3 DATA QUALITY OBJECTIVES

The QA objective for measurement data is to ensure that environmental monitoring data of known and acceptable quality are provided. Data from laboratory analysis of site samples will be used for site assessments. In particular, the data will be used to support the site conceptual model, which will be used to assess the risks to human health and the ecosystem. In addition, data will be used to screen the site in terms of the level and extent of contaminants. Table 3-1 indicates the analytical DQO level for each chemical analysis for each study. Method-specific DQOs for laboratory and field analyses are presented in Tables 3-2 through 3-5.

3.1 CHEMICAL TESTING

The QA objectives for analytical data are defined below:

- *Precision:* Precision measures the reproducibility of measurements under a given set of conditions. Precision is expressed in terms of relative percent differences (RPDs). RPD is calculated as follows:

$$\text{RPD} = \frac{(\text{S-D})}{[(\text{S+D})/2]} x\,100$$

Where: S = Initial Sample Result
D = Duplicate Sample Result

The laboratory objective for precision is to equal or exceed the precision *demonstrated* for similar samples, and RPD will fall within the established control limits for the sample preparation methods (Tables 3-2 to 3-4). In general, the matrix spike (initial sample result) and matrix duplicate (duplicate sample result) will be used to determine the precision, in accordance with typical laboratory Standard Operating Procedures (SOPs).

- *Accuracy*: Accuracy is a measure of the bias or error in a measurement. Examples of bias include contamination and errors made in sample collection, preservation, handling, and analysis. Accuracy will be assessed by the collection of field/trip blanks and in the laboratory by the use of known and unknown QC samples and matrix spikes. Accuracy will be measured by the percent recovery based on matrix spikes or surrogate recoveries. Percent recovery is calculated as follows:

$$\text{Percent Recovery} = \frac{(\text{SSR-SR})}{\text{SA}} x\,100$$

Where: SSR = spike sample result
SR = sample (unspiked) result
A = spike added

- The *laboratory* objective for accuracy is to equal or exceed the accuracy demonstrated for the analytical methods on similar samples, and will fall within the established control limits.
- *Representativeness:* Representativeness is the degree to which the sample data accurately and precisely represent an environmental condition. Ensuring that sampling locations are selected properly and an adequate number of samples are collected, as developed in the SAPs, will satisfy representativeness. Field replicates will be used to assess representativeness; results should be within one-half order of magnitude (factor of 5) or less for a typical analysis.
- *Completeness:* Completeness is the percent of measurements that are judged to be valid. The completeness of the data means that all the required samples have been taken and requisite analyses performed to generate an adequate database to successfully complete the remedial design studies. Completeness values will be 95 percent for demonstrated analytical techniques as described in Tables 3-1 to 3-5. Completeness will be determined by comparing the number of analyses attempted against the number of subsequent data points judged to be usable for the designated purpose(s).
- *Comparability:* Comparability expresses the confidence with which one data set can be compared with another. The SAPs will specify that the sampling method employed, the chain-of-custody methods responsible for the transfer of the samples to the analytical laboratories, and the analytical techniques implemented at the laboratories be performed as specified in this QAPP, including the DQO levels shown in Tables 3-1 to 3-5.

Field measurement QA objectives will be addressed as follows:

- All field instruments will be calibrated in accordance with the manufacturer's instruction and/or the associated SOPs to address accuracy.
- Precision will be addressed by taking replicate measurements, and comparing these measurements to the manufacturer's specifications for the individual instrument.
- Representativeness will be based on professional judgment by examining the matrix from which the sample was measured and/or collected.
- The completeness goal is 95 percent, based on the proposed number of measurements compared to the number of completed measurements.
- Samples will be considered comparable if the instrument is functioning within the manufacturer's specifications and if calibrations are made within the recommended frequency as specified by the manufacturer or the associated SOP.

The sample design for the project, including the number of samples, duplicates, and blanks for each material to be sampled for each study, is presented in the SAPs (Volume II).

Table 3-1 DQO Levels, Rayonier RI, Port Angeles (Part 1 of 2)

Location/ Area	Matrix Type	Samples: Est. No. Design	Est. No. Field QA/QC	Analytical Group	Sample Prep. Method	Analytical Protocol (EPA)	DQO Level
Bone Yard	Soil	4	1	Arsenic	3050B/3051	6010/7000 series or 6020	definitive
Chlorine Dioxide Generator/ Pre-Fab Area	Soil	1	1	Copper	3050B/3051	6010/7000 series or 6020	definitive
Log Yard	Soil	6	1	PAHs	3540C/3550B	8270C/SIM	definitive
		12	1	Dioxins/Furans	Incld.	1613B	definitive
		6	1	Metals	3050B/3051	6010/7000 series or 6020	definitive
		2	1	TPH	NA	NWTPH-Dx/Gx	screening
		2	1	TPH fractions	Incld.	NWEPH/VPH	screening
		2	1	Lead	3050B/3051	6010/7000 series or 6020	definitive
Wood Mill	Soil	4	1	Dioxins/Furans	Incld.	1613B	definitive
		2	1	PAHs	3540C/3550B	8270C/SIM	definitive
		2	1	SVOCs	3540C/3550B	8270C	definitive
		4	1	PCBs	3540C/3565	8082	definitive
		4	1	TPH	NA	NWTPH-Dx/Gx	screening
		4	1	TPH fractions	Incld.	NWEPH/VPH	screening
		4	1	Metals	3050B/3051	6010/7000 series or 6020	definitive
Roll Storage Area	Soil	4	1	SVOCs	3540C/3550B	8270C	definitive
		4	1	Metals	3050B/3051	6010/7000 series or 6020	definitive
		2	1	Dioxins/Furans	Incld.	1613B	definitive
		4	1	Pesticides	3540C/3550B	8081A	definitive
		4		PCBs	3540C/3565	8082	definitive
SSL Lagoon	Soil	4	1	PAHs	3540C/3550B	8270C/SIM	definitive
		4	1	Metals	3050B/3051	6010/7000 series or 6020	definitive
		4	1	Dioxins/Furans	Incld.	1613B	definitive
Main Process Area [1/]	Soil	21	2	SVOCs	3540C/3550B	8270C/SIM	definitive
		36	2	Dioxins/Furans	Incld.	1613B	definitive
		6	1	Arsenic	3050B/3051	6010/7000 series or 6020	definitive
		21	2	Metals	3050B/3051	6010/7000 series or 6020	definitive
		10	1	TPH	NA	NWTPH-Dx/Gx	screening
		10	1	TPH fractions	Incld.	NWEPH/VPH	screening
		11	1	Lead	3050B/3051	6010/7000 series or 6020	definitive
Ecological Samples	Soil	15	1	Dioxins/Furans	Incld.	1613B	definitive
		15	1	Metals	3050B/3051	6010/7000 series or 6020	definitive
		3	1	PCBs	3540C/3550B	8270C/SIM	Definitive
	Plant	3	1	PCBs	3540C/3550B	8270C/SIM	Definitive
		8	1	Dioxins/Furans	Incld.	1613B	Definitive
		8	1	Metals	3050B/3051	6010/7000 series or 6020	Definitive
	Worm	3	1	PCBs	3540C/3550B	8270C/SIM	Definitive
		8	1	Dioxins/Furans	Incld.	1613B	Definitive
		8	1	Metals	3050B/3051	6010/7000 series or 6020	Definitive

