    AppChi2      2.883                     99% KM (Chebyshev) UCL    9.633
        95% Gamma Approximate UCL (Use when n >= 40)      10.61
          95% Adjusted Gamma UCL (Use when n < 40)      11.16
Note: DL/2 is not a recommended method.

           Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
              These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
                                     For additional insight, the user may want to consult a statistician.
```

Appendix C.1-5
Groundwater ProUCL Output - Entire Site
LO-58
Caribou, ME

CIS-1,2-DICHLOROETHENE

General Statistics

Number of Valid Data	36	Number of Detected Data	13
Number of Distinct Detected Data	13	Number of Non-Detect Data	23
		Percent Non-Detects	63.89%
Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.185	Minimum Detected	-1.687
Maximum Detected	8.9	Maximum Detected	2.186
Mean of Detected	2.371	Mean of Detected	0.371
SD of Detected	2.578	SD of Detected	1.052
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	1	Maximum Non-Detect	0
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	28
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	8
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	77.78%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.763	Shapiro Wilk Test Statistic	0.968
5% Shapiro Wilk Critical Value	0.866	5% Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.051	Mean	-0.655
SD	1.817	SD	1.023
95% DL/2 (t) UCL	1.562	95% H-Stat (DL/2) UCL	1.328
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-1.166
		SD in Log Scale	1.541
		Mean in Original Scale	0.98
		SD in Original Scale	1.849
		95% t UCL	1.5
		95% Percentile Bootstrap UCL	1.512
		95% BCA Bootstrap UCL	1.636
		95% H-UCL	2.27
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.939	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	2.526		
nu star	24.4		
A-D Test Statistic	0.493	**Nonparametric Statistics**	
5% A-D Critical Value	0.755	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.755	Mean	0.988
5% K-S Critical Value	0.242	SD	1.818
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.316
		95% KM (t) UCL	1.521
Assuming Gamma Distribution		95% KM (z) UCL	1.507
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1.433
Minimum	0.000001	95% KM (bootstrap t) UCL	1.806
Maximum	8.9	95% KM (BCA) UCL	1.894
Mean	0.901	95% KM (Percentile Bootstrap) UCL	1.668
Median	0.000001	95% KM (Chebyshev) UCL	2.364
SD	1.888	97.5% KM (Chebyshev) UCL	2.959
k star	0.117	99% KM (Chebyshev) UCL	4.129
Theta star	7.712		
Nu star	8.411	**Potential UCLs to Use**	
AppChi2	2.975	95% KM (t) UCL	1.521
95% Gamma Approximate UCL (Use when n >= 40)	2.547		
95% Adjusted Gamma UCL (Use when n < 40)	2.678		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Appendix C.1-5
Groundwater ProUCL Output - Entire Site
LO-58
Caribou, ME

TRICHLOROETHENE

General Statistics

Number of Valid Data	36	Number of Detected Data	26
Number of Distinct Detected Data	22	Number of Non-Detect Data	10
		Percent Non-Detects	27.78%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.18	Minimum Detected	-1.715
Maximum Detected	7.25	Maximum Detected	1.981
Mean of Detected	2.648	Mean of Detected	0.248
SD of Detected	2.535	SD of Detected	1.364
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	1	Maximum Non-Detect	0

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	23
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	13
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	63.89%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.812	Shapiro Wilk Test Statistic	0.803
5% Shapiro Wilk Critical Value	0.92	5% Shapiro Wilk Critical Value	0.92
Data not Normal at 5% Significance Level		**Data not Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2.009	Mean	-0.129
SD	2.384	SD	1.32
95% DL/2 (t) UCL	2.681	95% H-Stat (DL/2) UCL	3.898
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-0.0449
		SD in Log Scale	1.291
		Mean in Original Scale	2.059
		SD in Original Scale	2.353
		95% t UCL	2.722
		95% Percentile Bootstrap UCL	2.728
		95% BCA Bootstrap UCL	2.73
		95% H-UCL	3.994
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	0.748	**Data do not follow a Discernable Distribution (0.05)**	
Theta Star	3.542		
nu star	38.87		
A-D Test Statistic	2.237	**Nonparametric Statistics**	
5% A-D Critical Value	0.781	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.781	Mean	2.007
5% K-S Critical Value	0.178	SD	2.351
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.4
		95% KM (t) UCL	2.683
Assuming Gamma Distribution		95% KM (z) UCL	2.665
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	2.679
Minimum	0.000001	95% KM (bootstrap t) UCL	2.77
Maximum	7.25	95% KM (BCA) UCL	2.637
Mean	2.098	95% KM (Percentile Bootstrap) UCL	2.676
Median	0.711	95% KM (Chebyshev) UCL	3.75
SD	2.358	97.5% KM (Chebyshev) UCL	4.504
k star	0.337	99% KM (Chebyshev) UCL	5.985
Theta star	6.218		
Nu star	24.29	**Potential UCLs to Use**	
AppChi2	14.07	97.5% KM (Chebyshev) UCL	4.504
95% Gamma Approximate UCL (Use when n >= 40)	3.622		
95% Adjusted Gamma UCL (Use when n < 40)	3.715		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

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APPENDIX D

SLERA APPENDICIES

APPENDIX D.1

ECOLOGICAL RISK ASSESSMENT PROUCL OUTPUT

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

```
                               UCL Statistics for Data Sets with Non-Detects


          User Selected Options
      Date/Time of Computation   2/7/2014 1:23:44 PM
                     From File   ProUCL_Input_Jan_2014.xls
                Full Precision   OFF
        Confidence Coefficient   95%
Number of Bootstrap Operations   2000


ALUMINUM

                                          General Statistics
             Total Number of Observations    14                 Number of Distinct Observations    12
                                                                 Number of Missing Observations     0
                                  Minimum  13500                                           Mean  17329
                                  Maximum  25600                                         Median  17200
                                       SD   3234                               Std. Error of Mean  864.3
                 Coefficient of Variation    0.187                                     Skewness     1.293

                                          Normal GOF Test
             Shapiro Wilk Test Statistic    0.893                    Shapiro Wilk GOF Test
          5% Shapiro Wilk Critical Value    0.874        Data appear Normal at 5% Significance Level
               Lilliefors Test Statistic    0.191                     Lilliefors GOF Test
             5% Lilliefors Critical Value    0.237        Data appear Normal at 5% Significance Level
                            Data appear Normal at 5% Significance Level

                                     Assuming Normal Distribution
          95% Normal UCL                                         95% UCLs (Adjusted for Skewness)
                  95% Student's-t UCL  18859                       95% Adjusted-CLT UCL (Chen-1995)  19069
                                                                  95% Modified-t UCL (Johnson-1978)  18909

                                          Gamma GOF Test
                        A-D Test Statistic    0.393                 Anderson-Darling Gamma GOF Test
                       5% A-D Critical Value    0.734   Detected data appear Gamma Distributed at 5% Significance Level
                        K-S Test Statistic    0.163               Kolmogrov-Smirnoff Gamma GOF Test
                       5% K-S Critical Value    0.228   Detected data appear Gamma Distributed at 5% Significance Level
                   Detected data appear Gamma Distributed at 5% Significance Level

                                          Gamma Statistics
                              k hat (MLE)   34.03                     k star (bias corrected MLE)    26.78
                          Theta hat (MLE)   509.3                 Theta star (bias corrected MLE)   647
                             nu hat (MLE)   952.7                         nu star (bias corrected)   749.9
               MLE Mean (bias corrected)  17329                         MLE Sd (bias corrected)   3348
                                                               Approximate Chi Square Value (0.05)   687.4
             Adjusted Level of Significance    0.0312                     Adjusted Chi Square Value   679.4
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

```
                                         Assuming Gamma Distribution
95% Approximate Gamma UCL (use when n>=50))  18905          95% Adjusted Gamma UCL (use when n<50)  19126

                                            Lognormal GOF Test
                 Shapiro Wilk Test Statistic   0.939            Shapiro Wilk Lognormal GOF Test
               5% Shapiro Wilk Critical Value  0.874       Data appear Lognormal at 5% Significance Level
                    Lilliefors Test Statistic  0.155              Lilliefors Lognormal GOF Test
                 5% Lilliefors Critical Value  0.237       Data appear Lognormal at 5% Significance Level
                              Data appear Lognormal at 5% Significance Level

                                           Lognormal Statistics
                   Minimum of Logged Data   9.51                               Mean of logged Data   9.745
                   Maximum of Logged Data   10.15                                SD of logged Data   0.175

                                      Assuming Lognormal Distribution
                            95% H-UCL  18919                         90% Chebyshev (MVUE) UCL  19754
             95% Chebyshev (MVUE) UCL  20858                       97.5% Chebyshev (MVUE) UCL  22390
             99% Chebyshev (MVUE) UCL  25398

                              Nonparametric Distribution Free UCL Statistics
                     Data appear to follow a Discernible Distribution at 5% Significance Level

                                    Nonparametric Distribution Free UCLs
                          95% CLT UCL  18750                                95% Jackknife UCL  18859
             95% Standard Bootstrap UCL  18744                            95% Bootstrap-t UCL  19380
               95% Hall's Bootstrap UCL  20304                   95% Percentile Bootstrap UCL  18775
                  95% BCA Bootstrap UCL  19050
          90% Chebyshev(Mean, Sd) UCL  19922                     95% Chebyshev(Mean, Sd) UCL  21096
        97.5% Chebyshev(Mean, Sd) UCL  22726                     99% Chebyshev(Mean, Sd) UCL  25928

                                            Suggested UCL to Use
                  95% Student's-t UCL  18859

 Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
    These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
             and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
                          For additional insight the user may want to consult a statistician.
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

```
ANTIMONY

                                         General Statistics
            Total Number of Observations   9                    Number of Distinct Observations   8
                    Number of Detects      7                            Number of Non-Detects     2
           Number of Distinct Detects      7                   Number of Distinct Non-Detects     1
                     Minimum Detect        0.35                        Minimum Non-Detect         4.6
                     Maximum Detect        0.68                        Maximum Non-Detect         4.6
                    Variance Detects       0.0145                      Percent Non-Detects        22.22%
                        Mean Detects       0.52                             SD Detects            0.12
                      Median Detects       0.52                             CV Detects            0.231
                    Skewness Detects       -0.241                     Kurtosis Detects            -1.2
               Mean of Logged Detects      -0.678                 SD of Logged Detects            0.244

      Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
      guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
            For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
      Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

                                   Normal GOF Test on Detects Only
            Shapiro Wilk Test Statistic    0.954                    Shapiro Wilk GOF Test
         5% Shapiro Wilk Critical Value    0.803     Detected Data appear Normal at 5% Significance Level
               Lilliefors Test Statistic   0.176                      Lilliefors GOF Test
            5% Lilliefors Critical Value   0.335     Detected Data appear Normal at 5% Significance Level
                        Detected Data appear Normal at 5% Significance Level

    Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs
                                   Mean    0.52                         Standard Error of Mean    0.0455
                                     SD    0.111                              95% KM (BCA) UCL    0.589
                       95% KM (t) UCL      0.605             95% KM (Percentile Bootstrap) UCL    0.586
                       95% KM (z) UCL      0.595                      95% KM Bootstrap t UCL      0.609
                 90% KM Chebyshev UCL      0.656                       95% KM Chebyshev UCL       0.718
               97.5% KM Chebyshev UCL      0.804                       99% KM Chebyshev UCL       0.972

                            Gamma GOF Tests on Detected Observations Only
                     A-D Test Statistic    0.282                   Anderson-Darling GOF Test
                  5% A-D Critical Value    0.707    Detected data appear Gamma Distributed at 5% Significance Level
                     K-S Test Statistic    0.198                   Kolmogrov-Smirnoff GOF
                  5% K-S Critical Value    0.311    Detected data appear Gamma Distributed at 5% Significance Level
                   Detected data appear Gamma Distributed at 5% Significance Level

                                 Gamma Statistics on Detected Data Only
                            k hat (MLE)    20.51                   k star (bias corrected MLE)    11.82
                        Theta hat (MLE)    0.0253              Theta star (bias corrected MLE)    0.044
                           nu hat (MLE)    287.2                     nu star (bias corrected)     165.4
                MLE Mean (bias corrected)  0.52                        MLE Sd (bias corrected)    0.151
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

```
                                      Gamma Kaplan-Meier (KM) Statistics
                                        k hat (KM)   21.81                                    nu hat (KM)   392.5
                  Approximate Chi Square Value (392.52, α)   347.6               Adjusted Chi Square Value (392.52, β)   338.7
      95% Gamma Approximate KM-UCL (use when n>=50)   0.587         95% Gamma Adjusted KM-UCL (use when n<50)   0.603

                                  Gamma ROS Statistics using Imputed  Non-Detects
                      GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
                                GROS may not be used when kstar of detected data is small such as < 0.1
                               For such situations, GROS method tends to yield inflated values of UCLs and BTVs
                  For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates
                                           Minimum   0.35                                         Mean   0.519
                                           Maximum   0.68                                       Median   0.52
                                                SD   0.109                                          CV   0.21
                                        k hat (MLE)   24.16                      k star (bias corrected MLE)   16.18
                                    Theta hat (MLE)   0.0215                 Theta star (bias corrected MLE)   0.0321
                                       nu hat (MLE)   434.8                         nu star (bias corrected)   291.2
                            MLE Mean (bias corrected)   0.519                         MLE Sd (bias corrected)   0.129
                                                                          Adjusted Level of Significance (β)   0.0231
                  Approximate Chi Square Value (291.23, α)   252.7               Adjusted Chi Square Value (291.23, β)   245.1
          95% Gamma Approximate UCL (use when n>=50)   0.598              95% Gamma Adjusted UCL (use when n<50)   0.617

                                  Lognormal GOF Test on Detected Observations Only
                            Shapiro Wilk Test Statistic   0.936                    Shapiro Wilk GOF Test
                         5% Shapiro Wilk Critical Value   0.803      Detected Data appear Lognormal at 5% Significance Level
                               Lilliefors Test Statistic   0.183                      Lilliefors GOF Test
                            5% Lilliefors Critical Value   0.335      Detected Data appear Lognormal at 5% Significance Level
                                Detected Data appear Lognormal at 5% Significance Level

                                  Lognormal ROS Statistics Using Imputed Non-Detects
                               Mean in Original Scale   0.518                              Mean in Log Scale   -0.678
                                 SD in Original Scale   0.109                                SD in Log Scale   0.221
                  95% t UCL (assumes normality of ROS data)   0.586                 95% Percentile Bootstrap UCL   0.573
                                  95% BCA Bootstrap UCL   0.575                          95% Bootstrap t UCL   0.583
                                   95% H-UCL (Log ROS)   0.604

                 UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed
                                      KM Mean (logged)   -0.678                           95% H-UCL (KM -Log)   0.607
                                        KM SD (logged)   0.226                      95% Critical H Value (KM-Log)   1.933
                      KM Standard Error of Mean (logged)   0.0922

                                                   DL/2 Statistics
                        DL/2 Normal                                          DL/2 Log-Transformed
                               Mean in Original Scale   0.916                              Mean in Log Scale   -0.343
                                 SD in Original Scale   0.792                                SD in Log Scale   0.699
                          95% t UCL (Assumes normality)   1.406                               95% H-Stat UCL   1.731
                      DL/2 is not a recommended method, provided for comparisons and historical reasons
```

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.605	95% KM (Percentile Bootstrap) UCL	0.586

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

AROCLOR 1260

```
                                        General Statistics
             Total Number of Observations  14                   Number of Distinct Observations  6
                      Number of Detects  3                            Number of Non-Detects  11
                Number of Distinct Detects  3                    Number of Distinct Non-Detects  4
                         Minimum Detect  0.0053                         Minimum Non-Detect  0.018
                         Maximum Detect  0.049                          Maximum Non-Detect  0.0225
                        Variance Detects 4.9446E-4                      Percent Non-Detects  78.57%
                           Mean Detects  0.0248                               SD Detects  0.0222
                         Median Detects  0.02                                 CV Detects  0.898
                       Skewness Detects  0.92                           Kurtosis Detects  N/A
                  Mean of Logged Detects  -4.056                    SD of Logged Detects  1.119

                         Warning: Data set has only 3 Detected Values.
             This is not enough to compute meaningful or reliable statistics and estimates.


                                    Normal GOF Test on Detects Only
              Shapiro Wilk Test Statistic  0.966                      Shapiro Wilk GOF Test
            5% Shapiro Wilk Critical Value  0.767    Detected Data appear Normal at 5% Significance Level
                 Lilliefors Test Statistic  0.252                        Lilliefors GOF Test
              5% Lilliefors Critical Value  0.512    Detected Data appear Normal at 5% Significance Level
                         Detected Data appear Normal at 5% Significance Level

       Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs
                                    Mean  0.00956                   Standard Error of Mean  0.00382
                                      SD  0.0116                          95% KM (BCA) UCL  N/A
                           95% KM (t) UCL  0.0163          95% KM (Percentile Bootstrap) UCL  N/A
                           95% KM (z) UCL  0.0158                    95% KM Bootstrap t UCL  N/A
                      90% KM Chebyshev UCL  0.021                     95% KM Chebyshev UCL  0.0262
                    97.5% KM Chebyshev UCL  0.0334                    99% KM Chebyshev UCL  0.0476

                             Gamma GOF Tests on Detected Observations Only
                                Not Enough Data to Perform GOF Test

                                  Gamma Statistics on Detected Data Only
                               k hat (MLE)  1.543               k star (bias corrected MLE)  N/A
                           Theta hat (MLE)  0.016           Theta star (bias corrected MLE)  N/A
                              nu hat (MLE)  9.259                  nu star (bias corrected)  N/A
                   MLE Mean (bias corrected)  N/A                     MLE Sd (bias corrected)  N/A

                                    Gamma Kaplan-Meier (KM) Statistics
                                k hat (KM)  0.677                              nu hat (KM)  18.95
                                                           Adjusted Level of Significance (β)  0.0312
              Approximate Chi Square Value (18.95, α)  10.08       Adjusted Chi Square Value (18.95, β)  9.235
  95% Gamma Approximate KM-UCL (use when n>=50)  0.018    95% Gamma Adjusted KM-UCL (use when n<50)  0.0196
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

```
                          Lognormal GOF Test on Detected Observations Only
           Shapiro Wilk Test Statistic   0.988                     Shapiro Wilk GOF Test
      5% Shapiro Wilk Critical Value   0.767          Detected Data appear Lognormal at 5% Significance Level
             Lilliefors Test Statistic   0.218                       Lilliefors GOF Test
          5% Lilliefors Critical Value   0.512          Detected Data appear Lognormal at 5% Significance Level
                       Detected Data appear Lognormal at 5% Significance Level

                         Lognormal ROS Statistics Using Imputed Non-Detects
                 Mean in Original Scale   0.00979                              Mean in Log Scale   -5.038
                   SD in Original Scale   0.0122                                 SD in Log Scale    0.853
 95% t UCL (assumes normality of ROS data)   0.0156                   95% Percentile Bootstrap UCL   0.0156
                  95% BCA Bootstrap UCL   0.0185                             95% Bootstrap t UCL   0.0292
                     95% H-UCL (Log ROS)   0.0171

       UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed
                        KM Mean (logged)   -4.978                             95% H-UCL (KM -Log)   0.0128
                          KM SD (logged)    0.649                     95% Critical H Value (KM-Log)   2.278
          KM Standard Error of Mean (logged)    0.215

                                          DL/2 Statistics
               DL/2 Normal                                        DL/2 Log-Transformed
                 Mean in Original Scale   0.0131                               Mean in Log Scale   -4.498
                   SD in Original Scale   0.0108                                 SD in Log Scale    0.502
             95% t UCL (Assumes normality)   0.0182                                95% H-Stat UCL   0.0167
               DL/2 is not a recommended method, provided for comparisons and historical reasons

                            Nonparametric Distribution Free UCL Statistics
                       Detected Data appear Normal Distributed at 5% Significance Level

                                        Suggested UCL to Use
                          95% KM (t) UCL   0.0163                 95% KM (Percentile Bootstrap) UCL   N/A
                             Warning: One or more Recommended UCL(s) not available!

   Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
                          Recommendations are based upon data size, data distribution, and skewness.
     These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

BARIUM

```
                                          General Statistics
               Total Number of Observations   14                   Number of Distinct Observations   14
                                                                    Number of Missing Observations    0
                                    Minimum   29.2                                           Mean   45.66
                                    Maximum   84.5                                         Median   40.4
                                         SD   15.67                              Std. Error of Mean    4.187
                   Coefficient of Variation    0.343                                     Skewness    1.363

                                            Normal GOF Test
                 Shapiro Wilk Test Statistic    0.869                  Shapiro Wilk GOF Test
               5% Shapiro Wilk Critical Value   0.874          Data Not Normal at 5% Significance Level
                    Lilliefors Test Statistic   0.218                   Lilliefors GOF Test
                 5% Lilliefors Critical Value   0.237          Data appear Normal at 5% Significance Level
                        Data appear Approximate Normal at 5% Significance Level

                                      Assuming Normal Distribution
           95% Normal UCL                                      95% UCLs (Adjusted for Skewness)
                       95% Student's-t UCL   53.08                    95% Adjusted-CLT UCL (Chen-1995)   54.18
                                                                     95% Modified-t UCL (Johnson-1978)   53.33

                                             Gamma GOF Test
                           A-D Test Statistic   0.464              Anderson-Darling Gamma GOF Test
                          5% A-D Critical Value 0.734   Detected data appear Gamma Distributed at 5% Significance Level
                           K-S Test Statistic   0.189              Kolmogrov-Smirnoff Gamma GOF Test
                          5% K-S Critical Value 0.229   Detected data appear Gamma Distributed at 5% Significance Level
                       Detected data appear Gamma Distributed at 5% Significance Level

                                            Gamma Statistics
                              k hat (MLE)   10.72                          k star (bias corrected MLE)    8.472
                          Theta hat (MLE)    4.259                     Theta star (bias corrected MLE)    5.39
                             nu hat (MLE)  300.2                              nu star (bias corrected)  237.2
                   MLE Mean (bias corrected)  45.66                             MLE Sd (bias corrected)   15.69
                                                                    Approximate Chi Square Value (0.05)  202.6
               Adjusted Level of Significance  0.0312                          Adjusted Chi Square Value  198.3

                                       Assuming Gamma Distribution
 95% Approximate Gamma UCL (use when n>=50))   53.48              95% Adjusted Gamma UCL (use when n<50)   54.62

                                           Lognormal GOF Test
                 Shapiro Wilk Test Statistic    0.94             Shapiro Wilk Lognormal GOF Test
               5% Shapiro Wilk Critical Value   0.874        Data appear Lognormal at 5% Significance Level
                    Lilliefors Test Statistic   0.168              Lilliefors Lognormal GOF Test
                 5% Lilliefors Critical Value   0.237        Data appear Lognormal at 5% Significance Level
                            Data appear Lognormal at 5% Significance Level
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

Lognormal Statistics

Minimum of Logged Data	3.374	Mean of logged Data	3.774
Maximum of Logged Data	4.437	SD of logged Data	0.309

Assuming Lognormal Distribution

95% H-UCL	53.79	90% Chebyshev (MVUE) UCL	56.95
95% Chebyshev (MVUE) UCL	62.13	97.5% Chebyshev (MVUE) UCL	69.31
99% Chebyshev (MVUE) UCL	83.42		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	52.55	95% Jackknife UCL	53.08
95% Standard Bootstrap UCL	52.27	95% Bootstrap-t UCL	55.83
95% Hall's Bootstrap UCL	55.81	95% Percentile Bootstrap UCL	52.64
95% BCA Bootstrap UCL	53.71		
90% Chebyshev(Mean, Sd) UCL	58.23	95% Chebyshev(Mean, Sd) UCL	63.92
97.5% Chebyshev(Mean, Sd) UCL	71.81	99% Chebyshev(Mean, Sd) UCL	87.33

Suggested UCL to Use

95% Student's-t UCL	53.08

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

BENZO(A)ANTHRACENE

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	2.0000E-4	Mean	0.0313
Maximum	0.21	Median	0.00445
SD	0.0679	Std. Error of Mean	0.0181
Coefficient of Variation	2.17	Skewness	2.338

Normal GOF Test

Shapiro Wilk Test Statistic	0.496	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.435	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.237	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0634	95% Adjusted-CLT UCL (Chen-1995)	0.0732
		95% Modified-t UCL (Johnson-1978)	0.0653

Gamma GOF Test

A-D Test Statistic	1.463	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.82	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.308	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.246	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.361	k star (bias corrected MLE)	0.331
Theta hat (MLE)	0.0866	Theta star (bias corrected MLE)	0.0944
nu hat (MLE)	10.11	nu star (bias corrected)	9.275
MLE Mean (bias corrected)	0.0313	MLE Sd (bias corrected)	0.0543
		Approximate Chi Square Value (0.05)	3.494
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	3.038

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.083	95% Adjusted Gamma UCL (use when n<50)	0.0954

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.915	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.182	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.237	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

Lognormal Statistics

Minimum of Logged Data	-8.517	Mean of logged Data	-5.319
Maximum of Logged Data	-1.561	SD of logged Data	1.986

Assuming Lognormal Distribution

95% H-UCL	0.455	90% Chebyshev (MVUE) UCL	0.0718
95% Chebyshev (MVUE) UCL	0.0926	97.5% Chebyshev (MVUE) UCL	0.122
99% Chebyshev (MVUE) UCL	0.179		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0611	95% Jackknife UCL	0.0634
95% Standard Bootstrap UCL	0.0598	95% Bootstrap-t UCL	0.439
95% Hall's Bootstrap UCL	0.346	95% Percentile Bootstrap UCL	0.062
95% BCA Bootstrap UCL	0.0736		
90% Chebyshev(Mean, Sd) UCL	0.0857	95% Chebyshev(Mean, Sd) UCL	0.11
97.5% Chebyshev(Mean, Sd) UCL	0.145	99% Chebyshev(Mean, Sd) UCL	0.212

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	0.212

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

BENZO(A)PYRENE

```
                                          General Statistics
             Total Number of Observations    14                       Number of Distinct Observations    13
                                                                      Number of Missing Observations     0
                                  Minimum 1.9000E-4                                              Mean    0.0328
                                  Maximum    0.225                                             Median    0.00505
                                       SD    0.0708                                 Std. Error of Mean    0.0189
                  Coefficient of Variation   2.16                                             Skewness    2.378

                                          Normal GOF Test
                Shapiro Wilk Test Statistic  0.503                     Shapiro Wilk GOF Test
             5% Shapiro Wilk Critical Value  0.874          Data Not Normal at 5% Significance Level
                  Lilliefors Test Statistic  0.418                      Lilliefors GOF Test
               5% Lilliefors Critical Value  0.237          Data Not Normal at 5% Significance Level
                                 Data Not Normal at 5% Significance Level

                                     Assuming Normal Distribution
            95% Normal UCL                                     95% UCLs (Adjusted for Skewness)
                      95% Student's-t UCL    0.0663                 95% Adjusted-CLT UCL (Chen-1995)    0.0768
                                                                  95% Modified-t UCL (Johnson-1978)    0.0683

                                           Gamma GOF Test
                          A-D Test Statistic  1.384                Anderson-Darling Gamma GOF Test
                         5% A-D Critical Value  0.821      Data Not Gamma Distributed at 5% Significance Level
                          K-S Test Statistic  0.309               Kolmogrov-Smirnoff Gamma GOF Test
                         5% K-S Critical Value  0.246      Data Not Gamma Distributed at 5% Significance Level
                             Data Not Gamma Distributed at 5% Significance Level

                                          Gamma Statistics
                                 k hat (MLE)  0.359                        k star (bias corrected MLE)    0.33
                             Theta hat (MLE)  0.0914                   Theta star (bias corrected MLE)    0.0995
                                nu hat (MLE)  10.05                            nu star (bias corrected)    9.23
                     MLE Mean (bias corrected)  0.0328                         MLE Sd (bias corrected)    0.0571
                                                                 Approximate Chi Square Value (0.05)    3.466
              Adjusted Level of Significance  0.0312                         Adjusted Chi Square Value    3.013

                                     Assuming Gamma Distribution
   95% Approximate Gamma UCL (use when n>=50))  0.0873        95% Adjusted Gamma UCL (use when n<50)    0.1

                                          Lognormal GOF Test
                Shapiro Wilk Test Statistic  0.915                Shapiro Wilk Lognormal GOF Test
             5% Shapiro Wilk Critical Value  0.874         Data appear Lognormal at 5% Significance Level
                  Lilliefors Test Statistic  0.196                  Lilliefors Lognormal GOF Test
               5% Lilliefors Critical Value  0.237         Data appear Lognormal at 5% Significance Level
                              Data appear Lognormal at 5% Significance Level
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

```
                                   Lognormal Statistics
          Minimum of Logged Data   -8.568                      Mean of logged Data   -5.283
          Maximum of Logged Data   -1.492                        SD of logged Data    2.034

                              Assuming Lognormal Distribution
                       95% H-UCL    0.584             90% Chebyshev (MVUE) UCL    0.0812
       95% Chebyshev (MVUE) UCL     0.105           97.5% Chebyshev (MVUE) UCL    0.138
       99% Chebyshev (MVUE) UCL     0.203

                       Nonparametric Distribution Free UCL Statistics
              Data appear to follow a Discernible Distribution at 5% Significance Level

                            Nonparametric Distribution Free UCLs
                   95% CLT UCL      0.0639                   95% Jackknife UCL    0.0663
     95% Standard Bootstrap UCL     0.0618                 95% Bootstrap-t UCL    0.393
        95% Hall's Bootstrap UCL    0.338          95% Percentile Bootstrap UCL   0.0656
          95% BCA Bootstrap UCL     0.0771
     90% Chebyshev(Mean, Sd) UCL    0.0896           95% Chebyshev(Mean, Sd) UCL  0.115
   97.5% Chebyshev(Mean, Sd) UCL    0.151            99% Chebyshev(Mean, Sd) UCL  0.221

                                   Suggested UCL to Use
    99% Chebyshev (Mean, Sd) UCL    0.221

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
   These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
          and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
                        For additional insight the user may want to consult a statistician.
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

BENZO(B)FLUORANTHENE

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	3.6000E-4	Mean	0.0473
Maximum	0.36	Median	0.0068
SD	0.105	Std. Error of Mean	0.0281
Coefficient of Variation	2.222	Skewness	2.632

Normal GOF Test

Shapiro Wilk Test Statistic	0.496	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.437	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.237	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0971	95% Adjusted-CLT UCL (Chen-1995)	0.115
		95% Modified-t UCL (Johnson-1978)	0.1

Gamma GOF Test

A-D Test Statistic	1.495	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.817	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.306	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.245	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.38	k star (bias corrected MLE)	0.346
Theta hat (MLE)	0.125	Theta star (bias corrected MLE)	0.137
nu hat (MLE)	10.63	nu star (bias corrected)	9.683
MLE Mean (bias corrected)	0.0473	MLE Sd (bias corrected)	0.0805
		Approximate Chi Square Value (0.05)	3.745
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	3.27

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.122	95% Adjusted Gamma UCL (use when n<50)	0.14

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.921	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.193	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.237	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

