

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. CONTRACT ID CODE J	PAGE OF PAGES 1 2
2. AMENDMENT/MODIFICATION NO. 0004	3. EFFECTIVE DATE 24-Jun-2004	4. REQUISITION/PURCHASE REQ. NO. W68MD9-4086-1703	5. PROJECT NO.(If applicable)	
6. ISSUED BY USA ENGINEER DISTRICT, SEATTLE ATTN: CENWS-CT 4735 EAST MARGINAL WAY SOUTH SEATTLE WA 98134-2329	CODE W912DW	7. ADMINISTERED BY (If other than item 6) See Item 6		
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		X	9A. AMENDMENT OF SOLICITATION NO. W912DW-04-R-0025	
		X	9B. DATED (SEE ITEM 11) 10-May-2004	
			10A. MOD. OF CONTRACT/ORDER NO.	
			10B. DATED (SEE ITEM 13)	
CODE	FACILITY CODE			
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS				
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer <input checked="" type="checkbox"/> is extended, <input type="checkbox"/> is not extended.				
Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning <u>1</u> copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12. ACCOUNTING AND APPROPRIATION DATA (If required)				
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.				
A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).				
C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
D. OTHER (Specify type of modification and authority)				
E. IMPORTANT: Contractor <input type="checkbox"/> is not, <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.) TITLE: Analytical Laboratory Services for Environmental Sample Analysis in the States of Washington, Idaho, Oregon and Montana for the Seattle District, U.S. Army Corps of Engineers SEE ATTACHED CONTINUATION SHEET				
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.				
15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)		
		TEL: _____ EMAIL: _____		
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED	
_____ (Signature of person authorized to sign)		BY _____ (Signature of Contracting Officer)	24-Jun-2004	

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

- a. This amendment is issued to reflect the following changes to the said Solicitation.
- b. Section B, Bid Schedule, is revised and replaced with the attached Bid Schedule in its entirety.
- c. Section C, Scope of Work, is hereby replaced with the attached Scope of Work in its entirety.
- d. The Evaluation Factors for Award in Section M, is revised and replaced with the attached Evaluation Factors in its entirety.
- e. The vertical lines in each attached documents identify all changes to the above.
- f. The due date of June 29, 2004, 2:00PM, for both technical and price proposals remains unchanged.
- g. All other terms and conditions remain unchanged; there are no other changes as a result of this amendment.

BASE ITEMS

ANALYTICAL METHODS LISTING

ITEM NUMBER	DESCRIPTION	METHOD	UNIT PRICE (\$)
0001	Organic Analyses		
0001AA	Halogenated/Aromatic Volatile Organics	EPA 602/8021	
0001AB	PCBs in water and soil	EPA 608/8082	
0001AC	Organochlorine Pesticides	EPA 608/8081	
0001AD	Organophosphorus Pesticides	EPA 8141	
0001AE	Chlorinated Herbicides	EPA 8151	
0001AF	Volatile Organics	EPA 624/524.2/8260	
0001AG	Volatile Organics + 10 TICs	EPA 624/8260	
0001AH	Volatile Organics, low-level (full scan)	EPA 624/8260	
0001AI	Pentachlorophenol	EPA 625/8270	
0001AJ	Phenols	EPA 625/8270	
0001AK	Semi-Volatile Organics (BNAs)	EPA 625/8270	
0001AL	Semi-Volatile Organics (BNAs) + 20 TICs	EPA 625/8270	
0001AM	Semi-Volatile Organics (BNAs), low-level (full scan)	EPA 625/8270	
0001AN	Polynuclear Aromatic Hydrocarbons	EPA 625/8270	
0001AO	Polynuclear Aromatic Hydrocarbons low-level (full scan)	EPA 625/8270	
0001AP	Dioxins / Furans	EPA 8290	
0001AQ	Polynuclear Aromatic Hydrocarbons	EPA 8310	
0001AR	Explosives	EPA 8330	
0001AS	1,4-Dioxane	EPA 8260 or 8270 (modified)	
0001AT	Perchlorate (LC/MS/MS)	EPA 8321A/331.0	
0001AU	Perchlorate (IC)	EPA 314.0	
0001AV	Tributyltin	Krone	
0001AW	Tributyltin in pore water (includes extraction)	Krone	
0001AX	EDB & EDC	EPA 504/8011	
0001AY	Hydrocarbon Dissolved Gases	RSK 175	

0002	Underground Storage Tank Analyses	METHOD	UNIT PRICE \$
0002AA	Hydrocarbon Identification Method for Soil and Water	NWTPH-HCID	
0002AB	Volatile Petroleum Products Method for Soil and Water Analyses	NWTPH-Gx	

0002AC	Semivolatile Petroleum Products Method for Soil and Water Analyses	NWTPH-Dx	
0002AD	Method for the Determination fo Volatile Petroleum Hydrocarbons (VPH) Fractions	VPH Fractions	
0002AE	Method for the Determination of Extractable Petroleum Hydrocarbons (EPH) Fractions	EPH Fractions	
0002AF	VOCs (benzene, ethyl benzene toluene, total xylenes, n-hexane, MTBE, EDB, EDC)	EPA 8260	
0002AG	Naphthalenes	EPA 8260	
0002AH	Oil and Grease (Gravimetric)	EPA 413.1	
0002AI	Oil and Grease (IR)	EPA 413.2	
0002AJ	Total Recoverable Petroleum Hydrocarbons	EPA 418.1	
0002AK	Hexane Extractable Hydrocarbons	EPA 1664	
0002AK	Total Lead	EPA 6010	
0002AL	Wear Metals (cadmium, chromium, lead, nickel, zinc)	EPA 6010	
0002AM	Carcinogenic PAHs	EPA 8270	
0002AN	PCBs	EPA 8082	
0003	Metals Packages	METHOD	UNIT PRICE \$
0003AA	RCRA List as Total Metals: As, Ba, Cd, Cr, Pb, Se, Ag by ICP Hg by AA	EPA 6010 EPA 7470/7471	
0003AB	EPA Priority Pollutant Metals in water: Ag, Be, Cr, Cu, Ni, Zn by ICP Sb, As, Cd, Pb, Se, Tl by ICP-MS Hg by AA	EPA 200.7/6010 EPA 200.8/6020 EPA 245.2/7470	
0003AC	EPA Priority Pollutant Metals in soil or water: Ag, Be, Cr, Cu, Ni, Zn, Sb, As, Cd, Pb, Se, Tl Hg by AA	EPA 6010 EPA 7470/7471	
0003AD	CLP Target Analyte List (TAL) Metals: Al, Ba, Be, Ca, Cr, Co, Cu, Fe, Mg Mn, Ni, K, Ag, Na, V, Zn, by ICP Sb, As, Cd, Pb, Se, Tl, by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471	
0003AE	TCLP Metals (Extraction and Analysis) As, Ba, Cd, Cr, Pb, Ag, Se by ICP Hg by AA	EPA 6010A EPA 7470	
0003AF	RCRA List to Meet MTCA Requirements: BA, Cr, Ag, Se by ICP AS, Cd, Pb by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471	
0004	Spectrophotometry	METHOD	UNIT PRICE \$
0004AA	Flame Atomic Absorption (FAA, full method list)	EPA 7000	

0004AB	Graphite Furnace (GFAA, full method list)	EPA 7000	
0004AC	Mercury, Cold Vapor AA (Including Prep)	EPA 7470/7471	
0004AD	Chromium, Hexavalent (Including Prep)	EPA 7196	
0005	Spectroscopy (ICP):	METHOD	UNIT PRICE \$
	Individual Metals by ICP...		
0005AA	Aluminum (Al)	EPA 6010	
0005AB	Silver (Ag)		
0005AC	Arsenic (As)		
0005AD	Boron (B)		
0005AE	Barium (Ba)		
0005AF	Beryllium (Be)		
0005AG	Calcium (Ca)		
0005AH	Cadmium (Cd)		
0005AI	Cobalt (Co)		
0005AJ	Chromium (Cu)		
0005AK	Copper (Cu)		
0005AL	Iron (Fe)		
0005AM	Potassium (K)		
0005AN	Magnesium (Mg)		
0005AO	Manganese (Mn)		
0005AP	Molybdenum (Mo)		
0005AQ	Sodium (Na)		
0005AR	Nickel (Ni)		
0005AS	Lead (Pb)		
0005AT	Antimony (Sb)		
0005AU	Selenium (Se)		
0005AV	Tin (Sn)		
0005AW	Titanium (Ti)		
0005AX	Thallium (Tl)		
0005AY	Vanadium (V)		
0005AZ	Zinc (Zn)		

0006	Spectroscopy (ICP):	METHOD	UNIT PRICE \$
	Individual Metals by ICP-MS...		
0006AA	Aluminum (Al)	EPA 6020	

0006AB	Silver (Ag)		
0006AC	Arsenic (As)		
0006AD	Boron (B)		
0006AE	Barium (Ba)		
0006AF	Beryllium (Be)		
0006AG	Calcium (Ca)		
0006AH	Cadmium (Cd)		
0006AI	Cobalt (Co)		
0006AJ	Chromium (Cu)		
0006AK	Copper (Cu)		
0006AL	Iron (Fe)		
0006AM	Potassium (K)		
0006AN	Magnesium (Mg)		
0006AO	Manganese (Mn)		
0006AP	Molybdenum (Mo)		
0006AQ	Sodium (Na)		
0006AR	Nickel (Ni)		
0006AS	Lead (Pb)		
0006AT	Antimony (Sb)		
0006AU	Selenium (Se)		
0006AV	Tin (Sn)		
0006AW	Titanium (Ti)		
0006AX	Thallium (Tl)		
0006AY	Vanadium (V)		
0006AZ	Zinc (Zn)		
0007	General Chemistry	METHOD	UNIT PRICE \$
0007AA	Biochemical Oxygen Demand	EPA 405.1	
0007AB	Bromide	EPA 320.1/300.0	
0007AC	Carbonate	EPA 310.1/310.2	
0007AD	Chemical Oxygen Demand	EPA 410.1/410.4	
0007AE	Chloride	EPA 325.2/300.0	
0007AF	Chlorine - Residual	EPA 330.5	
0007AG	Conductivity	EPA 120.1	
0007AH	Corrosivity to Steel	EPA 1110	
0007AI	Cyanide - Total	EPA 335.3	
0007AJ	Cyanide - Amenable	EPA 335.3	