Table 3-1 DQO Levels, Rayonier RI, Port Angeles (Part 2 of 2)

Location/ Area	Matrix Type	Samples: Est. No. Design	Est. No. Field QA/QC	Analytical Group	Sample Prep. Method	Analytical Protocol (EPA)	DQO Level
Site Ground Water	Ground Water	20	2	VOCs	5030B	8260B	definitive
		20	2	SVOCs	3510C/3520C	8270C/SIM	definitive
		20	2	Pesticides	3510C/3520C	8081A	definitive
		20	2	PCBs	3510C/3520C	8082	definitive
		20	2	PAHs	3510C/3520C	8310 or 8270C/SIM	definitive
		20	2	Metals/cations[2/]	3010A	6010/7000 series or 6020	definitive
		20	2	TPH diesel/oils	NA	NWTPH-Dx	screening
		20	2	PH		150.1	screening
		20	2	Alkalinity		310.0	screening
		20	2	Conductivity		120.1	screening
		20	2	TOC		9060	screening
		20	2	TSS		160.2	screening
		20	2	TDS		160.1	screening
		20	2	COD		410.2	screening
		20	2	Anions[3/]		300.0	screening
		15	2	Ammonia		350.2	screening
		20	2	Cation/anion balance		SM 1030E	screening
		15	2	Tannin/Lignin		SM 5550	screening
Ennis Creek	Seds.	1	1	TOC	Incld.	9060	definitive
		1	1	Grain Size	Incld.	PSEP/Plumb	definitive
		1	1	SVOCs	3540C/3550B	8270C/SIM	definitive
		1	1	Dioxins/Furans	Incld.	1613B	definitive
		1	1	Metals (excld. Hg)	3050B/3051	6010/7000 series or 6020	definitive
		1	1	Mercury	3020A	7471	definitive
QA/QC	Blanks, Rinsate and Trip Blanks	NA	5	SVOCs	3510C/3520C	8270C/SIM	definitive
		NA	3	PAHs	3510C/3520C	8310 or 8270C/SIM	definitive
		NA	5	PCBs	3510C/3520C	8082	definitive
		NA	5	Pesticides	3510C/3520C	8081A	definitive
		NA	5	Dioxins/Furans	Incld.	1613B	definitive
		NA	5	Metals (excld. Hg)	3010A	6010/7000 series or 6020	definitive
		NA	5	Mercury	3020A	7471	definitive

[1/] Areas include: machine room, finish room, air pollution control equipment, recovery boiler, blowpits, transformer building, digester building, acid plant, bleach plant, laboratory area, screen room, Buck's shop area, log yard transformer area, sawmill transformer area

[2/] Additional cations include: calcium, iron, magnesium, potassium, sodium

[3/] Anions include: bromide, chloride, fluoride, nitrate-nitrogen, nitrite-nitrogen, ortho-phosphate, sulfate

[4/] Twenty background soil samples will be collected. Ten samples will be initially analyzed and ten samples will be archived for possible analysis at a later date.

Table 3-2 Reporting and QC Limits for Water (Part 1 of 6)

	CAS Number	Reporting Limits for Water[1/] (µg/L)	Project Specific QC Limits for Water[2/]	
			RPD	% R
Volatiles (GC/MS) (EPA Method 8260B)[3/]				
Acetone	67-64-1	1.0	0-25	70-130
Benzene	71-43-2	0.2	0-25	70-130
Bromodichloromethane	75-27-4	0.2	0-25	70-130
Bromoform	75-25-2	0.2	0-25	70-130
2-Butanone	78-93-3	1.0	0-25	70-130
Carbon Disulfide	75-15-0	0.2	0-25	70-130
Carbon Tetrachloride	56-23-5	0.2	0-25	70-130
Chlorobenzene	108-90-7	0.2	0-25	70-130
Chlorodibromomethane	124-48-1	0.2	0-25	70-130
Chloroethane	75-00-3	0.2	0-25	70-130
Chloroform	67-66-3	0.2	0-25	70-130
Chloromethane	74-87-3	0.2	0-25	70-130
Dibromochloromethane	124-48-1	0.2	0-25	70-130
1,1-Dichloroethane	75-34-3	0.06[9/]	0-25	70-130
1,2-Dichloroethane	107-06-2	0.2	0-25	70-130
1,1-Dichloroethene	75-35-4	0.06[9/]	0-25	70-130
Trans-1,2-dichloroethene	150-60-5	0.2	0-25	70-130
1,2-Dichloropropane	78-87-8	0.2	0-25	70-130
Cis-1,3-dichloropropene	542-75-6	0.2	0-25	70-130
Trans-1,3-dichloropropene	542-75-6	0.2	0-25	70-130
Ethylbenzene	100-41-4	0.2	0-25	70-130
2-Hexanone	591-78-6	1.0	0-25	70-130
Methylene Chloride (Dichloromethane)	75-09-2	0.3	0-25	70-130
4-Methyl-2-pentanone	108-10-1	1.0	0-25	70-130
Styrene	100-42-5	0.2	0-25	70-130
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0-25	70-130
Tetrachloroethene	127-18-4	0.2	0-25	70-130
Toluene	108-88-3	0.2	0-25	70-130
1,1,1-Trichloroethane	71-55-6	0.2	0-25	70-130
1,1,2-Trichloroethane	79-00-5	0.2	0-25	70-130
Trichloroethene	79-01-6	0.2	0-25	70-130
Vinyl Acetate	108-05-4	0.2	0-25	70-130
Vinyl Chloride	75-01-4	0.03[8/]	0-25	70-130
Xylenes (Total)	1330-20-7	0.4	0-25	70-130

Table 3-2. Reporting and QC Limits for Water (Page 2 of 6)