```
                                      Lognormal Statistics
             Minimum of Logged Data   -7.929                              Mean of logged Data   -4.8
             Maximum of Logged Data   -1.022                                SD of logged Data    1.88

                                 Assuming Lognormal Distribution
                          95% H-UCL    0.487                       90% Chebyshev (MVUE) UCL   0.0996
          95% Chebyshev (MVUE) UCL     0.128                     97.5% Chebyshev (MVUE) UCL   0.168
          99% Chebyshev (MVUE) UCL     0.245

                           Nonparametric Distribution Free UCL Statistics
                  Data appear to follow a Discernible Distribution at 5% Significance Level

                                 Nonparametric Distribution Free UCLs
                        95% CLT UCL    0.0935                                95% Jackknife UCL   0.0971
          95% Standard Bootstrap UCL   0.0914                              95% Bootstrap-t UCL   0.702
             95% Hall's Bootstrap UCL  0.462                      95% Percentile Bootstrap UCL   0.0981
               95% BCA Bootstrap UCL   0.113
         90% Chebyshev(Mean, Sd) UCL   0.132                       95% Chebyshev(Mean, Sd) UCL   0.17
       97.5% Chebyshev(Mean, Sd) UCL   0.223                       99% Chebyshev(Mean, Sd) UCL   0.327

                                        Suggested UCL to Use
        99% Chebyshev (Mean, Sd) UCL   0.327

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
     These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
            and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
                         For additional insight the user may want to consult a statistician.
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

BENZO(E)PYRENE

```
                                          General Statistics
            Total Number of Observations   14                    Number of Distinct Observations   13
                                                                  Number of Missing Observations    0
                                 Minimum 2.4000E-4                                          Mean   0.0272
                                 Maximum   0.185                                          Median   0.00485
                                      SD   0.0565                              Std. Error of Mean   0.0151
                Coefficient of Variation   2.073                                        Skewness    2.427

                                            Normal GOF Test
               Shapiro Wilk Test Statistic   0.517                    Shapiro Wilk GOF Test
          5% Shapiro Wilk Critical Value   0.874            Data Not Normal at 5% Significance Level
                  Lilliefors Test Statistic   0.401                     Lilliefors GOF Test
             5% Lilliefors Critical Value   0.237            Data Not Normal at 5% Significance Level
                                Data Not Normal at 5% Significance Level

                                       Assuming Normal Distribution
       95% Normal UCL                                            95% UCLs (Adjusted for Skewness)
                     95% Student's-t UCL   0.054                    95% Adjusted-CLT UCL (Chen-1995)   0.0625
                                                                    95% Modified-t UCL (Johnson-1978)   0.0556

                                            Gamma GOF Test
                         A-D Test Statistic   1.404                 Anderson-Darling Gamma GOF Test
                      5% A-D Critical Value   0.809          Data Not Gamma Distributed at 5% Significance Level
                         K-S Test Statistic   0.325                Kolmogrov-Smirnoff Gamma GOF Test
                      5% K-S Critical Value   0.244          Data Not Gamma Distributed at 5% Significance Level
                             Data Not Gamma Distributed at 5% Significance Level

                                            Gamma Statistics
                              k hat (MLE)   0.417                           k star (bias corrected MLE)    0.376
                          Theta hat (MLE)   0.0652                       Theta star (bias corrected MLE)   0.0725
                             nu hat (MLE)   11.69                                 nu star (bias corrected)   10.52
                 MLE Mean (bias corrected)   0.0272                                MLE Sd (bias corrected)   0.0444
                                                                       Approximate Chi Square Value (0.05)    4.268
           Adjusted Level of Significance   0.0312                                  Adjusted Chi Square Value    3.754

                                       Assuming Gamma Distribution
  95% Approximate Gamma UCL (use when n>=50))   0.0671           95% Adjusted Gamma UCL (use when n<50)   0.0763

                                           Lognormal GOF Test
               Shapiro Wilk Test Statistic   0.923                Shapiro Wilk Lognormal GOF Test
          5% Shapiro Wilk Critical Value   0.874         Data appear Lognormal at 5% Significance Level
                  Lilliefors Test Statistic   0.226                  Lilliefors Lognormal GOF Test
             5% Lilliefors Critical Value   0.237         Data appear Lognormal at 5% Significance Level
                              Data appear Lognormal at 5% Significance Level
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

```
                                   Lognormal Statistics
        Minimum of Logged Data   -8.335                          Mean of logged Data   -5.168
        Maximum of Logged Data   -1.687                            SD of logged Data    1.801

                              Assuming Lognormal Distribution
                     95% H-UCL    0.244              90% Chebyshev (MVUE) UCL    0.0598
     95% Chebyshev (MVUE) UCL    0.0766            97.5% Chebyshev (MVUE) UCL    0.1
     99% Chebyshev (MVUE) UCL    0.146

                       Nonparametric Distribution Free UCL Statistics
              Data appear to follow a Discernible Distribution at 5% Significance Level

                           Nonparametric Distribution Free UCLs
                   95% CLT UCL    0.0521                       95% Jackknife UCL    0.054
     95% Standard Bootstrap UCL   0.0505                     95% Bootstrap-t UCL     0.276
        95% Hall's Bootstrap UCL  0.245               95% Percentile Bootstrap UCL   0.0535
         95% BCA Bootstrap UCL    0.0639
    90% Chebyshev(Mean, Sd) UCL   0.0725               95% Chebyshev(Mean, Sd) UCL   0.093
  97.5% Chebyshev(Mean, Sd) UCL   0.121                99% Chebyshev(Mean, Sd) UCL    0.177

                                    Suggested UCL to Use
   99% Chebyshev (Mean, Sd) UCL   0.177

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
   These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
         and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
                       For additional insight the user may want to consult a statistician.
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

BENZO(K)FLUORANTHENE

```
                                         General Statistics
          Total Number of Observations   14                       Number of Distinct Observations   13
                                                                   Number of Missing Observations    0
                               Minimum   1.9000E-4                                           Mean   0.0243
                               Maximum   0.16                                              Median   0.0047
                                    SD   0.0483                                 Std. Error of Mean   0.0129
              Coefficient of Variation   1.983                                           Skewness   2.414

                                          Normal GOF Test
            Shapiro Wilk Test Statistic   0.539                    Shapiro Wilk GOF Test
        5% Shapiro Wilk Critical Value   0.874           Data Not Normal at 5% Significance Level
              Lilliefors Test Statistic   0.395                      Lilliefors GOF Test
            5% Lilliefors Critical Value   0.237           Data Not Normal at 5% Significance Level
                             Data Not Normal at 5% Significance Level

                                    Assuming Normal Distribution
                  95% Normal UCL                                95% UCLs (Adjusted for Skewness)
                   95% Student's-t UCL   0.0472                 95% Adjusted-CLT UCL (Chen-1995)   0.0545
                                                               95% Modified-t UCL (Johnson-1978)   0.0486

                                          Gamma GOF Test
                     A-D Test Statistic   1.18                Anderson-Darling Gamma GOF Test
                   5% A-D Critical Value   0.807      Data Not Gamma Distributed at 5% Significance Level
                     K-S Test Statistic   0.293               Kolmogrov-Smirnoff Gamma GOF Test
                   5% K-S Critical Value   0.244      Data Not Gamma Distributed at 5% Significance Level
                          Data Not Gamma Distributed at 5% Significance Level

                                          Gamma Statistics
                           k hat (MLE)   0.431                         k star (bias corrected MLE)   0.386
                       Theta hat (MLE)   0.0565                    Theta star (bias corrected MLE)   0.063
                          nu hat (MLE)   12.07                             nu star (bias corrected)   10.81
              MLE Mean (bias corrected)   0.0243                             MLE Sd (bias corrected)   0.0392
                                                               Approximate Chi Square Value (0.05)   4.457
          Adjusted Level of Significance   0.0312                           Adjusted Chi Square Value   3.93

                                    Assuming Gamma Distribution
   95% Approximate Gamma UCL (use when n>=50))   0.0591         95% Adjusted Gamma UCL (use when n<50)   0.067

                                         Lognormal GOF Test
            Shapiro Wilk Test Statistic   0.928               Shapiro Wilk Lognormal GOF Test
        5% Shapiro Wilk Critical Value   0.874         Data appear Lognormal at 5% Significance Level
              Lilliefors Test Statistic   0.214                 Lilliefors Lognormal GOF Test
            5% Lilliefors Critical Value   0.237         Data appear Lognormal at 5% Significance Level
                            Data appear Lognormal at 5% Significance Level
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

```
                                   Lognormal Statistics
           Minimum of Logged Data   -8.568                              Mean of logged Data   -5.224
           Maximum of Logged Data   -1.833                                SD of logged Data    1.853

                               Assuming Lognormal Distribution
                        95% H-UCL    0.285                      90% Chebyshev (MVUE) UCL    0.062
         95% Chebyshev (MVUE) UCL    0.0797                   97.5% Chebyshev (MVUE) UCL    0.104
         99% Chebyshev (MVUE) UCL    0.152

                        Nonparametric Distribution Free UCL Statistics
                  Data appear to follow a Discernible Distribution at 5% Significance Level

                               Nonparametric Distribution Free UCLs
                      95% CLT UCL    0.0456                               95% Jackknife UCL    0.0472
       95% Standard Bootstrap UCL    0.0448                             95% Bootstrap-t UCL    0.178
          95% Hall's Bootstrap UCL   0.174                      95% Percentile Bootstrap UCL    0.0469
           95% BCA Bootstrap UCL     0.0559
     90% Chebyshev(Mean, Sd) UCL     0.0631                     95% Chebyshev(Mean, Sd) UCL    0.0806
   97.5% Chebyshev(Mean, Sd) UCL     0.105                      99% Chebyshev(Mean, Sd) UCL    0.153

                                   Suggested UCL to Use
     99% Chebyshev (Mean, Sd) UCL    0.153

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
  These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
          and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
                       For additional insight the user may want to consult a statistician.
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

Benzo[g,h,i]perylene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Number of Detects	13	Number of Non-Detects	1
Number of Distinct Detects	13	Number of Distinct Non-Detects	1
Minimum Detect	3.7000E-4	Minimum Non-Detect	7.5000E-4
Maximum Detect	0.16	Maximum Non-Detect	7.5000E-4
Variance Detects	0.00213	Percent Non-Detects	7.143%
Mean Detects	0.0201	SD Detects	0.0461
Median Detects	0.0025	CV Detects	2.301
Skewness Detects	2.819	Kurtosis Detects	7.976
Mean of Logged Detects	-5.643	SD of Logged Detects	1.744

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.486	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.44	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.246	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.0186	Standard Error of Mean	0.012
SD	0.043	95% KM (BCA) UCL	0.041
95% KM (t) UCL	0.0398	95% KM (Percentile Bootstrap) UCL	0.0396
95% KM (z) UCL	0.0383	95% KM Bootstrap t UCL	0.347
90% KM Chebyshev UCL	0.0545	95% KM Chebyshev UCL	0.0708
97.5% KM Chebyshev UCL	0.0934	99% KM Chebyshev UCL	0.138

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.726	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.813	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.35	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.254	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.382	k star (bias corrected MLE)	0.345
Theta hat (MLE)	0.0524	Theta star (bias corrected MLE)	0.0581
nu hat (MLE)	9.942	nu star (bias corrected)	8.981
MLE Mean (bias corrected)	0.0201	MLE Sd (bias corrected)	0.0341

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.188	nu hat (KM)	5.26
Approximate Chi Square Value (5.26, α)	1.274	Adjusted Chi Square Value (5.26, β)	1.035
95% Gamma Approximate KM-UCL (use when n>=50)	0.077	95% Gamma Adjusted KM-UCL (use when n<50)	0.0947

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	3.7000E-4	Mean	0.0193
Maximum	0.16	Median	0.00255
SD	0.0444	CV	2.297
k hat (MLE)	0.405	k star (bias corrected MLE)	0.366
Theta hat (MLE)	0.0478	Theta star (bias corrected MLE)	0.0529
nu hat (MLE)	11.33	nu star (bias corrected)	10.24
MLE Mean (bias corrected)	0.0193	MLE Sd (bias corrected)	0.032
		Adjusted Level of Significance (β)	0.0312
Approximate Chi Square Value (10.24, α)	4.09	Adjusted Chi Square Value (10.24, β)	3.589
95% Gamma Approximate UCL (use when n>=50)	0.0484	95% Gamma Adjusted UCL (use when n<50)	0.0551

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.873	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.23	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.246	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0186	Mean in Log Scale	-5.823
SD in Original Scale	0.0446	SD in Log Scale	1.806
95% t UCL (assumes normality of ROS data)	0.0398	95% Percentile Bootstrap UCL	0.0399
95% BCA Bootstrap UCL	0.0532	95% Bootstrap t UCL	0.345
95% H-UCL (Log ROS)	0.13		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-5.802	95% H-UCL (KM -Log)	0.0921
KM SD (logged)	1.713	95% Critical H Value (KM-Log)	4.103
KM Standard Error of Mean (logged)	0.477		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0186	Mean in Log Scale	-5.803
SD in Original Scale	0.0446	SD in Log Scale	1.78
95% t UCL (Assumes normality)	0.0398	95% H-Stat UCL	0.119

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

99% KM (Chebyshev) UCL	0.138

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

CADMIUM

General Statistics

Total Number of Observations	14	Number of Distinct Observations	10
Number of Detects	13	Number of Non-Detects	1
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	0.069	Minimum Non-Detect	0.33
Maximum Detect	0.515	Maximum Non-Detect	0.33
Variance Detects	0.0191	Percent Non-Detects	7.143%
Mean Detects	0.167	SD Detects	0.138
Median Detects	0.12	CV Detects	0.83
Skewness Detects	2.147	Kurtosis Detects	3.511
Mean of Logged Detects	-1.994	SD of Logged Detects	0.589

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.599	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.423	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.246	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.163	Standard Error of Mean	0.0359
SD	0.129	95% KM (BCA) UCL	0.236
95% KM (t) UCL	0.226	95% KM (Percentile Bootstrap) UCL	0.227
95% KM (z) UCL	0.222	95% KM Bootstrap t UCL	0.495
90% KM Chebyshev UCL	0.27	95% KM Chebyshev UCL	0.319
97.5% KM Chebyshev UCL	0.387	99% KM Chebyshev UCL	0.52

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.921	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.741	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.372	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.239	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.631	k star (bias corrected MLE)	2.075
Theta hat (MLE)	0.0634	Theta star (bias corrected MLE)	0.0803
nu hat (MLE)	68.4	nu star (bias corrected)	53.95
MLE Mean (bias corrected)	0.167	MLE Sd (bias corrected)	0.116

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	1.592	nu hat (KM)	44.56
Approximate Chi Square Value (44.56, α)	30.25	Adjusted Chi Square Value (44.56, β)	28.69
95% Gamma Approximate KM-UCL (use when n>=50)	0.24	95% Gamma Adjusted KM-UCL (use when n<50)	0.253

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.069	Mean	0.163
Maximum	0.515	Median	0.12
SD	0.133	CV	0.817
k hat (MLE)	2.777	k star (bias corrected MLE)	2.229
Theta hat (MLE)	0.0588	Theta star (bias corrected MLE)	0.0733
nu hat (MLE)	77.75	nu star (bias corrected)	62.43
MLE Mean (bias corrected)	0.163	MLE Sd (bias corrected)	0.109
		Adjusted Level of Significance (β)	0.0312
Approximate Chi Square Value (62.43, α)	45.25	Adjusted Chi Square Value (62.43, β)	43.32
95% Gamma Approximate UCL (use when n>=50)	0.225	95% Gamma Adjusted UCL (use when n<50)	0.235

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.757	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.328	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.246	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.163	Mean in Log Scale	-2.002
SD in Original Scale	0.133	SD in Log Scale	0.567
95% t UCL (assumes normality of ROS data)	0.227	95% Percentile Bootstrap UCL	0.222
95% BCA Bootstrap UCL	0.243	95% Bootstrap t UCL	0.507
95% H-UCL (Log ROS)	0.221		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.167	Mean in Log Scale	-1.98
SD in Original Scale	0.133	SD in Log Scale	0.568
95% t UCL (Assumes normality)	0.229	95% H-Stat UCL	0.227

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	0.319

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

CHROMIUM

```
                                           General Statistics
                 Total Number of Observations    14                      Number of Distinct Observations    12
                                                                         Number of Missing Observations     0
                                      Minimum    28.2                                               Mean    32.24
                                      Maximum    56.3                                             Median    29.3
                                           SD     7.271                                Std. Error of Mean     1.943
                     Coefficient of Variation     0.226                                          Skewness     3.185

                                             Normal GOF Test
                   Shapiro Wilk Test Statistic    0.547                    Shapiro Wilk GOF Test
                5% Shapiro Wilk Critical Value    0.874          Data Not Normal at 5% Significance Level
                     Lilliefors Test Statistic    0.289                      Lilliefors GOF Test
                   5% Lilliefors Critical Value   0.237          Data Not Normal at 5% Significance Level
                                     Data Not Normal at 5% Significance Level

                                        Assuming Normal Distribution
           95% Normal UCL                                         95% UCLs (Adjusted for Skewness)
                         95% Student's-t UCL     35.68                 95% Adjusted-CLT UCL (Chen-1995)    37.2
                                                                      95% Modified-t UCL (Johnson-1978)    35.95

                                             Gamma GOF Test
                            A-D Test Statistic    2.093               Anderson-Darling Gamma GOF Test
                          5% A-D Critical Value   0.734      Data Not Gamma Distributed at 5% Significance Level
                            K-S Test Statistic    0.261              Kolmogrov-Smirnoff Gamma GOF Test
                          5% K-S Critical Value   0.228      Data Not Gamma Distributed at 5% Significance Level
                               Data Not Gamma Distributed at 5% Significance Level

                                            Gamma Statistics
                                 k hat (MLE)     28.84                         k star (bias corrected MLE)    22.7
                             Theta hat (MLE)      1.118                    Theta star (bias corrected MLE)     1.42
                                nu hat (MLE)    807.4                             nu star (bias corrected)   635.7
                      MLE Mean (bias corrected)  32.24                              MLE Sd (bias corrected)     6.765
                                                                     Approximate Chi Square Value (0.05)   578.2
               Adjusted Level of Significance     0.0312                        Adjusted Chi Square Value   571

                                         Assuming Gamma Distribution
 95% Approximate Gamma UCL (use when n>=50))     35.44          95% Adjusted Gamma UCL (use when n<50)    35.89

                                             Lognormal GOF Test
                   Shapiro Wilk Test Statistic    0.621                Shapiro Wilk Lognormal GOF Test
                5% Shapiro Wilk Critical Value    0.874         Data Not Lognormal at 5% Significance Level
                     Lilliefors Test Statistic    0.259                  Lilliefors Lognormal GOF Test
                   5% Lilliefors Critical Value   0.237         Data Not Lognormal at 5% Significance Level
                                    Data Not Lognormal at 5% Significance Level
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

Lognormal Statistics

Minimum of Logged Data	3.339	Mean of logged Data	3.456
Maximum of Logged Data	4.031	SD of logged Data	0.18

Assuming Lognormal Distribution

95% H-UCL	35.23	90% Chebyshev (MVUE) UCL	36.81
95% Chebyshev (MVUE) UCL	38.92	97.5% Chebyshev (MVUE) UCL	41.85
99% Chebyshev (MVUE) UCL	47.6		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	35.43	95% Jackknife UCL	35.68
95% Standard Bootstrap UCL	35.32	95% Bootstrap-t UCL	42.52
95% Hall's Bootstrap UCL	46.19	95% Percentile Bootstrap UCL	35.68
95% BCA Bootstrap UCL	37.33		
90% Chebyshev(Mean, Sd) UCL	38.07	95% Chebyshev(Mean, Sd) UCL	40.71
97.5% Chebyshev(Mean, Sd) UCL	44.37	99% Chebyshev(Mean, Sd) UCL	51.57

Suggested UCL to Use

95% Student's-t UCL	35.68	or 95% Modified-t UCL	35.95

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

```
CHRYSENE


                                              General Statistics
                Total Number of Observations   14                        Number of Distinct Observations    13
                                                                          Number of Missing Observations     0
                                     Minimum 2.9000E-4                                              Mean   0.034
                                     Maximum   0.22                                               Median  0.0059
                                          SD  0.071                                    Std. Error of Mean  0.019
                    Coefficient of Variation   2.087                                            Skewness   2.324

                                               Normal GOF Test
                  Shapiro Wilk Test Statistic  0.506                    Shapiro Wilk GOF Test
               5% Shapiro Wilk Critical Value  0.874          Data Not Normal at 5% Significance Level
                     Lilliefors Test Statistic  0.419                     Lilliefors GOF Test
                  5% Lilliefors Critical Value  0.237          Data Not Normal at 5% Significance Level
                                      Data Not Normal at 5% Significance Level

                                          Assuming Normal Distribution
                 95% Normal UCL                                    95% UCLs (Adjusted for Skewness)
                        95% Student's-t UCL  0.0676                      95% Adjusted-CLT UCL (Chen-1995)  0.0778
                                                                        95% Modified-t UCL (Johnson-1978)  0.0696

                                               Gamma GOF Test
                           A-D Test Statistic  1.48                 Anderson-Darling Gamma GOF Test
                          5% A-D Critical Value  0.812      Data Not Gamma Distributed at 5% Significance Level
                             K-S Test Statistic  0.318                Kolmogrov-Smirnoff Gamma GOF Test
                          5% K-S Critical Value  0.245      Data Not Gamma Distributed at 5% Significance Level
                                 Data Not Gamma Distributed at 5% Significance Level

                                               Gamma Statistics
                                 k hat (MLE)  0.401                              k star (bias corrected MLE)   0.363
                             Theta hat (MLE)  0.0848                         Theta star (bias corrected MLE)  0.0937
                                nu hat (MLE)  11.23                                  nu star (bias corrected)  10.16
                     MLE Mean (bias corrected)  0.034                                 MLE Sd (bias corrected)  0.0565
                                                                         Approximate Chi Square Value (0.05)   4.042
                  Adjusted Level of Significance  0.0312                              Adjusted Chi Square Value   3.545

                                          Assuming Gamma Distribution
      95% Approximate Gamma UCL (use when n>=50))  0.0855          95% Adjusted Gamma UCL (use when n<50)  0.0975

                                              Lognormal GOF Test
                  Shapiro Wilk Test Statistic  0.91                 Shapiro Wilk Lognormal GOF Test
               5% Shapiro Wilk Critical Value  0.874         Data appear Lognormal at 5% Significance Level
                     Lilliefors Test Statistic  0.214                  Lilliefors Lognormal GOF Test
                  5% Lilliefors Critical Value  0.237         Data appear Lognormal at 5% Significance Level
                                    Data appear Lognormal at 5% Significance Level
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

Lognormal Statistics

Minimum of Logged Data	-8.146	Mean of logged Data	-5.02
Maximum of Logged Data	-1.514	SD of logged Data	1.854

Assuming Lognormal Distribution

95% H-UCL	0.351	90% Chebyshev (MVUE) UCL	0.0762
95% Chebyshev (MVUE) UCL	0.0979	97.5% Chebyshev (MVUE) UCL	0.128
99% Chebyshev (MVUE) UCL	0.187		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0652	95% Jackknife UCL	0.0676
95% Standard Bootstrap UCL	0.0645	95% Bootstrap-t UCL	0.39
95% Hall's Bootstrap UCL	0.296	95% Percentile Bootstrap UCL	0.0655
95% BCA Bootstrap UCL	0.0773		
90% Chebyshev(Mean, Sd) UCL	0.0909	95% Chebyshev(Mean, Sd) UCL	0.117
97.5% Chebyshev(Mean, Sd) UCL	0.152	99% Chebyshev(Mean, Sd) UCL	0.223

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	0.223

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. For additional insight the user may want to consult a statistician.

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

COPPER

```
                                              General Statistics
                Total Number of Observations     14                    Number of Distinct Observations    13
                                                                        Number of Missing Observations     0
                                     Minimum     18.7                                              Mean    35.95
                                     Maximum     72.25                                           Median    36.55
                                          SD     14.71                                Std. Error of Mean    3.932
                    Coefficient of Variation      0.409                                        Skewness    1.038

                                              Normal GOF Test
                  Shapiro Wilk Test Statistic     0.893                    Shapiro Wilk GOF Test
              5% Shapiro Wilk Critical Value      0.874        Data appear Normal at 5% Significance Level
                    Lilliefors Test Statistic     0.179                    Lilliefors GOF Test
                5% Lilliefors Critical Value      0.237        Data appear Normal at 5% Significance Level
                                  Data appear Normal at 5% Significance Level

                                          Assuming Normal Distribution
          95% Normal UCL                                           95% UCLs (Adjusted for Skewness)
                       95% Student's-t UCL       42.91                    95% Adjusted-CLT UCL (Chen-1995)    43.58
                                                                         95% Modified-t UCL (Johnson-1978)    43.1

                                              Gamma GOF Test
                           A-D Test Statistic     0.466               Anderson-Darling Gamma GOF Test
                        5% A-D Critical Value     0.737    Detected data appear Gamma Distributed at 5% Significance Level
                           K-S Test Statistic     0.181             Kolmogrov-Smirnoff Gamma GOF Test
                        5% K-S Critical Value     0.229    Detected data appear Gamma Distributed at 5% Significance Level
                         Detected data appear Gamma Distributed at 5% Significance Level

                                              Gamma Statistics
                                k hat (MLE)      6.993                         k star (bias corrected MLE)     5.542
                            Theta hat (MLE)      5.141                     Theta star (bias corrected MLE)     6.487
                               nu hat (MLE)    195.8                               nu star (bias corrected)   155.2
                    MLE Mean (bias corrected)    35.95                                MLE Sd (bias corrected)     15.27
                                                                        Approximate Chi Square Value (0.05)   127.4
               Adjusted Level of Significance    0.0312                             Adjusted Chi Square Value   124

                                          Assuming Gamma Distribution
  95% Approximate Gamma UCL (use when n>=50))    43.79              95% Adjusted Gamma UCL (use when n<50)     44.97

                                              Lognormal GOF Test
                  Shapiro Wilk Test Statistic     0.938               Shapiro Wilk Lognormal GOF Test
              5% Shapiro Wilk Critical Value      0.874       Data appear Lognormal at 5% Significance Level
                    Lilliefors Test Statistic     0.166                 Lilliefors Lognormal GOF Test
                5% Lilliefors Critical Value      0.237       Data appear Lognormal at 5% Significance Level
                                 Data appear Lognormal at 5% Significance Level
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

Lognormal Statistics

Minimum of Logged Data	2.929	Mean of logged Data	3.509
Maximum of Logged Data	4.28	SD of logged Data	0.394

Assuming Lognormal Distribution

95% H-UCL	44.84	90% Chebyshev (MVUE) UCL	47.46
95% Chebyshev (MVUE) UCL	52.69	97.5% Chebyshev (MVUE) UCL	59.95
99% Chebyshev (MVUE) UCL	74.22		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	42.42	95% Jackknife UCL	42.91
95% Standard Bootstrap UCL	42.23	95% Bootstrap-t UCL	43.94
95% Hall's Bootstrap UCL	45.1	95% Percentile Bootstrap UCL	42.24
95% BCA Bootstrap UCL	43.8		
90% Chebyshev(Mean, Sd) UCL	47.75	95% Chebyshev(Mean, Sd) UCL	53.09
97.5% Chebyshev(Mean, Sd) UCL	60.51	99% Chebyshev(Mean, Sd) UCL	75.07

Suggested UCL to Use

95% Student's-t UCL	42.91

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

DIBENZO(A,H)ANTHRACENE

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Number of Detects	11	Number of Non-Detects	3
Number of Distinct Detects	11	Number of Distinct Non-Detects	3
Minimum Detect	7.6000E-4	Minimum Non-Detect	7.2000E-4
Maximum Detect	0.0455	Maximum Non-Detect	7.7000E-4
Variance Detects	2.5151E-4	Percent Non-Detects	21.43%
Mean Detects	0.0086	SD Detects	0.0159
Median Detects	0.0013	CV Detects	1.845
Skewness Detects	2.002	Kurtosis Detects	2.689
Mean of Logged Detects	-6.007	SD of Logged Detects	1.465

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.555	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.423	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.267	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.00691	Standard Error of Mean	0.00386
SD	0.0138	95% KM (BCA) UCL	0.0142
95% KM (t) UCL	0.0138	95% KM (Percentile Bootstrap) UCL	0.0132
95% KM (z) UCL	0.0133	95% KM Bootstrap t UCL	0.0908
90% KM Chebyshev UCL	0.0185	95% KM Chebyshev UCL	0.0238
97.5% KM Chebyshev UCL	0.031	99% KM Chebyshev UCL	0.0454

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.775	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.781	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.343	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.269	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.507	k star (bias corrected MLE)	0.429
Theta hat (MLE)	0.017	Theta star (bias corrected MLE)	0.02
nu hat (MLE)	11.15	nu star (bias corrected)	9.442
MLE Mean (bias corrected)	0.0086	MLE Sd (bias corrected)	0.0131

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.251	nu hat (KM)	7.031
Approximate Chi Square Value (7.03, α)	2.188	Adjusted Chi Square Value (7.03, β)	1.847
95% Gamma Approximate KM-UCL (use when n>=50)	0.0222	95% Gamma Adjusted KM-UCL (use when n<50)	0.0263

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	7.6000E-4	Mean	0.0089
Maximum	0.0455	Median	0.00185
SD	0.0139	CV	1.565
k hat (MLE)	0.624	k star (bias corrected MLE)	0.538
Theta hat (MLE)	0.0143	Theta star (bias corrected MLE)	0.0165
nu hat (MLE)	17.47	nu star (bias corrected)	15.06
MLE Mean (bias corrected)	0.0089	MLE Sd (bias corrected)	0.0121
		Adjusted Level of Significance (β)	0.0312
Approximate Chi Square Value (15.06, α)	7.302	Adjusted Chi Square Value (15.06, β)	6.597
95% Gamma Approximate UCL (use when n>=50)	0.0183	95% Gamma Adjusted UCL (use when n<50)	0.0203

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.749	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.269	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.267	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00678	Mean in Log Scale	-6.661
SD in Original Scale	0.0144	SD in Log Scale	1.831
95% t UCL (assumes normality of ROS data)	0.0136	95% Percentile Bootstrap UCL	0.0131
95% BCA Bootstrap UCL	0.0162	95% Bootstrap t UCL	0.0831
95% H-UCL (Log ROS)	0.0618		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00683	Mean in Log Scale	-6.411
SD in Original Scale	0.0143	SD in Log Scale	1.515
95% t UCL (Assumes normality)	0.0136	95% H-Stat UCL	0.0247

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	0.031

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

INDENO(1,2,3-CD)PYRENE