0007AK	Flashpoint	EPA 1010/1021	
0007AL	Fluoride	EPA 340.2/300.0	
0007AM	Hardness - Total	EPA 130.2/130.1	
0007AN	Hardness - Ca and Mg	SM2340B	
0007AO	Major Anions (full method list)	EPA 300 Series	
0007AP	Major Cations (Na, K, Ca, and Mg for aqueous samples or Na, K, Ca, Mg, Fe, Mn, and Al for soil samples)	EPA 6010/7000	
0007AQ	Moisture	EPA CLP	
0007AR	Nitrogen - Nitrate	EPA 353.2/300.0	
0007AS	Nitrogen - Nitrite	EPA 354.1/353.2/300.0	
0007AT	Nitrogen - Nitrate and Nitrite	EPA 353.2/300.0	
0007AU	Nitrogen - Total Kjeldahl	EPA 351.3/351.4	
0007AV	Paint Filter Liquids Test	EPA 9096	
0007AW	pH	EPA 9040/9045/150.1	
0007AX	Phenolic Compounds	EPA 420.1/420.2	
0007AY	Phosphate - Ortho	EPA 365.2/365.1/300.0	
0007AZ	Phosphate - Total	EPA 365.4	
0007BA	Salinity	SM252D	
0007BB	Silicon Dioxide (Silica)	EPA 270.1	
0007BC	Solids - Dissolved	EPA 160.1	
0007BD	Solids - Suspended	EPA 160.2	
0007BE	Solids - total	EPA 160.3	
0007BF	Solids - Settleable	EPA 160.5	
0007BG	Specify Gravity	ASTM D854/SM2710F	
0007BH	Sulfate	EPA 374.2/300.0	
0007BI	Sulfide	EPA 376.2	
0007BJ	Sulfite	EPA 377.1	

0008	PSDDQ and Marine Sediment Parameters	METHOD	UNIT PRICE \$
0008AA	Grain Size Distribution	ASTM D422	
0008AB	Nitrogen - Ammonia	EPA 350.1/350.2	
0008AC	Metals: Cu, Zn by ICP As, Cd, Cr, Pb, Ag by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471	
0008AD	Solids - Volatile	EPA 160.4	

0008AE	Semivolatile Organics: Pthalate Esters, LPAHs, HPAHs, Phenols, Chlorinated benzenes, Misc. Compounds	EPA 8270	
0008AF	PCBs	EPA 8081	
0008AG	Tributyltin (water or sediment)	Krone (GC-MS)	
0008AH	Tributyltin in pore water (includes extraction)	Krone (GC-MS)	
0009	General Chemistry	METHOD	UNIT PRICE \$
0009AA	Surfactant Test (MBAS)	EPA 425.1	
0009AB	Temperature	EPA 170.1	
0009AC	TOC	EPA 9060	
0009AD	TOX	EPA 9020	
0009AE	Turbidity	EPA 180.1	
0010	Misc	METHOD	UNIT PRICE \$
0010AA	Methanol kit for 5035	EPA 5035	
0010AB	NaHSO ₄ kit for low-level volatiles	EPA 5035	
0011	Hourly Services		UNIT PRICE \$
0011AA	Identification of unknowns, etc.		
0012	Data Deliverables		UNIT PRICE \$
	Definitive (hard copy), Adobe, SEDD (2A or 2B) - Include in base analysis cost.		
0012AA	Comprehensive (hard copy), Adobe, SEDD (2A or 2B)		
0013	Cost Multiplier for Miscellaneous Expedited Sample Analysis		UNIT PRICE \$
0013AA	24 hours		
0013AB	48 hours		
0013AC	72 hours		
0013AD	7 days		
0013AE	14 days		
	21 days = Standard turn-around-time (Include in bases analysis cost.)		
Note: Unless otherwise specified in a task order, project-specific Matrix Spike (MS)/Matrix Spike Duplicate (MSD) are required. The cost of MS/MD shall be included as part of the base analysis cost.			

FIRST OPTION PERIOD

ANALYTICAL METHODS LISTING

ITEM NUMBER	DESCRIPTION	METHOD	UNIT PRICE (\$)
1001	Organic Analyses		
1001AA	Halogenated/Aromatic Volatile Organics	EPA 602/8021	
1001AB	PCBs in water and soil	EPA 608/8082	
1001AC	Organochlorine Pesticides	EPA 608/8081	
1001AD	Organophosphorus Pesticides	EPA 8141	
1001AE	Chlorinated Herbicides	EPA 8151	
1001AF	Volatile Organics	EPA 624/524.2/8260	
1001AG	Volatile Organics + 10 TICs	EPA 624/8260	
1001AH	Volatile Organics, low-level (full scan)	EPA 624/8260	
1001AI	Pentachlorophenol	EPA 625/8270	
1001AJ	Phenols	EPA 625/8270	
1001AK	Semi-Volatile Organics (BNAs)	EPA 625/8270	
1001AL	Semi-Volatile Organics (BNAs) + 20 TICs	EPA 625/8270	
1001AM	Semi-Volatile Organics (BNAs), low-level (full scan)	EPA 625/8270	
1001AN	Polynuclear Aromatic Hydrocarbons	EPA 625/8270	
1001AO	Polynuclear Aromatic Hydrocarbons, low-level (full scan)	EPA 625/8270	
1001AP	Dioxins / Furans	EPA 8290	
1001AQ	Polynuclear Aromatic Hydrocarbons	EPA 8310	
1001AR	Explosives	EPA 8330	
1001AS	1,4-Dioxane	EPA 8260 or 8270 (modified)	
1001AT	Perchlorate (LC/MS/MS)	EPA 8321A/331.0	
1001AU	Perchlorate (IC)	EPA 314.0	
1001AV	Tributyltin	Krone	
1001AW	Tributyltin in pore water (includes extraction)	Krone	
1001AX	EDB & EDC	EPA 504/8011	
1001AY	Hydrocarbon Dissolved Gases	RSK 175	

1002	Underground Storage Tank Analyses	METHOD	UNIT PRICE (\$)
1002AA	Hydrocarbon Identification Method for Soil and Water	NWTPH-HCID	
1002AB	Volatile Petroleum Products Method for Soil and Water Analyses	NWTPH-Gx	

1002AC	Semivolatile Petroleum Products Method for Soil and Water Analyses	NWTPH-Dx	
1002AD	Method for the Determination of Volatile Petroleum Hydrocarbons (VPH) Fractions	VPH Fractions	
1002AE	Method for the Determination of Extractable Petroleum Hydrocarbons (EPH) Fractions	EPH Fractions	
1002AF	VOCs (benzene, ethyl benzene toluene, total xylenes, n-hexane, MTBE, EDB, EDC)	EPA 8260	
1002AG	Naphthalenes	EPA 8260	
1002AH	Oil and Grease (Gravimetric)	EPA 413.1	
1002AI	Oil and Grease (IR)	EPA 413.2	
1002AJ	Total Recoverable Petroleum Hydrocarbons	EPA 418.1	
1002AK	Hexane Extractable Hydrocarbons	EPA 1664	
1002AK	Total Lead	EPA 6010	
1002AL	Wear Metals (cadmium, chromium, lead, nickel, zinc)	EPA 6010	
1002AM	Carcinogenic PAHs	EPA 8270	
1002AN	PCBs	EPA 8082	
1003	Metals Packages	METHOD	UNIT PRICE (\$)
1003AA	RCRA List as Total Metals: As, Ba, Cd, Cr, Pb, Se, Ag by ICP Hg by AA	EPA 6010 EPA 7470/7471	
1003AB	EPA Priority Pollutant Metals in water: Ag, Be, Cr, Cu, Ni, Zn by ICP Sb, As, Cd, Pb, Se, Tl by ICP-MS Hg by AA	EPA 200.7/6010 EPA 200.8/6020 EPA 245.2/7470	
1003AC	EPA Priority Pollutant Metals in soil or water: Ag, Be, Cr, Cu, Ni, Zn, Sb, As, Cd, Pb, Se, Tl Hg by AA	EPA 6010 EPA 7470/7471	
1003AD	CLP Target Analyte List (TAL) Metals: Al, Ba, Be, Ca, Cr, Co, Cu, Fe, Mg Mn, Ni, K, Ag, Na, V, Zn, by ICP Sb, As, Cd, Pb, Se, Tl, by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471	
1003AE	TCLP Metals (Extraction and Analysis) As, Ba, Cd, Cr, Pb, Ag, Se by ICP Hg by AA	EPA 6010A EPA 7470	
1003AF	RCRA List to Meet MTCA Requirements: BA, Cr, Ag, Se by ICP AS, Cd, Pb by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471	
1004	Spectrophotometry	METHOD	UNIT PRICE (\$)
1004AA	Flame Atomic Absorption (FAA, full method list)	EPA 7000	

1004AB	Graphite Furnace (GFAA, full method list)	EPA 7000	
1004AC	Mercury, Cold Vapor AA (Including Prep)	EPA 7470/7471	
1004AD	Chromium, Hexavalent (Including Prep)	EPA 7196	
1005	Spectroscopy (ICP):	METHOD	UNIT PRICE (\$)
	Individual Metals by ICP...		
1005AA	Aluminum (Al)	EPA 6010	
1005AB	Silver (Ag)		
1005AC	Arsenic (As)		
1005AD	Boron (B)		
1005AE	Barium (Ba)		
1005AF	Beryllium (Be)		
1005AG	Calcium (Ca)		
1005AH	Cadmium (Cd)		
1005AI	Cobalt (Co)		
1005AJ	Chromium (Cu)		
1005AK	Copper (Cu)		
1005AL	Iron (Fe)		
1005AM	Potassium (K)		
1005AN	Magnesium (Mg)		
1005AO	Manganese (Mn)		
1005AP	Molybdenum (Mo)		
1005AQ	Sodium (Na)		
1005AR	Nickel (Ni)		
1005AS	Lead (Pb)		
1005AT	Antimony (Sb)		
1005AU	Selenium (Se)		
1005AV	Tin (Sn)		
1005AW	Titanium (Ti)		
1005AX	Thallium (Tl)		
1005AY	Vanadium (V)		
1005AZ	Zinc (Zn)		

1006	Spectroscopy (ICP):	METHOD	UNIT PRICE (\$)
	Individual Metals by ICP-MS...		
1006AA	Aluminum (Al)	EPA 6020	
1006AB	Silver (Ag)		