	CAS Number	Reporting Limits for Water[1/] (µg/L)	Project Specific QC Limits for Water[2/]	
			RPD	% R
Semi-Volatiles (GC/MS) (EPA Method 8270C)[3/]				
Acenaphthene	83-32-9	See note 7	0-25	50-150
Acenaphthylene	208-96-8	See note 7	0-25	50-150
Anthracene	120-12-7	See note 7	0-25	50-150
Benzo(a)anthracene	56-55-3	See note 7	0-25	50-150
Benzo(b)fluoranthene	205-99-2	See note 7	0-25	50-150
Benzo(k)fluoranthene	207-08-9	See note 7	0-25	50-150
Benzoic Acid	65-85-0	10.	0-25	50-150
Benzo(g,h,i)perylene	191-24-2	See note 7	0-25	50-150
Benzo(a)pyrene	50-32-8	See note 7	0-25	50-150
Benzyl Alcohol	100-51-6	5.0	0-25	50-150
Bis(2-chloroethoxy)methane	111-91-1	1.0	0-25	50-150
Bis(2-chloroethyl)ether	111-44-4	0.039[8/]	0-25	50-150
Bis(2-chloroisopropyl)ether	108-60-1	1.0	0-25	50-150
4-bromophenyl phenyl ether	101-53-3	1.0	0-25	50-150
Butyl benzyl phthalate	85-68-7	1.0	0-25	50-150
Carbazole	86-74-8	1.0	0-25	50-150
4-Chloroaniline	106-47-8	3.0	0-25	50-150
4-Chloro-3-methylphenol	59-50-7	2.0	0-25	50-150
2-Chloronaphthalene	91-58-7	1.0	0-25	50-150
2-Chlorophenol	95-57-8	1.0	0-25	50-150
4-Chlorophenyl phenyl ether	7005-72-3	1.0	0-25	50-150
Chrysene	218-01-9	See note 7	0-25	50-150
Dibenzo(a,h)anthracene	53-70-3	See note 7	0-25	50-150
Dibenzofuran	132-64-9	1.0	0-25	50-150
Di-n-butyl phthalate	84-74-2	1.0	0-25	50-150
1,2-Dichlorobenzene	95-50-1	1.0	0-25	50-150
1,3-Dichlorobenzene	541-73-1	1.0	0-25	50-150
1,4-Dichlorobenzene	106-46-7	1.0	0-25	50-150
3,3'-Dichlorobenzidine	91-94-1	0.19[8/]	0-25	50-150
2,4-Dichlorophenol	120-83-2	3.0	0-25	50-150
Diethyl phthalate	84-66-2	1.0	0-25	50-150
2,4-Dimethylphenol	105-67-9	3.0	0-25	50-150
Dimethyl phthalate	131-11-3	1.0	0-25	50-150
4,6-Dinitro-2-methylphenol	534-52-1	10.	0-25	50-150
2,4-Dinitrophenol	51-28-5	10.	0-25	50-150

Table 3-2. Reporting and QC Limits for Water (Page 3 of 6)

	CAS Number	ReportingLimits for Water[1/] (µg/L)	Project Specific QC Limits for Water[2/]	
			RPD	% R
Semi-Volatiles (GC/MS) (EPA Method 8270C)[3/] *continued*				
2,4-Dinitrotoluene	121-14-2	5.0	0-25	50-150
2,6-Dinitrotoluene	606-20-2	5.0	0-25	50-150
Di-n-octyl phthalate	117-84-0	1.0	0-25	50-150
Bis(2-ethylhexyl)phthalate	117-81-7	1.0	0-25	50-150
Fluoranthene	206-44-0	See note 7	0-25	50-150
Fluorene	86-73-7	See note 7	0-25	50-150
Hexachlorobenzene	118-74-1	0.053[8/]	0-25	50-150
Hexachlorobutadiene	87-68-3	0.55[9/]	0-25	50-150
Hexachlorocyclopentadiene	77-47-4	5.0	0-25	50-150
Hexachloroethane	67-72-1	2.0	0-25	50-150
Indeno(1,2,3-cd)pyrene	193-39-5	See note 7	0-25	50-150
Isophorone	78-59-1	1.0	0-25	50-150
2-Methylnaphthalene	91-57-6	1.0	0-25	50-150
2-Methylphenol	95-48-7	2.0	0-25	50-150
3-Methylphenol	108-39-4	1.0	0-25	50-150
4-Methylphenol	106-44-5	1.0	0-25	50-150
Naphthalene	91-20-3	See note 7	0-25	50-150
2-Nitroaniline	88-74-4	5.0	0-25	50-150
3-Nitroaniline	99-09-2	6.0	0-25	50-150
4-Nitroaniline	100-01-6	5.0	0-25	50-150
Nitrobenzene	98-95-3	1.0	0-25	50-150
2-Nitrophenol	88-75-5	5.0	0-25	50-150
4-Nitrophenol	100-02-7	5.0	0-25	50-150
N-Nitrosodiphenylamine	86-30-6	1.0	0-25	50-150
N-Nitroso-di-n-propylamine	621-64-7	0.011[8/]	0-25	50-150
Pentachlorophenol	87-86-5	0.71[9/]	0-25	50-150
Phenanthrene	85-01-8	See note 7	0-25	50-150
Phenol	108-95-2	2.0	0-25	50-150
Pyrene	129-00-0	See note 7	0-25	50-150
1,2,4-Trichlorobenzene	120-82-1	1.0	0-25	50-150
2,4,5-Trichlorophenol	95-95-4	5.0	0-25	50-150
2,4,6-Trichlorophenol	88-06-2	5.0	0-25	50-150
Pesticides (GC) (EPA Method 8081A)[3,4/]				
Aldrin	309-00-2	0.0002[11/]	0-25	50-150
Alpha-BHC	319-84-6	0.006[9/]	0-25	50-150
Alpha-Chlordane	5103-71-9	0.0005[9/]	0-25	50-150
Beta-BHC	319-85-4	0.005[9/]	0-25	50-150
Delta-BHC	319-86-8	0.005[9/]	0-25	50-150
Gamma-BHC (Lindane)	58-89-9	0.005[9/]	0-25	50-150
Gamma-Chlordane	5103-74-2	0.003[9/]	0-25	50-150
4,4'-DDD	72-54-8	0.0004[9/]	0-25	50-150
4,4'-DDE	72-55-9	0.0003[9/]	0-25	50-150
4,4'-DDT	50-29-3	0.0005[11/]	0-25	50-150

Table 3-2. Reporting and QC Limits for Water (Page 4 of 6)

	CAS Number	ReportingLimits for Water[1/] (µg/L)	Project Specific QC Limits for Water[2/]	
			RPD	% R
Pesticides (GC) (EPA Method 8081A)[3,4/] *continued*				
Dieldrin	60-57-1	0.0004[11/]	0-25	50-150
Endosulfan I	959-98-8	0.005[9/]	0-25	50-150
Endosulfan II	33213-65-9	0.005[9/]	0-25	50-150
Endosulfan sulfate	1031-07-8	0.010[9/]	0-25	50-150
Endrin	72-20-8	0.002[9/]	0-25	50-150
Endrin Aldehyde	7421-36-3	0.05[9/]	0-25	50-150
Endrin Ketone	53494-70-5	0.002[9/]	0-25	50-150
Heptachlor	76-44-8	0.0003[11/]	0-25	50-150
Heptachlor epoxide	1024-57-3	0.0003[11/]	0-25	50-150
Methoxychlor	72-43-5	0.015[9/]	0-25	50-150
Toxaphene	8001-35-2	0.03[11/]	0-25	50-150
PCBs (GC/ECD) (EPA Method 8082)				
Aroclor 1016	12674-11-2	0.014[8/]	0-25	50-150
Aroclor 1221	11104-28-2	0.014[8/]	0-25	50-150
Aroclor 1232	11141-16-5	0.014[8/]	0-25	50-150
Aroclor 1242	53469-21-9	0.014[8/]	0-25	50-150
Aroclor 1248	12672-29-6	0.014[8/]	0-25	50-150
Aroclor 1254	11097-69-1	0.014[8/]	0-25	50-150
Aroclor 1260	11096-82-5	0.014[8/]	0-25	50-150
Metals (ICP/GFAA or ICP/MS) (EPA Methods 6010B/7000 or 6020)[5/]				
Arsenic	7440-38-2	0.028[9/]	0-20	75-125
Beryllium	7440-41-7	NL (0.1 to 1) [11/]	0-20	75-125
Calcium	7440-70-2	NL (50)	0-20	75-125
Cadmium	7440-43-9	NL (0.7 [9/])	0-20	75-125
Chromium	7440-47-3	NL (0.2 to 0.5) [9/]	0-20	75-125
Copper	7440-50-8	NL (0.1 to 0.5) [9/]	0-20	75-125
Lead	7439-92-1	NL (0.02 to 1) [9/]	0-20	75-125
Magnesium	7439-95-4	NL (20)	0-20	75-125
Mercury (by Method 7470A CVAA)	7439-97-6	NL (0.012[8/])	0-20	75-125
Nickel	7440-02-0	NL (0.2 to 0.5) [9/]	0-20	75-125
Potassium	7440-09-7	NL (20)	0-20	75-125
Selenium	7782-49-2	NL (1) [9/]	0-20	75-125
Silver	7440-22-4	NL (0.5 to 2) [9/]	0-20	75-125
Sodium	7440-23-5	NL (100)	0-20	75-125
Thallium (by Method 7841 GFAA)	7440-28-0	NL (0.6 to 1) [9/]	0-20	75-125
Zinc	7440-66-6	NL (0.5 to 4)	0-20	75-125

