Appendix A
Updated Analytical Methods, DQIs, and Requirements

This appendix presents updated information (where needed) related to analytical methods, data quality indicators (DQIs), and laboratory requirements. Thus, the tables in this appendix include only the subset of chemicals for which updates are needed. This information has been updated based on changes to the selected laboratories for dioxin/furan analysis (will be done by Cape Fear Analytical) and polycyclic aromatic hydrocarbon (PAH)/semivolatile organic compound (SVOC) analyses (will be done by ALS-Kelso). These laboratories were added during the Phase II Pre-Design Investigation (PDI). DQIs for analyses listed in Appendix D that were not included in the PDI quality assurance project plan (QAPP) or QAPP Addendum 1 are also presented.

TABLES

Table A-1
Updated DQIs for Laboratory Analyses

Parameter[1]	Unit	Precision[2]	Accuracy[2]		Completeness
			CRM/LCS[3]	Spiked Samples	
PAHs[4]	µg/kg dw	± 35%	44–203%/ 30–130%	10–150%	90%
cPAHs[4]	µg/kg dw	± 35%	35–155%/ 35–130%	10–140%	90%
SVOCs	µg/kg dw	± 35%	10–160%	10–160%	90%
Hexachlorobenzene	µg/kg dw	± 35%	20–120%	20–120%	90%
Dioxins/furans	ng/kg dw	± 25%	50–150%/ 63–170%	63–170%[5]	90%

Notes:

1. Individual analytes are listed in Table A-9.
2. Values listed are method limits provided by the laboratories. The percentages provided represent the acceptance range for each parameter. Individual compound recoveries for PAHs and SVOCs are provided in Table A-9.
3. An LCS may be used to assess accuracy when CRM is unavailable. CRMs will be analyzed for PAHs, PCB Aroclors, and dioxins/furans only. The satisfactory acceptance limit for CRM recovery will include the uncertainty range around the CRM mean, as well as the uncertainty of the method measurement.
4. cPAHs and PAHs will be analyzed by EPA 8270E or 8270E-SIM, depending on selected laboratory procedures.
5. This is the labelled compound percent recovery range.

µg : microgram
cPAH: carcinogenic polycyclic aromatic hydrocarbon
CRM: certified reference material
DQI: data quality indicator
dw: dry weight
EPA: U.S. Environmental Protection Agency
kg: kilogram
LCS: laboratory control sample
ng: nanogram
PAH: polycyclic aromatic hydrocarbon
PCB: polychlorinated biphenyl
SIM: selected ion monitoring
SVOC: semivolatile organic compound

Table A-2
RAO 1, 2, and 4 COCs, Associated RL Goals (Updated), and RALs for Sediment Samples

COC	Method	Unit	RL	RAL[1]
cPAH[2]	EPA 8270D	µg TEQ/kg dw	18.1[3]	900[4]
cPAH[2]	EPA 8270D SIM	µg TEQ/kg dw	4.5[3]	900[4]
Dioxins/ furans	EPA 1613b	ng TEQ/kg dw	3.13[5]	25

Notes:

1. RAL is the minimum value for a COC listed in ROD Table 28 (EPA 2014b) or cPAH ESD (EPA 2021).
2. Per the ROD (EPA 2014a), cPAHs consist of a subset of seven PAHs that EPA has classified as probable human carcinogens: benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. Two methods are provided for cPAH analysis; method used is dependent on selected laboratory procedures.
3. The RL for the cPAH TEQ value was calculated using one-half the RL for each of the cPAH compounds and the appropriate toxic equivalency factor values (California EPA 2009). Individual compound RLs are listed in Table A-7.
4. The 2014 ROD RAL is based on a benzo(a)pyrene slope factor that has since been updated. The updated value from the cPAH ESD (EPA 2021) is listed in this table.
5. The RL for the dioxin/furan TEQ value is based on the laboratory minimum calibration level from Cape Fear Analytical; the dioxin/furan mammalian TEQ value was calculated using one-half the RL for each dioxin/furan compound and appropriate mammal toxic equivalency factor values (Van den Berg et al. 2006). Individual congener LOQs are listed in Table A-8. Sample-specific TEQs will be calculated using EDLs. The TEQ value calculated based on EDLs listed in Table A-8 is 0.32 ng TEQ/kg dw.