1006AC	Arsenic (As)		
1006AD	Boron (B)		
1006AE	Barium (Ba)		
1006AF	Beryllium (Be)		
1006AG	Calcium (Ca)		
1006AH	Cadmium (Cd)		
1006AI	Cobalt (Co)		
1006AJ	Chromium (Cu)		
1006AK	Copper (Cu)		
1006AL	Iron (Fe)		
1006AM	Potassium (K)		
1006AN	Magnesium (Mg)		
1006AO	Manganese (Mn)		
1006AP	Molybdenum (Mo)		
1006AQ	Sodium (Na)		
1006AR	Nickel (Ni)		
1006AS	Lead (Pb)		
1006AT	Antimony (Sb)		
1006AU	Selenium (Se)		
1006AV	Tin (Sn)		
1006AW	Titanium (Ti)		
1006AX	Thallium (Tl)		
1006AY	Vanadium (V)		
1006AZ	Zinc (Zn)		
1007	General Chemistry	METHOD	UNIT PRICE (\$)
1007AA	Biochemical Oxygen Demand	EPA 405.1	
1007AB	Bromide	EPA 320.1/300.0	
1007AC	Carbonate	EPA 310.1/310.2	
1007AD	Chemical Oxygen Demand	EPA 410.1/410.4	
1007AE	Chloride	EPA 325.2/300.0	
1007AF	Chlorine - Residual	EPA 330.5	
1007AG	Conductivity	EPA 120.1	
1007AH	Corrosivity to Steel	EPA 1110	
1007AI	Cyanide - Total	EPA 335.3	
1007AJ	Cyanide - Amenable	EPA 335.3	
1007AK	Flashpoint	EPA 1010/1021	

1007AL	Fluoride	EPA 340.2/300.0	
1007AM	Hardness - Total	EPA 130.2/130.1	
1007AN	Hardness - Ca and Mg	SM2340B	
1007AO	Major Anions (full method list)	EPA 300 Series	
1007AP	Major Cations (Na, K, Ca, and Mg for aqueous samples or Na, K, Ca, Mg, Fe, Mn, and Al for soil samples)	EPA 6010/7000	
1007AQ	Moisture	EPA CLP	
1007AR	Nitrogen - Nitrate	EPA 353.2/300.0	
1007AS	Nitrogen - Nitrite	EPA 354.1/353.2/300.0	
1007AT	Nitrogen - Nitrate and Nitrite	EPA 353.2/300.0	
1007AU	Nitrogen - Total Kjeldahl	EPA 351.3/351.4	
1007AV	Paint Filter Liquids Test	EPA 9096	
1007AW	pH	EPA 9040/9045/150.1	
1007AX	Phenolic Compounds	EPA 420.1/420.2	
1007AY	Phosphate - Ortho	EPA 365.2/365.1/300.0	
1007AZ	Phosphate - Total	EPA 365.4	
1007BA	Salinity	SM252D	
1007BB	Silicon Dioxide (Silica)	EPA 270.1	
1007BC	Solids - Dissolved	EPA 160.1	
1007BD	Solids - Suspended	EPA 160.2	
1007BE	Solids - total	EPA 160.3	
1007BF	Solids - Settleable	EPA 160.5	
1007BG	Specify Gravity	ASTM D854/SM2710F	
1007BH	Sulfate	EPA 374.2/300.0	
1007BI	Sulfide	EPA 376.2	
1007BJ	Sulfite	EPA 377.1	

1008	PSDDA and Marine Sediment Parameters	METHOD	UNIT PRICE (\$)
1008AA	Grain Size Distribution	ASTM D422	
1008AB	Nitrogen - Ammonia	EPA 350.1/350.2	
1008AC	Metals: Cu, Zn by ICP As, Cd, Cr, Pb, Ag by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471	
1008AD	Solids - Volatile	EPA 160.4	
1008AE	Semivolatile Organics: Phthalate Esters, LPAHs, HPAHs, Phenols, Chlorinated benzenes, Misc. Compounds	EPA 8270	

1008AF	PCBs	EPA 8081	
1008AG	Tributyltin (water or sediment)	Krone (GC-MS)	
1008AH	Tributyltin in pore water (includes extraction)	Krone (GC-MS)	
1009	General Chemistry	METHOD	UNIT PRICE (\$)
1009AA	Surfactant Test (MBAS)	EPA 425.1	
1009AB	Temperature	EPA 170.1	
1009AC	TOC	EPA 9060	
1009AD	TOX	EPA 9020	
1009AE	Turbidity	EPA 180.1	
1010	Misc	METHOD	UNIT PRICE (\$)
1010AA	Methanol kit for 5035	EPA 5035	
1010AB	NaHSO ₄ kit for low-level volatiles	EPA 5035	
1011	Hourly Services		UNIT PRICE (\$)
1011AA	Identification of unknowns, etc.		
1012	Data Deliverables		UNIT PRICE (\$)
	Definitive (hard copy), Adobe, SEDD (2A or 2B) - Include in base analysis cost.		
1012AA	Comprehensive (hard copy), Adobe, SEDD (2A or 2B)		
1013	Cost Multiplier for Miscellaneous Expedited Sample Analysis		UNIT PRICE (\$)
1013AA	24 hours		
1013AB	48 hours		
1013AC	72 hours		
1013AD	7 days		
1013AE	14 days		
	21 days = Standard turn-around-time (Include in bases analysis cost.)		

Note: Unless otherwise specified in a task order, project-specific Matrix Spike (MS)/Matrix Spike Duplicate (MSD) are required. The cost of MS/MD shall be included as part of the base analysis cost.

SECOND OPTION PERIOD

ANALYTICAL METHODS LISTING

ITEM NUMBER	DESCRIPTION	METHOD	UNIT PRICE (\$)
2001	Organic Analyses		
2001AA	Halogenated/Aromatic Volatile Organics	EPA 602/8021	
2001AB	PCBs in water and soil	EPA 608/8082	
2001AC	Organochlorine Pesticides	EPA 608/8081	
2001AD	Organophosphorus Pesticides	EPA 8141	
2001AE	Chlorinated Herbicides	EPA 8151	
2001AF	Volatile Organics	EPA 624/524.2/8260	
2001AG	Volatile Organics + 10 TICs	EPA 624/8260	
2001AH	Volatile Organics, low-level (full scan)	EPA 624/8260	
2001AI	Pentachlorophenol	EPA 625/8270	
2001AJ	Phenols	EPA 625/8270	
2001AK	Semi-Volatile Organics (BNAs)	EPA 625/8270	
2001AL	Semi-Volatile Organics (BNAs) + 20 TICs	EPA 625/8270	
2001AM	Semi-Volatile Organics (BNAs), low-level (full scan)	EPA 625/8270	
2001AN	Polynuclear Aromatic Hydrocarbons	EPA 625/8270	
2001AO	Polynuclear Aromatic Hydrocarbons, low-level (full scan)	EPA 625/8270	
2001AP	Dioxins / Furans	EPA 8290	
2001AQ	Polynuclear Aromatic Hydrocarbons	EPA 8310	
2001AR	Explosives	EPA 8330	
2001AS	1,4-Dioxane	EPA 8260 or 8270 (modified)	
2001AT	Perchlorate (LC/MS/MS)	EPA 8321A/331.0	
2001AU	Perchlorate (IC)	EPA 314.0	
2001AV	Tributyltin	Krone	
2001AW	Tributyltin in pore water (includes extraction)	Krone	
2001AX	EDB & EDC	EPA 504/8011	
2001AY	Hydrocarbon Dissolved Gases	RSK 175	

2002	Underground Storage Tank Analyses	METHOD	UNIT PRICE (\$)
2002AA	Hydrocarbon Identification Method for Soil and Water	NWTPH-HCID	
2002AB	Volatile Petroleum Products Method for Soil and Water Analyses	NWTPH-Gx	

2002AC	Semivolatile Petroleum Products Method for Soil and Water Analyses	NWTPH-Dx	
2002AD	Method for the Determination of Volatile Petroleum Hydrocarbons (VPH) Fractions	VPH Fractions	
2002AE	Method for the Determination of Extractable Petroleum Hydrocarbons (EPH) Fractions	EPH Fractions	
2002AF	VOCs (benzene, ethyl benzene toluene, total xylenes, n-hexane, MTBE, EDB, EDC)	EPA 8260	
2002AG	Naphthalenes	EPA 8260	
2002AH	Oil and Grease (Gravimetric)	EPA 413.1	
2002AI	Oil and Grease (IR)	EPA 413.2	
2002AJ	Total Recoverable Petroleum Hydrocarbons	EPA 418.1	
2002AK	Hexane Extractable Hydrocarbons	EPA 1664	
2002AK	Total Lead	EPA 6010	
2002AL	Wear Metals (cadmium, chromium, lead, nickel, zinc)	EPA 6010	
2002AM	Carcinogenic PAHs	EPA 8270	
2002AN	PCBs	EPA 8082	
2003	Metals Packages	METHOD	UNIT PRICE (\$)
2003AA	RCRA List as Total Metals: As, Ba, Cd, Cr, Pb, Se, Ag by ICP Hg by AA	EPA 6010 EPA 7470/7471	
2003AB	EPA Priority Pollutant Metals in water: Ag, Be, Cr, Cu, Ni, Zn by ICP Sb, As, Cd, Pb, Se, Tl by ICP-MS Hg by AA	EPA 200.7/6010 EPA 200.8/6020 EPA 245.2/7470	
2003AC	EPA Priority Pollutant Metals in soil or water: Ag, Be, Cr, Cu, Ni, Zn, Sb, As, Cd, Pb, Se, Tl Hg by AA	EPA 6010 EPA 7470/7471	
2003AD	CLP Target Analyte List (TAL) Metals: Al, Ba, Be, Ca, Cr, Co, Cu, Fe, Mg Mn, Ni, K, Ag, Na, V, Zn, by ICP Sb, As, Cd, Pb, Se, Tl, by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471	
2003AE	TCLP Metals (Extraction and Analysis) As, Ba, Cd, Cr, Pb, Ag, Se by ICP Hg by AA	EPA 6010A EPA 7470	
2003AF	RCRA List to Meet MTCA Requirements: BA, Cr, Ag, Se by ICP AS, Cd, Pb by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471	
2004	Spectrophotometry	METHOD	UNIT PRICE (\$)

