7. QUALITY ASSURANCE AND QUALITY CONTROL REQUIREMENTS

7.1 DATA QUALITY OBJECTIVES

Table 3-1 of the QAPP indicates the analytical data quality objective (DQO) level for each analytical method used. Project-specific DQOs for laboratory analyses of sediment and tissue samples are presented in Tables 7-1 and 7-2.

7.2 FIELD QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Field QA/QC samples will be used to evaluate the efficiency of field decontamination procedures, variability resulting from sample handling, and site heterogeneity. All field quality control samples will be documented in the site logbook. Detailed descriptions of the field QA/QC samples that will be collected and analyzed are discussed in Section 7.8 of the QAPP. Field QA/QC samples for sediment and marine biota sampling include:

- Source water blanks (field blanks)
- Equipment rinsate blanks
- Field duplicates

Source water blanks and equipment rinsate blanks will be collected (as applicable) at a rate of one per day per sampling method. Blind field duplicates will be collected at a rate of 5 percent (one per 20 samples). Additionally, at the discretion of the QC Manager, split samples may be collected in order to check the degree of variance introduced by the laboratory in analyzing the samples. The split samples will be sent to a different laboratory than the primary laboratory.

Table 7-1. Data Quality Objectives for Sediment

	CAS Number	Recommended MDL or Estimated Quantitation Limit [1/]	SQS [2/]	Project Specific QC Limits for Sediment [3/]	
				RPD	% R
Conventionals					
Total Solids (%)	---	0.1	---	0-20	---
Total Volatile Solids (%)	---	0.1	---	0-20	---

Table 7-1. Data Quality Objectives for Sediment

	CAS Number	Recommended MDL or Estimated Quantitation Limit [1/]	SQS [2/]	Project Specific QC Limits for Sediment [3/]	
				RPD	% R
Total Organic Carbon (%)	---	0.1	---	0-20	80-120
Total Sulfides (mg/kg)	---	1	---	0-20	80-120
Acid Volatile Sulfides (mg/kg)	---	NL (0.5)	---	0-20	80-120
Ammonia (mg/kg)	---	1	---	0-20	80-120
Grain Size	---	---	---	0-20	---
Metals (mg/kg dry weight)					
Antimony	7440-36-0	2.5	150	0-20	75-125
Arsenic, speciated (inorganic and organic)	---	NL (1)	---	0-20	75-125
Arsenic	7440-38-2	1.0	57	0-20	75-125
Cadmium	7440-43-9	0.3	5.1	0-20	75-125
Copper	7440-50-8	15.0	390	0-20	75-125
Lead	7439-92-1	0.5	450	0-20	75-125
Mercury	7439-97-6	0.02	0.41	0-20	75-125
Nickel	7440-02-0	2.5	140	0-20	75-125
Selenium	7782-49-2	1.0	---	0-20	75-125
Silver	7440-22-4	0.2	6.1	0-20	75-125
Zinc	7440-66-6	15.0	410	0-20	75-125
LPAH (μg/kg dry weight)					
Naphthalene	91-20-3	20	2,100	0-50	50-150
Acenaphthylene	208-96-8	20	560	0-50	50-150
Acenaphthene	83-32-9	20	500	0-50	50-150
Fluorene	86-73-7	20	540	0-50	50-150
Phenanthrene	85-01-8	20	1,500	0-50	50-150
Anthracene	120-12-7	20	960	0-50	50-150
2-Methylnaphthalene	91-57-6	20	670	0-50	50-150
Total LPAH	---	---	5,200	---	---
HPAH (μg/kg dry weight)					
Fluoranthene	206-44-0	20	1,700	0-50	50-150
Pyrene	129-00-0	20	2,600	0-50	50-150
Benzo(a)anthracene	56-55-3	20	1,300	0-50	50-150
Chrysene	218-01-9	20	1,400	0-50	50-150