µg: microgram
COC: contaminant of concern
cPAH: carcinogenic polycyclic aromatic hydrocarbon
dw: dry weight
EDL: estimated detection limit
EPA: U.S. Environmental Protection Agency
ESD: Explanation of Significant Differences
kg: kilogram
LOQ: limit of quantitation
ng: nanogram
PAH: polycyclic aromatic hydrocarbon
RAL: remedial action level
RAO: remedial action objective
RL: reporting limit
ROD: Record of Decision
SIM: selected ion monitoring
TEQ: toxic equivalent

Table A-3
RAO 3 COCs, Associated RL Goals (Updated), and RALs for Sediment Samples

COC	Method	RL (µg/kg dw)	Lowest RAL (Benthic SCO) (µg/kg dw)
Benzo(a)anthracene	EPA 8270D	20.0	2,200[1]
Benzo(a)pyrene	EPA 8270D	20.0	1,980[1]
Total benzofluoranthenes	EPA 8270D	40.0	4,600[1]
Chrysene	EPA 8270D	20.0	2,200[1]
Dibenzo(a,h)anthracene	EPA 8270D	20.0	240[1]
Indeno(1,2,3-cd)pyrene	EPA 8270D	20.0	680[1]
Anthracene	EPA 8270D	20.0	4,400[1]
Acenaphthene	EPA 8270D	20.0	320[1]
Acenapthylene	EPA 8270D	20.0	1,320[1]
Benzo(g,h,i)perylene	EPA 8270D	20.0	620[1]
Fluoranthene	EPA 8270D	20.0	3,200[1]
Fluorene	EPA 8270D	20.0	460[1]
Naphthalene	EPA 8270D	20.0	1,980[1]
Phenanthrene	EPA 8270D	20.0	2,000[1]
Pyrene	EPA 8270D	20.0	20,000[1]
Total HPAHs[2]	EPA 8270D	40.0	19,200[1]
Total LPAHs[3]	EPA 8270D	20.0	7,400[1]
2,4-dimethylphenol	EPA 8270D	50.0	29
2-methylnaphthalene	EPA 8270D	10.0	760[1]
4-methylphenol	EPA 8270D	10.0	670
Benzoic acid	EPA 8270E	400	650
Benzyl alcohol[4]	EPA 8270E	20.0	57
Bis(2-ethylhexyl)phthalate	EPA 8270E	100.0	940[1]
Butyl benzyl phthalate	EPA 8270E	10.0	98[1]
Dibenzofuran	EPA 8270E	5.0	300[1]
Dimethyl phthalate	EPA 8270E	10.0	1,060[1]
Hexachlorobenzene	EPA 8081B	1.0	7.6[1]
n-Nitrosodiphenylamine	EPA 8270E	10.0	220[1]
Pentachlorophenol	EPA 8270E	100.0	360
Phenol	EPA 8270E	30.0	420
1,2,4-trichlorobenzene	EPA 8270E	10.0	16.2[1]
1,2-dichlorobenzene	EPA 8270E	10.0	46.0[1]
1,4-dichlorobenzene	EPA 8270E	10.0	62.0[1]

Notes:

1. OC-normalized RAL was converted to a dry weight value for this table using 2% TOC (average LDW sediment TOC). This value, which is less than the dry weight AETs in Table 8-1 of SCUM (Ecology 2021), is presented herein as a dry weight value only for the purpose of comparison to RLs.

2. HPAH compounds include fluoranthene, pyrene, benzo(a)anthracene, chrysene, total benzofluoranthenes, benzo(a)pyrene, indeno(1,2,3 cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.
3. LPAH compounds include naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, and 2-methylnaphthalene.
4. Because benzyl alcohol is not a CERCLA hazardous substance, benzyl alcohol data will not be included in the data evaluation reports. Benzyl alcohol data obtained through routine SVOC analysis of the PDI sediment samples will be provided to EPA.
µg : microgram
AET: apparent effects threshold
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
COC: contaminant of concern
dw: dry weight
EPA: U.S. Environmental Protection Agency
HPAH: high-molecular-weight polycyclic aromatic hydrocarbon
kg: kilogram
LDW: Lower Duwamish Waterway
LPAH: low-molecular-weight polycyclic aromatic hydrocarbon
OC: organic carbon
PDI: Pre-Design Investigation
RAL: remedial action level
RAO: remedial action objective
RL: reporting limit
SCO: sediment cleanup objective
SCUM: Sediment Cleanup User's Manual
SVOC: semivolatile organic compound

Table A-4
Updated Acceptance Limits and Corrective Actions for Laboratory Analyses