2004AA	Flame Atomic Absorption (FAA, full method list)	EPA 7000	
2004AB	Graphite Furnace (GFAA, full method list)	EPA 7000	
2004AC	Mercury, Cold Vapor AA (Including Prep)	EPA 7470/7471	
2004AD	Chromium, Hexavalent (Including Prep)	EPA 7196	
2005	Spectroscopy (ICP):	METHOD	UNIT PRICE (\$)
	Individual Metals by ICP...		
2005AA	Aluminum (Al)	EPA 6010	
2005AB	Silver (Ag)		
2005AC	Arsenic (As)		
2005AD	Boron (B)		
2005AE	Barium (Ba)		
2005AF	Beryllium (Be)		
2005AG	Calcium (Ca)		
2005AH	Cadmium (Cd)		
2005AI	Cobalt (Co)		
2005AJ	Chromium (Cu)		
2005AK	Copper (Cu)		
2005AL	Iron (Fe)		
2005AM	Potassium (K)		
2005AN	Magnesium (Mg)		
2005AO	Manganese (Mn)		
2005AP	Molybdenum (Mo)		
2005AQ	Sodium (Na)		
2005AR	Nickel (Ni)		
2005AS	Lead (Pb)		
2005AT	Antimony (Sb)		
2005AU	Selenium (Se)		
2005AV	Tin (Sn)		
2005AW	Titanium (Ti)		
2005AX	Thallium (Tl)		
2005AY	Vanadium (V)		
2005AZ	Zinc (Zn)		

2006	Spectroscopy (ICP):	METHOD	UNIT PRICE (\$)
	Individual Metals by ICP-MS...		
2006AA	Aluminum (Al)	EPA 6020	
2006AB	Silver (Ag)		
2006AC	Arsenic (As)		
2006AD	Boron (B)		
2006AE	Barium (Ba)		
2006AF	Beryllium (Be)		
2006AG	Calcium (Ca)		
2006AH	Cadmium (Cd)		
2006AI	Cobalt (Co)		
2006AJ	Chromium (Cu)		
2006AK	Copper (Cu)		
2006AL	Iron (Fe)		
2006AM	Potassium (K)		
2006AN	Magnesium (Mg)		
2006AO	Manganese (Mn)		
2006AP	Molybdenum (Mo)		
2006AQ	Sodium (Na)		
2006AR	Nickel (Ni)		
2006AS	Lead (Pb)		
2006AT	Antimony (Sb)		
2006AU	Selenium (Se)		
2006AV	Tin (Sn)		
2006AW	Titanium (Ti)		
2006AX	Thallium (Tl)		
2006AY	Vanadium (V)		
2006AZ	Zinc (Zn)		
2007	General Chemistry	METHOD	UNIT PRICE (\$)
2007AA	Biochemical Oxygen Demand	EPA 405.1	
2007AB	Bromide	EPA 320.1/300.0	
2007AC	Carbonate	EPA 310.1/310.2	
2007AD	Chemical Oxygen Demand	EPA 410.1/410.4	
2007AE	Chloride	EPA 325.2/300.0	
2007AF	Chlorine - Residual	EPA 330.5	

2007AG	Conductivity	EPA 120.1	
2007AH	Corrosivity to Steel	EPA 1110	
2007AI	Cyanide - Total	EPA 335.3	
2007AJ	Cyanide - Amenable	EPA 335.3	
2007AK	Flashpoint	EPA 1010/1021	
2007AL	Fluoride	EPA 340.2/300.0	
2007AM	Hardness - Total	EPA 130.2/130.1	
2007AN	Hardness - Ca and Mg	SM2340B	
2007AO	Major Anions (full method list)	EPA 300 Series	
2007AP	Major Cations (Na, K, Ca, and Mg for aqueous samples or Na, K, Ca, Mg, Fe, Mn, and Al for soil samples)	EPA 6010/7000	
2007AQ	Moisture	EPA CLP	
2007AR	Nitrogen - Nitrate	EPA 353.2/300.0	
2007AS	Nitrogen - Nitrite	EPA 354.1/353.2/300.0	
2007AT	Nitrogen - Nitrate and Nitrite	EPA 353.2/300.0	
2007AU	Nitrogen - Total Kjeldahl	EPA 351.3/351.4	
2007AV	Paint Filter Liquids Test	EPA 9096	
2007AW	pH	EPA 9040/9045/150.1	
2007AX	Phenolic Compounds	EPA 420.1/420.2	
2007AY	Phosphate - Ortho	EPA 365.2/365.1/300.0	
2007AZ	Phosphate - Total	EPA 365.4	
2007BA	Salinity	SM252D	
2007BB	Silicon Dioxide (Silica)	EPA 270.1	
2007BC	Solids - Dissolved	EPA 160.1	
2007BD	Solids - Suspended	EPA 160.2	
2007BE	Solids - total	EPA 160.3	
2007BF	Solids - Settleable	EPA 160.5	
2007BG	Specify Gravity	ASTM D854/SM2710F	
2007BH	Sulfate	EPA 374.2/300.0	
2007BI	Sulfide	EPA 376.2	
2007BJ	Sulfite	EPA 377.1	

2008	PSDDA and Marine Sediment Parameters	METHOD	UNIT PRICE (\$)
2008AA	Grain Size Distribution	ASTM D422	
2008AB	Nitrogen - Ammonia	EPA 350.1/350.2	

2008AC	Metals: Cu, Zn by ICP As, Cd, Cr, Pb, Ag by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471	
2008AD	Solids - Volatile	EPA 160.4	
2008AE	Semivolatile Organics: Phthalate Esters, LPAHs, HPAHs, Phenols, Chlorinated benzenes, Misc. Compounds	EPA 8270	
2008AF	PCBs	EPA 8081	
2008AG	Tributyltin (water or sediment)	Krone (GC-MS)	
2008AH	Tributyltin in pore water (includes extraction)	Krone (GC-MS)	
2009	General Chemistry	METHOD	UNIT PRICE (\$)
2009AA	Surfactant Test (MBAS)	EPA 425.1	
2009AB	Temperature	EPA 170.1	
2009AC	TOC	EPA 9060	
2009AD	TOX	EPA 9020	
2009AE	Turbidity	EPA 180.1	
2010	Misc	METHOD	UNIT PRICE (\$)
2010AA	Methanol kit for 5035	EPA 5035	
2010AB	NaHSO ₄ kit for low-level volatiles	EPA 5035	
2011	Hourly Services		UNIT PRICE (\$)
2011AA	Identification of unknowns, etc.		
2012	Data Deliverables		UNIT PRICE (\$)
	Definitive (hard copy), Adobe, SEDD (2A or 2B) - Include in base analysis cost.		
2012AA	Comprehensive (hard copy), Adobe, SEDD (2A or 2B)		
2013	Cost Multiplier for Miscellaneous Expedited Sample Analysis		UNIT PRICE (\$)
2013AA	24 hours		
2013AB	48 hours		
2013AC	72 hours		
2013AD	7 days		
2013AE	14 days		
	21 days = Standard turn-around-time (Include in bases analysis cost.)		
Note: Unless otherwise specified in a task order, project-specific Matrix Spike (MS)/Matrix Spike Duplicate (MSD) are required. The cost of MS/MD shall be included as part of the base analysis cost.			

THIRD OPTION PERIOD

ANALYTICAL METHODS LISTING

ITEM NUMBER	DESCRIPTION	METHOD	UNIT PRICE (\$)
3001	Organic Analyses		
3001AA	Halogenated/Aromatic Volatile Organics	EPA 602/8021	
3001AB	PCBs in water and soil	EPA 608/8082	
3001AC	Organochlorine Pesticides	EPA 608/8081	
3001AD	Organophosphorus Pesticides	EPA 8141	
3001AE	Chlorinated Herbicides	EPA 8151	
3001AF	Volatile Organics	EPA 624/524.2/8260	
3001AG	Volatile Organics + 10 TICs	EPA 624/8260	
3001AH	Volatile Organics, low-level (full scan)	EPA 624/8260	
3001AI	Pentachlorophenol	EPA 625/8270	
3001AJ	Phenols	EPA 625/8270	
3001AK	Semi-Volatile Organics (BNAs)	EPA 625/8270	
3001AL	Semi-Volatile Organics (BNAs) + 20 TICs	EPA 625/8270	
3001AM	Semi-Volatile Organics (BNAs), low-level (full scan)	EPA 625/8270	
3001AN	Polynuclear Aromatic Hydrocarbons	EPA 625/8270	
3001AO	Polynuclear Aromatic Hydrocarbons, low-level (full scan)	EPA 625/8270	
3001AP	Dioxins / Furans	EPA 8290	
3001AQ	Polynuclear Aromatic Hydrocarbons	EPA 8310	
3001AR	Explosives	EPA 8330	
3001AS	1,4-Dioxane	EPA 8260 or 8270 (modified)	
3001AT	Perchlorate (LC/MS/MS)	EPA 8321A/331.0	
3001AU	Perchlorate (IC)	EPA 314.0	
3001AV	Tributyltin	Krone	
3001AW	Tributyltin in pore water (includes extraction)	Krone	
3001AX	EDB & EDC	EPA 504/8011	
3001AY	Hydrocarbon Dissolved Gases	RSK 175	

3002	Underground Storage Tank Analyses	METHOD	UNIT PRICE (\$)
3002AA	Hydrocarbon Identification Method for Soil and Water	NWTPH-HCID	
3002AB	Volatile Petroleum Products Method for Soil and Water Analyses	NWTPH-Gx	

3002AC	Semivolatile Petroleum Products Method for Soil and Water Analyses	NWTPH-Dx	
3002AD	Method for the Determination fo Volatile Petroleum Hydrocarbons (VPH) Fractions	VPH Fractions	
3002AE	Method for the Determination of Extractable Petroleum Hydrocarbons (EPH) Fractions	EPH Fractions	
3002AF	VOCs (benzene, ethyl benzene toluene, total xylenes, n-hexane, MTBE, EDB, EDC)	EPA 8260	
3002AG	Naphthalenes	EPA 8260	
3002AH	Oil and Grease (Gravimetric)	EPA 413.1	
3002AI	Oil and Grease (IR)	EPA 413.2	
3002AJ	Total Recoverable Petroleum Hydrocarbons	EPA 418.1	
3002AK	Hexane Extractable Hydrocarbons	EPA 1664	
3002AK	Total Lead	EPA 6010	
3002AL	Wear Metals (cadmium, chromium, lead, nickel, zinc)	EPA 6010	
3002AM	Carcinogenic PAHs	EPA 8270	
3002AN	PCBs	EPA 8082	
3003	Metals Packages	METHOD	UNIT PRICE (\$)
3003AA	RCRA List as Total Metals: As, Ba, Cd, Cr, Pb, Se, Ag by ICP Hg by AA	EPA 6010 EPA 7470/7471	
3003AB	EPA Priority Pollutant Metals in water: Ag, Be, Cr, Cu, Ni, Zn by ICP Sb, As, Cd, Pb, Se, Tl by ICP-MS Hg by AA	EPA 200.7/6010 EPA 200.8/6020 EPA 245.2/7470	
3003AC	EPA Priotity Pollutant Metals in soil or water: Ag, Be, Cr, Cu, Ni, Zn, Sb, As, Cd, Pb, Se, Tl Hg by AA	EPA 6010 EPA 7470/7471	
3003AD	CLP Target Analyte List (TAL) Metals: Al, Ba, Be, Ca, Cr, Co, Cu, Fe, Mg Mn, Ni, K, Ag, Na, V, Zn, by ICP Sb, As, Cd, Pb, Se, Tl, by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471	
3003AE	TCLP Metals (Extraction and Analysis) As, Ba, Cd, Cr, Pb, Ag, Se by ICP Hg by AA	EPA 6010A EPA 7470	
3003AF	RCRA List to Meet MTCA Requirements: BA, Cr, Ag, Se by ICP AS, Cd, Pb by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471	
3004	Spectrophotometry	METHOD	UNIT PRICE (\$)
3004AA	Flame Atomic Absorption (FAA, full method list)	EPA 7000	

