

Validation Reference Information: Adapted from National Functional Guidelines for Inorganic Superfund Methods Data Review, 2020 and Region 1 EPA New England Environmental Data Review Supplement, 2018

Metals, method 6010B, 6020 or similar

1. Sample Holding Times

Criteria	Action	
	Detected Results	Non-detect Results
Aqueous/Water samples received with pH > 2 and pH not adjusted	J	R
Metals: Aqueous/Water samples > 180 days	J	R
Metals: Soil/Sediment samples > 180 days	J	R
Mercury: Aqueous/Water samples > 28 days	J	R
Mercury: Soil/Sediment samples > 28 days	J	R

Blanks

- Use each Preparation/Method in the analytical batch

Blank Type	Blank Result	Sample Result	Action for Samples
Preparation/Method Blank	> RL	\geq IDL/MDL but \leq RL	Qualify as non-detect (U) at the reported concentration
		> RL but < Blank Result	Qualify results as unusable (R)
		> Blank Result but < 10x Blank Result	Qualify results as estimated (J)
		\geq 10x Blank Result	No action is taken based on professional judgment
	\geq IDL/MDL but \leq RL	Non-detect	No action is taken based on professional judgment
		\geq IDL/MDL but \leq RL	Qualify as non-detect (U) at the reported concentration
		> RL	Use professional judgment (see below [1])

Equipment Blank (EB)	>RL and >PB	>RL but <EB	Qualify results as unusable (R)
		>EB but <10x EB	Qualify results as estimated (J)
		\geq IDL/MDL but \leq RL	Qualify as non-detect (U) at the reported concentration
		\geq 10x EB	No action is taken based on professional judgment

[1] Establish an action level (AL) at 5x the blank contamination. If sample result is <AL, qualify the reported result with a "U".

2. LCS/LCSD

Criteria	Action	
	Detected Compounds	Non-detected Compounds
RPD > 35%	J	UJ
%R > 150	R	No qualification
%R > 130	J+	No qualification
40% \leq %R < 69	J-	UJ
%R < 40%	J-	R

%R = % recovery

RPD = relative percent difference

Apply actions to all samples in associated batch.

3. MS/MSD

RPD < 20% for aqueous, RPD < 35% for soil samples, if sample and duplicate results $\geq 5x$ the RL else qualify J/UJ

For RPD > 120%, reject data

Apply action to all samples in associated batch.

If the sample result (SR) > 4x the spike concentration (S), no action is taken. Otherwise, for metals:

Criteria	Action	
	Detected Compounds	Non-detect
Matrix Spike %R < 30% Post-digestion spike %R < 75%	J-	R
Matrix Spike %R < 30% Post-digestion spike %R $\geq 75\%$	J	UJ
Matrix Spike %R 30-74% Post-digestion spike %R < 75%	J-	UJ
Matrix Spike %R 30-74% Post-digestion spike %R $\geq 75\%$	J	UJ
Matrix Spike %R > 125% Post-digestion spike %R > 125%	J+	No qualification
Matrix Spike %R > 125% Post-digestion spike %R $\leq 125\%$	J	No qualification
Matrix Spike %R < 30% No post-digestion spike performed	J-	R
Matrix Spike %R 30-74% No post-digestion spike performed	J-	UJ
Matrix Spike %R 75-125% No post-digestion spike is required	No qualification	No qualification
Matrix Spike %R > 125% No post-digestion spike performed	J+	No qualification

For mercury:

Criteria	Action	
	Detected Compounds	Non-detect
Matrix Spike %R < 30%	J-	R
Matrix Spike %R 30-74%	J-	UJ
Matrix Spike %R > 125%	J+	No qualification

%R = % recovery

4. Analytical Replicates

Criteria	Action	
	Detect	Non-detect
Duplicate analysis not performed at the specified frequency	J	UJ
Both original sample and duplicate sample results are $\geq 5x$ RL and $RPD > 20$ aqueous $RPD > 35\%$ soils	J	UJ
$RPD > 100\%$	Use professional judgment	Use professional judgment
Original sample or duplicate sample $<5x$ RL (including non-detects) and absolute difference between sample and duplicate $>RL$ (aqueous) and $>2X RL$ (non-aqueous)	J	UJ
Original sample or duplicate sample $<5x$ RL (including non-detects) and absolute difference between sample and duplicate $<RL$ (aqueous) and $<2X RL$ (non-aqueous)	No qualification	No qualification

Apply actions to all samples in preparation batch.