Table 7-1. Data Quality Objectives for Sediment

	CAS Number	Recommended MDL or Estimated Quantitation Limit [1/]	SQS [2/]	Project Specific QC Limits for Sediment [3/]	
				RPD	% R
Benzofluoranthenes	---	20	3,200	0-50	50-150
Benzo(a)pyrene	50-32-8	20	1,600	0-50	50-150
HPAH (continued)					
Indeno(1,2,3-c,d)pyrene	193-39-5	20	600	0-50	50-150
Dibenzo(a,h)anthracene	53-70-3	20	230	0-50	50-150
Benzo(g,h,i)perylene	191-24-2	20	670	0-50	50-150
Total HPAH	---	---	12,000	---	---
Chlorinated Hydrocarbons (µg/kg dry weight)					
1,2-Dichlorobenzene	95-50-1	10	35	0-50	50-150
1,4-Dichlorobenzene	106-46-7	10	110	0-50	50-150
1,2,4-Trichlorobenzene	120-82-1	10	31	0-50	50-150
Hexachlorobenzene	118-74-1	10	22	0-50	50-150
Hexachlorobutadiene	87-68-3	10	11	0-50	50-150
Phthalates (µg/kg dry weight)					
Dimethylphthalate	99-65-0	10	71	0-50	50-150
Diethylphthalate	84-66-2	10	200	0-50	50-150
Di-n-butylphthalate	84-74-2	10	1400	0-50	50-150
Butylbenzylphthalate	85-68-7	10	63	0-50	50-150
bis(2-Ethylhexyl)phthalate	117-81-7	10	1300	0-50	50-150
Di-n-octylphthalate	117-84-0	10	6200	0-50	50-150
Other SVOCs (µg/kg dry weight)					
Dibenzofuran	132-64-9	10	540	0-50	50-150
N-nitrosodiphenylamine	86-30-6	10	28	0-50	50-150
Pyridine	110-86-1	200	---	0-50	50-150
Phenols (µg/kg dry weight)					
Phenol	108-95-2	20	420	0-50	50-150
2-Methylphenol	95-48-7	6	63	0-50	50-150
4-Methylphenol (co-elutes with 3-Methylphenol)	106-44-5	20	670	0-50	50-150
2,4-Dimethylphenol	105-67-9	6	29	0-50	50-150
Pentachlorophenol	87-86-5	61	360	0-50	50-150
PCBs (µg/kg dry weight)					

Table 7-1. Data Quality Objectives for Sediment

	CAS Number	Recommended MDL or Estimated Quantitation Limit [1/]	SQS [2/]	Project Specific QC Limits for Sediment [3/]	
				RPD	% R
Aroclor 1242	53469-21-9	20	---	0-50	50-150
Aroclor 1254	11097-69-1	20	---	0-50	50-150
Aroclor 1260	11096-82-5	20	---	0-50	50-150
Selected Congeners	---	NL (0.5)	---	0-50	50-150
Pesticides (μg/kg dry weight)					
Alpha-BHC	319-84-6	2	---	0-50	50-150
Beta-BHC	319-85-4	0.6	---	0-50	50-150
Delta-BHC	319-86-8	2	---	0-50	50-150
Gamma-BHC (Lindane)	58-89-9	0.4	---	0-50	50-150
4,4'- DDD	72-54-8	0.8	---	0-50	50-150
4,4'- DDE	72-55-9	0.8	---	0-50	50-150
4,4'- DDT	50-29-3	0.7	---	0-50	50-150
Resin Acids, Fatty Acids, and Bleach Plant Derivatives (mg/kg dry weight)					
3,4,5-Trichloroguaiacol	57057-83-7	NL (0.3)	---	0-50	50-150
Tetrachloroguaiacol	2539-17-5	NL (0.3)	---	0-50	50-150
Linoleic Acid	60-33-3	NL (0.3)	---	0-50	50-150
Oleic Acid/Linolenic Acid	---	NL (0.3)	---	0-50	50-150
Pimaric Acid	127-27-5	NL (0.3)	---	0-50	50-150
Isopimaric Acid	5835-26-7	NL (0.3)	---	0-50	50-150
Dehydroabietic Acid	1740-19-8	NL (0.3)	---	0-50	50-150
Abietic Acid	514-10-3	NL (0.3)	---	0-50	50-150
9,10-Dichlorostearic Acid	5829-48-1	NL (0.3)	---	0-50	50-150
14-Chlorodehydroabietic Acid	65281-76-7	NL (0.3)	---	0-50	50-150
12-Chlorodehydroabietic Acid	65310-45-4	NL (0.3)	---	0-50	50-150
Dichlorodehydroabietic Acid	57055-39-7	NL (0.3)	---	0-50	50-150
Dioxins/Furans (μg /kg dry weight)					
2,3,7,8-TCDD	1746-01-6	.001	---	0-50	50-150
Total TCDD	41903-57-5	---	---	---	---