Table 3-2. Reporting and QC Limits for Water (Page 5 of 6)

	CAS Number	ReportingLimits for Water[1/] (µg/L)	Project Specific QC Limits for Water[2/]	
			RPD	% R
TPH-Diesel Extended Range (GC) (NWTPH-Dx)				
Diesel Range (Jet Fuels through Diesel #2)	NA	250	0-30	50-150
Motor Oil Range (after Diesel #2)	NA	500	0-30	50-150
Polynuclear Aromatic Hydrocarbons (GC/MS -SIM) (EPA Method 8270C SIM)[6/]				
Acenaphthene	83-32-9	0.010[10/]	0-25	50-150
Acenaphthylene	208-96-8	0.010[10/]	0-25	50-150
Anthracene	120-12-7	0.010[10/]	0-25	50-150
Benzo(a)anthracene	56-55-3	0.010[10/]	0-25	50-150
Benzo(a)pyrene	50-32-8	0.010[10/]	0-25	50-150
Benzo(b)fluoranthene	205-99-2	0.010[10/]	0-25	50-150
Benzo(g,h,I)perylene	191-24-2	0.010[10/]	0-25	50-150
Benzo(k)fluoranthene	207-08-9	0.010[10/]	0-25	50-150
Chrysene	218-01-9	0.010[10/]	0-25	50-150
Dibenzo(a,h)anthracene	53-70-3	0.010[10/]	0-25	50-150
Fluoranthene	206-44-0	0.010[10/]	0-25	50-150
Fluorene	86-73-7	0.010[10/]	0-25	50-150
Indeno(1,2,3-cd)pyrene	193-39-5	0.010[10/]	0-25	50-150
Naphthalene	91-20-3	0.010[10/]	0-25	50-150
Phenanthrene	85-01-8	0.010[10/]	0-25	50-150
Pyrene	129-00-0	0.010[10/]	0-25	50-150
Conventionals				
Alkalinity	NA	NL	0-20	NA
Ammonia as Nitrogen	NA	30	0-20	80-120
Chloride	NA	NL	0-20	80-120
Conductivity	NA	NL	0-20	NA
Fluoride	NA	NL	0-20	80-120
Nitrate as Nitrogen	NA	NL	0-20	80-120
Otho-phosphate	NA	NL	0-20	80-120
PH	NA	NA	0-20	NA
Sulfate	NA	NL	0-20	80-120
Total Dissolved Solids	NA	10,000	0-20	NA
Total Organic Carbon	NA	1,000	0-20	80-120
Total Suspended Solids	NA	4,000	0-20	NA

Table 3-2. Reporting and QC Limits for Water (Part 6 of 6)

	CAS Number	ReportingLimits for Water[1/] (µg/L)	Project Specific QC Limits for Water[2/]	
			RPD	% R
Other				
Cation-Anion Balance	NA	NA	NA	NA
Tannin and Lignin	NA	NL	0-20	80-120

Sources: Volatiles, Semi-volatiles, Pesticides, PCBs, Metals, Polynuclear Aromatic Hydrocarbons (EPA, 1996a) (ARI, 2001); TPH (Ecology, 1997); Conventionals (EPA, 1983).

NA = Not applicable.

NL = A quantitation limit is not listed in the method.

[1/] Specific quantitation or reporting limits are matrix dependent. The limits listed herein are provided for guidance and may not always be achievable. For VOAs, RLs are based upon a 20 ml purge volume.

[2/] Project-specific QC limits are listed; the off-site laboratory will provide laboratory-specific guidelines developed from laboratory QC samples.

[3/] Because of the nature of the analytical method, other compounds may be identified than appear on this table.

[4/] Quantitation limits for individual target analytes are not listed in Method 8081A. The quantitation limits listed in this table are derived from recent laboratory detection limit studies (ARI, 2001) . Actual quantitation limits are a function of the specific instrument, matrix, and operating conditions, and must be determined by the laboratory.

[5/] For metals, the EPA methods list estimated instrument detection limits (IDLs) for guidance. Quantitation limits are not specified by the EPA methods, and are a function of the specific instrument, matrix, and operating conditions, and must be determined by the laboratory. Estimated quantitation limits, as provided in parentheses in this table, are typical of those that a laboratory can achieve by Method 6020.

[6/] EPA Method 8310 HPLC may be substituted if all criteria listed in this table are met.

[7/] Polycyclic Aromatic Hydrocarbons (PAHs) must be analyzed by SIM to achieve required detection limits. See Reporting Limit for SIM.

[8/] Commercial laboratories may be unable to achieve this regulatory driven limit. Use special analytical procedures (SAS) and report to MDL. Extra sample volume may be required.

[9/] The laboratory must report to the MDL in order to achieve this regulatory driven limit.

[10/] The laboratory may need to use ultra low preparation options and report to MDL to achieve this regulatory driven limit. Additional sample volume may be required.

[11/] Commercial laboratories cannot attain the regulatory limit, which is lower than the value shown. Use special analytical procedures (SAS) and report to MDL. Extra sample volume may be required.