```
                                                 General Statistics
                 Total Number of Observations     14                     Number of Distinct Observations    14
                                                                          Number of Missing Observations     0
                                      Minimum  1.9000E-4                                            Mean    0.0208
                                      Maximum     0.145                                           Median   0.0038
                                           SD    0.0441                                Std. Error of Mean   0.0118
                     Coefficient of Variation     2.122                                         Skewness    2.453

                                                  Normal GOF Test
                   Shapiro Wilk Test Statistic    0.511                  Shapiro Wilk GOF Test
                5% Shapiro Wilk Critical Value    0.874          Data Not Normal at 5% Significance Level
                     Lilliefors Test Statistic    0.418                   Lilliefors GOF Test
                  5% Lilliefors Critical Value    0.237          Data Not Normal at 5% Significance Level
                                      Data Not Normal at 5% Significance Level

                                            Assuming Normal Distribution
              95% Normal UCL                                       95% UCLs (Adjusted for Skewness)
                         95% Student's-t UCL    0.0417                    95% Adjusted-CLT UCL (Chen-1995)   0.0485
                                                                         95% Modified-t UCL (Johnson-1978)   0.043

                                                   Gamma GOF Test
                             A-D Test Statistic    1.354              Anderson-Darling Gamma GOF Test
                          5% A-D Critical Value    0.813      Data Not Gamma Distributed at 5% Significance Level
                             K-S Test Statistic    0.296             Kolmogrov-Smirnoff Gamma GOF Test
                          5% K-S Critical Value    0.245      Data Not Gamma Distributed at 5% Significance Level
                                 Data Not Gamma Distributed at 5% Significance Level

                                                  Gamma Statistics
                                   k hat (MLE)    0.397                          k star (bias corrected MLE)    0.36
                               Theta hat (MLE)    0.0523                     Theta star (bias corrected MLE)   0.0578
                                  nu hat (MLE)    11.12                              nu star (bias corrected)   10.07
                        MLE Mean (bias corrected)  0.0208                               MLE Sd (bias corrected)  0.0347
                                                                      Approximate Chi Square Value (0.05)    3.987
                  Adjusted Level of Significance   0.0312                             Adjusted Chi Square Value   3.494

                                            Assuming Gamma Distribution
  95% Approximate Gamma UCL (use when n>=50))   0.0525          95% Adjusted Gamma UCL (use when n<50)   0.06

                                                Lognormal GOF Test
                   Shapiro Wilk Test Statistic    0.93               Shapiro Wilk Lognormal GOF Test
                5% Shapiro Wilk Critical Value    0.874        Data appear Lognormal at 5% Significance Level
                     Lilliefors Test Statistic    0.182                Lilliefors Lognormal GOF Test
                  5% Lilliefors Critical Value    0.237        Data appear Lognormal at 5% Significance Level
                                    Data appear Lognormal at 5% Significance Level
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

Lognormal Statistics

Minimum of Logged Data	-8.568	Mean of logged Data	-5.531
Maximum of Logged Data	-1.931	SD of logged Data	1.856

Assuming Lognormal Distribution

95% H-UCL	0.212	90% Chebyshev (MVUE) UCL	0.0459
95% Chebyshev (MVUE) UCL	0.0589	97.5% Chebyshev (MVUE) UCL	0.0771
99% Chebyshev (MVUE) UCL	0.113		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0402	95% Jackknife UCL	0.0417
95% Standard Bootstrap UCL	0.0387	95% Bootstrap-t UCL	0.234
95% Hall's Bootstrap UCL	0.175	95% Percentile Bootstrap UCL	0.0409
95% BCA Bootstrap UCL	0.051		
90% Chebyshev(Mean, Sd) UCL	0.0562	95% Chebyshev(Mean, Sd) UCL	0.0722
97.5% Chebyshev(Mean, Sd) UCL	0.0944	99% Chebyshev(Mean, Sd) UCL	0.138

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	0.138

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

IRON

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	28400	Mean	32643
Maximum	49300	Median	31225
SD	5180	Std. Error of Mean	1384
Coefficient of Variation	0.159	Skewness	2.911

Normal GOF Test

Shapiro Wilk Test Statistic	0.634	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.32	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.237	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	35095	95% Adjusted-CLT UCL (Chen-1995)	36071
		95% Modified-t UCL (Johnson-1978)	35274

Gamma GOF Test

A-D Test Statistic	1.649	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.733	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.307	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.228	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	52.9	k star (bias corrected MLE)	41.61
Theta hat (MLE)	617.1	Theta star (bias corrected MLE)	784.4
nu hat (MLE)	1481	nu star (bias corrected)	1165
MLE Mean (bias corrected)	32643	MLE Sd (bias corrected)	5060
		Approximate Chi Square Value (0.05)	1087
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	1077

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	34993	95% Adjusted Gamma UCL (use when n<50)	35319

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.703	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.298	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.237	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

```
                                   Lognormal Statistics
          Minimum of Logged Data   10.25                            Mean of logged Data   10.38
          Maximum of Logged Data   10.81                              SD of logged Data    0.136

                              Assuming Lognormal Distribution
                      95% H-UCL  34892                    90% Chebyshev (MVUE) UCL  36171
       95% Chebyshev (MVUE) UCL  37782                  97.5% Chebyshev (MVUE) UCL  40019
       99% Chebyshev (MVUE) UCL  44414

                       Nonparametric Distribution Free UCL Statistics
                      Data do not follow a Discernible Distribution (0.05)

                           Nonparametric Distribution Free UCLs
                    95% CLT UCL  34920                          95% Jackknife UCL  35095
     95% Standard Bootstrap UCL  34822                        95% Bootstrap-t UCL  39637
        95% Hall's Bootstrap UCL  45559                95% Percentile Bootstrap UCL  35043
          95% BCA Bootstrap UCL  36221
    90% Chebyshev(Mean, Sd) UCL  36796                 95% Chebyshev(Mean, Sd) UCL  38677
  97.5% Chebyshev(Mean, Sd) UCL  41289                 99% Chebyshev(Mean, Sd) UCL  46418

                                   Suggested UCL to Use
             95% Student's-t UCL  35095                      or 95% Modified-t UCL  35274

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
  These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
                and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
                          For additional insight the user may want to consult a statistician.
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

LEAD

```
                                               General Statistics
              Total Number of Observations    14                       Number of Distinct Observations    12
                                                                        Number of Missing Observations     0
                                   Minimum    15.05                                              Mean    19.94
                                   Maximum    34.2                                             Median    17.4
                                        SD     5.689                                Std. Error of Mean     1.52
                  Coefficient of Variation     0.285                                         Skewness     1.638

                                                Normal GOF Test
                Shapiro Wilk Test Statistic     0.798                    Shapiro Wilk GOF Test
             5% Shapiro Wilk Critical Value     0.874          Data Not Normal at 5% Significance Level
                   Lilliefors Test Statistic    0.237                      Lilliefors GOF Test
                5% Lilliefors Critical Value    0.237          Data Not Normal at 5% Significance Level
                                       Data Not Normal at 5% Significance Level

                                          Assuming Normal Distribution
             95% Normal UCL                                         95% UCLs (Adjusted for Skewness)
                       95% Student's-t UCL    22.63                       95% Adjusted-CLT UCL (Chen-1995)    23.15
                                                                         95% Modified-t UCL (Johnson-1978)    22.74

                                                Gamma GOF Test
                          A-D Test Statistic    0.866               Anderson-Darling Gamma GOF Test
                         5% A-D Critical Value  0.734       Data Not Gamma Distributed at 5% Significance Level
                          K-S Test Statistic    0.236              Kolmogrov-Smirnoff Gamma GOF Test
                         5% K-S Critical Value  0.228       Data Not Gamma Distributed at 5% Significance Level
                                  Data Not Gamma Distributed at 5% Significance Level

                                               Gamma Statistics
                                 k hat (MLE)    15.96                          k star (bias corrected MLE)    12.59
                             Theta hat (MLE)     1.249                     Theta star (bias corrected MLE)     1.584
                                nu hat (MLE)   446.9                             nu star (bias corrected)   352.5
                     MLE Mean (bias corrected)  19.94                               MLE Sd (bias corrected)     5.62
                                                                      Approximate Chi Square Value (0.05)   310
              Adjusted Level of Significance    0.0312                           Adjusted Chi Square Value  304.7

                                          Assuming Gamma Distribution
 95% Approximate Gamma UCL (use when n>=50))    22.67              95% Adjusted Gamma UCL (use when n<50)    23.07

                                               Lognormal GOF Test
                Shapiro Wilk Test Statistic     0.861                Shapiro Wilk Lognormal GOF Test
             5% Shapiro Wilk Critical Value     0.874          Data Not Lognormal at 5% Significance Level
                   Lilliefors Test Statistic    0.225                  Lilliefors Lognormal GOF Test
                5% Lilliefors Critical Value    0.237         Data appear Lognormal at 5% Significance Level
                              Data appear Approximate Lognormal at 5% Significance Level
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

```
                                      Lognormal Statistics
           Minimum of Logged Data   2.711                               Mean of logged Data   2.961
           Maximum of Logged Data   3.532                                 SD of logged Data   0.25

                                  Assuming Lognormal Distribution
                        95% H-UCL   22.67                       90% Chebyshev (MVUE) UCL   23.91
       95% Chebyshev (MVUE) UCL   25.73                       97.5% Chebyshev (MVUE) UCL   28.26
       99% Chebyshev (MVUE) UCL   33.22

                            Nonparametric Distribution Free UCL Statistics
                 Data appear to follow a Discernible Distribution at 5% Significance Level

                                 Nonparametric Distribution Free UCLs
                     95% CLT UCL   22.44                               95% Jackknife UCL   22.63
       95% Standard Bootstrap UCL   22.38                             95% Bootstrap-t UCL   24.87
          95% Hall's Bootstrap UCL   28.56                   95% Percentile Bootstrap UCL   22.37
           95% BCA Bootstrap UCL   22.99
     90% Chebyshev(Mean, Sd) UCL   24.5                    95% Chebyshev(Mean, Sd) UCL   26.57
   97.5% Chebyshev(Mean, Sd) UCL   29.43                    99% Chebyshev(Mean, Sd) UCL   35.07

                                        Suggested UCL to Use
              95% Student's-t UCL   22.63                          or 95% Modified-t UCL   22.74

 Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
   These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
            and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
                          For additional insight the user may want to consult a statistician.
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

MERCURY

```
                                          General Statistics
             Total Number of Observations  14                      Number of Distinct Observations  14
                                                                    Number of Missing Observations   0
                                  Minimum  0.025                                              Mean  0.0914
                                  Maximum  0.35                                             Median  0.059
                                       SD  0.0914                                Std. Error of Mean  0.0244
                 Coefficient of Variation  1.001                                          Skewness  2.157

                                            Normal GOF Test
               Shapiro Wilk Test Statistic  0.719               Shapiro Wilk GOF Test
            5% Shapiro Wilk Critical Value  0.874        Data Not Normal at 5% Significance Level
                 Lilliefors Test Statistic  0.257               Lilliefors GOF Test
              5% Lilliefors Critical Value  0.237        Data Not Normal at 5% Significance Level
                                  Data Not Normal at 5% Significance Level

                                      Assuming Normal Distribution
          95% Normal UCL                                    95% UCLs (Adjusted for Skewness)
                     95% Student's-t UCL  0.135                    95% Adjusted-CLT UCL (Chen-1995)  0.147
                                                                   95% Modified-t UCL (Johnson-1978)  0.137

                                             Gamma GOF Test
                        A-D Test Statistic  0.637              Anderson-Darling Gamma GOF Test
                     5% A-D Critical Value  0.749    Detected data appear Gamma Distributed at 5% Significance Level
                        K-S Test Statistic  0.157              Kolmogrov-Smirnoff Gamma GOF Test
                     5% K-S Critical Value  0.232    Detected data appear Gamma Distributed at 5% Significance Level
                          Detected data appear Gamma Distributed at 5% Significance Level

                                            Gamma Statistics
                               k hat (MLE)  1.633                        k star (bias corrected MLE)  1.33
                           Theta hat (MLE)  0.056                    Theta star (bias corrected MLE)  0.0687
                              nu hat (MLE)  45.72                           nu star (bias corrected)  37.25
                   MLE Mean (bias corrected)  0.0914                           MLE Sd (bias corrected)  0.0792
                                                                   Approximate Chi Square Value (0.05)  24.28
             Adjusted Level of Significance  0.0312                             Adjusted Chi Square Value  22.9

                                      Assuming Gamma Distribution
 95% Approximate Gamma UCL (use when n>=50)  0.14              95% Adjusted Gamma UCL (use when n<50)  0.149

                                           Lognormal GOF Test
               Shapiro Wilk Test Statistic  0.929             Shapiro Wilk Lognormal GOF Test
            5% Shapiro Wilk Critical Value  0.874       Data appear Lognormal at 5% Significance Level
                 Lilliefors Test Statistic  0.127               Lilliefors Lognormal GOF Test
              5% Lilliefors Critical Value  0.237       Data appear Lognormal at 5% Significance Level
                                Data appear Lognormal at 5% Significance Level
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

```
                                      Lognormal Statistics
         Minimum of Logged Data   -3.689                            Mean of logged Data   -2.729
         Maximum of Logged Data   -1.05                               SD of logged Data    0.803

                                 Assuming Lognormal Distribution
                      95% H-UCL    0.157                     90% Chebyshev (MVUE) UCL    0.147
       95% Chebyshev (MVUE) UCL    0.174                   97.5% Chebyshev (MVUE) UCL    0.212
       99% Chebyshev (MVUE) UCL    0.286

                           Nonparametric Distribution Free UCL Statistics
               Data appear to follow a Discernible Distribution at 5% Significance Level

                                Nonparametric Distribution Free UCLs
                    95% CLT UCL    0.132                            95% Jackknife UCL    0.135
      95% Standard Bootstrap UCL   0.129                          95% Bootstrap-t UCL    0.196
        95% Hall's Bootstrap UCL   0.339                   95% Percentile Bootstrap UCL    0.134
          95% BCA Bootstrap UCL    0.149
    90% Chebyshev(Mean, Sd) UCL    0.165                  95% Chebyshev(Mean, Sd) UCL    0.198
  97.5% Chebyshev(Mean, Sd) UCL    0.244                  99% Chebyshev(Mean, Sd) UCL    0.334

                                       Suggested UCL to Use
         95% Adjusted Gamma UCL    0.149

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
    These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
               and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
                         For additional insight the user may want to consult a statistician.
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

PERYLENE

General Statistics

Total Number of Observations	14	Number of Distinct Observations	13
Number of Detects	11	Number of Non-Detects	3
Number of Distinct Detects	10	Number of Distinct Non-Detects	3
Minimum Detect	6.7500E-4	Minimum Non-Detect	7.2000E-4
Maximum Detect	0.0545	Maximum Non-Detect	7.7000E-4
Variance Detects	3.7145E-4	Percent Non-Detects	21.43%
Mean Detects	0.0102	SD Detects	0.0193
Median Detects	0.0014	CV Detects	1.893
Skewness Detects	1.988	Kurtosis Detects	2.571
Mean of Logged Detects	-5.957	SD of Logged Detects	1.539

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.549	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.43	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.267	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.00814	Standard Error of Mean	0.00469
SD	0.0167	95% KM (BCA) UCL	0.0164
95% KM (t) UCL	0.0165	95% KM (Percentile Bootstrap) UCL	0.0158
95% KM (z) UCL	0.0159	95% KM Bootstrap t UCL	0.121
90% KM Chebyshev UCL	0.0222	95% KM Chebyshev UCL	0.0286
97.5% KM Chebyshev UCL	0.0375	99% KM Chebyshev UCL	0.0549

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.78	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.787	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.369	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.27	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.468	k star (bias corrected MLE)	0.401
Theta hat (MLE)	0.0217	Theta star (bias corrected MLE)	0.0254
nu hat (MLE)	10.31	nu star (bias corrected)	8.828
MLE Mean (bias corrected)	0.0102	MLE Sd (bias corrected)	0.0161

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.236	nu hat (KM)	6.62
Approximate Chi Square Value (6.62, α)	1.965	Adjusted Chi Square Value (6.62, β)	1.647
95% Gamma Approximate KM-UCL (use when n>=50)	0.0274	95% Gamma Adjusted KM-UCL (use when n<50)	0.0327

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

```
                                   Gamma ROS Statistics using Imputed  Non-Detects
                 GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
                              GROS may not be used when kstar of detected data is small such as < 0.1
                             For such situations, GROS method tends to yield inflated values of UCLs and BTVs
              For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates
                                        Minimum  6.7500E-4                                          Mean    0.0101
                                        Maximum    0.0545                                         Median    0.00185
                                             SD    0.0169                                             CV    1.667
                                    k hat (MLE)    0.577                      k star (bias corrected MLE)    0.501
                                Theta hat (MLE)    0.0176                 Theta star (bias corrected MLE)    0.0202
                                   nu hat (MLE)    16.17                        nu star (bias corrected)    14.04
                       MLE Mean (bias corrected)    0.0101                         MLE Sd (bias corrected)    0.0143
                                                                       Adjusted Level of Significance (β)    0.0312
            Approximate Chi Square Value (14.04, α)    6.595                Adjusted Chi Square Value (14.04, β)    5.931
         95% Gamma Approximate UCL (use when n>=50)    0.0216          95% Gamma Adjusted UCL (use when n<50)    0.024

                                   Lognormal GOF Test on Detected Observations Only
                          Shapiro Wilk Test Statistic    0.761                  Shapiro Wilk GOF Test
                        5% Shapiro Wilk Critical Value    0.85        Detected Data Not Lognormal at 5% Significance Level
                             Lilliefors Test Statistic    0.294                  Lilliefors GOF Test
                           5% Lilliefors Critical Value    0.267       Detected Data Not Lognormal at 5% Significance Level
                                  Detected Data Not Lognormal at 5% Significance Level

                                  Lognormal ROS Statistics Using Imputed Non-Detects
                          Mean in Original Scale    0.00805                               Mean in Log Scale    -6.491
                            SD in Original Scale    0.0174                                  SD in Log Scale    1.717
          95% t UCL (assumes normality of ROS data)    0.0163                   95% Percentile Bootstrap UCL    0.0159
                           95% BCA Bootstrap UCL    0.0187                            95% Bootstrap t UCL    0.114
                             95% H-UCL (Log ROS)    0.0469

                                                    DL/2 Statistics
                  DL/2 Normal                                              DL/2 Log-Transformed
                          Mean in Original Scale    0.00808                               Mean in Log Scale    -6.372
                            SD in Original Scale    0.0174                                  SD in Log Scale    1.582
                     95% t UCL (Assumes normality)    0.0163                                  95% H-Stat UCL    0.0323
                       DL/2 is not a recommended method, provided for comparisons and historical reasons

                                      Nonparametric Distribution Free UCL Statistics
                                Data do not follow a Discernible Distribution at 5% Significance Level

                                                  Suggested UCL to Use
                              99% KM (Chebyshev) UCL    0.0549
                                      Warning: Recommended UCL exceeds the maximum observation

       Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
                                  Recommendations are based upon data size, data distribution, and skewness.
            These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
     However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

PYRENE

```
                                          General Statistics
            Total Number of Observations   14                      Number of Distinct Observations   14
                                                                    Number of Missing Observations    0
                                 Minimum  3.7000E-4                                           Mean   0.0608
                                 Maximum   0.425                                            Median   0.00845
                                      SD   0.132                                 Std. Error of Mean  0.0353
                Coefficient of Variation   2.172                                          Skewness   2.409

                                            Normal GOF Test
              Shapiro Wilk Test Statistic  0.502                   Shapiro Wilk GOF Test
           5% Shapiro Wilk Critical Value  0.874        Data Not Normal at 5% Significance Level
                 Lilliefors Test Statistic 0.432                    Lilliefors GOF Test
               5% Lilliefors Critical Value 0.237       Data Not Normal at 5% Significance Level
                                Data Not Normal at 5% Significance Level

                                      Assuming Normal Distribution
           95% Normal UCL                                    95% UCLs (Adjusted for Skewness)
                     95% Student's-t UCL   0.123                  95% Adjusted-CLT UCL (Chen-1995)   0.143
                                                                 95% Modified-t UCL (Johnson-1978)   0.127

                                            Gamma GOF Test
                        A-D Test Statistic 1.444              Anderson-Darling Gamma GOF Test
                       5% A-D Critical Value 0.82     Data Not Gamma Distributed at 5% Significance Level
                        K-S Test Statistic 0.318            Kolmogrov-Smirnoff Gamma GOF Test
                       5% K-S Critical Value 0.246    Data Not Gamma Distributed at 5% Significance Level
                           Data Not Gamma Distributed at 5% Significance Level

                                           Gamma Statistics
                              k hat (MLE)  0.365                       k star (bias corrected MLE)   0.334
                          Theta hat (MLE)  0.167                   Theta star (bias corrected MLE)   0.182
                             nu hat (MLE)  10.21                          nu star (bias corrected)   9.353
                  MLE Mean (bias corrected) 0.0608                         MLE Sd (bias corrected)   0.105
                                                                Approximate Chi Square Value (0.05)  3.542
             Adjusted Level of Significance 0.0312                          Adjusted Chi Square Value 3.082

                                      Assuming Gamma Distribution
 95% Approximate Gamma UCL (use when n>=50)) 0.161          95% Adjusted Gamma UCL (use when n<50)   0.185

                                          Lognormal GOF Test
              Shapiro Wilk Test Statistic  0.918               Shapiro Wilk Lognormal GOF Test
           5% Shapiro Wilk Critical Value  0.874       Data appear Lognormal at 5% Significance Level
                 Lilliefors Test Statistic 0.209                Lilliefors Lognormal GOF Test
               5% Lilliefors Critical Value 0.237      Data appear Lognormal at 5% Significance Level
                             Data appear Lognormal at 5% Significance Level
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

```
                                        Lognormal Statistics
            Minimum of Logged Data   -7.902                           Mean of logged Data   -4.632
            Maximum of Logged Data   -0.856                             SD of logged Data    1.976

                                  Assuming Lognormal Distribution
                      95% H-UCL       0.867                  90% Chebyshev (MVUE) UCL       0.14
      95% Chebyshev (MVUE) UCL        0.181                97.5% Chebyshev (MVUE) UCL       0.237
      99% Chebyshev (MVUE) UCL        0.348

                             Nonparametric Distribution Free UCL Statistics
                 Data appear to follow a Discernible Distribution at 5% Significance Level

                                  Nonparametric Distribution Free UCLs
                   95% CLT UCL        0.119                         95% Jackknife UCL       0.123
      95% Standard Bootstrap UCL      0.116                       95% Bootstrap-t UCL       0.817
         95% Hall's Bootstrap UCL     0.637               95% Percentile Bootstrap UCL      0.125
            95% BCA Bootstrap UCL     0.135
     90% Chebyshev(Mean, Sd) UCL      0.167               95% Chebyshev(Mean, Sd) UCL       0.215
   97.5% Chebyshev(Mean, Sd) UCL      0.281               99% Chebyshev(Mean, Sd) UCL       0.412

                                          Suggested UCL to Use
    99% Chebyshev (Mean, Sd) UCL      0.412

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
    These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
              and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
                         For additional insight the user may want to consult a statistician.
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

SELENIUM

General Statistics

Total Number of Observations	14	Number of Distinct Observations	13
Number of Detects	8	Number of Non-Detects	6
Number of Distinct Detects	8	Number of Distinct Non-Detects	5
Minimum Detect	1	Minimum Non-Detect	2.4
Maximum Detect	2.3	Maximum Non-Detect	4.55
Variance Detects	0.287	Percent Non-Detects	42.86%
Mean Detects	1.579	SD Detects	0.535
Median Detects	1.45	CV Detects	0.339
Skewness Detects	0.302	Kurtosis Detects	-2.077
Mean of Logged Detects	0.406	SD of Logged Detects	0.342

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.861	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.26	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.313	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	1.579	Standard Error of Mean	0.189
SD	0.501	95% KM (BCA) UCL	1.883
95% KM (t) UCL	1.914	95% KM (Percentile Bootstrap) UCL	1.888
95% KM (z) UCL	1.89	95% KM Bootstrap t UCL	1.975
90% KM Chebyshev UCL	2.147	95% KM Chebyshev UCL	2.404
97.5% KM Chebyshev UCL	2.761	99% KM Chebyshev UCL	3.463

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.571	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.715	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.264	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.294	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	9.966	k star (bias corrected MLE)	6.312
Theta hat (MLE)	0.158	Theta star (bias corrected MLE)	0.25
nu hat (MLE)	159.5	nu star (bias corrected)	101
MLE Mean (bias corrected)	1.579	MLE Sd (bias corrected)	0.628

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	9.934	nu hat (KM)	278.1
Approximate Chi Square Value (278.14, α)	240.5	Adjusted Chi Square Value (278.14, β)	235.9
95% Gamma Approximate KM-UCL (use when n>=50)	1.826	95% Gamma Adjusted KM-UCL (use when n<50)	1.862

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

```
                                 Gamma ROS Statistics using Imputed  Non-Detects
                     GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
                               GROS may not be used when kstar of detected data is small such as < 0.1
                            For such situations, GROS method tends to yield inflated values of UCLs and BTVs
                For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates
                                     Minimum    1                                              Mean    1.564
                                     Maximum    2.3                                          Median    1.54
                                          SD    0.408                                            CV    0.261
                                 k hat (MLE)    16.07                      k star (bias corrected MLE)    12.68
                             Theta hat (MLE)    0.0973                 Theta star (bias corrected MLE)    0.123
                                nu hat (MLE)   450                           nu star (bias corrected)   354.9
                    MLE Mean (bias corrected)    1.564                       MLE Sd (bias corrected)    0.439
                                                                  Adjusted Level of Significance (β)    0.0312
          Approximate Chi Square Value (354.94, α)   312.3            Adjusted Chi Square Value (354.94, β)   307
    95% Gamma Approximate UCL (use when n>=50)    1.778          95% Gamma Adjusted UCL (use when n<50)    1.808

                                 Lognormal GOF Test on Detected Observations Only
                  Shapiro Wilk Test Statistic    0.867                    Shapiro Wilk GOF Test
               5% Shapiro Wilk Critical Value    0.818      Detected Data appear Lognormal at 5% Significance Level
                     Lilliefors Test Statistic    0.243                    Lilliefors GOF Test
                 5% Lilliefors Critical Value    0.313      Detected Data appear Lognormal at 5% Significance Level
                                Detected Data appear Lognormal at 5% Significance Level

                                 Lognormal ROS Statistics Using Imputed Non-Detects
                       Mean in Original Scale    1.548                                Mean in Log Scale    0.406
                         SD in Original Scale    0.408                                  SD in Log Scale    0.26
       95% t UCL (assumes normality of ROS data)    1.741                      95% Percentile Bootstrap UCL    1.728
                        95% BCA Bootstrap UCL    1.742                              95% Bootstrap t UCL    1.755
                           95% H-UCL (Log ROS)    1.775

            UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed
                             KM Mean (logged)    0.406                              95% H-UCL (KM -Log)    1.871
                               KM SD (logged)    0.32                       95% Critical H Value (KM-Log)    1.911
            KM Standard Error of Mean (logged)    0.121

                                                DL/2 Statistics
                  DL/2 Normal                                         DL/2 Log-Transformed
                       Mean in Original Scale    1.529                                Mean in Log Scale    0.383
                         SD in Original Scale    0.472                                  SD in Log Scale    0.293
                  95% t UCL (Assumes normality)    1.752                                  95% H-Stat UCL    1.786
                   DL/2 is not a recommended method, provided for comparisons and historical reasons

                                      Nonparametric Distribution Free UCL Statistics
                                 Detected Data appear Normal Distributed at 5% Significance Level

                                                 Suggested UCL to Use
                              95% KM (t) UCL    1.914                  95% KM (Percentile Bootstrap) UCL    1.888
```

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

THALLIUM

General Statistics

Total Number of Observations	14	Number of Distinct Observations	10
Number of Detects	1	Number of Non-Detects	13
Number of Distinct Detects	1	Number of Distinct Non-Detects	9

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable THALLIUM was not processed!

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

VANADIUM

General Statistics

Total Number of Observations	14	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	16.4	Mean	24.33
Maximum	29.8	Median	24.4
SD	3.938	Std. Error of Mean	1.052
Coefficient of Variation	0.162	Skewness	-0.356

Normal GOF Test

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.12	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.237	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	26.19	95% Adjusted-CLT UCL (Chen-1995)	25.95
		95% Modified-t UCL (Johnson-1978)	26.18

Gamma GOF Test

A-D Test Statistic	0.288	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.733	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.141	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.228	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	38.72	k star (bias corrected MLE)	30.47
Theta hat (MLE)	0.628	Theta star (bias corrected MLE)	0.798
nu hat (MLE)	1084	nu star (bias corrected)	853.2
MLE Mean (bias corrected)	24.33	MLE Sd (bias corrected)	4.407
		Approximate Chi Square Value (0.05)	786.4
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	777.9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	26.39	95% Adjusted Gamma UCL (use when n<50)	26.68

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.151	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.237	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

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                                   Lognormal Statistics
          Minimum of Logged Data    2.797                             Mean of logged Data     3.179
          Maximum of Logged Data    3.395                               SD of logged Data     0.17

                              Assuming Lognormal Distribution
                       95% H-UCL    26.52                     90% Chebyshev (MVUE) UCL     27.67
       95% Chebyshev (MVUE) UCL     29.18                   97.5% Chebyshev (MVUE) UCL     31.28
       99% Chebyshev (MVUE) UCL     35.39

                       Nonparametric Distribution Free UCL Statistics
               Data appear to follow a Discernible Distribution at 5% Significance Level

                            Nonparametric Distribution Free UCLs
                    95% CLT UCL     26.06                            95% Jackknife UCL     26.19
    95% Standard Bootstrap UCL      26.02                          95% Bootstrap-t UCL     26.01
       95% Hall's Bootstrap UCL     25.96                  95% Percentile Bootstrap UCL    25.99
        95% BCA Bootstrap UCL       25.84
   90% Chebyshev(Mean, Sd) UCL      27.49                  95% Chebyshev(Mean, Sd) UCL     28.92
 97.5% Chebyshev(Mean, Sd) UCL      30.9                   99% Chebyshev(Mean, Sd) UCL     34.8

                                   Suggested UCL to Use
             95% Student's-t UCL    26.19

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
  These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
          and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
                         For additional insight the user may want to consult a statistician.

  Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be
          reliable.  Chen's and Johnson's methods provide adjustments for positvely skewed data sets.
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Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

ZINC

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	50	Mean	65.88
Maximum	124	Median	59
SD	20.35	Std. Error of Mean	5.439
Coefficient of Variation	0.309	Skewness	2.151

Normal GOF Test

Shapiro Wilk Test Statistic	0.73	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.293	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.237	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	75.51	95% Adjusted-CLT UCL (Chen-1995)	78.16
		95% Modified-t UCL (Johnson-1978)	76.03

Gamma GOF Test

A-D Test Statistic	1.159	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.734	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.274	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.228	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	14.67	k star (bias corrected MLE)	11.57
Theta hat (MLE)	4.49	Theta star (bias corrected MLE)	5.691
nu hat (MLE)	410.8	nu star (bias corrected)	324.1
MLE Mean (bias corrected)	65.88	MLE Sd (bias corrected)	19.36
		Approximate Chi Square Value (0.05)	283.4
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	278.3

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	75.34	95% Adjusted Gamma UCL (use when n<50)	76.71

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.817	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.259	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.237	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Appendix D.1
ProUCL Output for the Ecological Risk Assessment
LO-58
Caribou, ME

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                                      Lognormal Statistics
           Minimum of Logged Data   3.912                              Mean of logged Data   4.153
           Maximum of Logged Data   4.82                                 SD of logged Data   0.257

                                  Assuming Lognormal Distribution
                        95% H-UCL   75.08                       90% Chebyshev (MVUE) UCL   79.22
         95% Chebyshev (MVUE) UCL   85.38                     97.5% Chebyshev (MVUE) UCL   93.93
         99% Chebyshev (MVUE) UCL  110.7

                           Nonparametric Distribution Free UCL Statistics
                         Data do not follow a Discernible Distribution (0.05)

                                Nonparametric Distribution Free UCLs
                      95% CLT UCL   74.82                              95% Jackknife UCL   75.51
       95% Standard Bootstrap UCL   74.4                             95% Bootstrap-t UCL   87.75
          95% Hall's Bootstrap UCL  110.2                  95% Percentile Bootstrap UCL   75.02
           95% BCA Bootstrap UCL   77.59
      90% Chebyshev(Mean, Sd) UCL   82.19                    95% Chebyshev(Mean, Sd) UCL   89.58
    97.5% Chebyshev(Mean, Sd) UCL   99.84                    99% Chebyshev(Mean, Sd) UCL  120

                                        Suggested UCL to Use
              95% Student's-t UCL   75.51                           or 95% Modified-t UCL   76.03

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
    These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
              and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
                        For additional insight the user may want to consult a statistician.
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APPENDIX D.2

SAMPLE BY SAMPLE COMPARISON OF DETECTED SOIL CONCENTRATIONS WITH SOIL-BASED PHYTOTOXICITY BENCHMARKS

Table D.2
Sample by Sample Comparison of Detected Soil Concentrations with Soil-based Phytotoxicity Benchmarks
LO-58
Caribou, Maine

Location	Analyte	Sample ID	Result (mg/kg)	Benchmark (mg/kg)	Ratio
AMAC	Aluminum	LO58-SB01-0002	15700	5	3140
AMAC	Aluminum	LO58-SB02-0002	15900	5	3180
AMAC	Aluminum	LO58-SB03-0002	25600	5	5120
AMAC	Arsenic	LO58-SB01-0002	6.2	18	0.344444444
AMAC	Arsenic	LO58-SB02-0002	4.8	18	0.266666667
AMAC	Arsenic	LO58-SB03-0002	8.5	18	0.472222222
AMAC	Barium	LO58-SB01-0002	44	5	8.8
AMAC	Barium	LO58-SB02-0002	59.9	5	11.98
AMAC	Barium	LO58-SB03-0002	62.6	5	12.52
AMAC	Beryllium	LO58-SB01-0002	0.61	0.1	6.1
AMAC	Beryllium	LO58-SB02-0002	1	0.1	10
AMAC	Beryllium	LO58-SB03-0002	1.4	0.1	14
AMAC	Chromium	LO58-SB01-0002	32	0.018	1777.777778
AMAC	Chromium	LO58-SB02-0002	35.8	0.018	1988.888889
AMAC	Chromium	LO58-SB03-0002	56.3	0.018	3127.777778
AMAC	Cobalt	LO58-SB01-0002	10.3	13	0.792307692
AMAC	Cobalt	LO58-SB02-0002	10.9	13	0.838461538
AMAC	Cobalt	LO58-SB03-0002	19.6	13	1.507692308
AMAC	Copper	LO58-SB01-0002	26.6	70	0.38
AMAC	Copper	LO58-SB02-0002	23.3	70	0.332857143
AMAC	Copper	LO58-SB03-0002	34	70	0.485714286
AMAC	High Molecular Weight PAHs	LO58-SB01-0002	0.1214	1.2	0.101166667
AMAC	High Molecular Weight PAHs	LO58-SB02-0002	0.00812	1.2	0.006766667
AMAC	High Molecular Weight PAHs	LO58-SB03-0002	1.579	1.2	1.315833333
AMAC	Manganese	LO58-SB01-0002	487	220	2.213636364
AMAC	Manganese	LO58-SB02-0002	486	220	2.209090909
AMAC	Manganese	LO58-SB03-0002	654	220	2.972727273
AMAC	Mercury	LO58-SB01-0002	0.048	0.349	0.137535817
AMAC	Mercury	LO58-SB02-0002	0.065	0.349	0.186246418
AMAC	Mercury	LO58-SB03-0002	0.025	0.349	0.071633238
AMAC	Nickel	LO58-SB01-0002	38.4	38	1.010526316
AMAC	Nickel	LO58-SB02-0002	51.6	38	1.357894737
AMAC	Nickel	LO58-SB03-0002	84.6	38	2.226315789
AMAC	Selenium	LO58-SB01-0002	0.85	0.52	1.634615385
AMAC	Selenium	LO58-SB02-0002	1.2	0.52	2.307692308
AMAC	Vanadium	LO58-SB01-0002	22.2	2	11.1
AMAC	Vanadium	LO58-SB02-0002	20.1	2	10.05
AMAC	Vanadium	LO58-SB03-0002	29.2	2	14.6
AMAC	Zinc	LO58-SB01-0002	54.8	160	0.3425
AMAC	Zinc	LO58-SB02-0002	53.8	160	0.33625
AMAC	Zinc	LO58-SB03-0002	91.9	160	0.574375
Launcher	Aluminum	LO58-SB04-0002	13900	5	2780
Launcher	Aluminum	LO58-SB05-0002	15500	5	3100
Launcher	Aluminum	LO58-SB06-0002	13000	5	2600
Launcher	Aluminum	LO58-SB07-0002	14900	5	2980
Launcher	Aluminum	LO58-SB08-0001	18100	5	3620
Launcher	Aluminum	LO58-SB09-0002	13500	5	2700
Launcher	Aluminum	LO58-SB10-0002	18100	5	3620
Launcher	Aluminum	LO58-SB11-0001	19000	5	3800
Launcher	Aluminum	LO58-SB12-0001	15800	5	3160
Launcher	Aluminum	LO58-SB13-0002	16400	5	3280
Launcher	Aluminum	LO58-SB14-0001	18100	5	3620
Launcher	Aluminum	LO58-SB15-0001	18000	5	3600
Launcher	Aluminum	LO58-SB-DUP-02	15900	5	3180
Launcher	Antimony	LO58-SB04-0002	0.52	0.5	1.04
Launcher	Antimony	LO58-SB05-0002	0.35	0.5	0.7
Launcher	Antimony	LO58-SB10-0002	0.49	0.5	0.98

Table D.2
Sample by Sample Comparison of Detected Soil Concentrations with Soil-based Phytotoxicity Benchmarks
LO-58
Caribou, Maine

Location	Analyte	Sample ID	Result (mg/kg)	Benchmark (mg/kg)	Ratio
Launcher	Antimony	LO58-SB12-0001	0.39	0.5	0.78
Launcher	Antimony	LO58-SB14-0001	0.61	0.5	1.22
Launcher	Antimony	LO58-SB15-0001	0.6	0.5	1.2
Launcher	Arsenic	LO58-SB04-0002	7.3	18	0.405555556
Launcher	Arsenic	LO58-SB05-0002	8	18	0.444444444
Launcher	Arsenic	LO58-SB06-0002	6.7	18	0.372222222
Launcher	Arsenic	LO58-SB07-0002	5.7	18	0.316666667
Launcher	Arsenic	LO58-SB08-0001	9	18	0.5
Launcher	Arsenic	LO58-SB09-0002	5.9	18	0.327777778
Launcher	Arsenic	LO58-SB10-0002	7.6	18	0.422222222
Launcher	Arsenic	LO58-SB11-0001	9.4	18	0.522222222
Launcher	Arsenic	LO58-SB12-0001	7.1	18	0.394444444
Launcher	Arsenic	LO58-SB13-0002	7	18	0.388888889
Launcher	Arsenic	LO58-SB14-0001	7.7	18	0.427777778
Launcher	Arsenic	LO58-SB15-0001	11.1	18	0.616666667
Launcher	Arsenic	LO58-SB-DUP-02	9.3	18	0.516666667
Launcher	Barium	LO58-SB04-0002	34.5	5	6.9
Launcher	Barium	LO58-SB05-0002	40.5	5	8.1
Launcher	Barium	LO58-SB06-0002	43.4	5	8.68
Launcher	Barium	LO58-SB07-0002	40.3	5	8.06
Launcher	Barium	LO58-SB08-0001	65.2	5	13.04
Launcher	Barium	LO58-SB09-0002	42.7	5	8.54
Launcher	Barium	LO58-SB10-0002	32.5	5	6.5
Launcher	Barium	LO58-SB11-0001	51.9	5	10.38
Launcher	Barium	LO58-SB12-0001	39.5	5	7.9
Launcher	Barium	LO58-SB13-0002	29.2	5	5.84
Launcher	Barium	LO58-SB14-0001	30.6	5	6.12
Launcher	Barium	LO58-SB15-0001	37.2	5	7.44
Launcher	Barium	LO58-SB-DUP-02	52.8	5	10.56
Launcher	Beryllium	LO58-SB04-0002	0.93	0.1	9.3
Launcher	Beryllium	LO58-SB05-0002	0.6	0.1	6
Launcher	Beryllium	LO58-SB06-0002	0.87	0.1	8.7
Launcher	Beryllium	LO58-SB07-0002	0.65	0.1	6.5
Launcher	Beryllium	LO58-SB08-0001	0.69	0.1	6.9
Launcher	Beryllium	LO58-SB09-0002	0.66	0.1	6.6
Launcher	Beryllium	LO58-SB10-0002	0.62	0.1	6.2
Launcher	Beryllium	LO58-SB11-0001	0.77	0.1	7.7
Launcher	Beryllium	LO58-SB12-0001	0.63	0.1	6.3
Launcher	Beryllium	LO58-SB13-0002	0.5	0.1	5
Launcher	Beryllium	LO58-SB14-0001	0.51	0.1	5.1
Launcher	Beryllium	LO58-SB15-0001	0.52	0.1	5.2
Launcher	Beryllium	LO58-SB-DUP-02	0.85	0.1	8.5
Launcher	Chromium	LO58-SB04-0002	28.8	0.018	1600
Launcher	Chromium	LO58-SB05-0002	29.1	0.018	1616.666667
Launcher	Chromium	LO58-SB06-0002	28	0.018	1555.555556
Launcher	Chromium	LO58-SB07-0002	28.2	0.018	1566.666667
Launcher	Chromium	LO58-SB08-0001	34.4	0.018	1911.111111
Launcher	Chromium	LO58-SB09-0002	29.1	0.018	1616.666667
Launcher	Chromium	LO58-SB10-0002	32.9	0.018	1827.777778
Launcher	Chromium	LO58-SB11-0001	34.9	0.018	1938.888889
Launcher	Chromium	LO58-SB12-0001	28.9	0.018	1605.555556
Launcher	Chromium	LO58-SB13-0002	28.6	0.018	1588.888889
Launcher	Chromium	LO58-SB14-0001	28.8	0.018	1600
Launcher	Chromium	LO58-SB15-0001	30.2	0.018	1677.777778
Launcher	Chromium	LO58-SB-DUP-02	31	0.018	1722.222222
Launcher	Cobalt	LO58-SB04-0002	13.4	13	1.030769231
Launcher	Cobalt	LO58-SB05-0002	11.3	13	0.869230769

Table D.2
Sample by Sample Comparison of Detected Soil Concentrations with Soil-based Phytotoxicity Benchmarks
LO-58
Caribou, Maine

Location	Analyte	Sample ID	Result (mg/kg)	Benchmark (mg/kg)	Ratio
Launcher	Cobalt	LO58-SB06-0002	9.1	13	0.7
Launcher	Cobalt	LO58-SB07-0002	9.7	13	0.746153846
Launcher	Cobalt	LO58-SB08-0001	10	13	0.769230769
Launcher	Cobalt	LO58-SB09-0002	11.6	13	0.892307692
Launcher	Cobalt	LO58-SB10-0002	12.9	13	0.992307692
Launcher	Cobalt	LO58-SB11-0001	13.9	13	1.069230769
Launcher	Cobalt	LO58-SB12-0001	13.3	13	1.023076923
Launcher	Cobalt	LO58-SB13-0002	12.4	13	0.953846154
Launcher	Cobalt	LO58-SB14-0001	12.3	13	0.946153846
Launcher	Cobalt	LO58-SB15-0001	13.5	13	1.038461538
Launcher	Cobalt	LO58-SB-DUP-02	11.3	13	0.869230769
Launcher	Copper	LO58-SB04-0002	23.7	70	0.338571429
Launcher	Copper	LO58-SB05-0002	21.9	70	0.312857143
Launcher	Copper	LO58-SB06-0002	39.6	70	0.565714286
Launcher	Copper	LO58-SB07-0002	21.9	70	0.312857143
Launcher	Copper	LO58-SB08-0001	40.9	70	0.584285714
Launcher	Copper	LO58-SB09-0002	18.7	70	0.267142857
Launcher	Copper	LO58-SB10-0002	24	70	0.342857143
Launcher	Copper	LO58-SB11-0001	49.5	70	0.707142857
Launcher	Copper	LO58-SB12-0001	44.4	70	0.634285714
Launcher	Copper	LO58-SB13-0002	26	70	0.371428571
Launcher	Copper	LO58-SB14-0001	39.1	70	0.558571429
Launcher	Copper	LO58-SB15-0001	41.8	70	0.597142857
Launcher	Copper	LO58-SB-DUP-02	50.7	70	0.724285714
Launcher	High Molecular Weight PAHs	LO58-SB04-0002	0.00752	1.2	0.006266667
Launcher	High Molecular Weight PAHs	LO58-SB05-0002	0.04936	1.2	0.041133333
Launcher	High Molecular Weight PAHs	LO58-SB06-0002	0.034405	1.2	0.028670833
Launcher	High Molecular Weight PAHs	LO58-SB07-0002	0.0537	1.2	0.04475
Launcher	High Molecular Weight PAHs	LO58-SB08-0001	0.2032	1.2	0.169333333
Launcher	High Molecular Weight PAHs	LO58-SB09-0002	0.00428	1.2	0.003566667
Launcher	High Molecular Weight PAHs	LO58-SB10-0002	0.00698	1.2	0.005816667
Launcher	High Molecular Weight PAHs	LO58-SB11-0001	0.043	1.2	0.035833333
Launcher	High Molecular Weight PAHs	LO58-SB12-0001	0.03998	1.2	0.033316667
Launcher	High Molecular Weight PAHs	LO58-SB13-0002	0.0558	1.2	0.0465
Launcher	High Molecular Weight PAHs	LO58-SB14-0001	0.049	1.2	0.040833333
Launcher	High Molecular Weight PAHs	LO58-SB15-0001	0.1068	1.2	0.089
Launcher	Manganese	LO58-SB04-0002	640	220	2.909090909
Launcher	Manganese	LO58-SB05-0002	669	220	3.040909091
Launcher	Manganese	LO58-SB06-0002	474	220	2.154545455
Launcher	Manganese	LO58-SB07-0002	464	220	2.109090909
Launcher	Manganese	LO58-SB08-0001	607	220	2.759090909
Launcher	Manganese	LO58-SB09-0002	682	220	3.1
Launcher	Manganese	LO58-SB10-0002	565	220	2.568181818
Launcher	Manganese	LO58-SB11-0001	616	220	2.8
Launcher	Manganese	LO58-SB12-0001	780	220	3.545454545
Launcher	Manganese	LO58-SB13-0002	566	220	2.572727273
Launcher	Manganese	LO58-SB14-0001	549	220	2.495454545
Launcher	Manganese	LO58-SB15-0001	615	220	2.795454545
Launcher	Manganese	LO58-SB-DUP-02	584	220	2.654545455
Launcher	Mercury	LO58-SB04-0002	0.093	0.349	0.266475645
Launcher	Mercury	LO58-SB05-0002	0.051	0.349	0.146131805
Launcher	Mercury	LO58-SB06-0002	0.11	0.349	0.315186246
Launcher	Mercury	LO58-SB07-0002	0.067	0.349	0.191977077
Launcher	Mercury	LO58-SB08-0001	0.35	0.349	1.00286533
Launcher	Mercury	LO58-SB09-0002	0.027	0.349	0.077363897
Launcher	Mercury	LO58-SB10-0002	0.037	0.349	0.106017192
Launcher	Mercury	LO58-SB11-0001	0.098	0.349	0.280802292

Table D.2
Sample by Sample Comparison of Detected Soil Concentrations with Soil-based Phytotoxicity Benchmarks
LO-58
Caribou, Maine

Location	Analyte	Sample ID	Result (mg/kg)	Benchmark (mg/kg)	Ratio
Launcher	Mercury	LO58-SB12-0001	0.043	0.349	0.123209169
Launcher	Mercury	LO58-SB13-0002	0.034	0.349	0.097421203
Launcher	Mercury	LO58-SB14-0001	0.085	0.349	0.243553009
Launcher	Mercury	LO58-SB15-0001	0.029	0.349	0.083094556
Launcher	Mercury	LO58-SB-DUP-02	0.12	0.349	0.343839542
Launcher	Nickel	LO58-SB04-0002	52.1	38	1.371052632
Launcher	Nickel	LO58-SB05-0002	39.5	38	1.039473684
Launcher	Nickel	LO58-SB06-0002	41.4	38	1.089473684
Launcher	Nickel	LO58-SB07-0002	38.7	38	1.018421053
Launcher	Nickel	LO58-SB08-0001	43.2	38	1.136842105
Launcher	Nickel	LO58-SB09-0002	37.7	38	0.992105263
Launcher	Nickel	LO58-SB10-0002	42.2	38	1.110526316
Launcher	Nickel	LO58-SB11-0001	48.4	38	1.273684211
Launcher	Nickel	LO58-SB12-0001	36.1	38	0.95
Launcher	Nickel	LO58-SB13-0002	39	38	1.026315789
Launcher	Nickel	LO58-SB14-0001	34.6	38	0.910526316
Launcher	Nickel	LO58-SB15-0001	35.9	38	0.944736842
Launcher	Nickel	LO58-SB-DUP-02	42.9	38	1.128947368
Launcher	Selenium	LO58-SB06-0002	0.86	0.52	1.653846154
Launcher	Selenium	LO58-SB08-0001	1.1	0.52	2.115384615
Launcher	Selenium	LO58-SB09-0002	1	0.52	1.923076923
Launcher	Selenium	LO58-SB10-0002	1.7	0.52	3.269230769
Launcher	Selenium	LO58-SB11-0001	2.3	0.52	4.423076923
Launcher	Selenium	LO58-SB12-0001	2	0.52	3.846153846
Launcher	Selenium	LO58-SB13-0002	2.2	0.52	4.230769231
Launcher	Selenium	LO58-SB-DUP-02	1.4	0.52	2.692307692
Launcher	Thallium	LO58-SB04-0002	0.49	0.01	49
Launcher	Vanadium	LO58-SB04-0002	16.4	2	8.2
Launcher	Vanadium	LO58-SB05-0002	24.6	2	12.3
Launcher	Vanadium	LO58-SB06-0002	18.1	2	9.05
Launcher	Vanadium	LO58-SB07-0002	20.3	2	10.15
Launcher	Vanadium	LO58-SB08-0001	29.1	2	14.55
Launcher	Vanadium	LO58-SB09-0002	20.5	2	10.25
Launcher	Vanadium	LO58-SB10-0002	24.2	2	12.1
Launcher	Vanadium	LO58-SB11-0001	25.9	2	12.95
Launcher	Vanadium	LO58-SB12-0001	24.1	2	12.05
Launcher	Vanadium	LO58-SB13-0002	27.5	2	13.75
Launcher	Vanadium	LO58-SB14-0001	22.2	2	11.1
Launcher	Vanadium	LO58-SB15-0001	25.9	2	12.95
Launcher	Vanadium	LO58-SB-DUP-02	23.7	2	11.85
Launcher	Zinc	LO58-SB04-0002	60.3	160	0.376875
Launcher	Zinc	LO58-SB05-0002	56.4	160	0.3525
Launcher	Zinc	LO58-SB06-0002	57.3	160	0.358125
Launcher	Zinc	LO58-SB07-0002	55.7	160	0.348125
Launcher	Zinc	LO58-SB08-0001	79.6	160	0.4975
Launcher	Zinc	LO58-SB09-0002	51.6	160	0.3225
Launcher	Zinc	LO58-SB10-0002	54.5	160	0.340625
Launcher	Zinc	LO58-SB11-0001	66.7	160	0.416875
Launcher	Zinc	LO58-SB12-0001	57.7	160	0.360625
Launcher	Zinc	LO58-SB13-0002	50.9	160	0.318125
Launcher	Zinc	LO58-SB14-0001	50	160	0.3125
Launcher	Zinc	LO58-SB15-0001	61.1	160	0.381875
Launcher	Zinc	LO58-SB-DUP-02	66.4	160	0.415
Creek-OffSite-Downstream	Aluminum	LO58-SD01-042112	22200	5	4440
Creek-OffSite-Downstream	Arsenic	LO58-SD01-042112	18.7	18	1.038888889
Creek-OffSite-Downstream	Barium	LO58-SD01-042112	100	5	20
Creek-OffSite-Downstream	Beryllium	LO58-SD01-042112	0.77	0.1	7.7

Table D.2
Sample by Sample Comparison of Detected Soil Concentrations with Soil-based Phytotoxicity Benchmarks
LO-58
Caribou, Maine

Location	Analyte	Sample ID	Result (mg/kg)	Benchmark (mg/kg)	Ratio
Creek-OffSite-Downstream	Chromium	LO58-SD01-042112	33.5	0.018	1861.111111
Creek-OffSite-Downstream	Cobalt	LO58-SD01-042112	9	13	0.692307692
Creek-OffSite-Downstream	Copper	LO58-SD01-042112	66.9	70	0.955714286
Creek-OffSite-Downstream	High Molecular Weight PAHs	LO58-SD01-042112	1.658	1.2	1.381666667
Creek-OffSite-Downstream	Manganese	LO58-SD01-042112	898	220	4.081818182
Creek-OffSite-Downstream	Mercury	LO58-SD01-042112	0.31	0.349	0.888252149
Creek-OffSite-Downstream	Nickel	LO58-SD01-042112	32	38	0.842105263
Creek-OffSite-Downstream	Vanadium	LO58-SD01-042112	28.7	2	14.35
Creek-OffSite-Downstream	Zinc	LO58-SD01-042112	117	160	0.73125
Creek-OnSite-Upstream	Aluminum	LO58-SD03-042112	17300	5	3460
Creek-OnSite-Upstream	Arsenic	LO58-SD03-042112	16.8	18	0.933333333
Creek-OnSite-Upstream	Barium	LO58-SD03-042112	68.4	5	13.68
Creek-OnSite-Upstream	Beryllium	LO58-SD03-042112	0.57	0.1	5.7
Creek-OnSite-Upstream	Chromium	LO58-SD03-042112	29.6	0.018	1644.444444
Creek-OnSite-Upstream	Cobalt	LO58-SD03-042112	10.7	13	0.823076923
Creek-OnSite-Upstream	Copper	LO58-SD03-042112	47.4	70	0.677142857
Creek-OnSite-Upstream	High Molecular Weight PAHs	LO58-SD03-042112	4.97	1.2	4.141666667
Creek-OnSite-Upstream	Manganese	LO58-SD03-042112	697	220	3.168181818
Creek-OnSite-Upstream	Mercury	LO58-SD03-042112	0.15	0.349	0.429799427
Creek-OnSite-Upstream	Nickel	LO58-SD03-042112	34.9	38	0.918421053
Creek-OnSite-Upstream	Selenium	LO58-SD03-042112	1.3	0.52	2.5
Creek-OnSite-Upstream	Vanadium	LO58-SD03-042112	27.6	2	13.8
Creek-OnSite-Upstream	Zinc	LO58-SD03-042112	132	160	0.825
Creek-OnSite-Downstream	Aluminum	LO58-SD02-042112	21100	5	4220
Creek-OnSite-Downstream	Aluminum	LO58-SD-DUP-01	21400	5	4280
Creek-OnSite-Downstream	Antimony	LO58-SD-DUP-01	0.68	0.5	1.36
Creek-OnSite-Downstream	Arsenic	LO58-SD02-042112	24	18	1.333333333
Creek-OnSite-Downstream	Arsenic	LO58-SD-DUP-01	23.8	18	1.322222222
Creek-OnSite-Downstream	Barium	LO58-SD02-042112	85.1	5	17.02
Creek-OnSite-Downstream	Barium	LO58-SD-DUP-01	83.9	5	16.78
Creek-OnSite-Downstream	Beryllium	LO58-SD02-042112	0.61	0.1	6.1
Creek-OnSite-Downstream	Beryllium	LO58-SD-DUP-01	0.62	0.1	6.2
Creek-OnSite-Downstream	Chromium	LO58-SD02-042112	31.6	0.018	1755.555556
Creek-OnSite-Downstream	Chromium	LO58-SD-DUP-01	31.6	0.018	1755.555556
Creek-OnSite-Downstream	Cobalt	LO58-SD02-042112	9.1	13	0.7
Creek-OnSite-Downstream	Cobalt	LO58-SD-DUP-01	9.4	13	0.723076923
Creek-OnSite-Downstream	Copper	LO58-SD02-042112	71.4	70	1.02
Creek-OnSite-Downstream	Copper	LO58-SD-DUP-01	73.1	70	1.044285714
Creek-OnSite-Downstream	High Molecular Weight PAHs	LO58-SD02-042112	2.14	1.2	1.783333333
Creek-OnSite-Downstream	Manganese	LO58-SD02-042112	512	220	2.327272727
Creek-OnSite-Downstream	Manganese	LO58-SD-DUP-01	514	220	2.336363636
Creek-OnSite-Downstream	Mercury	LO58-SD02-042112	0.22	0.349	0.630372493
Creek-OnSite-Downstream	Mercury	LO58-SD-DUP-01	0.23	0.349	0.659025788
Creek-OnSite-Downstream	Nickel	LO58-SD02-042112	32	38	0.842105263
Creek-OnSite-Downstream	Nickel	LO58-SD-DUP-01	32.9	38	0.865789474
Creek-OnSite-Downstream	Vanadium	LO58-SD02-042112	30.1	2	15.05
Creek-OnSite-Downstream	Vanadium	LO58-SD-DUP-01	29.5	2	14.75
Creek-OnSite-Downstream	Zinc	LO58-SD02-042112	123	160	0.76875
Creek-OnSite-Downstream	Zinc	LO58-SD-DUP-01	125	160	0.78125
BKG	Aluminum	LO58-BK01-0001	17500	5	3500
BKG	Aluminum	LO58-BK02-0001	16400	5	3280
BKG	Aluminum	LO58-BK03-0001	17700	5	3540
BKG	Aluminum	LO58-BK-DUP-01	15000	5	3000
BKG	Antimony	LO58-BK01-0001	0.59	0.5	1.18
BKG	Antimony	LO58-BK02-0001	0.55	0.5	1.1
BKG	Antimony	LO58-BK03-0001	1.1	0.5	2.2
BKG	Antimony	LO58-BK-DUP-01	0.55	0.5	1.1

Table D.2
Sample by Sample Comparison of Detected Soil Concentrations with Soil-based Phytotoxicity Benchmarks
LO-58
Caribou, Maine

Location	Analyte	Sample ID	Result (mg/kg)	Benchmark (mg/kg)	Ratio
BKG	Arsenic	LO58-BK01-0001	14.8	18	0.822222222
BKG	Arsenic	LO58-BK02-0001	14	18	0.777777778
BKG	Arsenic	LO58-BK03-0001	22.4	18	1.244444444
BKG	Arsenic	LO58-BK-DUP-01	14.6	18	0.811111111
BKG	Barium	LO58-BK01-0001	57.7	5	11.54
BKG	Barium	LO58-BK02-0001	63.2	5	12.64
BKG	Barium	LO58-BK03-0001	65	5	13
BKG	Barium	LO58-BK-DUP-01	57.2	5	11.44
BKG	Beryllium	LO58-BK01-0001	0.42	0.1	4.2
BKG	Beryllium	LO58-BK02-0001	0.38	0.1	3.8
BKG	Beryllium	LO58-BK03-0001	0.45	0.1	4.5
BKG	Beryllium	LO58-BK-DUP-01	0.37	0.1	3.7
BKG	Chromium	LO58-BK01-0001	37.6	0.018	2088.888889
BKG	Chromium	LO58-BK02-0001	40.3	0.018	2238.888889
BKG	Chromium	LO58-BK03-0001	31.8	0.018	1766.666667
BKG	Chromium	LO58-BK-DUP-01	26	0.018	1444.444444
BKG	Cobalt	LO58-BK01-0001	11.8	13	0.907692308
BKG	Cobalt	LO58-BK02-0001	9.1	13	0.7
BKG	Cobalt	LO58-BK03-0001	11.4	13	0.876923077
BKG	Cobalt	LO58-BK-DUP-01	13.9	13	1.069230769
BKG	Copper	LO58-BK01-0001	75.3	70	1.075714286
BKG	Copper	LO58-BK02-0001	79.8	70	1.14
BKG	Copper	LO58-BK03-0001	119	70	1.7
BKG	Copper	LO58-BK-DUP-01	72.1	70	1.03
BKG	High Molecular Weight PAHs	LO58-BK01-0001	0.3416	1.2	0.284666667
BKG	High Molecular Weight PAHs	LO58-BK02-0001	0.3662	1.2	0.305166667
BKG	High Molecular Weight PAHs	LO58-BK03-0001	0.1961	1.2	0.163416667
BKG	Manganese	LO58-BK01-0001	1390	220	6.318181818
BKG	Manganese	LO58-BK02-0001	655	220	2.977272727
BKG	Manganese	LO58-BK03-0001	920	220	4.181818182
BKG	Manganese	LO58-BK-DUP-01	1610	220	7.318181818
BKG	Mercury	LO58-BK01-0001	0.014	0.349	0.040114613
BKG	Mercury	LO58-BK02-0001	0.18	0.349	0.515759312
BKG	Mercury	LO58-BK03-0001	0.13	0.349	0.372492837
BKG	Mercury	LO58-BK-DUP-01	0.19	0.349	0.544412607
BKG	Nickel	LO58-BK01-0001	26.4	38	0.694736842
BKG	Nickel	LO58-BK02-0001	25.5	38	0.671052632
BKG	Nickel	LO58-BK03-0001	29.3	38	0.771052632
BKG	Nickel	LO58-BK-DUP-01	22	38	0.578947368
BKG	Selenium	LO58-BK01-0001	1.6	0.52	3.076923077
BKG	Selenium	LO58-BK02-0001	2.1	0.52	4.038461538
BKG	Selenium	LO58-BK03-0001	2	0.52	3.846153846
BKG	Selenium	LO58-BK-DUP-01	1.7	0.52	3.269230769
BKG	Vanadium	LO58-BK01-0001	35.4	2	17.7
BKG	Vanadium	LO58-BK02-0001	30.9	2	15.45
BKG	Vanadium	LO58-BK03-0001	32	2	16
BKG	Vanadium	LO58-BK-DUP-01	37.6	2	18.8
BKG	Zinc	LO58-BK01-0001	76.5	160	0.478125
BKG	Zinc	LO58-BK02-0001	72	160	0.45
BKG	Zinc	LO58-BK03-0001	76.6	160	0.47875
BKG	Zinc	LO58-BK-DUP-01	64.4	160	0.4025