3004AB	Graphite Furnace (GFAA, full method list)	EPA 7000	
3004AC	Mercury, Cold Vapor AA (Including Prep)	EPA 7470/7471	
3004AD	Chromium, Hexavalent (Including Prep)	EPA 7196	
3005	Spectroscopy (ICP):	METHOD	UNIT PRICE (\$)
	Individual Metals by ICP...		
3005AA	Aluminum (Al)		
3005AB	Silver (Ag)		
3005AC	Arsenic (As)		
3005AD	Boron (B)		
3005AE	Barium (Ba)		
3005AF	Beryllium (Be)		
3005AG	Calcium (Ca)		
3005AH	Cadmium (Cd)		
3005AI	Cobalt (Co)		
3005AJ	Chromium (Cu)		
3005AK	Copper (Cu)		
3005AL	Iron (Fe)		
3005AM	Potassium (K)		
3005AN	Magnesium (Mg)		
3005AO	Manganese (Mn)		
3005AP	Molybdenum (Mo)		
3005AQ	Sodium (Na)		
3005AR	Nickel (Ni)		
3005AS	Lead (Pb)		
3005AT	Antimony (Sb)		
3005AU	Selenium (Se)		
3005AV	Tin (Sn)		
3005AW	Titanium (Ti)		
3005AX	Thallium (Tl)		
3005AY	Vanadium (V)		
3005AZ	Zinc (Zn)	EPA 6010	
3006	Spectroscopy (ICP):	METHOD	UNIT PRICE (\$)
	Individual Metals by ICP-MS...		
3006AA	Aluminum (Al)	EPA 6020	
3006AB	Silver (Ag)		

3006AC	Arsenic (As)		
3006AD	Boron (B)		
3006AE	Barium (Ba)		
3006AF	Beryllium (Be)		
3006AG	Calcium (Ca)		
3006AH	Cadmium (Cd)		
3006AI	Cobalt (Co)		
3006AJ	Chromium (Cu)		
3006AK	Copper (Cu)		
3006AL	Iron (Fe)		
3006AM	Potassium (K)		
3006AN	Magnesium (Mg)		
3006AO	Manganese (Mn)		
3006AP	Molybdenum (Mo)		
3006AQ	Sodium (Na)		
3006AR	Nickel (Ni)		
3006AS	Lead (Pb)		
3006AT	Antimony (Sb)		
3006AU	Selenium (Se)		
3006AV	Tin (Sn)		
3006AW	Titanium (Ti)		
3006AX	Thallium (Tl)		
3006AY	Vanadium (V)		
3006AZ	Zinc (Zn)		
3007	General Chemistry	METHOD	UNIT PRICE (\$)
3007AA	Biochemical Oxygen Demand	EPA 405.1	
3007AB	Bromide	EPA 320.1/300.0	
3007AC	Carbonate	EPA 310.1/310.2	
3007AD	Chemical Oxygen Demand	EPA 410.1/410.4	
3007AE	Chloride	EPA 325.2/300.0	
3007AF	Chlorine - Residual	EPA 330.5	
3007AG	Conductivity	EPA 120.1	
3007AH	Corrosivity to Steel	EPA 1110	
3007AI	Cyanide - Total	EPA 335.3	
3007AJ	Cyanide - Amenable	EPA 335.3	
3007AK	Flashpoint	EPA 1010/1021	

3007AL	Fluoride	EPA 340.2/300.0	
3007AM	Hardness - Total	EPA 130.2/130.1	
3007AN	Hardness - Ca and Mg	SM2340B	
3007AO	Major Anions (full method list)	EPA 300 Series	
3007AP	Major Cations (Na, K, Ca, and Mg for aqueous samples or Na, K, Ca, Mg, Fe, Mn, and Al for soil samples)	EPA 6010/7000	
3007AQ	Moisture	EPA CLP	
3007AR	Nitrogen - Nitrate	EPA 353.2/300.0	
3007AS	Nitrogen - Nitrite	EPA 354.1/353.2/300.0	
3007AT	Nitrogen - Nitrate and Nitrite	EPA 353.2/300.0	
3007AU	Nitrogen - Total Kjeldahl	EPA 351.3/351.4	
3007AV	Paint Filter Liquids Test	EPA 9096	
3007AW	pH	EPA 9040/9045/150.1	
3007AX	Phenolic Compounds	EPA 420.1/420.2	
3007AY	Phosphate - Ortho	EPA 365.2/365.1/300.0	
3007AZ	Phosphate - Total	EPA 365.4	
3007BA	Salinity	SM252D	
3007BB	Silicon Dioxide (Silica)	EPA 270.1	
3007BC	Solids - Dissolved	EPA 160.1	
3007BD	Solids - Suspended	EPA 160.2	
3007BE	Solids - total	EPA 160.3	
3007BF	Solids - Settleable	EPA 160.5	
3007BG	Specify Gravity	ASTM D854/SM2710F	
3007BH	Sulfate	EPA 374.2/300.0	
3007BI	Sulfide	EPA 376.2	
3007BJ	Sulfite	EPA 377.1	
3008	PSDDQ and Marine Sediment Parameters	METHOD	UNIT PRICE (\$)
3008AA	Grain Size Distribution	ASTM D422	
3008AB	Nitrogen - Ammonia	EPA 350.1/350.2	
3008AC	Metals: Cu, Zn by ICP As, Cd, Cr, Pb, Ag by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471	
3008AD	Solids - Volatile	EPA 160.4	
3008AE	Semivolatile Organics: Phthalate Esters, LPAHs, HPAHs, Phenols, Chlorinated benzenes, Misc. Compounds	EPA 8270	

3008AF	PCBs	EPA 8081	
3008AG	Tributyltin (water or sediment)	Krone (GC-MS)	
3008AH	Tributyltin in pore water (includes extraction)	Krone (GC-MS)	

3009	General Chemistry	METHOD	UNIT PRICE (\$)
3009AA	Surfactant Test (MBAS)	EPA 425.1	
3009AB	Temperature	EPA 170.1	
3009AC	TOC	EPA 9060	
3009AD	TOX	EPA 9020	
3009AE	Turbidity	EPA 180.1	
3010	Misc	METHOD	UNIT PRICE (\$)
3010AA	Methanol kit for 5035	EPA 5035	
3010AB	NaHSO ₄ kit for low-level volatiles	EPA 5035	
3011	Hourly Services		UNIT PRICE (\$)
3011AA	Identification of unknowns, etc.		
3012	Data Deliverables		UNIT PRICE (\$)
	Definitive (hard copy), Adobe, SEDD (2A or 2B) - Include in base analysis cost.		
3012AA	Comprehensive (hard copy), Adobe, SEDD (2A or 2B)		
3013	Cost Multiplier for Miscellaneous Expedited Sample Analysis		UNIT PRICE (\$)
3013AA	24 hours		
3013AB	48 hours		
3013AC	72 hours		
3013AD	7 days		
3013AE	14 days		
	21 days = Standard turn-around-time (Include in bases analysis cost.)		

Note: Unless otherwise specified in a task order, project-specific Matrix Spike (MS)/Matrix Spike Duplicate (MSD) are required. The cost of MS/MD shall be included as part of the base analysis cost.

FOURTH OPTION PERIOD

ANALYTICAL METHODS LISTING

ITEM NUMBER	DESCRIPTION	METHOD	UNIT PRICE (\$)
4001	Organic Analyses		
4001AA	Halogenated/Aromatic Volatile Organics	EPA 602/8021	
4001AB	PCBs in water and soil	EPA 608/8082	
4001AC	Organochlorine Pesticides	EPA 608/8081	
4001AD	Organophosphorus Pesticides	EPA 8141	
4001AE	Chlorinated Herbicides	EPA 8151	
4001AF	Volatile Organics	EPA 624/524.2/8260	
4001AG	Volatile Organics + 10 TICs	EPA 624/8260	
4001AH	Volatile Organics, low-level (full scan)	EPA 624/8260	
4001AI	Pentachlorophenol	EPA 625/8270	
4001AJ	Phenols	EPA 625/8270	
4001AK	Semi-Volatile Organics (BNAs)	EPA 625/8270	
4001AL	Semi-Volatile Organics (BNAs) + 20 TICs	EPA 625/8270	
4001AM	Semi-Volatile Organics (BNAs), low-level (full scan)	EPA 625/8270	
4001AN	Polynuclear Aromatic Hydrocarbons	EPA 625/8270	
4001AO	Polynuclear Aromatic Hydrocarbons, low-level (full scan)	EPA 625/8270	
4001AP	Dioxins / Furans	EPA 8290	
4001AQ	Polynuclear Aromatic Hydrocarbons	EPA 8310	
4001AR	Explosives	EPA 8330	
4001AS	1,4-Dioxane	EPA 8260 or 8270 (modified)	
4001AT	Perchlorate (LC/MS/MS)	EPA 8321A/331.0	
4001AU	Perchlorate (IC)	EPA 314.0	
4001AV	Tributyltin	Krone	
4001AW	Tributyltin in pore water (includes extraction)	Krone	
4001AX	EDB & EDC	EPA 504/8011	
4001AY	Hydrocarbon Dissolved Gases	RSK 175	
4002	Underground Storage Tank Analyses	METHOD	UNIT PRICE (\$)
4002AA	Hydrocarbon Identification Method for Soil and Water	NWTPH-HCID	
4002AB	Volatile Petroleum Products Method for Soil and Water Analyses	NWTPH-Gx	