Table 3-3 Estimated Quantitation and QC Limits for Soils (Part 1 of 5)

	CAS Number	Estimated Quantitation Limits for Low Soils[1/] (mg/kg)	Project Specific QC Limits for Soils[2/]	
			RPD	% R
Polynuclear Aromatic Hydrocarbons (GC/MS) (EPA Method 8270C)				
Acenaphthene	83-32-9	0.07[7/]	0-30	50-150
Acenaphthylene	208-96-8	0.07[7/]	0-30	50-150
Anthracene	120-12-7	0.07[7/]	0-30	50-150
Benzo(a)anthracene	56-55-3	0.07[7/]	0-30	50-150
Benzo(b)fluoranthene	205-99-2	0.07[7/]	0-30	50-150
Benzo(k)fluoranthene	207-08-9	0.07[7/]	0-30	50-150
Benzo(g,h,I)perylene	191-24-2	0.07[7/]	0-30	50-150
Benzo(a)pyrene	50-32-8	0.07[7/]	0-30	50-150
Chrysene	218-01-9	0.07[7/]	0-30	50-150
Dibenzo(a,h)anthracene	53-70-3	0.07[7/]	0-30	50-150
Fluoranthene	206-44-0	0.07[7/]	0-30	50-150
Fluorene	86-73-7	0.07[7/]	0-30	50-150
Indeno(1,2,3-cd)pyrene	193-39-5	0.07[7/]	0-30	50-150
Naphthalene	91-20-3	0.07[7/]	0-30	50-150
Phenanthrene	85-01-8	0.07[7/]	0-30	50-150
Pyrene	129-00-0	0.07[7/]	0-30	50-150
Pesticides (GC) (EPA Method 8081A)				
Aldrin	309-00-2	0.001	0-25	50-150
Alpha-BHC	319-84-6	0.001	0-25	50-150
Alpha-Chlordane	5103-71-9	0.001	0-25	50-150
Beta-BHC	319-85-4	0.001	0-25	50-150
Delta-BHC	319-86-8	0.001	0-25	50-150
Gamma-BHC (Lindane)	58-89-9	0.001	0-25	50-150
Gamma-Chlordane	5103-74-2	0.001	0-25	50-150
4,4'-DDD	72-54-8	0.002	0-25	50-150
4,4'-DDE	72-55-9	0.002	0-25	50-150
4,4'-DDT	50-29-3	0.002	0-25	50-150
Dieldrin	60-57-1	0.002	0-25	50-150
Endosulfan I	959-98-8	0.001	0-25	50-150
Endosulfan II	33213-65-9	0.002	0-25	50-150
Endosulfan sulfate	1031-07-8	0.002	0-25	50-150
Endrin	72-20-8	0.002	0-25	50-150
Endrin Aldehyde	7421-36-3	0.002	0-25	50-150
Endrin Ketone	53494-70-5	0.002	0-25	50-150
Heptachlor	76-44-8	0.001	0-25	50-150
Heptachlor epoxide	1024-57-3	0.001	0-25	50-150
Methoxychlor	72-43-5	0.010	0-25	50-150
Hexachlorobutadiene	118-74-1	0.001	0-25	50-150
Hexachlorobenzene	87-68-3	0.001	0-25	50-150
Toxaphene	8001-35-2	0.10	0-25	50-150

Table 3-3 Estimated Quantitation and QC Limits for Soils (Part 2 of 5)

	CAS Number	Estimated Quantitation Limits for Low Soils[1/] (mg/kg)	Project Specific QC Limits for Soils[2/]	
			RPD	% R
PCBs (GC) (EPA Method 8082)				
Aroclor-1016	12674-11-2	0.02	0-30	50-150
Aroclor-1221	11104-28-2	0.02	0-30	50-150
Aroclor-1232	11141-16-5	0.02	0-30	50-150
Aroclor-1242	53469-21-9	0.02	0-30	50-150
Aroclor-1248	12672-29-6	0.02	0-30	50-150
Aroclor-1254	11097-69-1	0.02	0-30	50-150
Aroclor-1260	11096-82-5	0.02	0-30	50-150
Metals (GFAA, ICP, or ICP/MS) (EPA Methods 7060A/7421 or 6010B or 6020)[3/]				
Antimony	7440-36-0	NL (0.2 to 5)	0-20	75-125
Arsenic	7440-38-2	NL (0.2 to 0.5)	0-20	75-125
Barium	7440-39-3	NL (0.3 to 0.5)	0-20	75-125
Cadmium	7440-43-9	NL (0.05 to 0.2)	0-20	75-125
Chromium	7440-47-3	NL (0.3 to 0.5)	0-20	75-125
Cobalt	7440-48-4	NL (0.2 to 0.3)	0-20	75-125
Copper	7440-50-8	NL (0.1 to 0.5)	0-20	75-125
Lead	7439-92-1	NL (0.05 to 1)	0-20	75-125
Manganese	7439-96-5	NL (0.1 to 0.5)	0-20	75-125
Mercury (by Method 7470A CVAA)	7439-97-6	NL (0.05 to 0.1)	0-20	75-125
Nickel	7440-02-0	NL (0.5 to 1)	0-20	75-125
Selenium	7782-49-2	NL (0.5 to 5)	0-20	75-125
Silver	7440-22-4	NL (0.3 to 0.5)	0-20	75-125
Thallium	7440-28-0	NL (0.1 to 0.2)	0-20	75-125
Vanadium	7440-62-2	NL (0.2 to 0.3)	0-20	75-125
Zinc	7440-66-6	NL (0.6 to 4.0)	0-20	75-125
TPH-Diesel Extended Range (GC) (NWTPH-Dx)				
Diesel Range (Jet Fuels through Diesel #2)	NA	250	0-30	50-150
Motor Oil Range (after Diesel #2)	NA	500	0-30	50-150
TPH-Extractable Petroleum Hydrocarbons (GC) (NWEPH)				
C_8 to C_{10} Aliphatics	NA	50	0-25	70-130
$>C_{10}$ to C_{12} Aliphatics	NA	50	0-25	70-130
$>C_{12}$ to C_{16} Aliphatics	NA	50	0-25	70-130
$>C_{16}$ to C_{21} Aliphatics	NA	50	0-25	70-130
$>C_{21}$ to C_{34} Aliphatics	NA	50	0-25	70-130
C_8 to C_{10} Aromatics	NA	50	0-25	70-130
$>C_{10}$ to C_{12} Aromatics	NA	50	0-25	70-130
$>C_{12}$ to C_{16} Aromatics	NA	50	0-25	70-130
$>C_{16}$ to C_{21} Aromatics	NA	50	0-25	70-130
$>C_{21}$ to C_{34} Aromatics	NA	50	0-25	70-130

Table 3-3 Estimated Quantitation and QC Limits for Soils (Part 3 of 5)