APPENDIX D.3

SAMPLE BY SAMPLE COMPARISON OF DETECTED SOIL CONCENTRATIONS WITH SOIL-BASED SOIL INVERTEBRATE/MICROBE BENCHMARKS

Table D-3

Sample by Sample Comparison of Detected Soil Concentrations with Soil-based Soil Invertebrate/Microbe Benchmarks
LO-58
Caribou, Maine

Location	Analyte	Sample ID	Result (mg/kg)	Benchmark (mg/kg)	Ratio
AMAC	Acetone	LO58-SB01-0002	0.21	0.0099	21.21212121
AMAC	Acetone	LO58-SB02-0002	0.14	0.0099	14.14141414
AMAC	Acetone	LO58-SB03-0002	0.3	0.0099	30.3030303
AMAC	Carbon disulfide	LO58-SB01-0002	0.0014	0.000851	1.645123384
AMAC	Carbon disulfide	LO58-SB03-0002	0.00058	0.000851	0.681551116
AMAC	High Molecular Weight PAHs	LO58-SB01-0002	0.1214	18	0.006744444
AMAC	High Molecular Weight PAHs	LO58-SB02-0002	0.00812	18	0.000451111
AMAC	High Molecular Weight PAHs	LO58-SB03-0002	1.579	18	0.087722222
AMAC	Aluminum	LO58-SB01-0002	15700	600	26.16666667
AMAC	Aluminum	LO58-SB02-0002	15900	600	26.5
AMAC	Aluminum	LO58-SB03-0002	25600	600	42.66666667
AMAC	Arsenic	LO58-SB01-0002	6.2	0.25	24.8
AMAC	Arsenic	LO58-SB02-0002	4.8	0.25	19.2
AMAC	Arsenic	LO58-SB03-0002	8.5	0.25	34
AMAC	Barium	LO58-SB01-0002	44	330	0.133333333
AMAC	Barium	LO58-SB02-0002	59.9	330	0.181515152
AMAC	Barium	LO58-SB03-0002	62.6	330	0.18969697
AMAC	Beryllium	LO58-SB01-0002	0.61	40	0.01525
AMAC	Beryllium	LO58-SB02-0002	1	40	0.025
AMAC	Beryllium	LO58-SB03-0002	1.4	40	0.035
AMAC	Chromium	LO58-SB01-0002	32	0.2	160
AMAC	Chromium	LO58-SB02-0002	35.8	0.2	179
AMAC	Chromium	LO58-SB03-0002	56.3	0.2	281.5
AMAC	Cobalt	LO58-SB01-0002	10.3	1000	0.0103
AMAC	Cobalt	LO58-SB02-0002	10.9	1000	0.0109
AMAC	Cobalt	LO58-SB03-0002	19.6	1000	0.0196
AMAC	Copper	LO58-SB01-0002	26.6	80	0.3325
AMAC	Copper	LO58-SB02-0002	23.3	80	0.29125
AMAC	Copper	LO58-SB03-0002	34	80	0.425
AMAC	Iron	LO58-SB01-0002	31000	200	155
AMAC	Iron	LO58-SB02-0002	31500	200	157.5
AMAC	Iron	LO58-SB03-0002	49300	200	246.5
AMAC	Manganese	LO58-SB01-0002	487	450	1.082222222
AMAC	Manganese	LO58-SB02-0002	486	450	1.08
AMAC	Manganese	LO58-SB03-0002	654	450	1.453333333
AMAC	Mercury	LO58-SB01-0002	0.048	2.5	0.0192
AMAC	Mercury	LO58-SB02-0002	0.065	2.5	0.026
AMAC	Mercury	LO58-SB03-0002	0.025	2.5	0.01
AMAC	Nickel	LO58-SB01-0002	38.4	280	0.137142857
AMAC	Nickel	LO58-SB02-0002	51.6	280	0.184285714
AMAC	Nickel	LO58-SB03-0002	84.6	280	0.302142857
AMAC	Selenium	LO58-SB01-0002	0.85	4.1	0.207317073
AMAC	Selenium	LO58-SB02-0002	1.2	4.1	0.292682927
AMAC	Vanadium	LO58-SB01-0002	22.2	20	1.11
AMAC	Vanadium	LO58-SB02-0002	20.1	20	1.005
AMAC	Vanadium	LO58-SB03-0002	29.2	20	1.46
AMAC	Zinc	LO58-SB01-0002	54.8	120	0.456666667
AMAC	Zinc	LO58-SB02-0002	53.8	120	0.448333333
AMAC	Zinc	LO58-SB03-0002	91.9	120	0.765833333
Launcher	Acetone	LO58-SB04-0002	0.12	0.0099	12.12121212
Launcher	Acetone	LO58-SB05-0002	0.074	0.0099	7.474747475
Launcher	Acetone	LO58-SB06-0002	0.32	0.0099	32.32323232
Launcher	Acetone	LO58-SB07-0002	0.17	0.0099	17.17171717
Launcher	Acetone	LO58-SB08-0001	0.34	0.0099	34.34343434
Launcher	Acetone	LO58-SB09-0002	0.18	0.0099	18.18181818
Launcher	Acetone	LO58-SB10-0002	0.18	0.0099	18.18181818
Launcher	Acetone	LO58-SB11-0001	0.22	0.0099	22.22222222
Launcher	Acetone	LO58-SB12-0001	0.17	0.0099	17.17171717
Launcher	Acetone	LO58-SB13-0002	0.22	0.0099	22.22222222
Launcher	Acetone	LO58-SB14-0001	0.34	0.0099	34.34343434
Launcher	Acetone	LO58-SB15-0001	0.27	0.0099	27.27272727
Launcher	Acetone	LO58-SB-DUP-02	0.59	0.0099	59.5959596
Launcher	Carbon disulfide	LO58-SB06-0002	0.014	0.000851	16.45123384
Launcher	Carbon disulfide	LO58-SB07-0002	0.018	0.000851	21.15158637
Launcher	Carbon disulfide	LO58-SB11-0001	0.00088	0.000851	1.034077556
Launcher	Carbon disulfide	LO58-SB-DUP-02	0.0022	0.000851	2.58519389

Table D-3

Sample by Sample Comparison of Detected Soil Concentrations with Soil-based Soil Invertebrate/Microbe Benchmarks
LO-58
Caribou, Maine

Location	Analyte	Sample ID	Result (mg/kg)	Benchmark (mg/kg)	Ratio
Launcher	High Molecular Weight PAHs	LO58-SB04-0002	0.00752	18	0.000417778
Launcher	High Molecular Weight PAHs	LO58-SB05-0002	0.04936	18	0.002742222
Launcher	High Molecular Weight PAHs	LO58-SB06-0002	0.034405	18	0.001911389
Launcher	High Molecular Weight PAHs	LO58-SB07-0002	0.0537	18	0.002983333
Launcher	High Molecular Weight PAHs	LO58-SB08-0001	0.2032	18	0.011288889
Launcher	High Molecular Weight PAHs	LO58-SB09-0002	0.00428	18	0.000237778
Launcher	High Molecular Weight PAHs	LO58-SB10-0002	0.00698	18	0.000387778
Launcher	High Molecular Weight PAHs	LO58-SB11-0001	0.043	18	0.002388889
Launcher	High Molecular Weight PAHs	LO58-SB12-0001	0.03998	18	0.002221111
Launcher	High Molecular Weight PAHs	LO58-SB13-0002	0.0558	18	0.0031
Launcher	High Molecular Weight PAHs	LO58-SB14-0001	0.049	18	0.002722222
Launcher	High Molecular Weight PAHs	LO58-SB15-0001	0.1068	18	0.005933333
Launcher	Aluminum	LO58-SB04-0002	13900	600	23.16666667
Launcher	Aluminum	LO58-SB05-0002	15500	600	25.83333333
Launcher	Aluminum	LO58-SB06-0002	13000	600	21.66666667
Launcher	Aluminum	LO58-SB07-0002	14900	600	24.83333333
Launcher	Aluminum	LO58-SB08-0001	18100	600	30.16666667
Launcher	Aluminum	LO58-SB09-0002	13500	600	22.5
Launcher	Aluminum	LO58-SB10-0002	18100	600	30.16666667
Launcher	Aluminum	LO58-SB11-0001	19000	600	31.66666667
Launcher	Aluminum	LO58-SB12-0001	15800	600	26.33333333
Launcher	Aluminum	LO58-SB13-0002	16400	600	27.33333333
Launcher	Aluminum	LO58-SB14-0001	18100	600	30.16666667
Launcher	Aluminum	LO58-SB15-0001	18000	600	30
Launcher	Aluminum	LO58-SB-DUP-02	15900	600	26.5
Launcher	Antimony	LO58-SB04-0002	0.52	78	0.006666667
Launcher	Antimony	LO58-SB05-0002	0.35	78	0.004487179
Launcher	Antimony	LO58-SB10-0002	0.49	78	0.006282051
Launcher	Antimony	LO58-SB12-0001	0.39	78	0.005
Launcher	Antimony	LO58-SB14-0001	0.61	78	0.007820513
Launcher	Antimony	LO58-SB15-0001	0.6	78	0.007692308
Launcher	Arsenic	LO58-SB04-0002	7.3	0.25	29.2
Launcher	Arsenic	LO58-SB05-0002	8	0.25	32
Launcher	Arsenic	LO58-SB06-0002	6.7	0.25	26.8
Launcher	Arsenic	LO58-SB07-0002	5.7	0.25	22.8
Launcher	Arsenic	LO58-SB08-0001	9	0.25	36
Launcher	Arsenic	LO58-SB09-0002	5.9	0.25	23.6
Launcher	Arsenic	LO58-SB10-0002	7.6	0.25	30.4
Launcher	Arsenic	LO58-SB11-0001	9.4	0.25	37.6
Launcher	Arsenic	LO58-SB12-0001	7.1	0.25	28.4
Launcher	Arsenic	LO58-SB13-0002	7	0.25	28
Launcher	Arsenic	LO58-SB14-0001	7.7	0.25	30.8
Launcher	Arsenic	LO58-SB15-0001	11.1	0.25	44.4
Launcher	Arsenic	LO58-SB-DUP-02	9.3	0.25	37.2
Launcher	Barium	LO58-SB04-0002	34.5	330	0.104545455
Launcher	Barium	LO58-SB05-0002	40.5	330	0.122727273
Launcher	Barium	LO58-SB06-0002	43.4	330	0.131515152
Launcher	Barium	LO58-SB07-0002	40.3	330	0.122121212
Launcher	Barium	LO58-SB08-0001	65.2	330	0.197575758
Launcher	Barium	LO58-SB09-0002	42.7	330	0.129393939
Launcher	Barium	LO58-SB10-0002	32.5	330	0.098484848
Launcher	Barium	LO58-SB11-0001	51.9	330	0.157272727
Launcher	Barium	LO58-SB12-0001	39.5	330	0.11969697
Launcher	Barium	LO58-SB13-0002	29.2	330	0.088484848
Launcher	Barium	LO58-SB14-0001	30.6	330	0.092727273
Launcher	Barium	LO58-SB15-0001	37.2	330	0.112727273
Launcher	Barium	LO58-SB-DUP-02	52.8	330	0.16
Launcher	Beryllium	LO58-SB04-0002	0.93	40	0.02325
Launcher	Beryllium	LO58-SB05-0002	0.6	40	0.015
Launcher	Beryllium	LO58-SB06-0002	0.87	40	0.02175
Launcher	Beryllium	LO58-SB07-0002	0.65	40	0.01625
Launcher	Beryllium	LO58-SB08-0001	0.69	40	0.01725
Launcher	Beryllium	LO58-SB09-0002	0.66	40	0.0165
Launcher	Beryllium	LO58-SB10-0002	0.62	40	0.0155
Launcher	Beryllium	LO58-SB11-0001	0.77	40	0.01925
Launcher	Beryllium	LO58-SB12-0001	0.63	40	0.01575

Table D-3

Sample by Sample Comparison of Detected Soil Concentrations with Soil-based Soil Invertebrate/Microbe Benchmarks
LO-58
Caribou, Maine

Location	Analyte	Sample ID	Result (mg/kg)	Benchmark (mg/kg)	Ratio
Launcher	Beryllium	LO58-SB13-0002	0.5	40	0.0125
Launcher	Beryllium	LO58-SB14-0001	0.51	40	0.01275
Launcher	Beryllium	LO58-SB15-0001	0.52	40	0.013
Launcher	Beryllium	LO58-SB-DUP-02	0.85	40	0.02125
Launcher	Chromium	LO58-SB04-0002	28.8	0.2	144
Launcher	Chromium	LO58-SB05-0002	29.1	0.2	145.5
Launcher	Chromium	LO58-SB06-0002	28	0.2	140
Launcher	Chromium	LO58-SB07-0002	28.2	0.2	141
Launcher	Chromium	LO58-SB08-0001	34.4	0.2	172
Launcher	Chromium	LO58-SB09-0002	29.1	0.2	145.5
Launcher	Chromium	LO58-SB10-0002	32.9	0.2	164.5
Launcher	Chromium	LO58-SB11-0001	34.9	0.2	174.5
Launcher	Chromium	LO58-SB12-0001	28.9	0.2	144.5
Launcher	Chromium	LO58-SB13-0002	28.6	0.2	143
Launcher	Chromium	LO58-SB14-0001	28.8	0.2	144
Launcher	Chromium	LO58-SB15-0001	30.2	0.2	151
Launcher	Chromium	LO58-SB-DUP-02	31	0.2	155
Launcher	Cobalt	LO58-SB04-0002	13.4	1000	0.0134
Launcher	Cobalt	LO58-SB05-0002	11.3	1000	0.0113
Launcher	Cobalt	LO58-SB06-0002	9.1	1000	0.0091
Launcher	Cobalt	LO58-SB07-0002	9.7	1000	0.0097
Launcher	Cobalt	LO58-SB08-0001	10	1000	0.01
Launcher	Cobalt	LO58-SB09-0002	11.6	1000	0.0116
Launcher	Cobalt	LO58-SB10-0002	12.9	1000	0.0129
Launcher	Cobalt	LO58-SB11-0001	13.9	1000	0.0139
Launcher	Cobalt	LO58-SB12-0001	13.3	1000	0.0133
Launcher	Cobalt	LO58-SB13-0002	12.4	1000	0.0124
Launcher	Cobalt	LO58-SB14-0001	12.3	1000	0.0123
Launcher	Cobalt	LO58-SB15-0001	13.5	1000	0.0135
Launcher	Cobalt	LO58-SB-DUP-02	11.3	1000	0.0113
Launcher	Copper	LO58-SB04-0002	23.7	80	0.29625
Launcher	Copper	LO58-SB05-0002	21.9	80	0.27375
Launcher	Copper	LO58-SB06-0002	39.6	80	0.495
Launcher	Copper	LO58-SB07-0002	21.9	80	0.27375
Launcher	Copper	LO58-SB08-0001	40.9	80	0.51125
Launcher	Copper	LO58-SB09-0002	18.7	80	0.23375
Launcher	Copper	LO58-SB10-0002	24	80	0.3
Launcher	Copper	LO58-SB11-0001	49.5	80	0.61875
Launcher	Copper	LO58-SB12-0001	44.4	80	0.555
Launcher	Copper	LO58-SB13-0002	26	80	0.325
Launcher	Copper	LO58-SB14-0001	39.1	80	0.48875
Launcher	Copper	LO58-SB15-0001	41.8	80	0.5225
Launcher	Copper	LO58-SB-DUP-02	50.7	80	0.63375
Launcher	Iron	LO58-SB04-0002	32200	200	161
Launcher	Iron	LO58-SB05-0002	31900	200	159.5
Launcher	Iron	LO58-SB06-0002	29000	200	145
Launcher	Iron	LO58-SB07-0002	30200	200	151
Launcher	Iron	LO58-SB08-0001	36500	200	182.5
Launcher	Iron	LO58-SB09-0002	30600	200	153
Launcher	Iron	LO58-SB10-0002	31000	200	155
Launcher	Iron	LO58-SB11-0001	33500	200	167.5
Launcher	Iron	LO58-SB12-0001	30100	200	150.5
Launcher	Iron	LO58-SB13-0002	29300	200	146.5
Launcher	Iron	LO58-SB14-0001	28400	200	142
Launcher	Iron	LO58-SB15-0001	32100	200	160.5
Launcher	Iron	LO58-SB-DUP-02	33900	200	169.5
Launcher	Manganese	LO58-SB04-0002	640	450	1.422222222
Launcher	Manganese	LO58-SB05-0002	669	450	1.486666667
Launcher	Manganese	LO58-SB06-0002	474	450	1.053333333
Launcher	Manganese	LO58-SB07-0002	464	450	1.031111111
Launcher	Manganese	LO58-SB08-0001	607	450	1.348888889
Launcher	Manganese	LO58-SB09-0002	682	450	1.515555556
Launcher	Manganese	LO58-SB10-0002	565	450	1.255555556
Launcher	Manganese	LO58-SB11-0001	616	450	1.368888889
Launcher	Manganese	LO58-SB12-0001	780	450	1.733333333
Launcher	Manganese	LO58-SB13-0002	566	450	1.257777778

Table D-3

Sample by Sample Comparison of Detected Soil Concentrations with Soil-based Soil Invertebrate/Microbe Benchmarks
LO-58
Caribou, Maine

Location	Analyte	Sample ID	Result (mg/kg)	Benchmark (mg/kg)	Ratio
Launcher	Manganese	LO58-SB14-0001	549	450	1.22
Launcher	Manganese	LO58-SB15-0001	615	450	1.366666667
Launcher	Manganese	LO58-SB-DUP-02	584	450	1.297777778
Launcher	Mercury	LO58-SB04-0002	0.093	2.5	0.0372
Launcher	Mercury	LO58-SB05-0002	0.051	2.5	0.0204
Launcher	Mercury	LO58-SB06-0002	0.11	2.5	0.044
Launcher	Mercury	LO58-SB07-0002	0.067	2.5	0.0268
Launcher	Mercury	LO58-SB08-0001	0.35	2.5	0.14
Launcher	Mercury	LO58-SB09-0002	0.027	2.5	0.0108
Launcher	Mercury	LO58-SB10-0002	0.037	2.5	0.0148
Launcher	Mercury	LO58-SB11-0001	0.098	2.5	0.0392
Launcher	Mercury	LO58-SB12-0001	0.043	2.5	0.0172
Launcher	Mercury	LO58-SB13-0002	0.034	2.5	0.0136
Launcher	Mercury	LO58-SB14-0001	0.085	2.5	0.034
Launcher	Mercury	LO58-SB15-0001	0.029	2.5	0.0116
Launcher	Mercury	LO58-SB-DUP-02	0.12	2.5	0.048
Launcher	Nickel	LO58-SB04-0002	52.1	280	0.186071429
Launcher	Nickel	LO58-SB05-0002	39.5	280	0.141071429
Launcher	Nickel	LO58-SB06-0002	41.4	280	0.147857143
Launcher	Nickel	LO58-SB07-0002	38.7	280	0.138214286
Launcher	Nickel	LO58-SB08-0001	43.2	280	0.154285714
Launcher	Nickel	LO58-SB09-0002	37.7	280	0.134642857
Launcher	Nickel	LO58-SB10-0002	42.2	280	0.150714286
Launcher	Nickel	LO58-SB11-0001	48.4	280	0.172857143
Launcher	Nickel	LO58-SB12-0001	36.1	280	0.128928571
Launcher	Nickel	LO58-SB13-0002	39	280	0.139285714
Launcher	Nickel	LO58-SB14-0001	34.6	280	0.123571429
Launcher	Nickel	LO58-SB15-0001	35.9	280	0.128214286
Launcher	Nickel	LO58-SB-DUP-02	42.9	280	0.153214286
Launcher	Selenium	LO58-SB06-0002	0.86	4.1	0.209756098
Launcher	Selenium	LO58-SB08-0001	1.1	4.1	0.268292683
Launcher	Selenium	LO58-SB09-0002	1	4.1	0.243902439
Launcher	Selenium	LO58-SB10-0002	1.7	4.1	0.414634146
Launcher	Selenium	LO58-SB11-0001	2.3	4.1	0.56097561
Launcher	Selenium	LO58-SB12-0001	2	4.1	0.487804878
Launcher	Selenium	LO58-SB13-0002	2.2	4.1	0.536585366
Launcher	Selenium	LO58-SB-DUP-02	1.4	4.1	0.341463415
Launcher	Vanadium	LO58-SB04-0002	16.4	20	0.82
Launcher	Vanadium	LO58-SB05-0002	24.6	20	1.23
Launcher	Vanadium	LO58-SB06-0002	18.1	20	0.905
Launcher	Vanadium	LO58-SB07-0002	20.3	20	1.015
Launcher	Vanadium	LO58-SB08-0001	29.1	20	1.455
Launcher	Vanadium	LO58-SB09-0002	20.5	20	1.025
Launcher	Vanadium	LO58-SB10-0002	24.2	20	1.21
Launcher	Vanadium	LO58-SB11-0001	25.9	20	1.295
Launcher	Vanadium	LO58-SB12-0001	24.1	20	1.205
Launcher	Vanadium	LO58-SB13-0002	27.5	20	1.375
Launcher	Vanadium	LO58-SB14-0001	22.2	20	1.11
Launcher	Vanadium	LO58-SB15-0001	25.9	20	1.295
Launcher	Vanadium	LO58-SB-DUP-02	23.7	20	1.185
Launcher	Zinc	LO58-SB04-0002	60.3	120	0.5025
Launcher	Zinc	LO58-SB05-0002	56.4	120	0.47
Launcher	Zinc	LO58-SB06-0002	57.3	120	0.4775
Launcher	Zinc	LO58-SB07-0002	55.7	120	0.464166667
Launcher	Zinc	LO58-SB08-0001	79.6	120	0.663333333
Launcher	Zinc	LO58-SB09-0002	51.6	120	0.43
Launcher	Zinc	LO58-SB10-0002	54.5	120	0.454166667
Launcher	Zinc	LO58-SB11-0001	66.7	120	0.555833333
Launcher	Zinc	LO58-SB12-0001	57.7	120	0.480833333
Launcher	Zinc	LO58-SB13-0002	50.9	120	0.424166667
Launcher	Zinc	LO58-SB14-0001	50	120	0.416666667
Launcher	Zinc	LO58-SB15-0001	61.1	120	0.509166667
Launcher	Zinc	LO58-SB-DUP-02	66.4	120	0.553333333
Creek-OffSite-Downstream	2-Hexanone	LO58-SD01-100712	0.097	0.0582	1.666666667
Creek-OffSite-Downstream	Acetone	LO58-SD01-100712	0.53	0.0099	53.53535354
Creek-OffSite-Downstream	High Molecular Weight PAHs	LO58-SD01-042112	1.658	18	0.092111111

Table D-3

Sample by Sample Comparison of Detected Soil Concentrations with Soil-based Soil Invertebrate/Microbe Benchmarks
LO-58
Caribou, Maine

Location	Analyte	Sample ID	Result (mg/kg)	Benchmark (mg/kg)	Ratio
Creek-OffSite-Downstream	Aluminum	LO58-SD01-042112	22200	600	37
Creek-OffSite-Downstream	Arsenic	LO58-SD01-042112	18.7	0.25	74.8
Creek-OffSite-Downstream	Barium	LO58-SD01-042112	100	330	0.303030303
Creek-OffSite-Downstream	Beryllium	LO58-SD01-042112	0.77	40	0.01925
Creek-OffSite-Downstream	Chromium	LO58-SD01-042112	33.5	0.2	167.5
Creek-OffSite-Downstream	Cobalt	LO58-SD01-042112	9	1000	0.009
Creek-OffSite-Downstream	Copper	LO58-SD01-042112	66.9	80	0.83625
Creek-OffSite-Downstream	Iron	LO58-SD01-042112	30100	200	150.5
Creek-OffSite-Downstream	Manganese	LO58-SD01-042112	898	450	1.995555556
Creek-OffSite-Downstream	Mercury	LO58-SD01-042112	0.31	2.5	0.124
Creek-OffSite-Downstream	Nickel	LO58-SD01-042112	32	280	0.114285714
Creek-OffSite-Downstream	Vanadium	LO58-SD01-042112	28.7	20	1.435
Creek-OffSite-Downstream	Zinc	LO58-SD01-042112	117	120	0.975
Creek-OnSite-Upstream	Acetone	LO58-SD03-100712	0.39	0.0099	39.39393939
Creek-OnSite-Upstream	Carbon disulfide	LO58-SD03-100712	0.00088	0.000851	1.034077556
Creek-OnSite-Upstream	High Molecular Weight PAHs	LO58-SD03-042112	4.97	18	0.276111111
Creek-OnSite-Upstream	Aluminum	LO58-SD03-042112	17300	600	28.83333333
Creek-OnSite-Upstream	Arsenic	LO58-SD03-042112	16.8	0.25	67.2
Creek-OnSite-Upstream	Barium	LO58-SD03-042112	68.4	330	0.207272727
Creek-OnSite-Upstream	Beryllium	LO58-SD03-042112	0.57	40	0.01425
Creek-OnSite-Upstream	Chromium	LO58-SD03-042112	29.6	0.2	148
Creek-OnSite-Upstream	Cobalt	LO58-SD03-042112	10.7	1000	0.0107
Creek-OnSite-Upstream	Copper	LO58-SD03-042112	47.4	80	0.5925
Creek-OnSite-Upstream	Iron	LO58-SD03-042112	31500	200	157.5
Creek-OnSite-Upstream	Manganese	LO58-SD03-042112	697	450	1.548888889
Creek-OnSite-Upstream	Mercury	LO58-SD03-042112	0.15	2.5	0.06
Creek-OnSite-Upstream	Nickel	LO58-SD03-042112	34.9	280	0.124642857
Creek-OnSite-Upstream	Selenium	LO58-SD03-042112	1.3	4.1	0.317073171
Creek-OnSite-Upstream	Vanadium	LO58-SD03-042112	27.6	20	1.38
Creek-OnSite-Upstream	Zinc	LO58-SD03-042112	132	120	1.1
Creek-OnSite-Downstream	Acetone	LO58-SD02-100712	0.41	0.0099	41.41414141
Creek-OnSite-Downstream	High Molecular Weight PAHs	LO58-SD02-042112	2.14	18	0.118888889
Creek-OnSite-Downstream	Aluminum	LO58-SD02-042112	21100	600	35.16666667
Creek-OnSite-Downstream	Aluminum	LO58-SD-DUP-01	21400	600	35.66666667
Creek-OnSite-Downstream	Antimony	LO58-SD-DUP-01	0.68	78	0.008717949
Creek-OnSite-Downstream	Arsenic	LO58-SD02-042112	24	0.25	96
Creek-OnSite-Downstream	Arsenic	LO58-SD-DUP-01	23.8	0.25	95.2
Creek-OnSite-Downstream	Barium	LO58-SD02-042112	85.1	330	0.257878788
Creek-OnSite-Downstream	Barium	LO58-SD-DUP-01	83.9	330	0.254242424
Creek-OnSite-Downstream	Beryllium	LO58-SD02-042112	0.61	40	0.01525
Creek-OnSite-Downstream	Beryllium	LO58-SD-DUP-01	0.62	40	0.0155
Creek-OnSite-Downstream	Chromium	LO58-SD02-042112	31.6	0.2	158
Creek-OnSite-Downstream	Chromium	LO58-SD-DUP-01	31.6	0.2	158
Creek-OnSite-Downstream	Cobalt	LO58-SD02-042112	9.1	1000	0.0091
Creek-OnSite-Downstream	Cobalt	LO58-SD-DUP-01	9.4	1000	0.0094
Creek-OnSite-Downstream	Copper	LO58-SD02-042112	71.4	80	0.8925
Creek-OnSite-Downstream	Copper	LO58-SD-DUP-01	73.1	80	0.91375
Creek-OnSite-Downstream	Iron	LO58-SD02-042112	30200	200	151
Creek-OnSite-Downstream	Iron	LO58-SD-DUP-01	30700	200	153.5
Creek-OnSite-Downstream	Manganese	LO58-SD02-042112	512	450	1.137777778
Creek-OnSite-Downstream	Manganese	LO58-SD-DUP-01	514	450	1.142222222
Creek-OnSite-Downstream	Mercury	LO58-SD02-042112	0.22	2.5	0.088
Creek-OnSite-Downstream	Mercury	LO58-SD-DUP-01	0.23	2.5	0.092
Creek-OnSite-Downstream	Nickel	LO58-SD02-042112	32	280	0.114285714
Creek-OnSite-Downstream	Nickel	LO58-SD-DUP-01	32.9	280	0.1175
Creek-OnSite-Downstream	Vanadium	LO58-SD02-042112	30.1	20	1.505
Creek-OnSite-Downstream	Vanadium	LO58-SD-DUP-01	29.5	20	1.475
Creek-OnSite-Downstream	Zinc	LO58-SD02-042112	123	120	1.025
Creek-OnSite-Downstream	Zinc	LO58-SD-DUP-01	125	120	1.041666667
BKG	Acetone	LO58-BK01-0001	0.57	0.0099	57.57575758
BKG	Acetone	LO58-BK02-0001	0.64	0.0099	64.64646465
BKG	Acetone	LO58-BK03-0001	0.38	0.0099	38.38383838
BKG	Acetone	LO58-BK-DUP-01	0.57	0.0099	57.57575758
BKG	High Molecular Weight PAHs	LO58-BK01-0001	0.3416	18	0.018977778
BKG	High Molecular Weight PAHs	LO58-BK02-0001	0.3662	18	0.020344444
BKG	High Molecular Weight PAHs	LO58-BK03-0001	0.1961	18	0.010894444

