



US Army Corps
of Engineers

LO-58 Former Nike Battery Launch Site Caribou, ME

November 2022

BUILDING STRONG®

SITE HISTORY

The LO-58 former Nike Battery Launch site (referred to as “the site”) is located in Caribou, Aroostook County, Maine. The site is 17 acres in size and located at 253 Van Buren Road (Route 1). The property is currently owned by the Lister-Knowlton Veterans of Foreign Wars (VFW) Post 9389.

The property was acquired from the town of Caribou in 1955 by the United States (U.S.) Government for the construction of a Nike missile launching facility. The site consists of the former Nike Missile Launcher Area; the former Engine, Generator, and Frequency Changer Building (Generator Building); the former Missile Assembly & Test Building (Test Building); the Acid Fueling/Neutralization Station (AFNS); and the former Barracks Building.

A series of site visits and environmental investigations have been performed since mid-1980s. Based on the results of the environmental investigations, the contaminants found attributable to releases from the former LO-58 site are volatile organic compounds (VOCs) associated with fuels formerly used and stored at the site and chlorinated solvents associated with missile maintenance. In groundwater, the only identified contaminant of concern (COC) identified was trichloroethylene (TCE). In indoor air, the COCs identified were chloroform, naphthalene, and TCE.

CURRENT USE

The LO-58 former Nike Battery Launch site is currently owned by the Lister-Knowlton VFW Post 9389. The former Barracks Building has been repurposed as the VFW Building. The former Generator Building has been expanded and is used by the Adult Multiple Alternative Center (AMAC) as an adult learning center. Aside from the former sentry station, the only other building that remains standing is the former Test Building.

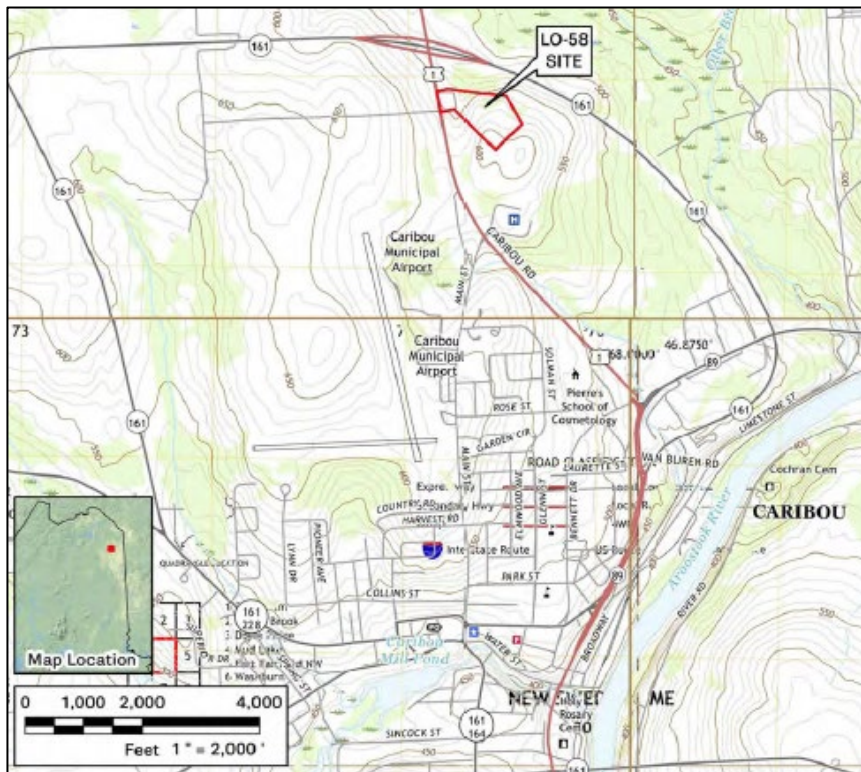


Figure 1. Location of the LO-58 former Nike Battery Launch Area.

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<https://www.nae.usace.army.mil/Missions/Projects-Topics/LO-58-Former-Nike-Battery-Launch-Site-FUDS/>

HISTORICAL USE AND FUDS ELIGIBILITY

Between 1955 and 1957, the LO-58 Launch Area 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 Warhead Building, the AFNS, and the former

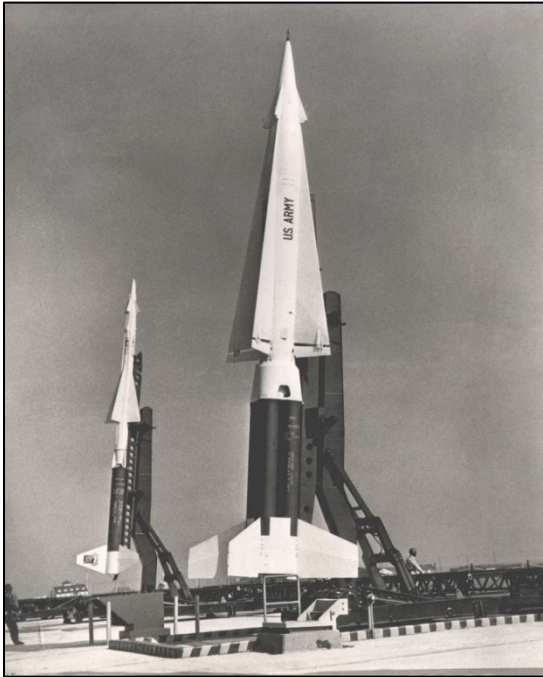


Figure 2. Nike Ajax next to a Nike Hercules Missile.
(source: <http://www.themilitarystandard.com/>)