Table 7-1. Data Quality Objectives for Sediment

	CAS Number	Recommended MDL or Estimated Quantitation Limit [1/]	SQS [2/]	Project Specific QC Limits for Sediment [3/]	
				RPD	% R
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

Table 7-1. Data Quality Objectives for Sediment

	CAS Number	Recommended MDL or Estimated Quantitation Limit [1/]	SQS [2/]	Project Specific QC Limits for Sediment [3/]	
				RPD	% R

Sources: Conventionals Metals except arsenic, LPAH, HPAH, Phenols, PCB Aroclors (PSEP, 1997); Arsenic, speciated (EPA, 1996b,c); PCB Congeners (EPA, 1996a); Resin Acids, Fatty Acids, and Bleach Plant Derivatives (NCASI); 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/] Recommended MDLs are listed for target analytes that have SQLs and all conventionals. For the other target analytes, estimated quantitation limits are listed. Sample-specific quantitation limits are matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

[2/] The SQS values for nonionizable organic compounds listed herein are not TOC-based standards.

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

Table 7-2. Data Quality Objectives for Marine Biota

	CAS Number	Estimated Quantitation Limit [1/]	Project Specific QC Limits for Marine Biota [2/]	
			RPD	% R
Metals (mg/kg wet weight)				
Arsenic, speciated (inorganic and organic)	---	NL (0.002)	0-20	75-125
Arsenic	7440-38-2	NL (0.002)	0-20	75-125
Cadmium	7440-43-9	NL (0.04)	0-20	75-125
Copper	7440-50-8	NL (0.04)	0-20	75-125
Lead	7439-92-1	NL (0.2)	0-20	75-125
Mercury	7439-97-6	NL (0.05)	0-20	75-125
Selenium	7782-49-2	NL (0.4)	0-20	75-125
Zinc	7440-66-6	NL (0.15)	0-20	75-125
Polynuclear Aromatic Hydrocarbons (μg/kg wet weight)				
Acenaphthene	83-32-9	NL (0.5)	0-50	50-150
Acenaphthylene	208-96-8	NL (0.5)	0-50	50-150
Anthracene	120-12-7	NL (0.5)	0-50	50-150
Benzo(a)anthracene	56-55-3	NL (0.5)	0-50	50-150
Benzo(a)pyrene	50-32-8	NL (0.5)	0-50	50-150
Benzofluoranthenes	----	NL (0.5)	0-50	50-150
Benzo(b)fluoranthene	205-99-2	NL (0.5)	0-50	50-150
Benzo(k)fluoranthene	207-08-9	NL (0.5)	0-50	50-150
Benzo(g,h,i)perylene	191-24-2	NL (0.5)	0-50	50-150
Chrysene	218-01-9	NL (0.5)	0-50	50-150
Dibenz(a,h)anthracene	53-70-3	NL (0.5)	0-50	50-150
Fluoranthene	206-44-0	NL (0.5)	0-50	50-150
Fluorene	86-73-7	NL (0.5)	0-50	50-150
Indeno(1,2,3-c,d)pyrene	193-39-5	NL (0.5)	0-50	50-150
Naphthalene	91-20-3	NL (0.5)	0-50	50-150
2-Methylnaphthalene	91-57-6	NL (0.5)	0-50	50-150
Phenanthrene	85-01-8	NL (0.5)	0-50	50-150
Pyrene	129-00-0	NL (0.5)	0-50	50-150
Total LPAH	---	---	---	---