Table D-3

Sample by Sample Comparison of Detected Soil Concentrations with Soil-based Soil Invertebrate/Microbe Benchmarks
LO-58
Caribou, Maine

Location	Analyte	Sample ID	Result (mg/kg)	Benchmark (mg/kg)	Ratio
BKG	Aluminum	LO58-BK01-0001	17500	600	29.16666667
BKG	Aluminum	LO58-BK02-0001	16400	600	27.33333333
BKG	Aluminum	LO58-BK03-0001	17700	600	29.5
BKG	Aluminum	LO58-BK-DUP-01	15000	600	25
BKG	Antimony	LO58-BK01-0001	0.59	78	0.007564103
BKG	Antimony	LO58-BK02-0001	0.55	78	0.007051282
BKG	Antimony	LO58-BK03-0001	1.1	78	0.014102564
BKG	Antimony	LO58-BK-DUP-01	0.55	78	0.007051282
BKG	Arsenic	LO58-BK01-0001	14.8	0.25	59.2
BKG	Arsenic	LO58-BK02-0001	14	0.25	56
BKG	Arsenic	LO58-BK03-0001	22.4	0.25	89.6
BKG	Arsenic	LO58-BK-DUP-01	14.6	0.25	58.4
BKG	Barium	LO58-BK01-0001	57.7	330	0.174848485
BKG	Barium	LO58-BK02-0001	63.2	330	0.191515152
BKG	Barium	LO58-BK03-0001	65	330	0.196969697
BKG	Barium	LO58-BK-DUP-01	57.2	330	0.173333333
BKG	Beryllium	LO58-BK01-0001	0.42	40	0.0105
BKG	Beryllium	LO58-BK02-0001	0.38	40	0.0095
BKG	Beryllium	LO58-BK03-0001	0.45	40	0.01125
BKG	Beryllium	LO58-BK-DUP-01	0.37	40	0.00925
BKG	Chromium	LO58-BK01-0001	37.6	0.2	188
BKG	Chromium	LO58-BK02-0001	40.3	0.2	201.5
BKG	Chromium	LO58-BK03-0001	31.8	0.2	159
BKG	Chromium	LO58-BK-DUP-01	26	0.2	130
BKG	Cobalt	LO58-BK01-0001	11.8	1000	0.0118
BKG	Cobalt	LO58-BK02-0001	9.1	1000	0.0091
BKG	Cobalt	LO58-BK03-0001	11.4	1000	0.0114
BKG	Cobalt	LO58-BK-DUP-01	13.9	1000	0.0139
BKG	Copper	LO58-BK01-0001	75.3	80	0.94125
BKG	Copper	LO58-BK02-0001	79.8	80	0.9975
BKG	Copper	LO58-BK03-0001	119	80	1.4875
BKG	Copper	LO58-BK-DUP-01	72.1	80	0.90125
BKG	Iron	LO58-BK01-0001	28800	200	144
BKG	Iron	LO58-BK02-0001	27700	200	138.5
BKG	Iron	LO58-BK03-0001	33100	200	165.5
BKG	Iron	LO58-BK-DUP-01	29200	200	146
BKG	Manganese	LO58-BK01-0001	1390	450	3.088888889
BKG	Manganese	LO58-BK02-0001	655	450	1.455555556
BKG	Manganese	LO58-BK03-0001	920	450	2.044444444
BKG	Manganese	LO58-BK-DUP-01	1610	450	3.577777778
BKG	Mercury	LO58-BK01-0001	0.014	2.5	0.0056
BKG	Mercury	LO58-BK02-0001	0.18	2.5	0.072
BKG	Mercury	LO58-BK03-0001	0.13	2.5	0.052
BKG	Mercury	LO58-BK-DUP-01	0.19	2.5	0.076
BKG	Nickel	LO58-BK01-0001	26.4	280	0.094285714
BKG	Nickel	LO58-BK02-0001	25.5	280	0.091071429
BKG	Nickel	LO58-BK03-0001	29.3	280	0.104642857
BKG	Nickel	LO58-BK-DUP-01	22	280	0.078571429
BKG	Selenium	LO58-BK01-0001	1.6	4.1	0.390243902
BKG	Selenium	LO58-BK02-0001	2.1	4.1	0.512195122
BKG	Selenium	LO58-BK03-0001	2	4.1	0.487804878
BKG	Selenium	LO58-BK-DUP-01	1.7	4.1	0.414634146
BKG	Vanadium	LO58-BK01-0001	35.4	20	1.77
BKG	Vanadium	LO58-BK02-0001	30.9	20	1.545
BKG	Vanadium	LO58-BK03-0001	32	20	1.6
BKG	Vanadium	LO58-BK-DUP-01	37.6	20	1.88
BKG	Zinc	LO58-BK01-0001	76.5	120	0.6375
BKG	Zinc	LO58-BK02-0001	72	120	0.6
BKG	Zinc	LO58-BK03-0001	76.6	120	0.638333333
BKG	Zinc	LO58-BK-DUP-01	64.4	120	0.536666667

APPENDIX E

FEASIBILITY STUDY APPENDICIES

APPENDIX E.1

DETAILED COST ESTIMATES

APPENDIX E.1a

ESTIMATE OF MASS OF CONTAMINANTS IN SOIL
LO-58 FEASIBILITY STUDY
CARIBOU, ME

AMAC BUILDING SOURCE AREA ESTIMATE

Contaminant	Surface Area (sf)[1]	Ground Elevation	Bottom of Clean Soil Elevation[2]	Bedrock Elevation	Length of Contaminated Interval (ft)	Volume of Contaminated Soil(cf)	Weight of Contaminated Soil (lb)[4]	Mass of Contaminated Soil (kg)	Contaminant Concentration (ug/kg)[3]	Contaminant Mass (ug)	Contaminant Mass (kg)
TCE	8,000	569	565	558.00	7.00	56000	6,160,000.00	2794127	9	25147140.48	0.025

Notes:

1. Surface area estimated from historical soil boring data. SB-34 used to determine contaminant concentration near AMAC building. Surface area determined by drawing a boundary at approximately half the distance between SB-34 and the nearest clean boring locations.
2. Assume soil is contaminated from 4 ft bgs to bedrock. Based on SB-51, which shows no TCE contamination from 0-4 ft bgs.
3. Contaminant concentration obtained from soil sample collected at SB-34 between 12 to 12.5 ft bgs.
4. Soil bulk density of 110 pounds per cubic foot is assumed

LAUNCHER AREA SOURCE AREA ESTIMATE

Contaminant	Surface Area (sf)[1]	Ground Elevation	Bottom of Clean Soil Elevation [2]	Bedrock Elevation	Length of Contaminated Interval (ft)	Volume of Contaminated Soil(cf)	Weight of Contaminated Soil (lb)[4]	Mass of Contaminated Soil (kg)	Contaminant Concentration (ug/kg)[3]	Contaminant Mass (ug)	Contaminant Mass (kg)
TCE	5,500	583	583	571.50	11.50	63250	6,957,500	3155866	11	34714530	0.035
TPH-DRO	5,500	583	583	571.50	11.50	63250	6,957,500	3155866	36000	113611188240	114

Notes:

1. Surface area estimated from historical soil boring data. SB-13R used to determine contaminant concentration near launcher area. Surface area determined by drawing a boundary at approximately half the distance between SB-13R and the nearest clean boring locations.
2. Assume soil is contaminated from ground surface to bedrock.
3. Contaminant concentration obtained from soil sample collected at SB-13R between 9 to 10 ft bgs.
4. Soil bulk density of 110 pounds per cubic foot is assumed

SHED SOURCE AREA ESTIMATE

Contaminant	Surface Area (sf)[1]	Ground Elevation	Bottom of Clean Soil Elevation [2]	Bedrock Elevation	Length of Contaminated Interval (ft)	Volume of Contaminated Soil(cf)	Weight of Contaminated Soil (lb)[3]	Mass of Contaminated Soil (kg)	Contaminant Concentration (ug/kg)	Contaminant Mass (ug)	Contaminant Mass (kg)
TPH-DRO	9,000	565	565	555.00	10.00	90000	9,900,000	4490561	11000	49396168800	49

Notes:

1. Surface area estimated from historical soil boring data. SB-45 used to determine contaminant concentration at this location. Surface area determined by drawing a boundary at approximately half the distance between SB-45 and borings SB-21 and SB-22
2. Assume soil is contaminated from ground surface to bedrock.
3. Soil bulk density of 110 pounds per cubic foot is assumed

APPENDIX E.1b

ESTIMATE OF MASS OF CONTAMINANTS IN GROUNDWATER
LO-58 FEASIBILITY STUDY
CARIBOU, ME

Contaminant	Surface Area (sf)[1]	Depth to Top of Sample Interval (ft bgs)[2]	Depth to Bottom of Sample Interval (ft bgs)[2]	Length of Sample Interval (ft)	Volume of Contaminated Zone (cf)	Bedrock Porosity[3]	Groundwater Volume (cf)	Groundwater Volume (L)	Groundwater Volume (Gal)	Contaminant Concentration (ug/L)[4]	Contaminant Mass (ug)	Contaminant Mass (kg)
TCE	104,362	24.98	58.10	33.12	3456469	0.15	518470	14,681,423	3,878,677	2.55	37437628.84	0.037
Total VOCs	104,362	24.98	58.10	33.12	3456469	0.15	518470	14,681,423	3,878,677	43.83	643496561.03	0.643
Total VOCs, GRO, DRO	104,362	24.98	58.10	33.12	3456469	0.15	518470	14,681,423	3,878,677	293.13	4303575333.82	4.304

Notes:

1. Area obtained from Figure 4-3 of the LO-58 Conceptual Site Model Report, "Estimated Cone of Depression for Well DW-01 Under Test Pumping Conditions"
2. Sample intervals obtained from the table titled "Summary of Drinking Water Well Wire-Line Straddle Packer Sampling Analytical Results" from the LO-58 Conceptual Site Model Report.
3. Bedrock porosity obtained from Table 2.4 of "Groundwater" by R. Allan Freeze and John A. Cherry, 1979 - which stated that limestone may have porosities ranging between 0 to 20.
4. Concentration is an average of the results obtained from the six separate packer sampling intervals, as shown on the table titled "Summary of Drinking Water Well Wire-Line Straddle Packer Sampling Analytical Results" from the LO-58 Conceptual Site Model Report.

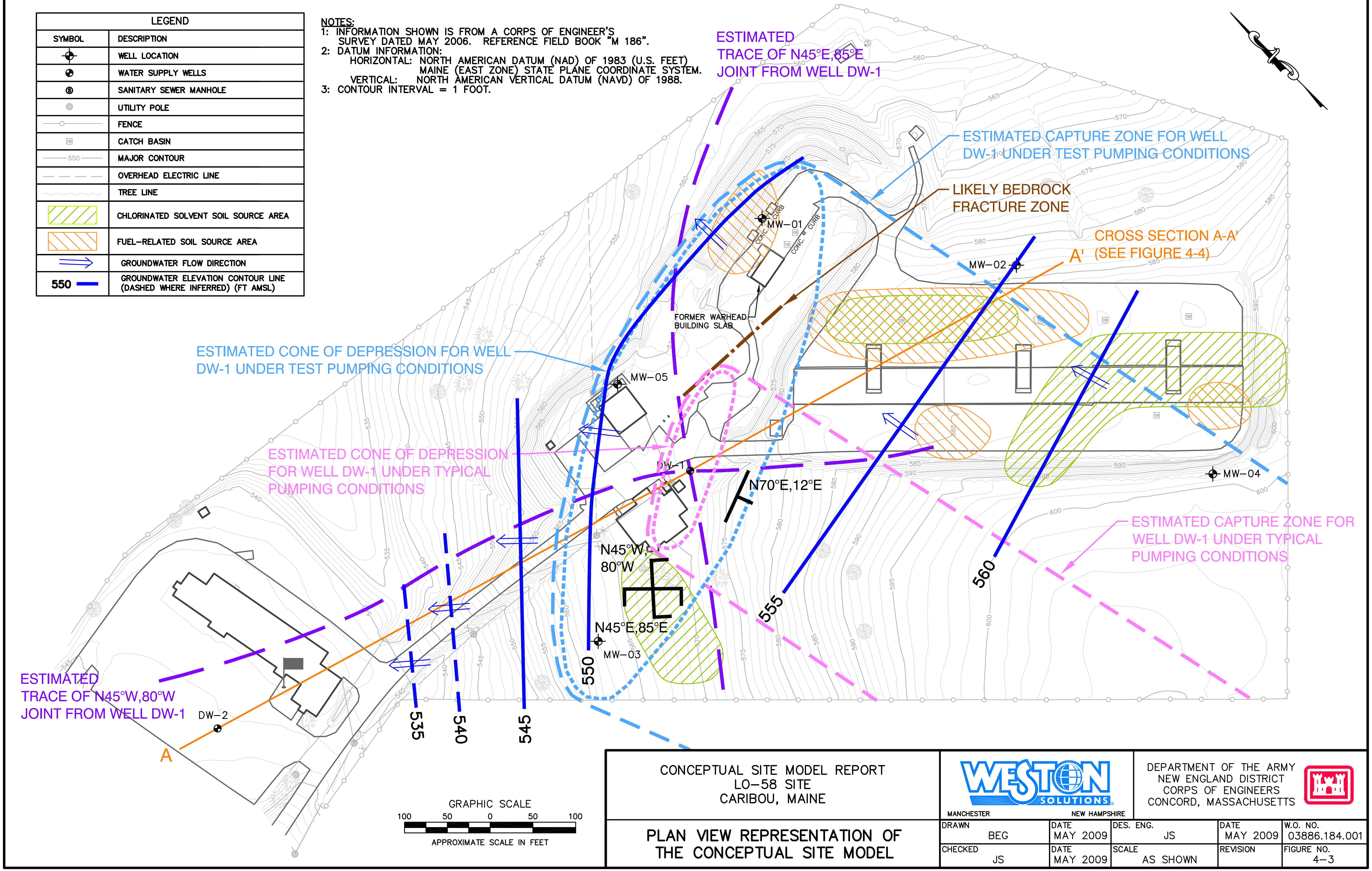
LEGEND	
SYMBOL	DESCRIPTION
⌖	WELL LOCATION
◕	WATER SUPPLY WELLS
Ⓢ	SANITARY SEWER MANHOLE
◍	UTILITY POLE
—o—	FENCE
▣	CATCH BASIN
—550—	MAJOR CONTOUR
— — —	OVERHEAD ELECTRIC LINE
∼∼∼	TREE LINE
▨	CHLORINATED SOLVENT SOIL SOURCE AREA
▨	FUEL–RELATED SOIL SOURCE AREA
⇒	GROUNDWATER FLOW DIRECTION
550 —	GROUNDWATER ELEVATION CONTOUR LINE (DASHED WHERE INFERRED) (FT AMSL)

NOTES:

1: INFORMATION SHOWN IS FROM A CORPS OF ENGINEER'S SURVEY DATED MAY 2006. REFERENCE FIELD BOOK "M 186".

2: DATUM INFORMATION:
HORIZONTAL: NORTH AMERICAN DATUM (NAD) OF 1983 (U.S. FEET) MAINE (EAST ZONE) STATE PLANE COORDINATE SYSTEM.
VERTICAL: NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.

3: CONTOUR INTERVAL = 1 FOOT.



CONCEPTUAL SITE MODEL REPORT
LO–58 SITE
CARIBOU, MAINE

WESTON SOLUTIONS
MANCHESTER NEW HAMPSHIRE

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT
CORPS OF ENGINEERS
CONCORD, MASSACHUSETTS

PLAN VIEW REPRESENTATION OF
THE CONCEPTUAL SITE MODEL

DRAWN BEG	DATE MAY 2009	DES. ENG. JS	DATE MAY 2009	W.O. NO. 03886.184.001
CHECKED JS	DATE MAY 2009	SCALE AS SHOWN	REVISION	FIGURE NO. 4–3

M:\Design\DWG\ACOE\MEFUDS\5FUDS\2009\LO–58 2009\CSM 2009\FIG 4–3.dwg, Layout1, 2/28/2011 2:56:35 PM, GIRARDEB, 1:1

Alternative GW1
Detailed Cost Estimate
Former LO-58 Nike Battery Launch Site
Caribou, Maine

Contents:

Present Value Analysis

Operations and Maintenance Cost Summary

Cost Assumptions

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate	Present Value
0	$0	$0	$0	$0	7.0%	$0
1	$0	$0	$0	$0	7.0%	$0
2	$0	$0	$0	$0	7.0%	$0
3	$0	$0	$0	$0	7.0%	$0
4	$0	$0	$0	$0	7.0%	$0
5	$0	$0	$50,000	$50,000	7.0%	$35,649
6	$0	$0	$0	$0	7.0%	$0
7	$0	$0	$0	$0	7.0%	$0
8	$0	$0	$0	$0	7.0%	$0
9	$0	$0	$0	$0	7.0%	$0
10	$0	$0	$50,000	$50,000	7.0%	$25,417
11	$0	$0	$0	$0	7.0%	$0
12	$0	$0	$0	$0	7.0%	$0
13	$0	$0	$0	$0	7.0%	$0
14	$0	$0	$0	$0	7.0%	$0
15	$0	$0	$50,000	$50,000	7.0%	$18,122
16	$0	$0	$0	$0	7.0%	$0
17	$0	$0	$0	$0	7.0%	$0
18	$0	$0	$0	$0	7.0%	$0
19	$0	$0	$0	$0	7.0%	$0
20	$0	$0	$50,000	$50,000	7.0%	$12,921
21	$0	$0	$0	$0	7.0%	$0
22	$0	$0	$0	$0	7.0%	$0
23	$0	$0	$0	$0	7.0%	$0
24	$0	$0	$0	$0	7.0%	$0
25	$0	$0	$50,000	$50,000	7.0%	$9,212
26	$0	$0	$0	$0	7.0%	$0
27	$0	$0	$0	$0	7.0%	$0
28	$0	$0	$0	$0	7.0%	$0
29	$0	$0	$0	$0	7.0%	$0
30	$0	$0	$50,000	$50,000	7.0%	$6,568
TOTAL	**$0**				**Total PV**	**$107,891**
					Capital PV	**$0**
					O&M PV	**$107,891**

[1] Five-year review lump sum cost of approximately $50,000

Note: Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	SOURCE
FY.1.0 Five-Year Reviews						
FY.1.1	Five-Year Review report preparation	1	LS	$50,000	$50,000	see assumptions
	Subtotal				**$50,000**	
TOTAL OPERATION AND MAINTENANCE COSTS (YEARS 1-30)					**$50,000**	

Operations and Maintenance Cost Assumptions	
FY.1.0 Five-Year Reviews	
FY.1.1 Five-Year Review Preparation	Estimated at $50,000 each report, based upon previous project cost data. Management and technical support costs are included in this cost. No contingencies are applied.

Alternative GW2
Detailed Cost Estimate
Former LO-58 Nike Battery Launch Site
Caribou, Maine

Contents:

Present Value Analysis

Capital Cost Summary

Operations and Maintenance Cost Summary

Cost Assumptions

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate	Present Value
0	$4,380	$34,109	$0	$38,489	7.0%	$38,489
1	$0	$34,109	$0	$34,109	7.0%	$31,877
2	$0	$34,109	$0	$34,109	7.0%	$29,792
3	$0	$34,109	$0	$34,109	7.0%	$27,843
4	$0	$34,109	$0	$34,109	7.0%	$26,022
5	$0	$34,109	$50,000	$84,109	7.0%	$59,968
6	$0	$34,109	$0	$34,109	7.0%	$22,728
7	$0	$34,109	$0	$34,109	7.0%	$21,241
8	$0	$34,109	$0	$34,109	7.0%	$19,852
9	$0	$34,109	$0	$34,109	7.0%	$18,553
10	$0	$34,109	$50,000	$84,109	7.0%	$42,757
11	$0	$34,109	$0	$34,109	7.0%	$16,205
12	$0	$34,109	$0	$34,109	7.0%	$15,145
13	$0	$34,109	$0	$34,109	7.0%	$14,154
14	$0	$34,109	$0	$34,109	7.0%	$13,228
15	$0	$34,109	$50,000	$84,109	7.0%	$30,485
16	$0	$34,109	$0	$34,109	7.0%	$11,554
17	$0	$34,109	$0	$34,109	7.0%	$10,798
18	$0	$34,109	$0	$34,109	7.0%	$10,092
19	$0	$34,109	$0	$34,109	7.0%	$9,431
20	$0	$34,109	$50,000	$84,109	7.0%	$21,735
21	$0	$34,109	$0	$34,109	7.0%	$8,238
22	$0	$34,109	$0	$34,109	7.0%	$7,699
23	$0	$34,109	$0	$34,109	7.0%	$7,195
24	$0	$34,109	$0	$34,109	7.0%	$6,724
25	$0	$34,109	$50,000	$84,109	7.0%	$15,497
26	$0	$34,109	$0	$34,109	7.0%	$5,873
27	$0	$34,109	$0	$34,109	7.0%	$5,489
28	$0	$34,109	$0	$34,109	7.0%	$5,130
29	$0	$34,109	$0	$34,109	7.0%	$4,794
30	$0	$34,109	$50,000	$84,109	7.0%	$11,049
TOTAL	**$4,380**				**Total PV**	**$569,638**
					Capital PV	**$4,380**
					O&M PV	**$565,258**

[1] Five-year review lump sum cost of approximately $50,000

Note: Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	SOURCE
1.0 Institutional Controls						
1.1	Record Survey	1	LS	$0.00	$0	see assumptions
1.2	Attorney's Fees	1	LS	$3,000.00	$3,000	see assumptions
	Subtotal				**$3,000**	
2.0 Project Management						
2.1	Project Management (estimate 10%)	1	LS	$780.00	$780	see assumptions
	Subtotal				**$780**	
3.0 Contingencies						
3.1	10% Scope & 10% Bid (20% total)	1	LS	$600.00	$600	see assumptions
	Subtotal				**$600**	
TOTAL DIRECT COSTS					**$3,000**	
TOTAL CAPITAL COSTS					**$4,380**	

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	SOURCE
OM.1.0 Point of Entry Treatment at DW-01						
OM.1.1	Carbon Filter Replacement	1	LS	$1,500	$1,500	see assumptions
OM.1.2	Electricity	12	Month	$105	$1,260	see assumptions
OM.1.3	DW-01 Sampling - Labor	4	HR	$85	$340	see assumptions
OM.1.4	DW-01 Sampling - Analytical	1	LS	$130	$130	see assumptions
	Subtotal				**$3,230**	
OM.2.0 Groundwater Monitoring Per Event (frequency = annual)						
OM.2.1	Sampling Equipment Rental	1	LS	$1,572	$1,572	see assumptions
OM.2.2	Disposable Equipment	10	EA	$22	$220	see assumptions
OM.2.3	Event Mobilization/Demobilization (2 Samplers)	24	HR	$85	$2,040	see assumptions
OM.2.4	Sampling Labor (2 Samplers)	88	HR	$85	$7,480	see assumptions
OM.2.5	Analytical Costs	18	EA	$410	$7,380	see assumptions
OM.2.6	Sampling Travel and MIE (2 Samplers)	1	LS	$1,321	$1,321	see assumptions
OM.2.7	Data Validation	10	HR	$110	$1,100	see assumptions
OM.2.8	Report Preparation	24	HR	$110	$2,640	see assumptions
	Subtotal				**$23,753**	
OM.3.0 Monitoring and Annual Reporting Engineering and Manangement Support						
OM.3.1	Project Management/Engineering Support (estimate 10%)	1	LS	$2,375	$2,375	see assumptions
	Subtotal				**$2,375**	
OM.4.0 O&M Contingencies						
OM.4.1	10% Scope & 15% Bid (25% total)	1	LS	$4,751	$4,751	see assumptions
	Subtotal				**$4,751**	
FY.1.0 Five-Year Reviews						
FY.1.1	Five-Year Review report preparation	1	LS	$50,000	$50,000	see assumptions
	Subtotal				**$50,000**	
TOTAL OPERATION AND MAINTENANCE COSTS (YEARS 1-30)					**$34,109**	

Capital Cost Assumptions		
1.0 Institutional Controls		
1.1	Record Boundary Survey	Approximate costs for a deed record survey including meets and bounds. Assumes 1 parcel.
1.2	Attorney's Fees	Attorney's fees associated with title research, drafting the restrictive covenants, and attaching a restriction to a deed for a single parcel, includes registry fees.
2.0 Project Management		
2.1	Project Management (estimate 10%)	The capital costs associated with this alternative are less than $100,000. In accordance with the EPA Guide to Developing and Documenting Cost Estimates During the FS, a capital cost percentage of 10% is recommended for project management.
3.0 Capital Contingencies		
3.1	Scope and Bid	A 10% scope contingency and 10% bid contingency was used, in accordance with the EPA Guide to Developing and Documenting Cost Estimates During the FS. These contingencies are considered to be representative of the potential for cost growth associated with a 0-10% complete remedial design. Given the minimal scope associated with this alternative, a scope contingency of 10% and a bid contingency of 10% were carried.

Operations and Maintenance Cost Assumptions		
OM.1.0 Point of Entry Treatment at DW-01		
OM.1.1	Carbon Filter Replacement	Based on vendor quote. Assumes carbon changeout once per year.
OM.1.2	Electricity	Assumes a 2 kw pump operating 8 hours a day. Assumes 11.1 cents per kwh (source:Edison Electric Institute Semi-Annual Survey)
OM.1.3	DW-01 Sampling - Labor	Assumes a local staff engineer will obtain sample.
OM.1.4	DW-01 Sampling - Analytical	Assumes one sample analyzed for VOCs.
OM.2.0 Groundwater Monitoring Per Event (frequency = annual)		
OM.2.1	Sampling Equipment Rental	Assumes a water quality monitoring instrument, bladder pump, water level meter, turbidity meter for one week for two samplers.
OM.2.2	Disposable Equipment	Assumes one bladder replacement kit for each well.
OM.2.3	Event Mobilization/Demobilization (2 Samplers)	Travel time between office and site = 6 hours
OM.2.4	Sampling Labor (2 Samplers)	Labor hours assume 10 hours per day Tuesday through Thursday, 2 hours per day on Monday and Friday.
OM.2.5	Analytical Costs	Assumes samples will be analyzed for VOCs (including 1,4-dioxane), SVOCs, and metals. Assumes two duplicate samples and MS/MSDs at two locations.
OM.2.6	Sampling Travel and MIE (2 Samplers)	Includes four hotel nights, one rental car, fuel, and per diem for two samplers. Assumes GSA per diem rates for the state of Maine. Assumes 75% of full rate on travel days.
OM.2.7	Data Validation	Assumes one hour per sample location.
OM.2.8	Report Preparation	Assumes project engineer will write report.
OM.3.0 Monitoring and Annual Reporting Management Support		
OM.3.1	Project Management Support	In accordance with the EPA Guide to Developing and Documenting Cost Estimates During the FS, the costs associated with project management (10%) are carried as a percentage of the expected annual O&M costs.
OM.4.0 O&M Contingencies		
OM.4.1	Scope and Bid	A 10% scope contingency and 10% bid contingency was used. These contingencies are considered to be representative of the potential for cost growth associated with a 0-10% complete remedial design.
FY.1.0 Five-Year Reviews		
FY.1.1	Five-Year Review Preparation	Estimated at $50,000 each report, based upon previous project cost data. Management and technical support costs are included in this cost. No contingencies are applied.