5. Field Duplicates

Criteria	RPD	Action	
		Detected	Non-detect
Sample and duplicate are nondetect results	Not calculable (NC)	No qualification	No qualification
Sample and duplicate results $\geq 5x$ RL	>30 (aqueous) >50 (solids)	J	Not Applicable
Sample and duplicate results $<5x$ RL	Absolute difference $>$ $2X RL$ (aqueous) Absolute difference $> 4XRL$ (non-aqueous)	J	UJ

Apply actions to the affected analyte in all samples of the same matrix prepared and analyzed by the same method.

7. SRM

Criteria	Action	
	Detect	Non-Detect
SRM %R $<10\%$	J-	R
SRM sample results below lower range limits and greater than 10%	J-	UJ
SRM sample results within limits provided by the vendor	No qualification	No qualification
SRM sample results above upper range limit	J+	No qualification

Apply actions to all samples in the preparation batch.

Validation Reference Information: National Functional Guidelines for Organic Superfund Methods Data Review, 2020 and Region 1 EPA New England Environmental Data Review Supplement, 2018

PAHs, method 8270E (GC/MS) or similar:

1. Sample Holding Times

Extraction from sampling (Days)		Analysis from Extraction (Days)	Action	
Water	Soil/Sediment		Detected Results	Non-detect Results
1-7	1-14	1-40	No qualification	No qualification
8-14	15-28	41-80	J	UJ
≥ 15	≥ 29	≥ 81	J	R

2. Method Blank or Equipment Blank

Blank result	Sample result	Action for samples
Detects	Not detected	No qualification
\leq RL	< RL	Report sample result with UJ
	\geq RL	No qualification
>RL	< RL	Report sample result with UJ
	\geq RL and < blank concentration	Report the sample result with a U
	\geq RL and blank concentration	No qualification
TIC detected	Detects	If the result is \leq blank result, report the sample result U. If the result is > blank result, no qualification is required
Gross Contamination	Detects	Qualify results as unusable (R)

RL = reporting limit

MDL = method detection limit

3. MS/MSD

Criteria	Action	
	Detected	Non-detected Compounds
%R > 120	J	No qualification
10% \leq %R < 30	J	UJ
%R < 10%	J	R*
%RPD > 50	J	No qualification

Note: Actions are applied to the native unspiked sample only
 *When the native sample concentration is >4X the concentration of the spike added no action taken

%R = % recovery

RPD = relative percent difference

Apply actions only to sample that was used for the MSD/MSD

4. LCS/LCSD

Criteria	Action	
	Detect	Non-Detect
LCS not performed at specified frequency or concentration	Use professional judgement	Use professional judgement
%R < 10	J-	R
10% < %R < 30	J-	UJ
30 < %R < 120	No qualification	No qualification
%R > 120	J+	No qualification
RPD > 50%	J	No qualification

%R = % recovery

RPD = relative percent difference

Apply actions to all samples in the associated batch.

5. Analytical Replicates/Field Duplicates

Criteria	RPD	Action	
		Detected	Non-detect
Sample and duplicate are non-detect	Not calculable (NC)	No qualification	No qualification
Sample and duplicate results \geq 5x RL	>30 (aqueous) >50 (solids)	J	Not Applicable
One or both sample and duplicate results <5x RL	Absolute difference > 2X RL (aqueous) Absolute difference > 4XRL (non-aqueous)	J	UJ

Apply actions to the affected analyte in all samples of the same matrix prepared and analyzed by the same method.