4002AC	Semivolatile Petroleum Products Method for Soil and Water Analyses	NWTPH-Dx	
4002AD	Method for the Determination fo Volatile Petroleum Hydrocarbons (VPH) Fractions	VPH Fractions	
4002AE	Method for the Determination of Extractable Petroleum Hydrocarbons (EPH) Fractions	EPH Fractions	
4002AF	VOCs (benzene, ethyl benzene toluene, total xylenes, n-hexane, MTBE, EDB, EDC)	EPA 8260	
4002AG	Naphthalenes	EPA 8260	
4002AH	Oil and Grease (Gravimetric)	EPA 413.1	
4002AI	Oil and Grease (IR)	EPA 413.2	
4002AJ	Total Recoverable Petroleum Hydrocarbons	EPA 418.1	
4002AK	Hexane Extractable Hydrocarbons	EPA 1664	
4002AK	Total Lead	EPA 6010	
4002AL	Wear Metals (cadmium, chromium, lead, nickel, zinc)	EPA 6010	
4002AM	Carcinogenic PAHs	EPA 8270	
4002AN	PCBs	EPA 8082	
4003	Metals Packages	METHOD	UNIT PRICE (\$)
4003AA	RCRA List as Total Metals: As, Ba, Cd, Cr, Pb, Se, Ag by ICP Hg by AA	EPA 6010 EPA 7470/7471	
4003AB	EPA Priority Pollutant Metals in water: Ag, Be, Cr, Cu, Ni, Zn by ICP Sb, As, Cd, Pb, Se, TI by ICP-MS Hg by AA	EPA 200.7/6010 EPA 200.8/6020 EPA 245.2/7470	
4003AC	EPA Priotity Pollutant Metals in soil or water: Ag, Be, Cr, Cu, Ni, Zn, Sb, As, Cd, Pb, Se, TI Hg by AA	EPA 6010 EPA 7470/7471	
4003AD	CLP Target Analyte List (TAL) Metals: Al, Ba, Be, Ca, Cr, Co, Cu, Fe, Mg Mn, Ni, K, Ag, Na, V, Zn, by ICP Sb, As, Cd, Pb, Se, TI, by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471	
4003AE	TCLP Metals (Extraction and Analysis) As, Ba, Cd, Cr, Pb, Ag, Se by ICP Hg by AA	EPA 6010A EPA 7470	
4003AF	RCRA List to Meet MTCA Requirements: BA, Cr, Ag, Se by ICP AS, Cd, Pb by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471	
4004	Spectrophotometry	METHOD	UNIT PRICE (\$)
4004AA	Flame Atomic Absorption (FAA, full method list)	EPA 7000	

4004AB	Graphite Furnace (GFAA, full method list)	EPA 7000		
4004AC	Mercury, Cold Vapor AA (Including Prep)	EPA 7470/7471		
4004AD	Chromium, Hexavalent (Including Prep)	EPA 7196		
0004	Spectroscopy (ICP):	METHOD	UNIT PRICE (\$)	
	Individual Metals by ICP...			
4005AA	Aluminum (Al)			
4005AB	Silver (Ag)			
4005AC	Arsenic (As)			
4005AD	Boron (B)			
4005AE	Barium (Ba)			
4005AF	Beryllium (Be)			
4005AG	Calcium (Ca)			
4005AH	Cadmium (Cd)			
4005AI	Cobalt (Co)			
4005AJ	Chromium (Cu)			
4005AK	Copper (Cu)			
4005AL	Iron (Fe)			
4005AM	Potassium (K)			
4005AN	Magnesium (Mg)			
4005AO	Manganese (Mn)			
4005AP	Molybdenum (Mo)			
4005AQ	Sodium (Na)			
4005AR	Nickel (Ni)			
4005AS	Lead (Pb)			
4005AT	Antimony (Sb)			
4005AU	Selenium (Se)			
4005AV	Tin (Sn)			
4005AW	Titanium (Ti)			
4005AX	Thallium (Tl)			
4005AY	Vanadium (V)			
4005AZ	Zinc (Zn)		EPA 6010	
4006	Spectroscopy (ICP):		METHOD	UNIT PRICE (\$)
	Individual Metals by ICP-MS...			
4006AA	Aluminum (Al)	EPA 6020		
4006AB	Silver (Ag)			

4006AC	Arsenic (As)		
4006AD	Boron (B)		
4006AE	Barium (Ba)		
4006AF	Beryllium (Be)		
4006AG	Calcium (Ca)		
4006AH	Cadmium (Cd)		
4006AI	Cobalt (Co)		
4006AJ	Chromium (Cu)		
4006AK	Copper (Cu)		
4006AL	Iron (Fe)		
4006AM	Potassium (K)		
4006AN	Magnesium (Mg)		
4006AO	Manganese (Mn)		
4006AP	Molybdenum (Mo)		
4006AQ	Sodium (Na)		
4006AR	Nickel (Ni)		
4006AS	Lead (Pb)		
4006AT	Antimony (Sb)		
4006AU	Selenium (Se)		
4006AV	Tin (Sn)		
4006AW	Titanium (Ti)		
4006AX	Thallium (Tl)		
4006AY	Vanadium (V)		
4006AZ	Zinc (Zn)		
4007	General Chemistry	METHOD	UNIT PRICE (\$)
4007AA	Biochemical Oxygen Demand	EPA 405.1	
4007AB	Bromide	EPA 320.1/300.0	
4007AC	Carbonate	EPA 310.1/310.2	
4007AD	Chemical Oxygen Demand	EPA 410.1/410.4	
4007AE	Chloride	EPA 325.2/300.0	
4007AF	Chlorine - Residual	EPA 330.5	
4007AG	Conductivity	EPA 120.1	
4007AH	Corrosivity to Steel	EPA 1110	
4007AI	Cyanide - Total	EPA 335.3	
4007AJ	Cyanide - Amenable	EPA 335.3	
4007AK	Flashpoint	EPA 1010/1021	

4007AL	Fluoride	EPA 340.2/300.0	
4007AM	Hardness - Total	EPA 130.2/130.1	
4007AN	Hardness - Ca and Mg	SM2340B	
4007AO	Major Anions (full method list)	EPA 300 Series	
4007AP	Major Cations (Na, K, Ca, and Mg for aqueous samples or Na, K, Ca, Mg, Fe, Mn, and Al for soil samples)	EPA 6010/7000	
4007AQ	Moisture	EPA CLP	
4007AR	Nitrogen - Nitrate	EPA 353.2/300.0	
4007AS	Nitrogen - Nitrite	EPA 354.1/353.2/300.0	
4007AT	Nitrogen - Nitrate and Nitrite	EPA 353.2/300.0	
4007AU	Nitrogen - Total Kjeldahl	EPA 351.3/351.4	
4007AV	Paint Filter Liquids Test	EPA 9096	
4007AW	pH	EPA 9040/9045/150.1	
4007AX	Phenolic Compounds	EPA 420.1/420.2	
4007AY	Phosphate - Ortho	EPA 365.2/365.1/300.0	
4007AZ	Phosphate - Total	EPA 365.4	
4007BA	Salinity	SM252D	
4007BB	Silicon Dioxide (Silica)	EPA 270.1	
4007BC	Solids - Dissolved	EPA 160.1	
4007BD	Solids - Suspended	EPA 160.2	
4007BE	Solids - total	EPA 160.3	
4007BF	Solids - Settleable	EPA 160.5	
4007BG	Specify Gravity	ASTM D854/SM2710F	
4007BH	Sulfate	EPA 374.2/300.0	
4007BI	Sulfide	EPA 376.2	
4007BJ	Sulfite	EPA 377.1	
4008	PSDDQ and Marine Sediment Parameters	METHOD	UNIT PRICE (\$)
4008AA	Grain Size Distribution	ASTM D422	
4008AB	Nitrogen - Ammonia	EPA 350.1/350.2	
4008AC	Metals: Cu, Zn by ICP As, Cd, Cr, Pb, Ag by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471	
4008AD	Solids - Volatile	EPA 160.4	
4008AE	Semivolatile Organics: Phthalate Esters, LPAHs, HPAHs, Phenols, Chlorinated benzenes, Misc. Compounds	EPA 8270	

4008AF	PCBs	EPA 8081	
4008AG	Tributyltin (water or sediment)	Krone (GC-MS)	
4008AH	Tributyltin in pore water (includes extraction)	Krone (GC-MS)	
4009	General Chemistry	METHOD	UNIT PRICE (\$)
4009AA	Surfactant Test (MBAS)	EPA 425.1	
4009AB	Temperature	EPA 170.1	
4009AC	TOC	EPA 9060	
4009AD	TOX	EPA 9020	
4009AE	Turbidity	EPA 180.1	

4010	Misc	METHOD	UNIT PRICE (\$)
4010AA	Methanol kit for 5035	EPA 5035	
4010AB	NaHSO ₄ kit for low-level volatiles	EPA 5035	
4011	Hourly Services		UNIT PRICE (\$)
4011AA	Identification of unknowns, etc.		
4012	Data Deliverables		UNIT PRICE (\$)
	Definitive (hard copy), Adobe, SEDD (2A or 2B) - Include in base analysis cost.		
4012AA	Comprehensive (hard copy), Adobe, SEDD (2A or 2B)		
4013	Cost Multiplier for Miscellaneous Expedited Sample Analysis		UNIT PRICE (\$)
4013AA	24 hours		
4013AB	48 hours		
4013AC	72 hours		
4013AD	7 days		
4013AE	14 days		
	21 days = Standard turn-around-time (Include in bases analysis cost.)		

Note: Unless otherwise specified in a task order, project-specific Matrix Spike (MS)/Matrix Spike Duplicate (MSD) are required. The cost of MS/MD shall be included as part of the base analysis cost.

U.S. ARMY CORPS OF ENGINEERS

**Seattle District Engineering & Technology Section
(CENWS-EC-TB-ET)**

**INDEFINITE DELIVERY CONTRACT FOR ANALYTICAL LABORATORY SERVICES
FOR ENVIRONMENTAL SAMPLE ANALYSIS**

SCOPE OF WORK



~~May-June~~ 2004

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SECTION 1: CONTRACT DESCRIPTION

1.1 Contract Objectives

The objective of this contract is to obtain chemical data that is technically valid, of known quality, and legally defensible, that will meet or exceed the required site-specific Data Quality Objectives (DQOs) for each project. The following mission statement reflects the Districts intentions in forming this contract:

Mission Statement

In order to achieve the objectives of projects executed on behalf of the Department of Defense, NWS seeks laboratories to participate as active partners in the execution of analyses to support the project goals. To foster the laboratories ability to achieve full partnership, NWS commits to the following actions:

- *Laboratories will be informed of project requirements in a written scope of work as far in advance as possible.*
- *Laboratories will be provided reviewer input opportunity on all project quality assurance project plans (QAPP). Acceptance of the plan shall be indicated by signature on the approval page of the QAPP.*
- *Laboratories will be provided the opportunity to participate in preparatory, initial and follow-up phase meetings. These meetings will serve as a forum for becoming fully informed of project goals and expectations. They will also serve as an opportunity for the laboratory to express its concerns regarding project schedule and execution of the required analyses.*

This contract describes the management policies, objectives, principles, and procedures, which will be used to generate data of the required quality following the principles set forth in the mission statement.