Alternative GW-3
Detailed Cost Estimate
Former LO-58 Nike Battery Launch Site
Caribou, Maine

Contents:

Present Value Analysis

Capital Cost Summary

Operations and Maintenance Cost Summary

Cost Assumptions

Year	Capital	O&M	5-Year Review [1]	Total	Discount Rate	Present Value
0	$56,125	$0	$0	$56,125	7.0%	$56,125
1	$0	$32,067	$0	$32,067	7.0%	$29,969
2	$0	$32,067	$0	$32,067	7.0%	$28,008
3	$0	$32,067	$0	$32,067	7.0%	$26,176
4	$0	$32,067	$0	$32,067	7.0%	$24,463
5	$0	$32,067	$50,000	$82,067	7.0%	$58,512
6	$0	$32,067	$0	$32,067	7.0%	$21,367
7	$0	$32,067	$0	$32,067	7.0%	$19,969
8	$0	$32,067	$0	$32,067	7.0%	$18,663
9	$0	$32,067	$0	$32,067	7.0%	$17,442
10	$0	$32,067	$50,000	$82,067	7.0%	$41,718
11	$0	$32,067	$0	$32,067	7.0%	$15,235
12	$0	$32,067	$0	$32,067	7.0%	$14,238
13	$0	$32,067	$0	$32,067	7.0%	$13,306
14	$0	$32,067	$0	$32,067	7.0%	$12,436
15	$0	$32,067	$50,000	$82,067	7.0%	$29,745
16	$0	$32,067	$0	$32,067	7.0%	$10,862
17	$0	$32,067	$0	$32,067	7.0%	$10,151
18	$0	$32,067	$0	$32,067	7.0%	$9,487
19	$0	$32,067	$0	$32,067	7.0%	$8,867
20	$0	$32,067	$50,000	$82,067	7.0%	$21,208
21	$0	$32,067	$0	$32,067	7.0%	$7,744
22	$0	$32,067	$0	$32,067	7.0%	$7,238
23	$0	$32,067	$0	$32,067	7.0%	$6,764
24	$0	$32,067	$0	$32,067	7.0%	$6,322
25	$0	$32,067	$50,000	$82,067	7.0%	$15,121
26	$0	$32,067	$0	$32,067	7.0%	$5,522
27	$0	$32,067	$0	$32,067	7.0%	$5,160
28	$0	$32,067	$0	$32,067	7.0%	$4,823
29	$0	$32,067	$0	$32,067	7.0%	$4,507
30	$0	$32,067	$50,000	$82,067	7.0%	$10,781
TOTAL	**$56,125**				**Total PV**	**$561,931**
					Capital PV	**$56,125**
					O&M PV	**$505,806**

[1] Five-year review lump sum cost of approximately $50,000

Note: Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	SOURCE
1.0 Institutional Controls						
1.1	Record Survey	1	LS	$10,000.00	$10,000	see assumptions
1.2	Attorney's Fees	1	LS	$3,500.00	$3,500	see assumptions
	Subtotal				**$13,500**	
2.0 Installation of New Drinking Water Supply Line						
2.1	Excavator and Operator (Trench Excavation and Backfill)	5	Day	$2,000.00	$10,000	see assumptions
2.2	Sand Bedding Layer	50	CY	$8.00	$400	see assumptions
2.3	Laborer	5	Day	$700.00	$3,500	see assumptions
2.4	Plumber	24	Hour	$100.00	$2,400	see assumptions
2.5	1.5" HDPE Tubing	700	LF	$2.00	$1,400	see assumptions
2.6	Preassure Tank, Water Softener system, Water Chlorination System, Contact Tank, Piping and Fittings	1	EA	$4,000.00	$4,000	see assumptions
	Subtotal				**$21,700**	
3.0 Technical Support & Project Management						
3.1	Technical Support and Project Management (estimate 30%)	1	LS	$4,050.00	$4,050	see assumptions
	Subtotal				**$4,050**	
4.0 Contingencies						
4.1	10% Scope & 10% Bid (20% total)	1	LS	$3,375.00	$3,375	see assumptions
	Subtotal				**$3,375**	
TOTAL DIRECT COSTS					**$13,500**	
TOTAL CAPITAL COSTS					**$56,125**	

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring Per Event (frequency = annual)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,572	$1,572	see assumptions
OM.1.2	Disposable Equipment	10	EA	$22	$220	see assumptions
OM.1.3	Event Mobilization/Demobilization (2 Samplers)	24	HR	$85	$2,040	see assumptions
OM.1.4	Sampling Labor (2 Samplers)	88	HR	$85	$7,480	see assumptions
OM.1.5	Analytical Costs	18	EA	$410	$7,380	see assumptions
OM.1.6	Sampling Travel and MIE (2 Samplers)	1	LS	$1,321	$1,321	see assumptions
OM.1.7	Data Validation	10	HR	$110	$1,100	see assumptions
OM.1.8	Report Preparation	24	LS	$110	$2,640	see assumptions
	Subtotal				**$23,753**	
OM.2.0 Monitoring and Annual Reporting Engineering and Manangement Support						
OM.2.1	Project Management/Engineering Support (estimate 10%)	1	LS	$2,375	$2,375	see assumptions
	Subtotal				**$2,375**	
OM.3.0 O&M Contingencies						
OM.3.1	10% Scope & 15% Bid (25% total)	1	LS	$5,938	$5,938	see assumptions
	Subtotal				**$5,938**	
FY.1.0 Five-Year Reviews						
FY.1.1	Five-Year Review report preparation	1	LS	$50,000	$50,000	see assumptions
	Subtotal				**$50,000**	
OPERATIONS AND MAINTENANCE COSTS (YEARS 1-30)					**$32,067**	

Capital Cost Assumptions		
1.0 Institutional Controls		
1.1	Record Boundary Survey	Approximate costs for a deed record survey including meets and bounds. Assumes 1 parcel.
1.2	Attorney's Fees	Attorney's fees associated with title research, drafting the restrictive covenants, and attaching a restriction to a deed for a single parcel, includes registry fees.
2.0 Installation of New Drinking Water Supply Line		
2.1	Excavator and Operator (Trench Excavation and Backfill)	Based on previous project cost data.
2.2	Sand Bedding Layer	Based on vendor pricing.
2.3	Laborer	Based on previous project cost data.
2.4	Plumber	Based on previous project cost data.
2.5	1.5" HDPE Tubing	Pipe friction loss at 5 gpm estiamted to be 1.5 feet, smaller diameters will generate unacceptable friction losses, particularly with uphill pumping. Estimate based on vendor pricing.
2.6	Preassure Tank, Water Softener system, Water Chlorination System, contact tank, piping and fittings	Assumes a 26 gallon diaphragm pressure tank, relief valve, pressure switch, backflow preventor, similar to in-place softener, chlorination system, and contact tank. Lump cost for fittings and piping/nipples. Costs based upon retail vendor pricing.
3.0 Technical Support & Project Management		
3.1	Technical Support & Project Management (estimate 30%)	The capital costs associated with this alternative are less than $100,000. In accordance with the EPA Guide to Developing and Documenting Cost Estimates During the FS, a capital cost percentage of 30% is recommended for project management, remedial design and construction management.
4.0 Capital Contingencies		
4.1	Scope and Bid	A 10% scope contingency and 10% bid contingency was used, in accordance with the EPA Guide to Developing and Documenting Cost Estimates During the FS. These contingencies are considered to be representative of the potential for cost growth associated with a 0-10% complete remedial design.

Operations and Maintenance Cost Assumptions		
OM.1.0 Groundwater Monitoring Per Event (frequency = annual)		
OM.1.1	Sampling Equipment Rental	Assumes a water quality monitoring instrument, bladder pump, water level meter, turbidity meter for one week for two samplers.
OM.1.2	Disposable Equipment	Assumes one bladder replacement kit for each well.
OM.1.3	Event Mobilization/Demobilization (2 Samplers	Travel time between office and site = 6 hours
OM.1.4	Sampling Labor (2 Samplers)	Labor hours assume 10 hours per day Tuesday through Thursday, 2 hours per day on Monday and Friday.
OM.1.5	Analytical Costs	Assumes samples will be analyzed for VOCs (including 1,4-dioxane), SVOCs, and metals. Assumes two duplicate samples and MS/MSDs at two locations.
OM.1.6	Sampling Travel and MIE (2 Samplers)	Includes four hotel nights, one rental car, fuel, and per diem for two samplers. Assumes GSA per diem rates for the state of Maine. Assumes 75% of full rate on travel days.
OM.1.7	Data Validation	Assumes one hour per sample location.
OM.1.8	Report Preparation	Assumes project engineer will write report.
OM.2.0 Monitoring and Annual Reporting Engineering and Management Support		
OM.2.1	Project Management Support	In accordance with the EPA Guide to Developing and Documenting Cost Estimates During the FS, the costs associated with project management (10%) are carried as a percentage of the expected annual O&M costs.
OM.3.0 O&M Contingencies		
OM.3.1	Scope and Bid	A 10% scope contingency and 15% bid contingency was used. These contingencies are considered to be representative of the potential for cost growth associated with a 0-10% complete remedial design.
FY.1.0 Five-Year Reviews		
FY.1.1	Five-Year Review Preparation	Estimated at $50,000 each report, based upon previous project cost data. Management and technical support costs are included in this cost. No contingencies are applied.

Alternative GW4
Detailed Cost Estimate
Former LO-58 Nike Battery Launch Site
Caribou, Maine

Contents:

Present Value Analysis

Capital Cost Summary

Operations and Maintenance Cost Summary

Cost Assumptions

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate	Present Value
0	$891,504	$0	$0	$891,504	7.0%	$891,504
1	$0	$32,067	$0	$32,067	7.0%	$29,969
2	$0	$32,067	$0	$32,067	7.0%	$28,008
3	$0	$32,067	$0	$32,067	7.0%	$26,176
4	$0	$32,067	$0	$32,067	7.0%	$24,463
5	$0	$32,067	$50,000	$82,067	7.0%	$58,512
6	$0	$32,067	$0	$32,067	7.0%	$21,367
7	$0	$32,067	$0	$32,067	7.0%	$19,969
8	$0	$32,067	$0	$32,067	7.0%	$18,663
9	$0	$32,067	$0	$32,067	7.0%	$17,442
10	$0	$32,067	$50,000	$82,067	7.0%	$41,718
11	$0	$32,067	$0	$32,067	7.0%	$15,235
12	$0	$32,067	$0	$32,067	7.0%	$14,238
13	$0	$32,067	$0	$32,067	7.0%	$13,306
14	$0	$32,067	$0	$32,067	7.0%	$12,436
15	$0	$32,067	$50,000	$82,067	7.0%	$29,745
16	$0	$32,067	$0	$32,067	7.0%	$10,862
17	$0	$32,067	$0	$32,067	7.0%	$10,151
18	$0	$32,067	$0	$32,067	7.0%	$9,487
19	$0	$32,067	$0	$32,067	7.0%	$8,867
20	$0	$32,067	$50,000	$82,067	7.0%	$21,208
21	$0	$32,067	$0	$32,067	7.0%	$7,744
22	$0	$32,067	$0	$32,067	7.0%	$7,238
23	$0	$32,067	$0	$32,067	7.0%	$6,764
24	$0	$32,067	$0	$32,067	7.0%	$6,322
25	$0	$32,067	$50,000	$82,067	7.0%	$15,121
26	$0	$32,067	$0	$32,067	7.0%	$5,522
27	$0	$32,067	$0	$32,067	7.0%	$5,160
28	$0	$32,067	$0	$32,067	7.0%	$4,823
29	$0	$32,067	$0	$32,067	7.0%	$4,507
30	$0	$32,067	$50,000	$82,067	7.0%	$10,781
TOTAL	**$891,504**				**Total PV**	**$1,397,310**
					Capital PV	**$891,504**
					O&M PV	**$505,806**

[1] Five-year review lump sum cost of approximately $50,000

Note: Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	SOURCE
1.0 Institutional Controls						
1.1	Record Survey	1	LS	$10,000.00	$10,000	see assumptions
1.2	Attorney's Fees	1	LS	$3,500.00	$3,500	see assumptions
	Subtotal				**$13,500**	
2.0 Installation of New Drinking Water Supply Line						
2.1	Excavator and Operator (Trench Excavation and Backfill)	5	Day	$2,000.00	$10,000	see assumptions
2.2	Sand Bedding Layer	50	CY	$8.00	$400	see assumptions
2.3	Laborer	5	Day	$700.00	$3,500	see assumptions
2.4	Plumber	24	Hour	$100.00	$2,400	see assumptions
2.5	1.5" HDPE Tubing	700	LF	$2.00	$1,400	see assumptions
2.6	Preassure Tank, Water Softener system, Water Chlorination System, Contact Tank, Piping and Fittings	1	EA	$4,000.00	$4,000	see assumptions
	Subtotal				**$21,700**	
3.0 In-Situ Treatment Injection Well Installation						
3.1	Drilling Subcontractor Mobilization	1	LS	$500.00	$500	see assumptions
3.2	Truck Mounted Drill Rig	3	Day	$450.00	$1,350	see assumptions
3.3	Steel Casing	300	LF	$84.00	$25,200	see assumptions
3.4	Engineer Oversight	30	HR	$110.00	$3,300	see assumptions
3.5	Engineer Mobilization/Demobilization	12	HR	$110.00	$1,320	see assumptions
3.6	Engineer Oversight Travel and MIE	1	LS	$748.00	$748	see assumptions
	Subtotal				**$32,418**	
4.0 In-Situ Groundwater Treatment						
4.1	Bench Scale Testing	1	LS	$45,000.00	$45,000	see assumptions
4.2	Pilot Test	1	LS	$125,000.00	$125,000	see assumptions
4.4	Subcontractor Mobilization	1	LS	$5,000.00	$5,000	see assumptions
4.5	Electrical Hook-Up	1	DAY	$750.00	$750	see assumptions
4.6	Injection Event Labor	1	LS	$145,000.00	$145,000	see assumptions
4.7	Injection Event Travel and Equipment Expsenes	1	LS	$25,500.00	$25,500	see assumptions
4.8	Injection Skids/Equipment	1	LS	$25,000.00	$25,000	see assumptions
4.9	Injection Equipment Assembly	1	LS	$8,420.00	$8,420	see assumptions
4.10	Poly Batch Tanks	2	LS	$1,500.00	$3,000	see assumptions
4.11	Frac Tank	2	Month	$1,500.00	$3,000	see assumptions
4.12	Spill Guard/Secondary Containment	2	LS	$1,500.00	$3,000	see assumptions
4.13	Packer Assembly (Including Freight)	12	EA	$2,176.00	$26,112	see assumptions
4.14	Teflon Tubing	750	LF	$0.40	$300	see assumptions
4.15	Small Air Compressor	4	Week	$250.00	$1,000	see assumptions
4.16	Large Air Compressor	4	Week	$500.00	$2,000	see assumptions
4.17	Fork Lift	4	Week	$650.00	$2,600	see assumptions
4.18	Generator	4	Week	$500.00	$2,000	see assumptions
4.19	Trailer	2	Month	$400.00	$800	see assumptions
4.20	Potable Restroom	2	Month	$400.00	$800	see assumptions
4.21	FMC Klozur Persulfate	30,000	LB	$1.60	$48,000	see assumptions
4.22	NaOH	5,500	Gal	$1.00	$5,500	see assumptions
4.23	Potable Water	72,000	Gal	$0.00	$0	see assumptions
4.24	Subcontractor Engineering/Design/Administration	1	LS	$45,000.00	$45,000	see assumptions
	Subtotal				**$522,782**	
5.0 Technical Support & Project Management						
5.1	Project Management/Engineering Support (estimate 26%)	1	LS	$153,504.00	$153,504	see assumptions
	Subtotal				**$153,504**	
6.0 Contingencies						
6.1	10% Scope & 15% Bid (25% total)	1	LS	$147,600.00	$147,600	see assumptions
	Subtotal				**$147,600**	
TOTAL DIRECT COSTS					**$590,400**	
TOTAL CAPITAL COSTS					**$891,504**	

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring Per Event (frequency = annual)						
OM.2.1	Sampling Equipment Rental	1	LS	$1,572	$1,572	see assumptions
OM.2.2	Disposable Equipment	10	EA	$22	$220	see assumptions
OM.2.3	Event Mobilization/Demobilization (2 Samplers)	24	HR	$85	$2,040	see assumptions
OM.2.4	Sampling Labor (2 Samplers)	88	HR	$85	$7,480	see assumptions
OM.2.5	Analytical Costs	18	EA	$410	$7,380	see assumptions
OM.2.6	Sampling Travel and MIE (2 Samplers)	1	LS	$1,321	$1,321	see assumptions
OM.2.7	Data Validation	10	HR	$110	$1,100	see assumptions
OM.2.8	Report Preparation	24	LS	$110	$2,640	see assumptions
	Subtotal				**$23,753**	
OM.2.0 Monitoring and Annual Reporting Engineering and Manangement Support						
OM.2.1	Project Management/Engineering Support (estimate 10%)	1	LS	$2,375	$2,375	see assumptions
	Subtotal				**$2,375**	
OM.3.0 O&M Contingencies						
OM.3.1	10% Scope & 15% Bid (25% total)	1	LS	$5,938	$5,938	see assumptions
	Subtotal				**$5,938**	
FY.1.0 Five-Year Reviews						
FY.1.1	Five-Year Review report preparation	1	LS	$50,000	$50,000	see assumptions
	Subtotal				**$50,000**	
OPERATIONS AND MAINTENANCE COSTS (YEARS 1-30)					**$32,067**	

Capital Cost Assumptions		
1.0 Institutional Controls		
1.1	Record Boundary Survey	Approximate costs for a deed record survey including meets and bounds. Assumes 1 parcel.
1.2	Attorney's Fees	Attorney's fees associated with title research, drafting the restrictive covenants, and attaching a restriction to a deed for a single parcel, includes registry fees.
2.0 Installation of New Drinking Water Supply Line		
2.1	Excavator and Operator (Trench Excavation and Backfill)	Based on previous project cost data.
2.2	Sand Bedding Layer	Based on vendor pricing.
2.3	Laborer	Based on previous project cost data.
2.4	Plumber	Based on previous project cost data.
2.5	1.5" HDPE Tubing	Pipe friction loss at 5 gpm estiamted to be 1.5 feet, smaller diameters will generate unacceptable friction losses, particularly with uphill pumping. Estimate based on vendor
2.6	Preassure Tank, Water Softener system, Water Chlorination System, contact tank, piping and fittings	Assumes a 26 gallon diaphragm pressure tank, relief valve, pressure switch, backflow preventor, similar to in-place softener, chlorination system, and contact tank. Lump cost for fittings and piping/nipples. Costs based upon retail vendor pricing.
3.0 In-Situ Treatment Injection Well Installation		
3.1	Drilling Subcontractor Mobilization	Based on previous project cost data.
3.2	Truck Mounted Drill Rig	Based on vendor standard pricing. Assumes 5 injection wells can be installed over a three day period.
3.3	Steel Casing	Based on vendor quote. Assumes five 60-foot injection wells.
3.4	Engineer Oversight	Assumes project level engineer to oversee drilling operations.
3.5	Engineer Mobilization/Demobilization	Travel time between office and site = 6 hours
3.6	Engineer Oversight Travel and MIE	Includes four hotel nights, one rental car, fuel, and per diem for one sampler. Assumes GSA per diem rates for the state of Maine. Assumes 75% of full rate on travel days.
4.0 In-Situ Groundwater Treatment		
4.1	Bench Scale Testing	Based on vendor pricing.
4.2	Pilot Test	Based on vendor pricing.
4.3	Subcontractor Mobilization	Includes travel to and from the site as well as equipment setup and breakdown.
4.4	Subcontractor Travel/MIE/Expsenses	Assumes two injection events.
4.5	Electrical Hook-Up	Includes service installation and hookup by an electrical subcontractor.
4.6	Injection Event Labor	Assumes two injection events.
4.7	Injection Event Travel and Equipment Expenes	Assumes two injection events. Includes per diem, as well as monitoring equipment and PPE.
4.8	Injection Skids/Equipment	Includes pumps, manifold, instrumentation, and batch plant rental.
4.9	Injection Equipment Assembly	Assumes 5 injection wells.
4.10	Poly Batch Tanks	Assumes 3,000 gallon polypropylene tanks.
4.11	Frac Tank	Assumes 20,000 gallon frac tank rental and delivery.
4.12	Spill Guard/Secondary Containment	Assumes 12' x 6' spill guard rental and delivery.
4.13	Packer Assembly (Including Freight)	Assumes two packers per well, plus one spare. Assumes $1,500 for freight.
4.14	Teflon Tubing	Assumes 125 feet per well, plus 125 extra feet.
4.15	Small Air Compressor	Air compressor for pneumatic packers.
4.16	Large Air Compressor	Air compressor for pneumatic diaphragm pump.
4.17	Fork Lift	Fork lift used for handling persulfate supersacks and NaOH drums.
4.18	Generator	Based on vendor pricing.
4.19	Trailer	Includes delivery and pickup.
4.20	Potable Restroom	Restroom for site workers.
4.21	FMC Klozur Persulfate	Assumes a packer-type injection process. Assumes a treatment area of approximately 200 feet wide by 600 feet long. The estimated quantity of injection chemicals is highly dependent on the nature of the bedrock fracture network.
4.22	NaOH	Assumes a packer-type injection process. Assumes a treatment area of approximately 200 feet wide by 600 feet long. The estimated quantity of injection chemicals is highly dependent on the nature of the bedrock fracture network.
4.23	Potable Water	Assumes potable water will be available on-site.
4.24	Subcontractor Engineering/Design/Administration	Includes project coordination, HASP production, procurement, reporting, and full scale design.
5.0 Technical Support & Project Management		
5.1	Project Management/Remedial Design/ Construction Management (estimate 26%)	The capital costs associated with this alternative are between $500,000 and $2,000,000, and according to the EPA Guide to Developing and Documenting Cost Estimates During the FS, a capital cost percentage of 26% is recommended for project management, remedial design and construction management.

6.0 Capital Contingencies		
6.1	Scope and Bid	A 10% scope contingency and 15% bid contingency was used, in accordance with the EPA Guide to Developing and Documenting Cost Estimates During the FS. These contingencies are considered to be representative of the potential for cost growth associated with a 0-10% complete remedial design. Given that the presented scope activities could vary widely based on bench scale and pilot testing, a scope contingency of 10% and a bid contingency of 15% was carried.

Operations and Maintenance Cost Assumptions		
OM.1.0 Groundwater Monitoring Per Event (frequency = annual)		
OM.1.1	Sampling Equipment Rental	Assumes a water quality monitoring instrument, bladder pump, water level meter, turbidity meter for one week for two samplers.
OM.1.2	Disposable Equipment	Assumes one bladder replacement kit for each well.
OM.1.3	Event Mobilization/Demobilization (2 Samplers)	Travel time between office and site = 6 hours
OM.1.4	Sampling Labor (2 Samplers)	Labor hours assume 10 hours per day Tuesday through Thursday, 2 hours per day on Monday and Friday.
OM.1.5	Analytical Costs	Assumes samples will be analyzed for VOCs (including 1,4-dioxane), SVOCs, and metals. Assumes two duplicate samples and MS/MSDs at two locations.
OM.1.6	Sampling Travel and MIE (2 Samplers)	Includes four hotel nights, one rental car, fuel, and per diem for two samplers. Assumes GSA per diem rates for the state of Maine. Assumes 75% of full rate on travel days.
OM.1.7	Data Validation	Assumes one hour per sample location.
OM.1.8	Report Preparation	Assumes project engineer will write report.
OM.2.0 Monitoring and Annual Reporting Engineering and Management Support		
OM.2.1	Project Management Support	In accordance with the EPA Guide to Developing and Documenting Cost Estimates During the FS, the costs associated with project management (10%) are carried as a percentage of the expected annual O&M costs.
OM.3.0 O&M Contingencies		
OM.3.1	Scope and Bid	A 10% scope contingency and 15% bid contingency was used. These contingencies are considered to be representative of the potential for cost growth associated with a 0-10% complete remedial design.
FY.1.0 Five-Year Reviews		
FY.1.1	Five-Year Review Preparation	Estimated at $50,000 each report, based upon previous project cost data. Management and technical support costs are included in this cost. No contingencies are applied.

Alternative GW5
Detailed Cost Estimate
Former LO-58 Nike Battery Launch Site
Caribou, Maine

Contents:

Present Value Analysis

Capital Cost Summary

Operations and Maintenance Cost Summary

Cost Assumptions

Year	Capital	O&M	5-Year Review[1]	Total	Discount Rate	Present Value
0	$284,223	$0	$0	$284,223	7.0%	$284,223
1	$0	$37,626	$0	$37,626	7.0%	$35,165
2	$0	$37,626	$0	$37,626	7.0%	$32,864
3	$0	$37,626	$0	$37,626	7.0%	$30,714
4	$0	$37,626	$0	$37,626	7.0%	$28,705
5	$0	$37,626	$50,000	$87,626	7.0%	$62,476
6	$0	$37,626	$0	$37,626	7.0%	$25,072
7	$0	$37,626	$0	$37,626	7.0%	$23,432
8	$0	$37,626	$0	$37,626	7.0%	$21,899
9	$0	$37,626	$0	$37,626	7.0%	$20,466
10	$0	$37,626	$50,000	$87,626	7.0%	$44,545
11	$0	$37,626	$0	$37,626	7.0%	$17,876
12	$0	$37,626	$0	$37,626	7.0%	$16,706
13	$0	$37,626	$0	$37,626	7.0%	$15,613
14	$0	$37,626	$0	$37,626	7.0%	$14,592
15	$0	$37,626	$50,000	$87,626	7.0%	$31,760
16	$0	$37,626	$0	$37,626	7.0%	$12,745
17	$0	$37,626	$0	$37,626	7.0%	$11,911
18	$0	$37,626	$0	$37,626	7.0%	$11,132
19	$0	$37,626	$0	$37,626	7.0%	$10,404
20	$0	$37,626	$50,000	$87,626	7.0%	$22,644
21	$0	$37,626	$0	$37,626	7.0%	$9,087
22	$0	$37,626	$0	$37,626	7.0%	$8,493
23	$0	$37,626	$0	$37,626	7.0%	$7,937
24	$0	$37,626	$0	$37,626	7.0%	$7,418
25	$0	$37,626	$50,000	$87,626	7.0%	$16,145
26	$0	$37,626	$0	$37,626	7.0%	$6,479
27	$0	$37,626	$0	$37,626	7.0%	$6,055
28	$0	$37,626	$0	$37,626	7.0%	$5,659
29	$0	$37,626	$0	$37,626	7.0%	$5,289
30	$0	$37,626	$50,000	$87,626	7.0%	$11,511
TOTAL	**$284,223**				**Total PV**	**$859,017**
					Capital PV	**$284,223**
					O&M PV	**$574,794**

[1] Five-year review lump sum cost of approximately $50,000

Note: Discount rate of 7% per EPA 540-R-00-002, OSWER 9355.0-75, July 2000, p. 4-5.

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	SOURCE
1.0 Institutional Controls						
1.1	Record Survey	1	LS	$10,000.00	$10,000	see assumptions
1.2	Attorney's Fees	1	LS	$3,500.00	$3,500	see assumptions
	Subtotal				**$13,500**	
3.0 Pre-Design Investigation						
3.1	Subcontractor Mobilization/Demobilization	1	LS	$500.00	$500	see assumptions
3.2	Excavator and Operator	2	Day	$2,000.00	$4,000	see assumptions
3.3	Engineer Mobilization/Demobilization	12	HR	$85.00	$1,020	see assumptions
3.4	Engineer Oversight	20	HR	$85.00	$1,700	see assumptions
3.5	Engineer Oversight Travel and MIE	1	LS	$748.00	$748	see assumptions
	Subtotal				**$7,968**	
4.0 Site Preparation and Treatment Building Construction						
4.1	Erosion/Sedimentation Control	100	FT	$1.00	$100	see assumptions
4.2	Excavator and Operator	2	Day	$2,000.00	$4,000	see assumptions
4.3	Concrete Slab	1	LS	$1,500.00	$1,500	see assumptions
4.4	Pre-Engineered Wooden 10' x 10' Building, Insulated	1	EA	$3,000.00	$3,000	see assumptions
4.5	Laborer (2)	4	Day	$400.00	$1,600	see assumptions
4.6	Electrician	16	HR	$100.00	$1,600	see assumptions
4.7	Heating Unit	1	EA	$900.00	$900	see assumptions
4.8	Carpenter	2	Day	$400.00	$800	see assumptions
4.9	Painter	1	Day	$300.00	$300	see assumptions
4.10	Plumber/Pipefitter	2	Day	$300.00	$600	see assumptions
4.11	Cement Finisher	1	Day	$200.00	$200	see assumptions
	Subtotal				**$14,600**	
5.0 Treatment System Installation, Well Upgrades, and Startup						
5.1	Activated Carbon Treatment Unit	2	EA	$450.00	$900	see assumptions
5.2	Engineer Oversight	40	HR	$100.00	$4,000	see assumptions
5.3	Extraction Well Pump	1	EA	$1,600.00	$1,600	see assumptions
5.4	75' Cable Kit	1	EA	$325.00	$325	see assumptions
5.5	Infrared Remote	1	EA	$375.00	$375	see assumptions
5.6	Control Box	1	EA	$500.00	$500	see assumptions
5.7	Transducer	1	EA	$800.00	$800	see assumptions
5.8	HDPE Tubing (100' Roll)	1	EA	$100.00	$100	see assumptions
5.9	Stainless-Steel Bag Filter Assembly	1	EA	$3,000.00	$3,000	see assumptions
5.10	160-gallon HDPE Equalization Tank	1	EA	$2,000.00	$2,000	see assumptions
5.11	Transfer pump 0.5-hp.	1	EA	$800.00	$800	see assumptions
5.12	Flow Meter/Totalizer	1	EA	$400.00	$400	see assumptions
	Subtotal				**$14,800**	
6.0 Infiltration Gallery Construction						
6.1	Subcontractor Mobilization/Demobilization	1	LS	$500.00	$500	see assumptions
6.2	Excavator and Operator	20	Day	$2,000.00	$40,000	see assumptions
6.3	Laborer (2)	20	Day	$800.00	$16,000	see assumptions
6.4	4" Perforated PVC Pipe	5,250	FT	$2.00	$10,500	see assumptions
6.5	Sand	1,000	CY	$8.00	$8,000	see assumptions
6.6	Engineer Mobilization/Demobilization	12	HR	$85.00	$1,020	see assumptions
6.7	Engineer Oversight	200	HR	$85.00	$17,000	see assumptions
6.8	Engineer Oversight Travel and MIE	1	LS	$3,500.00	$3,500	see assumptions
6.9	Skidsteer and Operator	20	Day	$1,500.00	$30,000	see assumptions
6.10	Site Restoration	1	LS	$2,500.00	$2,500	see assumptions
	Subtotal				**$129,020**	
7.0 Technical Support & Project Management						
7.1	Project Management/Engineering Support (estimate 33%)	1	LS	$59,363.04	$59,363	see assumptions
	Subtotal				**$59,363**	
8.0 Contingencies						
8.1	10% Scope & 15% Bid (25% total)	1	LS	$44,972.00	$44,972	see assumptions
	Subtotal				**$44,972**	
TOTAL DIRECT COSTS					**$179,888**	
TOTAL CAPITAL COSTS					**$284,223**	

DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	SOURCE
OM.1.0 Groundwater Monitoring Per Event (frequency = annual)						
OM.1.1	Sampling Equipment Rental	1	LS	$1,572	$1,572	see assumptions
OM.1.2	Disposable Equipment	10	EA	$22	$220	see assumptions
OM.1.3	Event Mobilization/Demobilization (2 Samplers)	24	HR	$85	$2,040	see assumptions
OM.1.4	Sampling Labor (2 Samplers)	88	HR	$85	$7,480	see assumptions
OM.1.5	Analytical Costs	18	EA	$410	$7,380	see assumptions
OM.1.6	Sampling Travel and MIE (2 Samplers)	1	LS	$1,321	$1,321	see assumptions
OM.1.7	Data Validation	10	HR	$85	$850	see assumptions
OM.1.8	Report Preparation	24	LS	$110	$2,640	see assumptions
	Subtotal				**$23,503**	
OM.2.0 Groundwater Treatment Operation and Maintenance						
OM.2.1	Activated Carbon Treatment Unit	1	EA	$450	$450	see assumptions
OM.2.2	Inpsect Treatment System	48	HR	$85	$4,080	see assumptions
OM.2.3	Electricity	1	Year	$1,007	$1,007	see assumptions
OM 2.4	Bag Filters	24	EA	$15	$360	see assumptions
	Subtotal				**$5,897**	
OM.3.0 Monitoring and Annual Reporting Engineering and Manangement Support						
OM.3.1	Project Management/Engineering Support (estimate 10%)	1	LS	$2,350	$2,350	see assumptions
	Subtotal				**$2,350**	
OM.4.0 O&M Contingencies						
OM.4.1	10% Scope & 15% Bid (25% total)	1	LS	$5,876	$5,876	see assumptions
	Subtotal				**$5,876**	
FY.1.0 Five-Year Reviews						
FY.1.1	Five-Year Review report preparation	1	LS	$50,000	$50,000	see assumptions
	Subtotal				**$50,000**	
OPERATIONS AND MAINTENANCE COSTS (YEARS 1-30)					**$37,626**	

Capital Cost Assumptions		
1.0 Institutional Controls		
1.1	Record Boundary Survey	Approximate costs for a deed record survey including meets and bounds. Assumes 1 parcel.
1.2	Attorney's Fees	Attorney's fees associated with title research, drafting the restrictive covenants, and attaching a restriction to a deed for a single parcel, includes registry fees.
3.0 Pre-Design Investigation		
3.1	Subcontractor Mobilization/Demobilization	Based on previous project cost data.
3.2	Excavator and Operator	Based on previous project cost data.
3.3	Engineer Mobilization/Demobilization	Travel time between office and site = 6 hours
3.4	Engineer Oversight	Assumes staff engineer.
3.5	Engineer Oversight Travel and MIE	Includes four hotel nights, one rental car, fuel, and per diem. Assumes GSA per diem rates for the state of Maine. Assumes 75% of full rate on travel days.
4.0 Site Preparation and Treatment Building Construction		
4.1	Erosion/Sedimentation Control	Based on previous project cost data.
4.2	Excavator and Operator	Based on previous project cost data.
4.3	Concrete Slab	Based on RS Means. Assumes 12' x 12' x 12" thick, 3000 psi concrete slab.
4.4	Pre-Engineered Wooden 10' x 10' Building, Insulated	Based on vendor pricing.
4.5	Laborer	Based on previous project cost data. 2 Laborers
4.6	Electrician	Based on previous project cost data.
4.7	Heating Unit	Based on McMaster Carr pricing. Assumes 1800 watt hazardous location convection heater.
4.8	Carpenter	Davis Bacon Wage Determination
4.9	Painter	Davis Bacon Wage Determination
4.10	Plumber/Pipefitter	Davis Bacon Wage Determination
4.11	Cement Finisher	Davis Bacon Wage Determination
5.0 Treatment System Installation, Well Upgrades, and Startup		
5.1	Activated Carbon Treatment Unit	Based on a quote from Carbon Systems, Inc. Assumes liquid phase activated carbon vessel (2) filled with 200 lbs of virgin carbon material.
5.2	Engineer Oversight	5 days at 8 hours per day
5.3	Extraction Well Pump	Based on a quote from Geotech Environmental Equipment, Inc. Assumes Grundfos Redi-Flo3 10SQE05-100NE Pump.
5.4	75' Cable Kit	Based on a quote from Geotech Environmental Equipment, Inc.
5.5	Infrared Remote	Based on a quote from Geotech Environmental Equipment, Inc.
5.6	Control Box	Based on a quote from Geotech Environmental Equipment, Inc.
5.7	Transducer	Based on a quote from Geotech Environmental Equipment, Inc.
5.8	HDPE Tubing (100' Roll)	Based on a quote from Geotech Environmental Equipment, Inc.
5.9	Stainless-Steel Bag Filter Assembly	Based on vendor pricing.
5.10	100-gallon HDPE Equalization Tank	Based on vendor pricing.
5.11	Transfer pump 0.5-hp.	Based on vendor pricing.
5.12	Flow Meter/Totalizer	Based on vendor pricing.
6.0 Infiltration Gallery Construction		
6.1	Subcontractor Mobilization/Demobilization	Based on previous project cost data.
6.2	Excavator and Operator	Based on previous project cost data.
6.3	Laborer (2)	Based on previous project cost data.
6.4	4" Perforated PVC Pipe	Basd on RS Means.
6.5	Sand	Based on vendor pricing.
6.6	Engineer Mobilization/Demobilization	Travel time between office and site = 6 hours
6.7	Engineer Oversight	Assumes staff engineer for 20 days at 10 hours per day.
6.8	Engineer Oversight Travel and MIE	Includes four hotel nights, one rental car, fuel, and per diem. Assumes GSA per diem rates for the state of Maine. Assumes 75% of full rate on travel days.
6.9	Skidsteer and Operator	Grade excavation spoils on-site
6.10	Site Restoration	Topsoil and seed impacted areas
7.0 Technical Support & Project Management		
7.1	Project Management/Engineering Support (estimate 33%)	The capital costs associated with ISCO are between $100,000 and $500,000. In Accordance with the EPA Guide to Developing and Documenting Cost Estimates During the FS, a technical support and project management capital cost percentage of 33% is recommended for project management, remedial design and construction management.
8.0 Capital Contingencies		
8.1	Scope and Bid	A 10% scope contingency and 15% bid contingency was used, in accordance with the EPA Guide to Developing and Documenting Cost Estimates During the FS. These contingencies are considered to be representative of the potential for cost growth associated with a 0-10% complete remedial design.