Parameter	QC Sample	Acceptance Limits[1]	Corrective Action[1]
PAHs	Surrogates	Laboratory acceptance criteria 28–122% or 50–150% until sufficient data have been generated for in-house limits	Correct the problem; then, if necessary, re-prep and reanalyze failed samples for surrogates in the batch if sufficient material is available. If obvious chromatographic interference is present, reanalysis may not be necessary, but the client must be notified prior to reporting data, and failures must be discussed in the case narrative.
SVOCs	Surrogates	Laboratory acceptance criteria 10–124% or 50–150% until sufficient data have been generated for in-house limits	Correct the problem, then re-prep and reanalyze failed samples for surrogates in the batch if sufficient material is available. If obvious chromatographic interference is present, reanalysis may not be necessary, but the client must be notified prior to reporting data, and failures must be discussed in the case narrative.

Notes:
1. Acceptance limits and corrective actions used by the laboratories were based on standard analytical protocols. Updates to the information originally provided in the QAPP are based on changes in the selected laboratory. All other acceptance limits and corrective actions are as presented in the PDI QAPP for the middle reach.
PAH: polycyclic aromatic hydrocarbon
PDI: Pre-Design Investigation
QAPP: quality assurance project plan
QC: quality control
SVOC: semivolatile organic compound

Table A-5
Updated Methods and RL Goals for PAHs and SVOCs in Sediment

Analyte	Method	Unit	MDL	RL
PAHs (based on 10-g dw sample)				
Acenaphthene[3]	EPA 8270D	µg/kg dw	3.2[1]	5.0[2]
Acenaphthylene[3]	EPA 8270D	µg/kg dw	2.6[1]	5.0[2]
Anthracene[3]	EPA 8270D	µg/kg dw	3.2[1]	5.0[2]
Benzo(a)anthracene[4]	EPA 8270D	µg/kg dw	3.6[1]	5.0[2]
Benzo(a)pyrene[4]	EPA 8270D	µg/kg dw	3.6[1]	5.0[2]
Total benzofluoranthenes[4]	EPA 8270D	µg/kg dw	8.0[1]	10.0[2]
Benzo(g,h,i)perylene[4]	EPA 8270D	µg/kg dw	3.7[1]	5.0[2]
Chrysene[4]	EPA 8270D	µg/kg dw	4.1[1]	5.0[2]
Dibenzo(a,h)anthracene[4]	EPA 8270D	µg/kg dw	3.0[1]	5.0[2]
Fluoranthene[4]	EPA 8270D	µg/kg dw	3.7[1]	5.0[2]
Fluorene[3]	EPA 8270D	µg/kg dw	3.3[1]	5.0[2]
Indeno(1,2,3-cd)pyrene[4]	EPA 8270D	µg/kg dw	3.2[1]	5.0[2]
2-methylnaphthalene[3]	EPA 8270D	µg/kg dw	2.8[1]	5.0[2]
Naphthalene[3]	EPA 8270D	µg/kg dw	2.9[1]	5.0[2]
Phenanthrene[3]	EPA 8270D	µg/kg dw	3.6[1]	5.0[2]
Pyrene[4]	EPA 8270D	µg/kg dw	3.7[1]	5.0[2]
cPAHs (based on 10-g dw sample)[5]				
Benzo(a)anthracene[4]	EPA 8270D	µg/kg dw	3.6[1]	5.0[2]
Benzo(a)pyrene[4]	EPA 8270D	µg/kg dw	3.6[1]	5.0[2]
Benzo(b)fluoranthene[4]	EPA 8270D	µg/kg dw	3.4[1]	5.0[2]
Benzo(k)fluoranthene[4]	EPA 8270D	µg/kg dw	4.0[1]	5.0[2]
Chrysene[4]	EPA 8270D	µg/kg dw	4.1[1]	5.0[2]
Dibenzo(a,h)anthracene[4]	EPA 8270D	µg/kg dw	3.0[1]	5.0[2]
Indeno(1,2,3-cd)pyrene[4]	EPA 8270D	µg/kg dw	3.2[1]	5.0[2]
SVOCs (based on 10-g dw sample)				
2,4-dimethylphenol	EPA 8270E-SIM	µg/kg dw	6.3[1]	50.0[2]
4-methylphenol	EPA 8270E	µg/kg dw	4.5[1]	10.0[2]
Benzoic acid	EPA 8270E-SIM	µg/kg dw	13[1]	400
Benzyl alcohol[6]	EPA 8270E-SIM	µg/kg dw	2.5[1]	20.0
Bis(2-ethylhexyl)phthalate	EPA 8270E	µg/kg dw	5.5[1]	100.0[2]
Butyl benzyl phthalate	EPA 8270E	µg/kg dw	9.4[1]	10.0[2]
Dibenzofuran	EPA 8270E	µg/kg dw	14[1]	5.0[2]
Dimethyl phthalate	EPA 8270E	µg/kg dw	4.4[1]	10.0[2]
Hexachlorobenzene	EPA 8081B	µg/kg dw	0.15[1]	1.0
n-Nitrosodiphenylamine	EPA 8270E-SIM	µg/kg dw	1.31	10.0