1.2 Contract Background

The Seattle District routinely generates primary samples and quality assurance samples that have been collected from various hazardous and toxic waste sites. The sampling and analytical work will primarily be in conjunction with investigations for the Department of Defense Environmental Restoration Programs (DERP), Installation Restoration Program (IRP), Formerly Used Defense Sites (FUDS), the Base Realignment and Closure (BRAC) program, Military and Civil Works as well as “Support for Others”.

1.3 Contract Description

This firm fixed price indefinite delivery order contract is for analytical services support for the U.S. Army Corps of Engineers Seattle District, for the chemical analysis of soil, air, soil vapor, dredge materials, treatment system process streams, sediment, sludge, ground water, surface water, and other environmental samples. These samples have typically been collected from various hazardous and toxic waste site cleanup projects. Others may be emergency operations samples for characterization of unknowns including chemical and biological agents. Chemical analysis and reporting services will be performed by the Contract Laboratory

in support of the hazardous waste investigations, remediation programs, and emergency operations conducted by, or on behalf of the Seattle District (NWS).

The purpose of this indefinite delivery contract is to enable the performance, under a single contract mechanism, of analytical services for various projects as needed. Individual task orders will be issued for each analytical services scope under this contract. Each task order will contain specific scope-related information such as number and type of analyses required, test method references, project deliverable requirements, project timing, applicable shipping information, etc. (Attachment 1). Upon receipt of a project scope of work, the contractor laboratory will develop and submit a cost estimate to the USACE point of contact. Following USACE approval of this cost estimate, a task order will be issued to the contract laboratory for the project work.

This contract will consist of a one-year base period, followed by four one-year option periods. The base period as well as each of the one-year option periods will cover up to ~~\$200,000~~\$250,000 worth of analytical services. For the one-year base contract period and the four one-year option periods, the laboratory should provide unit costs or a multiplier for each bid item.

The technical criteria to be used when selecting the contract laboratory can be found in Section M (Bid Evaluation Criteria) of the solicitation.

SECTION 2: GENERAL CONTRACT PROVISIONS

2.1 Analytical Services

The laboratory and its subcontractors shall provide technically valid and legally defensible analyses by specified methods for the environmental samples submitted under this contract.

2.2 Facilities and Personnel

Provide all laboratory facilities and qualified personnel for sample analyses, and provide access to work, as required.

2.3 Sample Containers

Provide appropriate sample containers with the required preservatives. Sufficient coolers and appropriate packaging material shall be provided by the laboratory for transport of samples to the Contract Laboratory in compliance with US DOT and IATA regulations. Sample containers and coolers for delivery of samples to the laboratory will be delivered to the -NWS offices at no additional expense to the Government.

2.4 Transportation of Samples

If the project site is located within a 50 mile radius of the laboratory, daily courier services shall be provided at no additional cost to the government. Requirements for transportation of samples and sample containers are provided in Section 5.1.

2.5 Sample Handling

Furnish labor, equipment and facilities to obtain and handle samples at the laboratory, to facilitate inspections and analyses and to provide storage, preservation and cooling of the samples, as necessary.

2.6 Sample Custody

Provide for and ensure that internal laboratory chain of custody, and ultimate disposal of samples takes place in accordance with USACE/EPA procedures. Disposal of all sample residuals after analysis will be the responsibility of the Contract Laboratory at no additional expense to the Government.

2.7 Record keeping

Maintain internal record keeping in accordance with good laboratory practices and the provisions of these specifications.

2.8 Reporting and Data Management

Provide for documentation and data management of the analytical results at the laboratory. Provide the specified paper and electronic reports of analytical results within the specified period of time.

2.9 Inspections

Comply with contract specified standards and ascertain compliance of materials and procedures with requirements of the Contract Documents.

2.10 On-Site Audits

Some projects may require the laboratory to participate on on-site audits. Advance notification will be provided in most cases. However, NWS may determine that it is in the best interest of the project to perform these audits with little notification. The laboratories shall comply with all requests for audits as specified in section 6.4.1.

SECTION 3: GENERAL CONTRACT REQUIREMENTS

This section summarizes a number of notable requirements under this contract; many of these requirements are described in more detail in later sections.

3.1 General Analytical Requirements

The analytical methods to be used are specified in the latest version of EPA SW-846 or are the latest versions specified by the State of Washington Department of Ecology (Ecology). The requirements and procedures of Chapters 1-8 of SW-846 shall also be followed as applicable to performance of laboratory work.

Many aspects of procedures specified by SW-846 and other methods are ambiguous or offer alternatives for choices of action. In order to address these ambiguities, the Seattle District adopts the USACE "Shell for Analytical Chemistry Requirements" as its base standard for laboratory data quality. This guidance has been officially promulgated as Appendix I of EM 200-1-3, "Requirements for the Preparation of Sampling and Analysis Plans (February 2001)". The "Shell for Analytical Chemistry Requirements" defines the options for execution of laboratory analyses that will be acceptable to USACE. Some aspects of work required by this contract will exceed the basic requirements of SW-846. If there is a conflict between the content of these specifications or "Shell for Analytical Chemistry" and the task-specific scope of work, the project scope will take precedence for execution of work for this contract.

The laboratory procedures anticipated for this contract are summarized in Table 3.1. Analytes included in these methods are listed in Table 3-2. These analysis requirements reflect the requirements of SW-846, 3rd Edition, Update III and the Ecology procedures for petroleum hydrocarbon analysis ("Analytical Methods for Petroleum Hydrocarbons", Publication No. ECY 97-602, June 1997). Additional testing may be required using other EPA, ASTM, or other designated procedures. These procedures may be updated as necessary to reflect changed regulatory testing requirements in RCRA, CERCLA and other programs. The analyte lists provided in Table 3-2 are to be considered as minimum lists.

Laboratory specific SOPs, as part of a Laboratory Quality Assurance Plan (LQAP), shall be followed for non-SW-846 (e.g., EPA Method 504.1) or Ecology methods upon approval of the NWS project chemist.

3.2 Laboratory Validation/Accreditation

The offerors shall demonstrate that they are validated by the USACE HTRW-CX (hereafter referred to as the CX) for all matrixes and methods listed in Table 3-1 prior to contract award. If the successful bidder is not currently validated by the CX, the validation process will be initiated by the Seattle District after initial selection of a candidate for award of this contract. (This specification is also applicable for subcontract laboratories. See discussion in PARAGRAPH: SUBCONTRACT LABS.) A detailed description of the validation process is included in USACE EM 200-1-1, Validation of Analytical Chemistry Laboratories. Final award of the contract is contingent upon successful validation by the CX for all analytical methods that are relevant for this contract. As a part of the bid package, the offerors must also demonstrate that they are accredited by the individual States covered under this contract. **If the initial candidate is unsuccessful in acquiring USACE validation and State certification within 60 days of contract award, an alternate candidate may be selected from the group of offerors.** Offerors are cautioned that the USACE validation process can take up to 90 days or longer.

The CX has announced that it may cease or curtail its laboratory validation program in the future. The CX validation program is expected to be augmented by USACE participation in the National Environmental Laboratory Accreditation Program (NELAP). The successful bidder must obtain NELAP accreditation in the event of the termination of the current USACE validation program.

3.2.1 Loss of Validation/Accreditation Status

The Contract Laboratory must maintain a validated/accredited status throughout the life of this contract. Loss of validation/accredited status at any time during the term of this contract may result in the termination of this contract for default.

3.2.2 Subcontracting of Contracted Work

If the bidder is not CX validated for any particular method or matrix listed in Table 3-1, then the bid must include the name, address and phone number of a (single) proposed subcontract laboratory which is capable of satisfying all of the requirements described in the paragraph above, “Laboratory Validation/Accreditation”. No more than 20% of the items shown in the Bid Schedule can be subcontracted out in this way. This is a technical requirement for 20% of the monetary value of the contract. However, dioxin analyses should not be included in calculating the total contract amount for this propose. If a Contractor team is formed, both laboratories must maintain a USACE validated status throughout the life of this contract. Loss of validation status by the primary laboratory at any time during the term of this contract may result in the termination of this contract for default. If a subcontractor laboratory loses validation status the principal laboratory will be required to procure services from a validated laboratory within 14 days of the loss of validation for the applicable analyses. Under these circumstances, if the primary laboratory wishes to team with a laboratory that does not hold a current USACE laboratory validation, the primary laboratory may propose a second laboratory and the validation process will be initiated by the District for the applicable analyses. However, in the interim period while the validation process is being completed, the primary laboratory will be required to obtain services from a currently validated organization in order to provide continuity for contract services. Failure of the primary laboratory to provide for continuity of laboratory services as described in this paragraph shall result in termination of this contract for default. Network laboratories shall be considered as a single corporate entity. Additionally, a single laboratory in the network organization must be designated as the principal service provider, and each laboratory in the network must be validated separately.

3.2.3 Other Quality Systems

The laboratory must establish quality systems based on ISO/IEC Guide 25, “General Requirements for the Competence of Calibration and Testing Laboratories”. The laboratory’s quality system must be compliant with the principles of ISO/IEC Guide 25.

3.3 Initial Laboratory Submittals

3.3.1 Laboratory Quality Assurance Plan

A Contract Laboratory Quality Assurance Plan (LQAP) shall be submitted in electronic format to the Contracting Officer before testing is initiated. The LQAPs shall be kept on file for all of the methods listed in Table 3-1 while testing is performed. This requirement will also apply to any additional testing methods performed by the Contract Laboratory. The SOP shall be a written narrative stepwise description of laboratory operating procedures as defined in SW-846 (or, for non-SW-846 methods, the official published methodology) including examples of laboratory documents. The LQAPs shall accurately describe the actual procedures used in the laboratory, and copies of the written LQAPs shall be available to the appropriate laboratory personnel. Calculations that are an intrinsic part of the instrument or its automation software need not be documented in the SOP. However, this kind of software shall be tested with a sample set of data to verify its correct operation. Calculations that are performed external to the instrument or its automation system shall be documented in the SOP. Additional detail is provided in Section 4.2 of this SOW.

3.3.2 Resumes and Other Initial Laboratory Submittals.

Within 30 days of contract award, the Contract Laboratory shall provide to the Contracting Officer the resumes for all of its personnel that will be associated with this contract. A summary of changes in personnel in the Contract Laboratory shall be provided to the Contracting Officer as they occur. Resumes of new personnel and their responsibilities shall be provided as they are added to the staff of the Contract Laboratory.