6. Surrogate Recoveries

Notes:	<u>Base/Neutral Surrogates</u>	<u>Acid Surrogates</u>
	NBZ = Nitrobenzene-d5	PHL = Phenol-d5
	FBP = 2-Fluorobiphenyl	2FP = 2-Fluorophenol
	TPH = Terphenyl-d14	TBP = 2,4,6-Tribromophenol

- Actions are only taken when one surrogate %R is <10% or when 2 or more surrogates in one fraction are outside 30-150% limits.
- Actions apply to only the compounds in the affected fraction. i.e. if 2 acid surrogate %Rs are below 30% (the lower limit), then all acid compounds will be qualified as indicated in the table.

Criteria	Action	
	Detected Results	Non-detect Results
%R > 150	J	No qualification
10% ≤ %R < 30	J	UJ
%R < 10% (sample dilution is not a factor)	J	R
%R < 10% (sample dilution is a factor) ¹	No qualification	No qualification

¹ If there is no surrogate information due to dilution then estimate (J/UJ) all results. However, in cases where there is surrogate information from multiple runs then base the surrogate actions on the least diluted run.

%R = % recovery

7. SRM

Criteria	Action	
	Detect	Non-Detect
SRM %R < 10%	J-	R
SRM sample results below lower range limits and greater than 10%	J-	UJ
SRM sample results within limits provided by the vendor	No qualification	No qualification
SRM sample results above upper range limit	J+	No qualification

Apply actions to all samples in the preparation batch.

Validation Reference Information: National Functional Guidelines for Organic Superfund Methods Data Review, 2020 and Region 1 EPA New England Environmental Data Review Supplement, 2018

PCBs, method 8082A or similar

1. Sample Holding Times

Extraction from sampling (Days)		Analysis from Extraction (Days)	Action	
Water	Soil/Sediment		Detected Results	Non-detect Results
365	365	1-40	No qualification	No qualification
≥ 365	≥ 365	41-80	J	UJ
≥ 365	≥ 365	≥ 81	J	R

2. Method Blank or Equipment Blank

Blank result	Sample result	Action for samples
Detects	Not detected	No qualification
\leq RL	< RL	Report sample result with a UJ
	\geq RL	No qualification
>RL	< RL	Report sample result with a UJ
	\geq RL and < blank concentration	Report the sample result with a U
	\geq RL and blank concentration	No qualification
TIC detected	Detects	If the result is \leq blank result, report the sample result U. If the result is $>$ blank result, no qualification is required
Gross Contamination	Detects	Qualify results as unusable (R)

RL = reporting limit

MDL = method detection limit

3.LCS/LCSD

Criteria	Action	
	Detected Compounds	Non-detect Compounds
%R > 150, RPD > 50%	J+	No qualification
10% \leq %R < 50%	J-	UJ
50 < %R < 150	No qualification	No qualification
%R < 10%	J-	R
RPD > 50%	J	No qualification

%R = % recovery

RPD = relative percent difference

Apply actions to all samples in the associated batch.

4. MS/MSD

Criteria	Action	
	Detected	Non-detect Compounds
%R > 150	J	No qualification
20% ≤ %R < 50%	J	UJ
%R < 20%	J	R*
%RPD > 50	J	No qualification

Note: Actions are applied to the native unspiked sample only
 *When the native sample concentration is >4X the concentration of the spike added (based on Region I criteria), evaluate the MS, MSD, and native sample with regards to %RSD rather than %R

%R = % recovery

RPD = relative percent difference

5. Analytical Replicates/Field Duplicates

Criteria	RPD	Action	
		Detected	Non-detect
Sample and duplicate are nondetect results	Not calculable (NC)	No qualification	No qualification
Sample and duplicate results ≥ 5x RL	>30 (aqueous) >50 (solids)	J	Not Applicable
Sample and duplicate results < 5x RL	Absolute difference > 2X RL (aqueous) Absolute difference > 4XRL (non-aqueous)	J	UJ

Apply actions to the affected analyte in all samples of the same matrix prepared and analyzed by the same method.

6. Surrogate Recoveries

Criteria	Action	
	Detected Results	Non-detect Results
%R > 150	J	No qualification
10% ≤ %R < 30	J	UJ
%R < 10% (sample dilution is not a factor)	J	R
%R < 10% (sample dilution is a factor) ¹	No qualification	No qualification

¹ If there is no surrogate information due to dilution then estimate (J/UJ) all results. However, in cases where there is surrogate information from multiple runs then base the surrogate actions on the least diluted run.