Table A-5
Updated Methods and RL Goals for PAHs and SVOCs in Sediment

Analyte	Method	Unit	MDL	RL
Pentachlorophenol	EPA 8270E-SIM	µg/kg dw	2.13	100.0
Phenol	EPA 8270E	µg/kg dw	3.1[1]	30.0[2]
1,2,4-trichlorobenzene	EPA 8270E-SIM	µg/kg dw	2.6[1]	10.0
1,2-dichlorobenzene	EPA 8270E-SIM	µg/kg dw	2.4[1]	10.0
1,4-dichlorobenzene	EPA 8270E-SIM	µg/kg dw	2.5[1]	10.0
Metals (based on 1-g dw sample)				
Iron	EPA 6020B	mg/kg dw	10.0[1]	20.0[2]
Manganese	EPA 6020B	mg/kg dw	0.25[1]	10.0[2]

Notes:
1. SW 846 no longer requires MDL values. The laboratories have the option to use these values to assess sensitivity for EPA 8000 series methods. The laboratories have continued to maintain MDL studies for these analytes, following EPA MDL Revision 2 (EPA 2016) procedures.
2. RL values are consistent with the LLOQ values required under EPA SW-846.
3. Compound is a component of the LPAH sum.
4. Compound is a component of the HPAH sum.
5. cPAHs will be analyzed using 8270E-SIM for samples that require cPAH analysis and not the full SVOC list (i.e. 0–45-cm sediments in Recovery Category 2/3 intertidal areas).
6. Because benzyl alcohol is not a CERCLA hazardous substance, benzyl alcohol data will not be included in the data evaluation reports. Benzyl alcohol data obtained through routine SVOC analysis of the PDI sediment samples will be provided to EPA.
µg: microgram
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
cPAH: carcinogenic polycyclic aromatic hydrocarbon
dw: dry weight
EPA: US Environmental Protection Agency
g: gram
HPAH: high-molecular-weight polycyclic aromatic hydrocarbon
kg: kilogram
LLOQ: lower limit of quantitation
LPAH: low-molecular-weight polycyclic aromatic hydrocarbon
MDL: method detection limit
mg: milligram
PAH: polycyclic aromatic hydrocarbon
PDI: Pre-Design Investigation
RL: reporting limit
SIM: selective ion monitoring
SVOC: semivolatile organic compounds
SW: solid waste

Table A-6
Updated Method and RL Goals for Dioxins/Furan Congeners in Sediment

Analyte	EPA Method 1613B			
	Sediment (ng/kg dw) Based on 10-g Sample		TEQ (ng/kg)	
	EDL[1]	LOQ[2]	TEF	TEQ[3]
2,3,7,8-TCDD	0.1	1.0	1	0.5
1,2,3,7,8-PeCDD	0.1	2.5	1	1.25
1,2,3,4,7,8-HxCDD	0.1	2.5	0.1	0.125
1,2,3,6,7,8-HxCDD	0.1	2.5	0.1	0.125
1,2,3,7,8,9-HxCDD	0.1	2.5	0.1	0.125
1,2,3,4,6,7,8-HpCDD	0.1	2.5	0.01	0.0125
OCDD	0.1	10.0	0.0003	0.0015
2,3,7,8-TCDF	0.1	1.0	0.1	0.05
1,2,3,7,8-PeCDF	0.1	2.5	0.03	0.0375
2,3,4,7,8-PeCDF	0.1	2.5	0.3	0.375
1,2,3,4,7,8-HxCDF	0.1	2.5	0.1	0.125
1,2,3,6,7,8-HxCDF	0.1	2.5	0.1	0.125
1,2,3,7,8,9-HxCDF	0.1	2.5	0.1	0.125
2,3,4,6,7,8-HxCDF	0.1	2.5	0.1	0.125
1,2,3,4,6,7,8-HpCDF	0.1	2.5	0.01	0.0125
1,2,3,4,7,8,9-HpCDF	0.1	2.5	0.01	0.0125
OCDF	0.1	5.0	0.0003	0.00075

Notes:

1. EDL is a sample-specific DL. The value provided herein is an estimate, and the sample-specific values will vary based on sample mass and the analytical conditions at the time of analysis.
2. LOQ is the laboratory's lowest concentration, at or above the LMCL, at which test accuracy (precision and bias) has been demonstrated. Values below the LOQ are J-qualified. The reported LOQ will be adjusted based on the mass of each sample
3. TEQ was calculated using the one-half RL value multiplied by the 2005 WHO TEF. Sample-specific TEQs will be calculated using EDLs.