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 propellant-4 (JP-4), inhibited red fuming nitric acid, and approximately one pint of unsymmetrical dimethylhydrazine to make the mixture hyperbolic; hence, it was capable of spontaneous ignition without the need for an additional ignition source. Reportedly, the missiles were periodically de-fueled at the AFNS so maintenance checks could be performed. There were reportedly ten Ajax missiles within each of the three missile magazines.

In 1960, the LO-58 site operations converted to the Hercules missile. Several changes occurred at Nike missile launching sites because 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 onsite missile magazines. Each magazine contained six Hercules missiles. Nike Hercules missile propellants contained polysulfide-ammonium perchlorate; however, contamination resulting from the Hercules missiles is unlikely since the solid rocket fuel arrived onsite already incorporated into the missile boosters and maintenance and/or replacement of the fuel was not performed. In addition, the missiles were never fired and there is no evidence to suggest that the propellant was disposed of at the LO-58 site.

The LO-58 site was deactivated by the United States Department of Defense (DoD) in 1966. Following its decommissioning as a military facility in 1969, the LO-58 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.

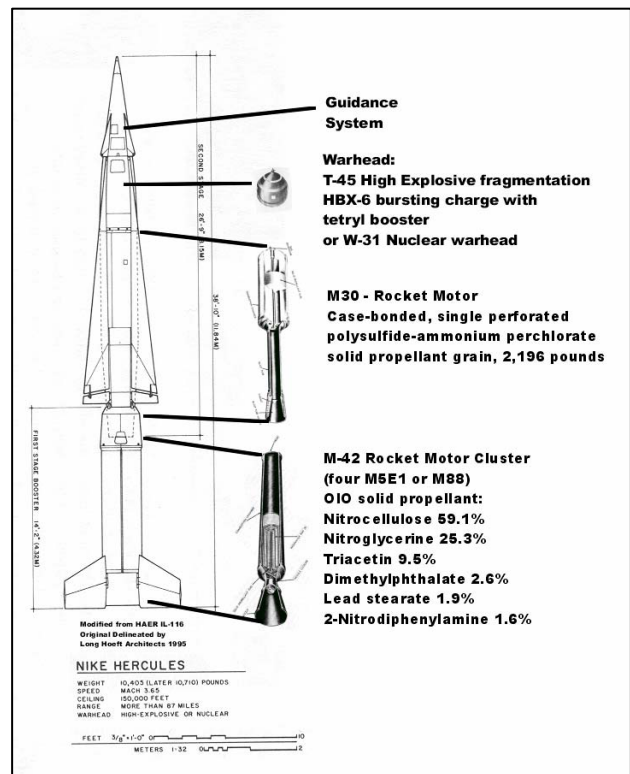


Figure 3. Nike Hercules Missile and Booster (TM 9-1385-51).

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Some sites, formerly used by the Department of Defense (DoD), are eligible to be cleaned up by the government under the Defense Environmental Restoration Program, Formerly Used Defense Sites (DERP-FUDS). In 1993, the U.S. Army Corps of Engineers (USACE) completed an assessment of the former Nike LO-58 Battery Launch Area and



Figure 4. Sign for the Lister-Knowlton VFW Post #9389.

determined it was eligible for the DERP-FUDS program. The U.S. Army is the lead agency and USACE has mission execution authority under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for the USACE FUDS Program. USACE executes the FUDS Program on behalf of the Army. Site investigation and remediation activities follow CERCLA and National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The Maine Department of Environmental Protection (MEDEP) has participated by providing regulatory oversight.

ENVIRONMENTAL INVESTIGATION ACTIVITIES

Site visits were performed between the mid-1980s and 1993 for the purpose of identifying environmental hazards associated with the former defense site. Plans for the LO-58 site indicated that three fuel storage tanks were originally at the facility. Records indicated the storage tanks had been removed. Inspections also noted that the AFNS area was still in place but indicated that it posed no threat to the environment and required no further action.

The three missile magazines at the LO-58 site were closed by Mason and Maine Environmental Engineering Co. between August and October 1994. The closure activities of each missile magazine included sampling of infiltrated water in the three magazines, removal and disposal of the water within the magazines, removal and disposal of hydraulic systems, and capping the three magazines with concrete planks as they were left in place. Topside magazine closure demolition work consisted of removing several vent pipes, manholes, and bulkhead doors.