	CAS Number	Estimated Quantitation Limits for Low Soils[1/] (mg/kg)	Project Specific QC Limits for Soils[2/]	
			RPD	% R
Semi-Volatiles (GC/MS) (EPA Method 8270C)[10/11/]				
Acenaphthene	83-32-9	0.07[7/]	0-50	50-150
Acenaphthylene	208-96-8	0.07[7/]	0-50	50-150
Anthracene	120-12-7	0.07[7/]	0-50	50-150
Benzo(a)anthracene	56-55-3	0.07[7/]	0-50	50-150
Benzo(b)fluoranthene	205-99-2	0.07[7/]	0-50	50-150
Benzo(k)fluoranthene	207-08-9	0.07[7/]	0-50	50-150
Benzo(g,h,i)perylene	191-24-2	0.07[7/]	0-50	50-150
Benzo(a)pyrene	50-32-8	0.07[7/]	0-50	50-150
Benzyl Alcohol	100-51-6	1.3	0-50	50-150
Bis(2-chloroethyl)ether	111-44-4	0.66	0-50	50-150
Bis(2-chloroisopropyl)ether	108-60-1	0.66	0-50	50-150
4-bromophenyl phenyl ether	101-53-3	0.66	0-50	50-150
Butyl benzyl phthalate	85-68-7	0.66	0-50	50-150
Carbazole	86-74-8	NL [6/]	0-50	50-150
4-Chloroaniline	106-47-8	1.3	0-50	50-150
4-Chloro-3-methylphenol	59-50-7	1.3	0-50	50-150
2-Chloronaphthalene	91-58-7	0.66	0-50	50-150
2-Chlorophenol	95-57-8	0.66	0-50	50-150
4-Chlorophenyl phenyl ether	7005-72-3	0.66	0-50	50-150
Chrysene	218-01-9	0.07[7/]	0-50	50-150
Dibenzo(a,h)anthracene	53-70-3	0.07[7/]	0-50	50-150
Dibenzofuran	132-64-9	0.66	0-50	50-150
Di-n-butyl phthalate	84-74-2	NL	0-50	50-150
1,2-Dichlorobenzene	95-50-1	0.66	0-50	50-150
1,3-Dichlorobenzene	541-73-1	0.66	0-50	50-150
1,4-Dichlorobenzene	106-46-7	0.66	0-50	50-150
3,3'-Dichlorobenzidine	91-94-1	1.3	0-50	50-150
2,4-Dichlorophenol	120-83-2	0.66	0-50	50-150
Diethyl phthalate	84-66-2	0.66	0-50	50-150
2,4-Dimethylphenol	105-67-9	0.66	0-50	50-150
Dimethyl phthalate	131-11-3	0.66	0-50	50-150
4,6-Dinitro-2-methylphenol	534-52-1	3.3	0-50	50-150
2,4-Dinitrophenol	51-28-5	3.3	0-50	50-150
2,4-Dinitrotoluene	121-14-2	0.66	0-50	50-150
2,6-Dinitrotoluene	606-20-2	0.66	0-50	50-150
Di-n-octyl phthalate	117-84-0	0.66	0-50	50-150
Bis(2-ethylhexyl)phthalate	117-81-7	0.66	0-50	50-150
Fluoranthene	206-44-0	0.07[7/]	0-50	50-150
Fluorene	86-73-7	0.07[7/]	0-50	50-150
Hexachlorobenzene	118-74-1	0.55[7/]	0-50	50-150

Table 3-3 Estimated Quantitation and QC Limits for Soils (Part 4 of 5)

	CAS Number	Estimated Quantitation Limits for Low Soils[1/] (mg/kg)	Project Specific QC Limits for Soils[2/]	
			RPD	% R
Semi-Volatiles (GC/MS) (EPA Method 8270C)[10/11/], *continued*				
Hexachlorobutadiene	87-68-3	0.66	0-50	50-150
Hexachlorocyclopentadiene	77-47-4	0.66	0-50	50-150
Hexachloroethane	67-72-1	0.66	0-50	50-150
Indeno(1,2,3-cd)pyrene	193-39-5	0.07[7/]	0-50	50-150
Isophorone	78-59-1	0.66	0-50	50-150
2-Methylnaphthalene	91-57-6	0.66	0-50	50-150
2-Methylphenol	95-48-7	0.66	0-50	50-150
3-Methylphenol [8/]	108-39-4	NL	0-50	50-150
4-Methylphenol [9/]	106-44-5	0.66	0-50	50-150
Naphthalene	91-20-3	0.07[7/]	0-50	50-150
2-Nitroaniline	88-74-4	3.3	0-50	50-150
3-Nitroaniline	99-09-2	3.3	0-50	50-150
4-Nitroaniline	100-01-6	NL	0-50	50-150
Nitrobenzene	98-95-3	0.66	0-50	50-150
2-Nitrophenol	88-75-5	0.66	0-50	50-150
4-Nitrophenol	100-02-7	3.3	0-50	50-150
N-Nitrosodiphenylamine	86-30-6	0.66	0-50	50-150
N-Nitroso-di-n-propylamine	621-64-7	0.13[7/]	0-50	50-150
Pentachlorophenol	87-86-5	2.0[7/]	0-50	50-150
Phenanthrene	85-01-8	0.07[7/]	0-50	50-150
Phenol	108-95-2	0.66	0-50	50-150
Pyrene	129-00-0	0.07[7/]	0-50	50-150
1,2,4-Trichlorobenzene	120-82-1	0.66	0-50	50-150
2,4,5-Trichlorophenol	95-95-4	0.66	0-50	50-150
2,4,6-Trichlorophenol	88-06-2	0.66	0-50	50-150
TPH-Gasolinie (GC) (NWTPH-Gx)				
Gasoline Range	NA	30	0-30	50-150
TPH-Volatile Petroleum Hydrocarbons (GC) (NWVPH)				
C_8 to C_{10} Aromatics	NA	50	0-25	70-130
$>C_{10}$ to C_{12} Aromatics	NA	50	0-25	70-130
$>C_{12}$ to C_{13} Aromatics	NA	50	0-25	70-130
C_5 to C_6 Aliphatics	NA	50	0-25	70-130
$>C_6$ to C_8 Aliphatics	NA	50	0-25	70-130
$>C_8$ to C_{10} Aliphatics	NA	50	0-25	70-130
$>C_{10}$ to C_{12} Aliphatics	NA	50	0-25	70-130

Table 3-3 Estimated Quantitation and QC Limits for Soils (Part 5 of 5)

	CAS Number	Estimated Quantitation Limits for Low Soils[1/] (mg/kg)	Project Specific QC Limits for Soils[2/]	
			RPD	% R
Dioxin/Furans (HRMS) (1613B)[4/]				
2,3,7,8-TCDD	1746-01-6	.000001	0-30	50-150
Total TCDD	41903-57-5			
2,3,7,8-TCDF	51207-31-9	.000001	0-30	50-150
Total TCDF	55722-27-5			
1,2,3,7,8-PeCDD	40321-76-4	.000005	0-30	50-150
Total PeCDD	36088-22-9			
1,2,3,7,8-PeCDF	57117-41-6	.000005	0-30	50-150
2,3,4,7,8-PeCDF	57117-31-4	.000005	0-30	50-150
Total PeCDF	30402-15-4			
1,2,3,4,7,8-HxCDD	39227-28-6	.000005	0-30	50-150
1,2,3,6,7,8-HxCDD	57653-85-7	.000005	0-30	50-150
1,2,3,7,8,9-HxCDD	19408-74-3	.000005	0-30	50-150
Total HxCDD	34465-46-8			
1,2,3,4,7,8-HxCDF	70648-26-9	.000005	0-30	50-150
1,2,3,6,7,8-HxCDF	57117-44-9	.000005	0-30	50-150
1,2,3,7,8,9-HxCDF	72918-21-9	.000005	0-30	50-150
2,3,4,6,7,8-HxCDF	60851-34-5	.000005	0-30	50-150
Total HxCDF	55684-94-1			
1,2,3,4,6,7,8-HpCDD	35822-46-9	.000005	0-30	50-150
Total HpCDD	37871-00-4			
1,2,3,4,6,7,8-HpCDF	67562-39-4	.000005	0-30	50-150
1,2,3,4,7,8,9-HpCDF	55673-89-7	.000005	0-30	50-150
Total HpCDF	38998-75-3			
OCDD	3268-87-9	.000010	0-30	50-150
OCDF	39001-02-0	.000010	0-30	50-150
Other				
Cation Exchange Capacity	NA	NL	0-20	75-125

Sources: Semi-volatiles, PCBs, Metals (EPA, 1996a); TPH (Ecology, 1997); Dioxin/Furans (EPA, 1994a).