DL: detection limit
dw: dry weight
EDL: estimated detection limit
EPA: U.S. Environmental Protection Agency
HpCDD: heptachlorodibenzo-*p*-dioxin
HpCDF: heptachlorodibenzofuran
HxCDD: hexachlorodibenzo-*p*-dioxin
HxCDF: hexachlorodibenzofuran
J: estimated concentration
kg: kilogram
LMCL: lower method calibration limit
LOQ: limit of quantitation
ng: nanogram

OCDD: octachlorodibenzo-*p*-dioxin
OCDF: octachlorodibenzofuran
PeCDD: pentachlorodibenzo-*p*-dioxin
PeCDF: pentachlorodibenzofuran
RL: reporting limit
TCDD: tetrachlorodibenzo-*p*-dioxin
TCDF: tetrachlorodibenzofuran
TEF: toxic equivalency factor
TEQ: toxic equivalent
WHO: World Health Organization

Table A-7
Updated Accuracy Recovery Range for Individual PAHs and Other SVOCs

Parameter	LCS/Spiked Sample[1,2]	CRM[1,2]
PAHs		
Acenaphthene	44–130%	51–149%
Acenaphthylene	44–130%	52–148%
Anthracene	46–130%	57–143%
Benzo(a)anthracene	52–130%	58–142%
Benzo(a)pyrene	25–130%	54–146%
Total benzofluoranthenes	21–150%	44–156%
Benzo(g,h,i)perylene	17–130%	49–152%
Chrysene	25–130%	58–142%
Dibenzo(a,h)anthracene	32–130%	50–150%
Fluoranthene	10–130%	55–145%
Fluorene	23–130%	54–146%
Indeno(1,2,3-cd)pyrene	17–130%	0–203%
2-methylnaphthalene	28-130%	NA
Naphthalene	29–130%	33–167%
Phenanthrene	10–130%	60–140%
Pyrene	16–130%	60–139%
cPAHs[3]		
Benzo(a)anthracene	52–130%	50–150%
Benzo(a)pyrene	52–130%	45–155%
Benzo(b)fluoranthene	52-130%	51–149%
Benzo(k)fluoranthene	52–130%	51–148%
Chrysene	51–130%	53–147%
Dibenzo(a,h)anthracene	44–130%	48–153%
Indeno(1,2,3-cd)pyrene	44–130%	53–147%
Other SVOCs		
1,2-dichlorobenzene	17–130%	NR
1,2,4-trichlorobenzene	18–130%	NR
1,4-dichlorobenzene	15–130%	NR
2,4-dimethylphenol	10–130%	NR
4-methylphenol	10–130%	NR
Benzoic acid	10–160%	NR
Benzyl alcohol	16–130%	NR
Bis(2-ethylhexyl)phthalate	23–130%	NR
Butyl benzyl phthalate	18–130%	NR
Dibenzofuran	15–130%	NR

Parameter	LCS/Spiked Sample[1,2]	CRM[1,2]
Dimethyl phthalate	11–130%	NR
n-Nitrosodiphenylamine	37–130%	NR
Pentachlorophenol	19–130%	NR
Phenol	10–130%	NR

Notes:
1. Values listed are performance-based limits provided by the laboratory.
2. An LCS may be used to assess accuracy when a CRM is unavailable. CRMs will be analyzed for PAHs only. The satisfactory acceptance limit for CRM recovery will include the uncertainty range of the CRM mean, as well as the uncertainty of the method of measurement: Commercial CRMs may change depending on availability.
3. cPAHs will be analyzed using 8270E-SIM for samples that require cPAH analysis and not the full SVOC list (i.e., 0–45-cm sediments in Recovery Category 2/3 intertidal areas).