In the fall 1996, the MEDEP responded to a complaint made by the current owner concerning odors in the water from the well serving the AMAC Building (well DW-01). Collection of samples confirmed the presence of TCE in the well water. Thereafter, MEDEP immediately installed a point-of-entry treatment (POET) system (i.e., where the waterlines enter the building) consisting of a dual granular activated carbon (GAC) filtering system to remove organic contaminants in the drinking water and initiated a quarterly monitoring program. USACE took over the maintenance and monitoring of the POET system at the AMAC Building in 2009. The POET system remains in use by the AMAC and filter changes are completed every five years based on a conservative estimate of 300,000 gallons of water usage by the facility per year. Additionally, the well servicing the VFW building (well DW-02) was also added to the monitoring program at the request of the MEDEP, following the 1998 site visit. The results of sampling of this well have never shown VOC contamination.

During a site visit in 1998, MEDEP investigated an area located southwest of the former Generator Building, where the 4,000-gallon underground storage tank (UST) was previously located.

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Although the tank had reportedly been removed, a magnetometer survey of the area detected a significant anomaly located near the southwest corner of the building. This magnetometer detection suggested that a large metallic object may still exist in this portion of the property. The results of a ground-penetrating radar (GPR) survey in 1999 indicated that the metallic response was not due to the presence of a UST in the area. The GPR profiles in this area are indicative of a small diameter metal pipe extending outwards from the corner of the former Generator Building.

A preliminary site investigation (PSI) was performed at the property in the summer 1999 to evaluate subsurface conditions. Passive soil gas and geophysical surveys were conducted, in addition to soil borings and soil sample collection. A total of 75 soil gas probes were installed on the LO-58 site during the PSI. A geophysical survey was performed near the former Generator Building, as well, which discovered a small diameter metal pipe extending from the Generator Building. In October 1999, an investigation was performed to characterize the LO-58 site soils, determine the depth of the overburden groundwater table (if present), explore the depth to bedrock, and sample potentially contaminated soil zones identified by the passive soil gas survey. A total of 40 soil borings were advanced in the overburden.

A supplemental site investigation was conducted between October 2000 and May 2001 to supplement the information obtained during the 1999 PSI. The objectives of the supplemental site investigation activities were to further evaluate the source of TCE in the onsite drinking water well DW-01; to obtain further information regarding hydrogeologic conditions in bedrock; and to fill data gaps caused by the premature removal of soil gas probes by third parties during the PSI. The supplemental site investigation activities included: a 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, total petroleum hydrocarbons (TPH)-diesel-range organics (DRO), and TPH-gasoline-range organics (GRO).

Following these site investigations, a Long-Term Monitoring Plan (LTMP) for the Maine FUDS (MEFUDS) program was developed. The MEFUDS LTMP included monitoring the two drinking water supply wells as well as the five newly installed bedrock monitoring wells on a semi-annual basis for a period of at least two years to investigate whether a remedial action was required in accordance with MEDEP regulations. Subsequently, 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 conceptual site model (CSM) related to groundwater flow.

A Remedial Investigation (RI)/Feasibility Study (FS) was conducted for the LO-58 site from 2011 to 2017. The overall objectives of the RI/FS 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 LO-58 site; and 4) to use this information in the FS to support the evaluation and development of potential remedial alternatives for the site. The RI/FS Report was finalized in February 2017.

In June 2018, a Proposed Plan for cleanup was published by USACE to summarize and document the RI/FS, as well as to present the rationale for the selected remedies for groundwater and vapor intrusion (VI). The preferred alternative selected by USACE was presented in the Proposed Plan and at a public meeting held on July 18, 2018, to solicit input from the community and MEDEP. The final remedy to address groundwater and VI risks to human health was documented in the

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LO-58 site Decision Document (DD) in February 2019. In groundwater, the only identified COC was TCE. In indoor air, the COCs identified in the DD were chloroform, naphthalene, and TCE.

The selected remedy for groundwater is continued POET for onsite drinking water well DW-01, institutional controls (annual notifications to landowner), monitored natural attenuation (MNA), and long-term monitoring (LTM). Additionally, the DD included the installation of up to four bedrock groundwater monitoring wells in the northwestern and southern portions of the site to monitor for possible offsite migration of contaminated groundwater toward adjacent properties as part of the selected groundwater remedy.

The selected remedy for VI includes active sub-slab vapor mitigation for the AMAC, institutional controls, and LTM. A sub-slab Vapor Intrusion Mitigation System was installed in July 2021 to remove contaminated vapors from below the building slab and vent them to the outside of the building. Results of indoor air samples collected in January 2022 indicated that the system is operating as intended and there are no COCs detected in the indoor air and therefore no risk to the occupants.

FUTURE WORK

Future work at the LO-58 former Nike Battery Launch site includes continuing the remedies established in the DD. Annual LTM will be completed for indoor air, sub-slab soil gas, and groundwater from monitoring wells and drinking water wells, including the collection of water samples from nearby homeowner's wells, if permission is granted. Additionally, USACE anticipates installing two new bedrock monitoring wells in the spring 2023.

COMMUNITY OUTREACH

Environmental reports and studies developed as part of the investigation, including the DD, are available at the Caribou Public Library and USACE, New England District.

HOW TO CONTACT US

If you have questions or comments about the environmental investigation activities, please contact:

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