NA = Not applicable.
NL = A quantitation limit is not listed in the method.

1/ Specific quantitation limits are matrix dependent. The quantitation limits listed herein are provided for guidance and may not be achievable. Quantitation limits listed for soil are based on wet weight. The quantitation limits calculated on a dry weight basis will be higher. "Low Soil" denotes a quantitation limit that is achievable in soil samples containing low concentrations of the respective analyte.

2/ Project-specific QC limits are listed; the off-site laboratory will provide laboratory-specific guidelines developed from laboratory QC samples.

3/ For metals, the EPA methods list estimated instrument detection limits (IDLs) for guidance. Quantitation limits are not specified by the EPA methods, and are a function of the specific instrument, matrix, and operating conditions, and must be determined by the laboratory. Estimated quantitation limits, as provided in parentheses in this table, are typical of those that a laboratory can achieve by Method 6020.

4/ For dioxin/furans, quantitation limits listed herein are defined as the levels at which the entire analytical system can give recognizable signals and acceptable calibration points. The values are equivalent to the concentrations of the lowest calibration standard, assuming that all method-specified sample weights, volumes, and cleanup procedures have been employed.

6/ NL = The quantitation limit for this compound is not listed in Method 8270C, the project specific limits are noted.

7/ Project specific limit; the laboratory may be required to report to MDL to achieve this limit.

8/ Typically co-elutes with 4 methylphenol.

9/ Typically co-elutes with 3 methylphenol.

10/ Quantitation limits for Method 8270C are based on a 30-gram sample and gel permeation chromatography cleanup.

11/ Compound list for Method 8270C assumes Method 3550B for soils/solids.

Table 3-4 Data Quality Objectives for Sediment (Part 1 of 2)

	CAS Number	Recommended MDL or Estimated Quantitation Limit [1/]	Project Specific QC Limits for Sediment [3/]	
			RPD	% R
Conventionals				
Total Organic Carbon (%)	---	0.1	0-20	80-120
Grain Size	---	---	0-20	---
Metals (mg/kg dry weight)				
Aluminum	7429-90-5	NL (2 to 5)	0-20	75-125
Antimony	7440-36-0	NL (0.2 to 5)	0-20	75-125
Arsenic	7440-38-2	NL (0.2 to 0.5)	0-20	75-125
Barium	7440-39-3	NL (0.3 to 0.5)	0-20	75-125
Beryllium	7440-41-7	NL (0.1 to 1)	0-20	75-125
Cadmium	7440-43-9	NL (0.05 to 0.2)	0-20	75-125
Calcium	7440-70-2	NL (5 to 50)	0-20	75-125
Chromium	7440-47-3	NL (0.3 to 0.5)	0-20	75-125
Cobalt	7440-48-4	NL (0.2 to 0.3)	0-20	75-125
Copper	7440-50-8	NL (0.1 to 0.5)	0-20	75-125
Iron	7439-89-6	NL (5 to 20)	0-20	75-125
Lead	7439-92-1	NL (0.05 to 1)	0-20	75-125
Magnesium	7439-95-4	NL (5 to 20)	0-20	75-125
Manganese	7439-96-5	NL (0.1 to 0.5)	0-20	75-125
Mercury (by Method 7470A CVAA)	7439-97-6	NL (0.05 to 0.1)	0-20	75-125
Nickel	7440-02-0	NL (0.5 to 1)	0-20	75-125
Potassium	7440-09-7	NL (20 to 50)	0-20	75-125
Selenium	7782-49-2	NL (0.5 to 5)	0-20	75-125
Silver	7440-22-4	NL (0.3 to 0.5)	0-20	75-125
Sodium	7440-23-5	NL (50 to 100)	0-20	75-125
Thallium	7440-28-0	NL (0.2 to 5)	0-20	75-125
Vanadium	7440-62-2	NL (0.2 to 0.3)	0-20	75-125
Zinc	7440-66-6	NL (0.6 to 4.0)	0-20	75-125
Polynuclear Aromatic Hydrocarbons (μg/kg dry weight)				
Naphthalene	91-20-3	20	0-50	50-150
Acenaphthylene	208-96-8	20	0-50	50-150
Acenaphthene	83-32-9	20	0-50	50-150
Fluorene	86-73-7	20	0-50	50-150
Phenanthrene	85-01-8	20	0-50	50-150
Anthracene	120-12-7	20	0-50	50-150
Fluoranthene	206-44-0	20	0-50	50-150
Pyrene	129-00-0	20	0-50	50-150
Benzo(a)anthracene	56-55-3	20	0-50	50-150
Chrysene	218-01-9	20	0-50	50-150
Benzo(b)fluoranthene	205-99-2	20	0-50	50-150
Benzo(k)fluoranthene	207-08-9	20	0-50	50-150
Benzo(a)pyrene	50-32-8	20	0-50	50-150

Table 3-4 Data Quality Objectives for Sediment (Part 2 of 2)

	CAS Number	Recommended MDL or Estimated Quantitation Limit [1/]	Project Specific QC Limits for Sediment [3/]	
			RPD	% R
Polynuclear Aromatic Hydrocarbons (µg/kg dry weight), *continued*				
Indeno(1,2,3-c,d)pyrene	193-39-5	20	0-50	50-150
Dibenzo(a,h)anthracene	53-70-3	20	0-50	50-150
Benzo(g,h,i)perylene	191-24-2	20	0-50	50-150
Dioxins/Furans				
2,3,7,8-TCDD	1746-01-6	.001	0-50	50-150
Total TCDD	41903-57-5	---	---	---
2,3,7,8-TCDF	51207-31-9	.001	0-50	50-150
Total TCDF	55722-27-5	---	---	---
1,2,3,7,8-PeCDD	40321-76-4	.005	0-50	50-150
Total PeCDD	36088-22-9	---	---	---
1,2,3,7,8-PeCDF	57117-41-6	.005	0-50	50-150
2,3,4,7,8-PeCDF	57117-31-4	.005	0-50	50-150
Total PeCDF	30402-15-4	---	---	---
1,2,3,4,7,8-HxCDD	39227-28-6	.005	0-50	50-150
1,2,3,6,7,8-HxCDD	57653-85-7	.005	0-50	50-150
1,2,3,7,8,9-HxCDD	19408-74-3	.005	0-50	50-150
Total HxCDD	34465-46-8	---	---	---
1,2,3,4,7,8-HxCDF	70648-26-9	.005	0-50	50-150
1,2,3,6,7,8-HxCDF	57117-44-9	.005	0-50	50-150
1,2,3,7,8,9-HxCDF	72918-21-9	.005	0-50	50-150
2,3,4,6,7,8-HxCDF	60851-34-5	.005	0-50	50-150
Total HxCDF	55684-94-1	---	---	---
1,2,3,4,6,7,8-HpCDD	35822-46-9	.005	0-50	50-150
Total HpCDD	37871-00-4	---	---	---
1,2,3,4,6,7,8-HpCDF	67562-39-4	.005	0-50	50-150
1,2,3,4,7,8,9-HpCDF	55673-89-7	.005	0-50	50-150
Total HpCDF	38998-75-3	---	---	---
OCDD	3268-87-9	.010	0-50	50-150
OCDF	39001-02-0	.010	0-50	50-150

Sources: Conventionals Metals, PAHs (EPA, 1996a); Dioxin/Furans (EPA, 1994a).