cPAH: carcinogenic polycyclic aromatic hydrocarbon
CRM: certified reference material
LCS: laboratory control sample
NA: not applicable
NR: not required
PAH: polycyclic aromatic hydrocarbon
SIM: selective ion monitoring
SVOC: semivolatile organic compound

Table A-8
DQIs for Laboratory Probe Analyses

Parameter	Method	Reference	Unit	Precision	Accuracy	Resolution
Conductivity	Electrode	EPA 120.1/SM 2510	µS	± 20%	90–100%	0.1
pH	Electrode	EPA 150.1/SM 4500-H^+	pH	± 0.1 pH unit	0.05 pH unit	0.1
ORP	Electrode	SM 2580-97	mV	± 10 mV	± 30 mV	0.1

Notes:
DQI: data quality indicator
EPA: U.S. Environmental Protection Agency
mV: millivolts
ORP: oxidation-reduction potential
SM: Standard Methods
µS: microsiemens

Table A-9
DQIs for Laboratory Porewater and TCLP and SPLP Extract Analyses

Parameter	Method	Reference	Unit	Precision	Accuracy	
					LCS	Spiked Samples
Arsenic species (III, V, MMAs, and DMAs)	IC-ICP-CRC-MS	Lab SOP	µg/L	± 25%	75–125%	75–125%
Dissolved metals	ICP-MS	EPA 1638 Mod	µg/L	± 25%	75–125%	75–125%
Metals	ICP-OES	EPA 6010D	mg/L	± 20%	75–125%	80–120%
Mercury	CVAA	EPA 7470A	mg/L	± 20%	75–125%	80–120%
Sulfide	Colorimetric	SM-4500-S^2	mg/L	± 20%	75–125%	75–125%

Notes:
µg: microgram
CRC: Collision Cell/Reaction Cell
CVAA: cold vapor atomic absorption
DMAs: dimethylarsinic acid
DQI: data quality indicator
EPA: U.S. Environmental Protection Agency
IC: ion chromatography
ICP: inductively coupled plasma
L: liter
LCS: laboratory control sample
mg: milligram
MMAs: monomethylarsonic acid
MS: mass spectrometry
OES: optical emission spectrometry
SM: Standard Method
SOP: standard operating procedure
SPLP: synthetic precipitation leaching procedure
TCLP: toxicity characteristic leaching procedure

Table A-10
Methods and RL Goals for Metals and Sulfide in Porewater and TCLP and SPLP Extract Metals

Analyte	Method	Unit	MDL	RL
Porewater				
Arsenic (III)	Laboratory SOP	µg/L	0.004	0.021
Arsenic (V)	Laboratory SOP	µg/L	0.010	0.021
MMAs	Laboratory SOP	µg/L	0.004	0.021
DMAs	Laboratory SOP	µg/L	0.005	0.021
Arsenic	EPA 1638 Mod	µg/L	0.022	0.072
Iron	EPA 1638 Mod	µg/L	1.8	5.4
Manganese	EPA 1638 Mod	µg/L	0.090	0.18
Sulfide	SM-4500-S[2]	mg/L	0.050	0.050
TCLP				
Arsenic	EPA 6010D	mg/L	0.0400	0.250
Barium	EPA 6010D	mg/L	0.00350	0.0300
Cadmium	EPA 6010D	mg/L	0.00250	0.0100
Chromium	EPA 6010D	mg/L	0.0100	0.0450
Lead	EPA 6010D	mg/L	0.0500	0.100
Selenium	EPA 6010D	mg/L	0.125	0.250
Silver	EPA 6010D	mg/L	0.00750	0.0150
Mercury	EPA 7470A	mg/L	0.000050	0.00010
SPLP				
Arsenic	EPA 6010D	mg/L	0.125	0.250
Barium	EPA 6010D	mg/L	0.00750	0.0150
Cadmium	EPA 6010D	mg/L	0.00500	0.0100
Chromium	EPA 6010D	mg/L	0.0125	0.0250
Lead	EPA 6010D	mg/L	0.0500	0.100
Selenium	EPA 6010D	mg/L	0.125	0.250
Silver	EPA 6010D	mg/L	0.00750	0.0150
Mercury	EPA 7470A	mg/L	0.000050	0.00010

Notes:
µg: microgram
DMAs: dimethylarsinic acid
EPA: U.S. Environmental Protection Agency
L: liter
mg: milligram
MDL: method detection limit
MMAs: monomethylarsonic acid
RL: reporting limit
SM: Standard Methods
SOP: standard operating procedure

SPLP: synthetic precipitation leaching procedure
TCLP: toxicity characteristic leaching procedure

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