Operations and Maintenance Cost Assumptions		
OM.1.0 Groundwater Monitoring Per Event (frequency = annual)		
OM.1.1	Sampling Equipment Rental	Assumes a water quality monitoring instrument, bladder pump, water level meter, turbidity meter for one week for two samplers.
OM.1.2	Disposable Equipment	Assumes one bladder replacement kit for each well.
OM.1.3	Event Mobilization/Demobilization (2 Samplers)	Travel time between office and site = 6 hours
OM.1.4	Sampling Labor (2 Samplers)	Labor hours assume 10 hours per day Tuesday through Thursday, 2 hours per day on Monday and Friday.
OM.1.5	Analytical Costs	Assumes samples will be analyzed for VOCs (including 1,4-dioxane), SVOCs, and metals. Assumes two duplicate samples and MS/MSDs at two locations.
OM.1.6	Sampling Travel and MIE (2 Samplers)	Includes four hotel nights, one rental car, fuel, and per diem for two samplers. Assumes GSA per diem rates for the state of Maine. Assumes 75% of full rate on travel days.
OM.1.7	Data Validation	Assumes one hour per sample location.
OM.1.8	Report Preparation	Assumes project engineer will write report.
OM.2.0 Groundwater Treatment Operation and Maintenance		
OM.2.1	Activated Carbon Treatment Unit	Assumes carbon treatment unit will be replaced once per year.
OM.2.2	Inpsect Treatment System	Assumes staff engineer, 2 hours twice per month.
OM.2.3	Electricity	Electricity costs for running building heating unit.
OM.2.4	Bag Filters	Assumes filter bags changed twice per month.
OM.3.0 Monitoring and Annual Reporting Engineering and Management Support		
OM.3.1	Project Management/Engineering Support	In accordance with the EPA Guide to Developing and Documenting Cost Estimates During the FS, the costs associated with project management (10%) are carried as a percentage of the expected annual O&M costs.
OM.4.0 O&M Contingencies		
OM.4.1	Scope and Bid	A 10% scope contingency and 15% bid contingency was used. These contingencies are considered to be representative of the potential for cost growth associated with a 0-10% complete remedial design.
FY.1.0 Five-Year Reviews		
FY.1.1	Five-Year Review Preparation	Estimated at $50,000 each report, based upon previous project cost data. Management and technical support costs are included in this cost. No contingencies are applied.

APPENDIX E.2

ESTIMATION OF TIME TO ACHIEVE PRGS

Appendix E.2
Estimate of Time to Achieve RAOs

Approach

Due to the limited availability of information regarding the time of the release, the location of the release and the size of the source area, a simplified approach was taken to estimate of the time to achieve remedial action objectives (RAOs). A source dissolution model (Falta, et al, 2007) was used to estimate the time to achieve RAOs. The following equations were used to predict the TCE mass and groundwater concentration in the source area.

$$M_t = M_0 e^{-\frac{QC_0 t}{M_0}}$$

$$C_t = C_0 e^{-\frac{QC_0 t}{M_0}}$$

Where: M_t = mass of contaminant at time t
M_0 = initial mass of contaminant
C_t = Concentration of contaminant in source area groundwater at time t
C_0 = Initial concentration of contaminant in source area groundwater
Q = volumetric flow of groundwater through the source area
t = time

The model evaluated up to three groundwater flow regimes:

1. Regional groundwater flow through the contaminant source area prior to the installation of DW1 in 1996;
2. The combined flow of groundwater through the source once DW-1 began pumping; and
3. The changes in DW-1 pumping rates resulting from each of the remedial alternatives
    a. For GW-1 and GW-3 it was assumed that DW-1 was shut down
    b. For GW-2 it was assumed that DW-1 continued pumping at the same rate
    c. For GW-5 it was assumed that DW-1 would be pumped at a rate of 5 gallons per minute.

The model was applied sequentially for each of the above flow regimes with the final mass and concentration of each step used as initial conditions for the subsequent modeling period. The time to achieve RAOs was taken to be the time to achieve the MCL for TCE.

The quantity of groundwater flow through the source area induced by pumping DW-1 was estimated using a dilution factor. The dilution factor was estimated by taking the following ratio:

$$DF = \frac{C_{DW-1}}{C_{source}}$$

Where: C_{DW-1} = the concentration of TCE measured in DW-1 on October 5, 2012 (Weston, 2011)
C_{source} = the predicted concentration in the source area in 2011.

The dilution factor was multiplied by the well flow rate to estimate the amount of water in the DW-1 discharge that originates in the source area.

Input Parameters

To the extent possible, input values were taken from site investigations. The following sources were utilized for model input:

- Water use at the AMAC building is 150 gallons per day (gpd) – Weston, 2011
- Regional groundwater flow – geometric mean of values presented in Colog (2009) table DW-1:1
- Initial concentration of TCE in groundwater – Solubility of TCE – Montgomery, 1996

Assumptions

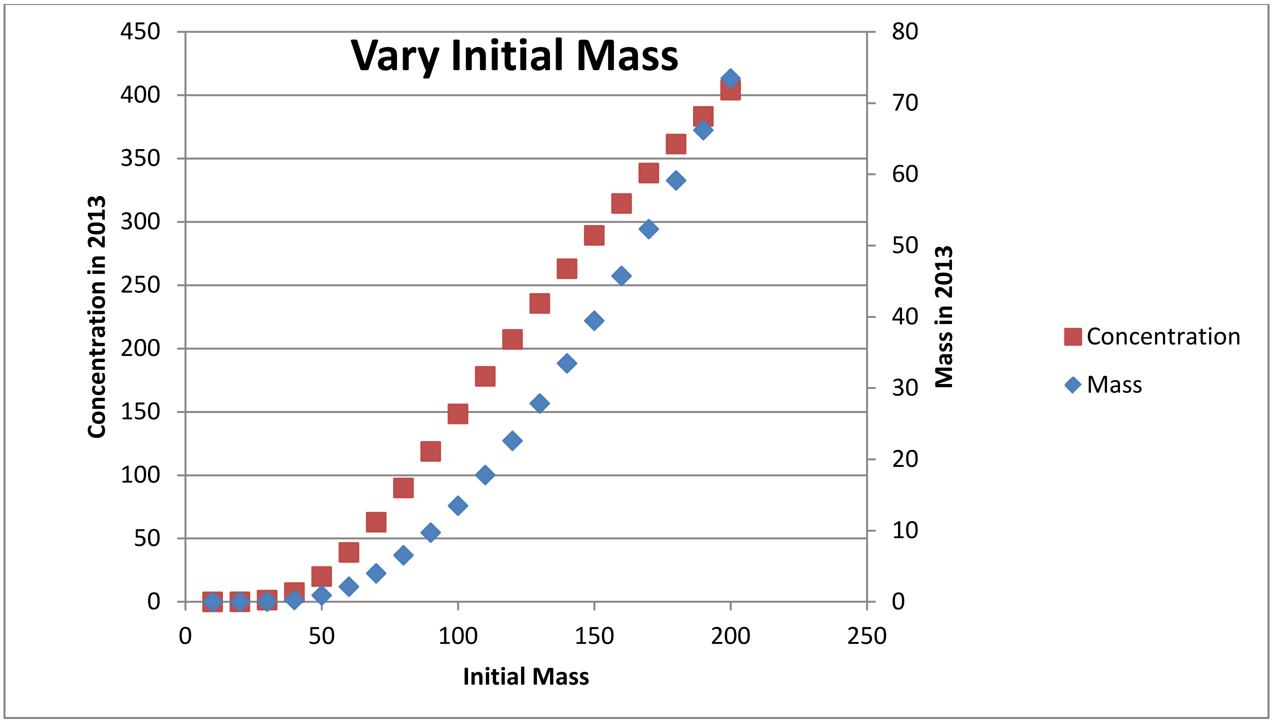
Numerous assumptions were made in the development of the estimates of time to achieve RAOs. The most significant assumption is the selection of the model. The model assumes that the environmental process governing the time to achieve RAOs is the dissolution of the TCE-containing source material. Factors such as matrix diffusion (i.e. the slow diffusion of contamination out of the rock matrix), changes in source geometry with time, the nature of the source (e.g. sorbed, non aqueous phase liquids, etc.), natural attenuation and many other processes are not explicitly considered in this approach.

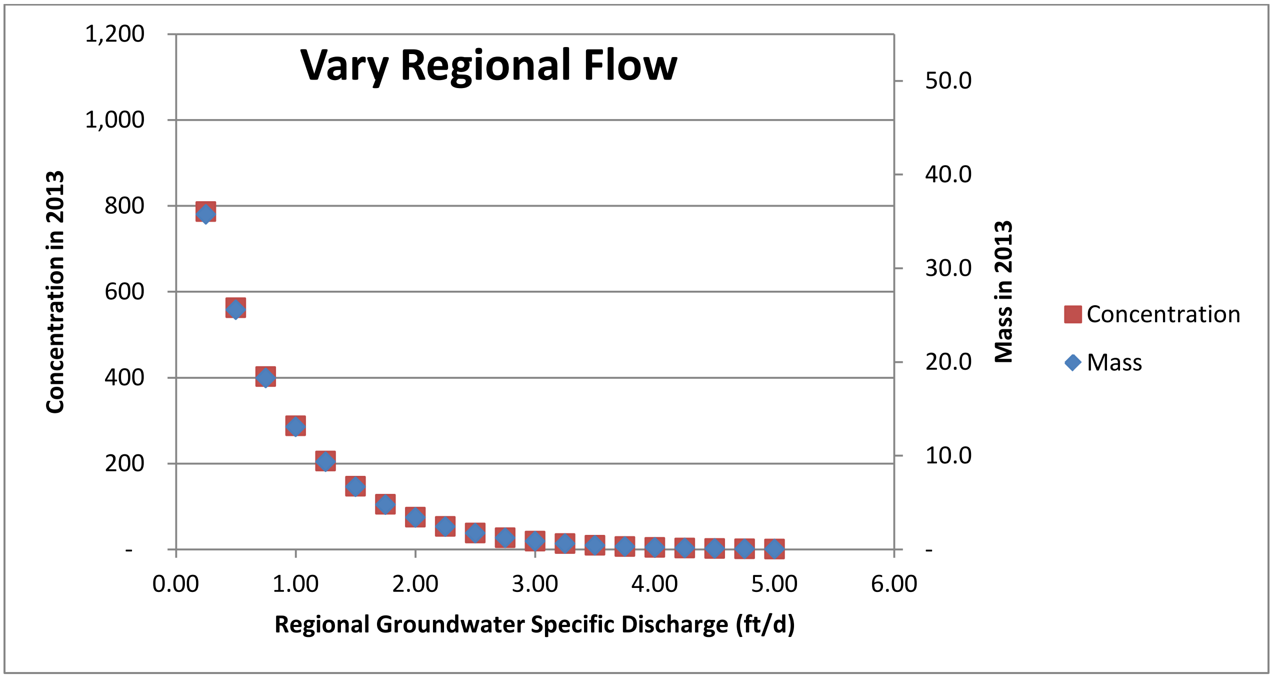
Due to the limited information available regarding the nature and the history of the source, a simplified approach that requires making a minimal number of assumptions regarding site characteristics was considered most appropriate. Significant assumptions used in the model include:

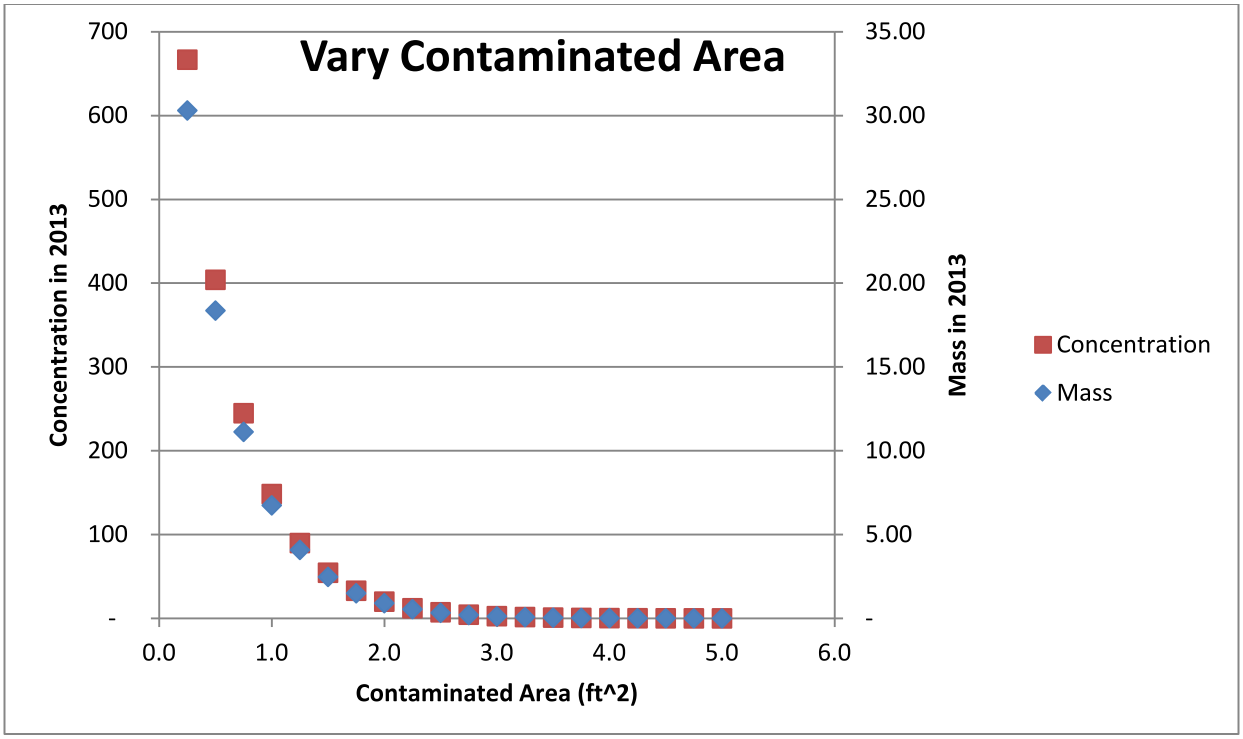
- The release occurred in 1969;
- The geometric mean of the regional groundwater flow measured by Colog (2009) in DW-1 is representative of the flow through the source area;
- The calculated dilution factor is representative of the flow of source zone water into DW-1; and
- The source has an area of 2 square feet.

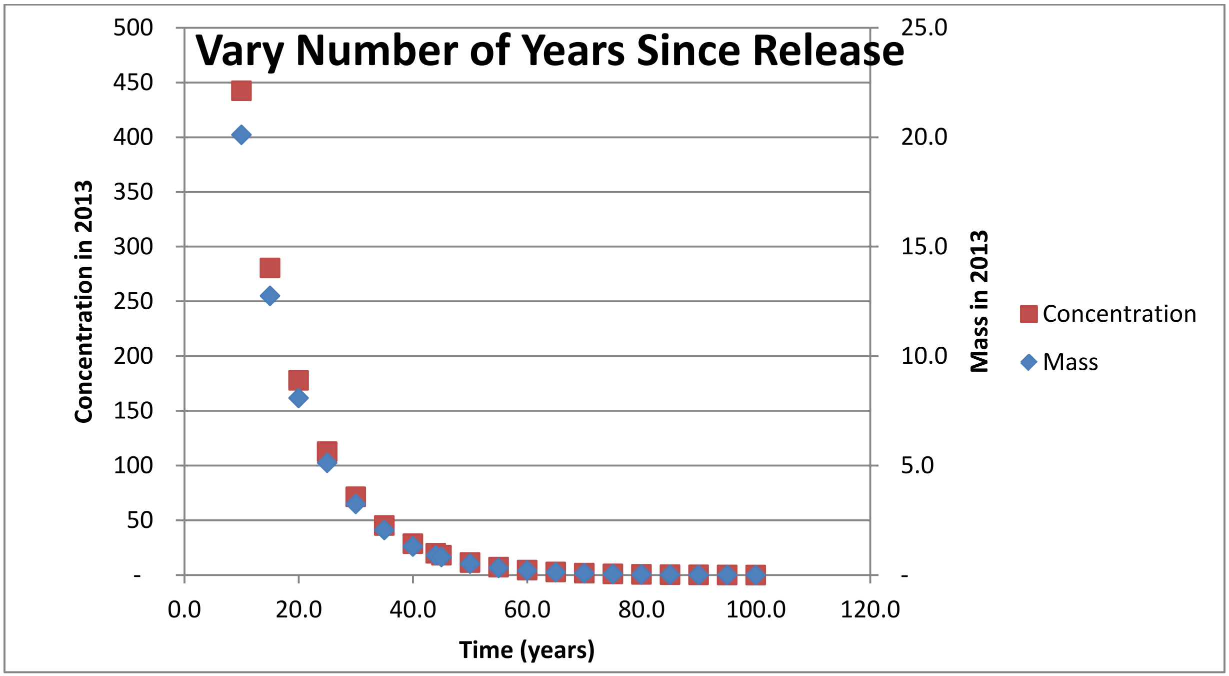
Sensitivity Analysis

A sensitivity analysis was performed to evaluate the impact of model input uncertainties on the model predictions. The model input identified in Table E.2-1 parameters was used and a single parameter was varied. The model predictions are presented in the charts on the following pages. As expected, the model predictions are most sensitive to those parameters in the exponential term (i.e. groundwater flow (including regional flow and source area), time and initial mass). Change in the assumed time of the release is important initially but as time increases the model predictions drop off and asymptotically approach zero concentration. No significant trend is observed in the sampling results for TCE measured in the DW-1 effluent. This may indicate that the change in source area groundwater concentration has reached the asymptotic phase.


Vary Initial Mass
Concentration in 2013
Mass in 2013
Initial Mass
450
400
350
300
250
200
150
100
50
0
80
70
60
50
40
30
20
10
0
0
50
100
150
200
250
Concentration
Mass


Vary Regional Flow
Concentration in 2013
Mass in 2013
Regional Groundwater Specific Discharge (ft/d)
1,200
1,000
800
600
400
200
-
50.0
40.0
30.0
20.0
10.0
-
0.00
1.00
2.00
3.00
4.00
5.00
6.00
Concentration
Mass





References

COLOG. (2009). *HydroPhysical™ and Geophysical Logging Results, Former Nike Battery Launch Site LO-58, ME FUDS, Caribou, Maine*. Division of Layne Christensen Company.12 January.

Falta, R.W., M.B. Stacy, N.M Ahsanuzzaman, M. Wang, and R. C. Earle, 2007. REMChlor Remediation Evaluation Model for Chlorinated Solvents Evaluation Model for Chlorinated Solvents, Sept 7, 2007.

J.H. Montgomery, 1996, Groundwater Chemicals Desk Reference. 2nd Ed. CRC Lewis Publishers

Weston, 2011. Final Conceptual Site Model, Former LO-58 Nike Battery Launch Site, Caribou, Maine. August.

Table E.2-1
Alternatives GW1 and GW3
Time to Achieve PRGs
Former LO-58 Nike Battery Launch Site
Caribou, Maine

Estimate Time to Remediate Under Various Groundwater Pumping Scenarios
Use Exponential Decay of Source Falta 2007 to Predict Time to Achieve RAOs

Regional Groundwater Flow Through Source Material

Assume Spill Occurred in	1969		
Regional Groundwater Flow (specific Discharge)	0.20	ft/d	Geometric Mean Value Colog (2009) Dilution Testing in DW-1
Area of source material exposed to GW flow	2	ft^2	
Regional Groundwater Flow through Source Material	3.0	gallons per day	
Mo= Initial Mass of TCE Spilled (assumed)	50.0	kg	
Initial concentration of effluent exiting source zone after release ($Co=C_{sat}$)	1,100.00	mg/l	
Decay of Source Prior to DW-1 Installation			
DW-1 Installed in:	1996		
t= time after release when DW-1 was installed	9,855 27.0	days years	
Mass TCE remaining when DW-1 was installed in 1996, Mo_{1996}	4.28	kg	
Concentration of source area groundwater in 1996 (Co_{1996})	94.11	mg/l	

Use Concentration of TCE in DW-1 to Estimate Amount of Well Flow Originating in Contaminant Source Zone

Estimated TCE Source Concentration 2012	21.9241	mg/l	
Measured DW-1 TCE Concentration 10/5/12 (average)	7.25	ug/l	
Estimated Dilution Factor C_{well}/C_{source}	3.3E-04		
DW-1 average discharge (Q_{DW-1}CSM p 4-4)	150	gallons per day	
Flow through Source induced by pumping of well ($DF*Q_{DW-1}$)	0.0	gallons per day	
Combined Flow (Regional+Q_{DW-1}) through source material after DW-1 is Installed (1996)	3.0	gallons per day	
Present Conditions	**2013**		
Predicted mass TCE 2013	0.8868	kg	
Predicted TCE source concentration in 2013	19.5088	mg/l	
<u>Estimate Time to Remediate DW-1 Turned Off</u>			
Year	2105		**92 years**
Combined Flow (Regional+Q_{DW-1}) through source material after DW-1 is turned off	3.0	gallons per day	
Predicted mass TCE at time t	0.0002	kg	
C(t)			
Predicted TCE Concentration at t years after implementation of alternative	0.0045	mg/l	

Notes
M(t)=Mo(exp(Q*Co*t/Mo))
C(t)=Co(exp(Q*Co*t/Mo))
Assume Release took place in 1969
Assume source of contamination is below the water table
Flow of groundwater through source zone = DW-1 flow * dilution factor
Note: PRG= 5ug/l MCL for TCE
Secondary terms in the time to remediate estimate were neglected

Reference
Falta, R.W. Et al, 2007, REMChlor Remediation Evaluation Model for Chlorinated Solvents

Table E.2-2
Alternative GW2
Time to Achieve PRGs
Former LO-58 Nike Battery Launch Site
Caribou, Maine

Estimate Time to Remediate Under Various Groundwater Pumping Scenarios
Use Exponential Decay of Source Falta 2007 to Predict Time to Achieve RAOs

Regional Groundwater Flow Through Source Material

Assume Spill Occurred in	1969		
Regional Groundwater Flow (specific Discharge)	0.20	ft/d	Geometric Mean Value Colog (2009) Dilution Testing in DW-1
Area of source material exposed to GW flow	2	ft^2	
Regional Groundwater Flow through Source Material	3.0	gallons per day	
Mo= Initial Mass of TCE Spilled (assumed)	50.0	kg	
Initial concentration of effluent exiting source zone after release ($Co=C_{sat}$)	1,100.00	mg/l	

Decay of Source Prior to DW-1 Installation

DW-1 Installed in:	1996	
t= time after release when DW-1 was installed	9,855 27.0	days years
Mass TCE remaining when DW-1 was installed in 1996, Mo_{1996}	4.28	kg
Concentration of source area groundwater in 1996 (Co_{1996})	94.11	mg/l

Use Concentration of TCE in DW-1 to Estimate Amount of Well Flow Originating in Contaminant Source Zone

Predicted TCE Source Concentration 2012	21.9241	mg/l
Measured DW-1 TCE Concentration 10/5/12 (average)	7.25	ug/l
Estimated Dilution Factor C_{well}/C_{source}	3.3E-04	
DW-1 average discharge (Q_{DW-1}CSM p 4-4)	150	gallons per day
Flow through Source induced by pumping of well (DF*Q_{DW-1})	0.0496	gallons per day
Combined Flow (Regional+Q_{DW-1}) through source material after DW-1 is Installed (1996)	3.0	gallons per day

Present Conditions	**2013**	
Predicted mass TCE 2013	0.8868	kg
Predicted TCE source concentration in 2013	19.5088	mg/l

Estimate Time to Remediate DW-1 Continuing Pumping

Year	2105		**92 Years**
Combined Flow (Regional+Q_{DW-1}) through source material after DW-1 is operating	3.0	gallons per day	
Predicted mass TCE at time t	1.8E-04	kg	
C(t)			
Predicted TCE Concentration at t years after implementation of alternative	0.0039	mg/l	

Notes

M(t)=Mo(exp(Q*Co*t/Mo))
C(t)=Co(exp(Q*Co*t/Mo))
Assume Release took place in 1969
Assume source of contamination is below the water table
Flow of groundwater through source zone = DW-1 flow * dilution factor
Note: PRG= 5ug/l MCL for TCE
Secondary terms in the time to remediate estimate were neglected

Reference

Falta, R.W. Et al, 2007, REMChlor Remediation Evaluation Model for Chlorinated Solvents

Table E.2-3
Alternative 5
Time to Achieve PRGs
Former LO-58 Nike Battery Launch Site
Caribou, Maine

Estimate Time to Remediate Under Various Groundwater Pumping Scenarios
Use Exponential Decay of Source Falta 2007 to Predict Time to Achieve RAOs

Regional Groundwater Flow Through Source Material

Assume Spill Occurred in	1969		
Regional Groundwater Flow (specific Discharge)	0.20	ft/d	Geometric Mean Value Colog (2009) Dilution Testing in DW-1
Area of source material exposed to GW flow	2	ft^2	
Regional Groundwater Flow through Source Material	3.0	gallons per day	
Mo= Initial Mass of TCE Spilled (assumed)	50.0	kg	
Initial concentration of effluent exiting source zone after release ($Co=C_{sat}$)	1,100.00	mg/l	

Decay of Source Prior to DW-1 Installation

DW-1 Installed in:	1996		
t= time after release when DW-1 was installed	9,855	days	
	27.0	years	
Mass TCE remaining when DW-1 was installed in 1996, Mo_{1996}	4.28	kg	
Concentration of source area groundwater in 1996 (Co_{1996})	94.11	mg/l	

Use Concentration of TCE in DW-1 to Estimate Amount of Well Flow Originating in Contaminant Source Zone

Estimated TCE Source Concentration 2012	21.9241	mg/l	
Measured DW-1 TCE Concentration 10/5/12 (average)	7.25	ug/l	
Estimated Dilution Factor C_{well}/C_{source}	3.3E-04		
DW-1 average discharge (Q_{DW-1}CSM p 4-4)	150	gallons per day	
Flow through Source induced by pumping of well ($DF*Q_{DW-1}$)	0.05	gallons per day	
Combined Flow (Regional+Q_{DW-1}) through source material after DW-1 is Installed (1996)	3.0	gallons per day	

Present Conditions	**2013**		
Predicted mass TCE 2013	0.8868	kg	
Predicted TCE source concentration in 2013	19.5088	mg/l	

<u>Alternative 5 - Pump DW-1 at 5 gpm</u>

Year = t	2065		**52 Year**
Flow through Source Area with DW-1 pumping at 5 gpm (include regional flow) (Regional Flow + 5 gpm*DF)	5	gallons per day	
Predicted mass TCE at time t	0.0002	kg	
C(t)			
Predicted TCE Concentration at t years after implementation of alternative	0.004	mg/l	

Notes

M(t)=Mo(exp(Q*Co*t/Mo))
C(t)=Co(exp(Q*Co*t/Mo))
Assume Release took place in 1969
Assume source of contamination is below the water table
Flow of groundwater through source zone = DW-1 flow * dilution factor
Note: PRG= 5ug/l MCL for TCE
Secondary terms in the time to remediate estimate were neglected

Reference

Falta, R.W. Et al, 2007, REMChlor Remediation Evaluation Model for Chlorinated Solvents