MDL = Method Detection Limit
NL = An MDL or estimated quantitation limit is not listed in the applicable method. The value listed in parentheses (if applicable) represents an estimated quantitation limit (uncorrected for sample moisture content) that may be achieved by a laboratory.
SQS = Sediment Quality Standard
--- = Not applicable.

1/ Sample-specific quantitation limits are matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.
3/ Project-specific QC limits are listed; the off-site laboratory may provide laboratory-specific guidelines developed from laboratory QC samples.

Table 3-5 Data Quality Objectives for Biota (Part 1of 2)

	CAS Number	Estimated Quantitation Limit [1/]	Project Specific QC Limits for Biota [2/]	
			RPD	% R
Metals (mg/kg wet weight)				
Antimony	7440-36-0	NL (0.2 to 5)	0-20	75-125
Arsenic	7440-38-2	NL (0.2 to 0.5)	0-20	75-125
Barium	7440-39-3	NL (0.3 to 0.5)	0-20	75-125
Cadmium	7440-43-9	NL (0.05 to 0.2)	0-20	75-125
Chromium	7440-47-3	NL (0.3 to 0.5)	0-20	75-125
Cobalt	7440-48-4	NL (0.2 to 0.3)	0-20	75-125
Copper	7440-50-8	NL (0.1 to 0.5)	0-20	75-125
Lead	7439-92-1	NL (0.05 to 1)	0-20	75-125
Manganese	7439-96-5	NL (0.1 to 0.5)	0-20	75-125
Mercury (by Method 7470A CVAA)	7439-97-6	NL (0.05 to 0.1)	0-20	75-125
Nickel	7440-02-0	NL (0.5 to 1)	0-20	75-125
Selenium	7782-49-2	NL (0.5 to 5)	0-20	75-125
Silver	7440-22-4	NL (0.3 to 0.5)	0-20	75-125
Thallium	7440-28-0	NL (0.1 to 0.2)	0-20	75-125
Vanadium	7440-62-2	NL (0.2 to 0.3)	0-20	75-125
Zinc	7440-66-6	NL (0.6 to 4.0)	0-20	75-125
PCBs (µg/kg wet weight)				
Aroclor-1016	12674-11-2	NL (10)	0-50	50-150
Aroclor-1221	11104-28-2	NL (10)	0-50	50-150
Aroclor-1232	11141-16-5	NL (10)	0-50	50-150
Aroclor 1242	53469-21-9	NL (10)	0-50	50-150
Aroclor-1248	12672-29-6	NL (10)	0-50	50-150
Aroclor 1254	11097-69-1	NL (10)	0-50	50-150
Aroclor 1260	11096-82-5	NL (10)	0-50	50-150
Selected Congeners	---	NL (0.5)	0-50	50-150
Dioxins/Furans (µg/kg wet weight)				
2,3,7,8-TCDD	1746-01-6	0.00012 [3/]	0-50	50-150
Total TCDD	41903-57-5	---	0-50	50-150
2,3,7,8-TCDF	51207-31-9	0.00013 [3/]	0-50	50-150
Total TCDF	55722-27-5	---	0-50	50-150
1,2,3,7,8-PeCDD	40321-76-4	0.00025 [3/]	0-50	50-150
Total PeCDD	36088-22-9	---	0-50	50-150
1,2,3,7,8-PeCDF	57117-41-6	0.00014 [3/]	0-50	50-150
2,3,4,7,8-PeCDF	57117-31-4	0.00018 [3/]	0-50	50-150
Total PeCDF	30402-15-4	---	0-50	50-150
1,2,3,4,7,8-HxCDD	39227-28-6	0.00038 [3/]	0-50	50-150
1,2,3,6,7,8-HxCDD	57653-85-7	0.00048 [3/]	0-50	50-150
1,2,3,7,8,9-HxCDD	19408-74-3	0.0003 [3/]	0-50	50-150
Total HxCDD	34465-46-8	---	---	---

Table 3-5. Data Quality Objectives for Biota (Part 2 of 2)

	CAS Number	Estimated Quantitation Limit [1/]	Project Specific QC Limits for Biota [2/]	
			RPD	% R
Dioxins/Furans (μg/kg wet weight), *continued*				
1,2,3,4,7,8-HxCDF	70648-26-9	0.00027 [3/]	0-50	50-150
1,2,3,6,7,8-HxCDF	57117-44-9	0.00023 [3/]	0-50	50-150
1,2,3,7,8,9-HxCDF	72918-21-9	0.00014 [3/]	0-50	50-150
2,3,4,6,7,8-HxCDF	60851-34-5	0.00025 [3/]	0-50	50-150
Total HxCDF	55684-94-1	---	---	---
1,2,3,4,6,7,8-HpCDD	35822-46-9	0.00041 [3/]	0-50	50-150
Total HpCDD	37871-00-4	---	---	---
1,2,3,4,6,7,8-HpCDF	67562-39-4	0.00052 [3/]	0-50	50-150
1,2,3,4,7,8,9-HpCDF	55673-89-7	0.00042 [3/]	0-50	50-150
Total HpCDF	38998-75-3	---	---	---
OCDD	3268-87-9	0.00035 [3/]	0-50	50-150
OCDF	39001-02-0	0.0014 [3/]	0-50	50-150
Other				
Percent Lipid	---	---	0-50	---

Sources: Metals, Pesticides, PAHs, PCB Aroclors,PCB Congeners and Percent Lipids (EPA, 1996a); Dioxin/Furans (EPA, 1994a).

NL = An estimated quantitation limit is not listed in the applicable method. The value listed in parentheses (if applicable) represents an estimated quantitation limit that may be achieved by a laboratory.

--- = Not applicable.

[1/] Sample-specific quantitation limits are matrix dependent. The estimated quantitation limits listed herein are provided for guidance and may not always be achievable. Limits for dioxins/furans are based upon a recent laboratory MDL study using a 20 gram sample in fish tissue; limits for other species may be higher. Limits will vary between laboratories and individual analytical runs. Limits may require reporting to the MDL.

[2/] Project-specific QC limits are listed; the off-site laboratory may provide laboratory-specific guidelines developed from laboratory QC samples.

[3/] The value shown is the estimated MDL for a 20 gram sample. The desired quantitation limit for 2,3,7,8, TCDD is 0.000042 ug/kg, which may not be attainable in a commercial laboratory, even with 100 gram samples. The desired limit for other dioxin and furan isomers is of the same order of magnitude. Report to the MDL, using additional sample volume where feasible.

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