Table 7-2. Data Quality Objectives for Marine Biota

	CAS Number	Estimated Quantitation Limit [1/]	Project Specific QC Limits for Marine Biota [2/]	
			RPD	% R
Total HPAH	---	---	---	---
Phenols (μg/kg wet weight)				
Pentachlorophenol	87-86-5	NL (25)	0-50	50-150
SVOCs (μg/kg wet weight)				
Pyridine	110-86-1	NL (<70)	0-50	50-150
Pesticides (μg/kg wet weight)				
Alpha-BHC	319-84-6	NL (0.5 to 2)	0-50	50-150
Beta-BHC	319-85-7	NL (0.5 to 2)	0-50	50-150
Delta-BHC	319-86-8	NL (0.5 to 2)	0-50	50-150
Gamma-BHC (Lindane)	58-89-9	NL (0.5 to 2)	0-50	50-150
4,4'- DDD	72-54-8	NL (0.7)	0-50	50-150
4,4'- DDE	72-55-9	NL (0.7	0-50	50-150
4,4'- DDT	50-29-3	NL (0.7)	0-50	50-150
PCBs (μg/kg wet weight)				
Aroclor 1242	53469-21-9	NL (1.5 to 3)	0-50	50-150
Aroclor 1254	11097-69-1	NL (1.5 to 3)	0-50	50-150
Aroclor 1260	11096-82-5	NL (1.5 to 3)	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	.00012	0-50	50-150
Total TCDD	41903-57-5	---	0-50	50-150
2,3,7,8-TCDF	51207-31-9	.00013	0-50	50-150
Total TCDF	55722-27-5	---	0-50	50-150
1,2,3,7,8-PeCDD	40321-76-4	.00025	0-50	50-150
Total PeCDD	36088-22-9	---	0-50	50-150
1,2,3,7,8-PeCDF	57117-41-6	.00014	0-50	50-150
2,3,4,7,8-PeCDF	57117-31-4	.00018	0-50	50-150
Total PeCDF	30402-15-4	---	0-50	50-150
1,2,3,4,7,8-HxCDD	39227-28-6	.00038	0-50	50-150
1,2,3,6,7,8-HxCDD	57653-85-7	.00048	0-50	50-150
1,2,3,7,8,9-HxCDD	19408-74-3	.0003	0-50	50-150

Table 7-2. Data Quality Objectives for Marine Biota

	CAS Number	Estimated Quantitation Limit [1/]	Project Specific QC Limits for Marine Biota [2/]	
			RPD	% R
Total HxCDD	34465-46-8	---	---	---
1,2,3,4,7,8-HxCDF	70648-26-9	.00027	0-50	50-150
1,2,3,6,7,8-HxCDF	57117-44-9	.00023	0-50	50-150
1,2,3,7,8,9-HxCDF	72918-21-9	.00014	0-50	50-150
2,3,4,6,7,8-HxCDF	60851-34-5	.00025	0-50	50-150
Total HxCDF	55684-94-1	---	---	---
1,2,3,4,6,7,8-HpCDD	35822-46-9	.00041	0-50	50-150
Total HpCDD	37871-00-4	---	---	---
1,2,3,4,6,7,8-HpCDF	67562-39-4	.00052	0-50	50-150
1,2,3,4,7,8,9-HpCDF	55673-89-7	.00042	0-50	50-150
Dioxins/Furans (μg/kg wet weight) (continued)				
Total HpCDF	38998-75-3	---	---	---
OCDD	3268-87-9	.00035	0-50	50-150
OCDF	39001-02-0	.0014	0-50	50-150
Other				
Percent Lipid	---	---	0-50	---

Sources: Arsenic, speciated (EPA, 1996b,c); Pesticides; PAHs, Phenols, PCB Aroclors (PSEP, 1997); 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. Limts for PAHs based on SIM technique reporting to MDLs. Limits for PCBs may require method modifications and are based on reporting to MDLs. 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.

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