%R = % recovery

7. SRM

Criteria	Action	
	Detect	Non-Detect
SRM %R <10%	J-	R
SRM sample results below lower range limits and greater than 10%	J-	UJ
SRM sample results within limits provided by the vendor	No qualification	No qualification
SRM sample results above upper range limit	J+	No qualification

Apply actions to all samples in the preparation batch.

Validation Reference Information: National Functional Guidelines for Organic Superfund Methods Data Review, 2020 and Region 1 EPA New England Environmental Data Review Supplement, 2018

Pesticides, method SW846 8081B or similar:

1. Sample Holding Times

Extraction from sampling (Days)		Analysis from Extraction (Days)	Action	
Water	Soil/Sediment		Detected Results	Non-detect Results
1-7	1-14	1-40	No qualification	No qualification
8-14	15-28	41-80	J	UJ
≥ 15	≥ 29	≥ 81	J	R

2. Method Blank or Equipment Blank

Blank result	Sample result	Action for samples
Detects	Not detected	No qualification
	< RL	Report sample result with a UJ
	≥ RL	No qualification
> RL	< RL	Report sample result with a UJ
	≥ RL and < blank concentration	Report the sample result with a U
	≥ RL and blank concentration	No qualification
TIC detected	Detects	If the result is ≤ blank result, report the sample result U. If the result is > blank result, no qualification is required
Gross Contamination	Detects	Qualify results as unusable (R)

RL = reporting limit

MDL = method detection limit

3. LCS/LCSD

Criteria	Action	
	Detect	Non-Detect
LCS not performed at specified frequency or concentration	Use professional judgement	Use professional judgement
%R < 10	J-	R
10% < %R < 30	J-	UJ
30 < %R < 120	No qualification	No qualification
%R > 120	J+	No qualification
RPD > 50%	J	No qualification

%R = % recovery

RPD = relative percent difference

Apply actions to all samples in the associated batch.

4. MS/MSD

Criteria	Action	
	Detected	Nondetected Compounds
%R > 120	J	No qualification
20% \leq %R < 30%	J	UJ
%R < 20%	J	R*
%RPD > 50	J	No qualification

Note: Actions are applied to the native unspiked sample only

*When the native sample concentration is >4X the concentration of the spike added (based on Region I criteria), evaluate the MS, MSD, and native sample with regards to %RSD rather than %R

%R = % recovery

RPD = relative percent difference

5. Analytical Replicates/Field Duplicates

Criteria	RPD	Action	
		Detected	Non-detect
Sample and duplicate are non-detect results	Not calculable (NC)	No qualification	No qualification
Sample and duplicate results $\geq 5 \times RL$	>30 (aqueous) >50 (solids)	J	Not Applicable
One or both sample and duplicate results $<5 \times RL$	Absolute difference > 2X RL (aqueous) Absolute difference $> 4 \times RL$ (non-aqueous)	J	UJ

Apply actions to the affected analyte in all samples of the same matrix prepared and analyzed by the same method.

6. Surrogate Recoveries

Criteria	Action	
	Detected Results	Non-detect Results
$\%R > 150$	J+	No qualification
$10\% \leq \%R < 30$	J-	UJ
$\%R < 10\%$ (sample dilution is not a factor)	J-	R
$\%R < 10\%$ (sample dilution is a factor) ¹	No qualification	No qualification

¹ If there is no surrogate information due to dilution then estimate (J/UJ) all results. However, in cases where there is surrogate information from multiple runs then base the surrogate actions on the least diluted run.

%R = % recovery

* Use professional judgment in qualifying data, as surrogate recovery problems may not directly apply to target analytes.

7. SRM

Criteria	Action	
	Detect	Non-Detect
SRM %R < 10%	J-	R
SRM sample results below lower range limits and greater than 10%	J-	UJ
SRM sample results within limits provided by the vendor	No qualification	No qualification
SRM sample results above upper range limit	J+	No qualification

Apply actions to all samples in the preparation batch.