Lists shall also be provided that detail the instruments, associated accessories, and dates of purchase. A facility floor plan shall also be provided. This information shall be reviewed and compared to the requirements of this contract. The Contracting Officer and senior District Chemists shall be notified of any changes as soon as possible.

3.4 Changes in Contract Laboratory Organization and Procedures

3.4.1 Changes in Organization and Facilities:

During the term of this contract the Contract Laboratory shall keep the Contracting Officer informed of any changes in its personnel, equipment, or facilities which could impact the Contract Laboratory's performance for this contract. These changes may include significant organizational restructuring, major layoffs, or changes in key laboratory personnel. Resumes for all new laboratory personnel shall be delivered to the Contracting Officer on a quarterly basis. Significant changes in laboratory personnel that result in non-compliance with contract requirements for personnel experience (by element) may result in termination of the contract for default.

3.4.2 Changes/Alterations to Contract Analytical Methods:

It is imperative that contract required methods be explicitly followed. Any deviations shall be approved in advance for each task order. Changes in Contract Laboratory LQAPs for USACE work under this contract shall be forwarded to the Contracting Officer before the changes become effective. *Note: Minor changes in laboratory procedure such as changes in glassware or type of gas chromatography column would not result in reissuing of a controlled copy SOP to the CO. However, a file detailing such changes shall be maintained on file at the laboratory and controlled copy revisions of LQAPs shall be reissued to the Contracting Officer on a semiannual basis in the event that only minor changes in laboratory procedures have been executed.*

3.5 Data Reports/Deliverables

All laboratory data shall be furnished in accordance with SEDD draft format version 4-15.0 or most current version. The minimum deliverable shall be SEDD 2A for the initial year of the contract. After this point, SEDD 2B shall be expected as a minimum deliverable where instrumentation permits. In the interim period, some task orders may request a stage 2B deliverable or higher deliverable at no additional cost to the government.

All chemical laboratory data shall be delivered in the SEDD format along with a printed error-free summary log generated with a consistency check tool. The report shall be delivered to the Corps of Engineers Project Chemist, within the turn-around-time specified in the task order. As specified in the Task Order, deliverables will be one copy of the final SEDD deliverable, one copy in Adobe, and one signed original hardcopy report. The government will not accept paper copy reports and electronic deliverables with discrepancies between the two. In the event that discrepancies are revealed, the laboratory shall regenerate the deliverables.

If any discrepancies are found, no payment will be made to the laboratory for analyses in the affected data package until the discrepancies are reconciled. Final payment will be reduced if corrections are made past the task order specified turnaround time, in accordance with section 3.7.2.

The SEDD files shall be delivered via e-mail or on CD-ROM (session not closed so data can be written to disk). A separate diskette or CD shall be provided for each data package or a single compiled EDD for the entire project as specified in the task order. SEDD deliverables shall be labeled with the project name, Seattle District project identification number, laboratory report number, date and name of the laboratory.

3.6 Contract Execution

3.6.1 Contract Estimated Quantities

It is estimated that approximately 700 samples requiring approximately 2000 ~~determinations~~ analyses may be submitted yearly. The Contract Laboratory shall be required to furnish all sample containers, preservative(s), labor, instrumentation, equipment, tools, and supplies required to perform the analyses. Subcontracting of samples sent to the laboratory is not permitted without the prior approval of the POA project chemist. Note: These quantities are estimates and shall not be considered to be binding on the Government. Only the minimum contract commitment is guaranteed by the Government as work to be performed under this contract.

3.6.2 Contract Task Orders

Any service required under this contract will be procured by the issuance of a task order (by the contracting officer), which will be preceded by a telephone call, electronic mail or facsimile transmission. The Contract Laboratory can decline to receive any given task order. The Contractor shall notify the Contracting Officer within 24 hours if they choose to decline any work offered. If the laboratory refuses more than 3 task orders in a row, no additional task orders will be offered to the laboratory. Work accepted by the Contract Laboratory shall meet all of the conditions and requirements of this contract.

3.6.3 Additional Services

Additional testing requested by the NWS project chemist may be any procedured as listed in the Contract Laboratory's published list of services. The offerors are to submit a current list of services and price list with their bids. Under the provisions of this Contract, the Contract Laboratory agrees to perform services not listed in the bid schedule for this contract and listed in their current published materials at the prices shown, unless negotiated otherwise. The Contract Laboratory agrees to provide the Contracting Officer with all updates and changes to their list of services and price lists as they occur. Prices shall remain constant during the base period of the contract.

3.6.4 Access to Data

Under normal circumstances USACE may require direct assess to its project laboratory data. Reasonable attempts shall be made on behalf of the laboratory and USACE to schedule these events in a manner that does not impact the laboratories normal operations.

Under rare circumstances, USACE may require direct access to ~~all~~ data produced by the Contract Laboratories with or without prior consent. Access to other clients data may be required in cases where other client's data are included in the same batch as USACE project samples. At any time, USACE representatives shall be granted access to data. However, it is not necessary for the laboratory to reveal the other clients identity. that is currently available at the laboratory for sample analyses for USACE projects with or without the prior consent. If the laboratory has an electronic system for delivery or early review of data, USACE shall be allowed electronic access to data with or without the consent of the laboratory. The Contract Laboratories shall provide written approval to the NWS CO agreeing to ~~unrestricted~~ access to data as described above.

3.7 Non-Conformance to Contract

3.7.1 Non-Conformance Investigations

When any out-of-control event relative to contract requirements is identified by the Government a non-conformance investigation must be initiated by the Contract Laboratory. Out-of-control in this context signifies any failure to execute the specific requirements of this contract or specific analytical methodologies described by USACE, EPA, ASTM, or other regulatory agencies. All work required to perform a non-conformance investigation including preparation of a corrective action plan or report of findings and any required support documentation shall be executed at no additional expense to the Government.

In the event of such an occurrence the Contract Laboratory must initiate an investigation into possible reasons for the discrepancy, and submit a plan to resolve the problem or a summary of findings within seven days of notification of the deficiency by the Contracting Officer. The corrective action plan or report of findings shall respond substantively to the deficiencies described by the Contracting Officer including a reasonable time frame for implementing any required corrective actions. The Contracting Officer shall determine the acceptability of the corrective action plan or report of findings and additional investigation may be required if the initial response is unacceptable. In the event that the Contract Laboratory is found to be non-responsive to contract requirements this contract may be terminated for default. All corrective action plans must be supported by the appropriate documentation as determined by the Government. The Government may require that additional raw data packages as defined in PARAGRAPH: FORMAT FOR RAW DATA PACKAGES shall be submitted and delivered to the Government offices for review. This data shall be delivered at no additional expense to the Government.

In cases where a comprehensive on-site "tape audit" is required, as determined by the Government, access to laboratory facilities and labor for laboratory staff needed to operate instruments or reprocess data in the presence of auditors shall be provided at no additional expense to the Government.

In cases where an off-site "tape audit" is required, data for project specific sample analyses, shall be provided on magnetic media (tape, floppy disc, CD-ROM, etc.) at no additional expense to the Government.

When an on-site or off-site tape audit is required the laboratory shall provide access to (or deliver) all data required to reconstruct the entire process of instrumental analysis (instrument performance check, initial calibration data, continuing calibration data, method blanks, sample analyses, LCS, etc.)

3.7.2 Late Delivery of Data Submittals

Late delivery of data will result in a reduction in payment for services related to sample analysis. Data packages are due to be received within time frames specified in the task order.

- When accelerated turn-around-time has been contracted for and the data is delivered late, payment will be reduced to correspond to the applicable payment for the actual delivery of data. For example, if 24 hr. turn-around-time has been contracted for and the data is delivered after 14 days but within 21 days (normal t/a time) payment for normal turn-around-time shall be made to the laboratory.
- For normal turn-around-time (and for accelerated t/a data that is not delivered within 21 days), if analytical data packages are not received in the Seattle District offices within 21 days of the time of sample receipt at the laboratory 5% of the payment for the task order (for the corresponding sample delivery groups) will be withheld.
- At the end of the first week beyond the data due date and for each week thereafter an additional 10% of task order payment (for the corresponding sample delivery groups) will be withheld up to a maximum of 55% of the total task order.

3.7.3 Rejection of Data

Data will be screened for contract compliance by the Contracting Officer. Failure to execute specific actions required by this contract will result in rejection of data for the corresponding samples.

- Failure to execute analytical methods as stated in the approved LQAPs will result in rejection of data.
- Failure to deliver analytical data in the format specified by these specifications will result in rejection of the data packages and direction to the Contract Laboratory by the Contracting Officer to reissue data deliverables in full compliance with these specifications. This work will be performed at no additional expense to the Government.
- At a minimum, payment will be denied for analytical work that is rejected for contract compliance failure. Alternatively, the Contracting Officer will require re-sampling and reanalysis at the expense of the Contract Laboratory. If this occurs, the Contract Laboratory will reimburse USACE for the full cost of re-sampling performed by USACE personnel or by USACE Contractor personnel as applicable.
- If rejection of data occurs after payment is made for the associated data and the USACE decides not to resample, the Contract Laboratory shall reimburse USACE for the cost of the analysis and no additional Task Orders will be offered until the credit is received.

3.7.4 Delay of Project Work

On-time delivery of analytical data to support the work of others is of critical importance. If late delivery of analytical data by the Contract Laboratory results in delay of work claims, the Contract Laboratory will be responsible for payment of these claims. In the event that a delay of work claim attributed to Contract Laboratory failure to deliver analytical data on time is substantiated by Contracting Officer review, this claim will be paid by the Contract Laboratory directly to [USACE](#), -the AE or construction contractor.

3.8 Invoicing

The Contract Laboratory shall submit a Draft Invoice with the submittal of the data package per Section 3.5 Data Reports/Deliverables. Upon verification, that submittal is in compliance with Contract requirements, a request for an Invoice will be forwarded to the Contract Laboratory by the NWS project chemist or designee.

The requested Invoice will take into account any Late Penalties per Section 3.7.2 and Rejected Data per Section 3.7.3. Data verification will be accomplished no later than 35 days after submittal of the final data package for the Task Order.

3.9 Review of Contract Laboratory Performance

The performance of the Contract Laboratory will be monitored by the Contracting Officer through technical review and comparison of data generated by other laboratories. USACE reserves the right to send performance evaluation (PE) samples, conduct on-site inspections, and instigate review meetings, if deemed necessary. If the Contract Laboratory has performance problems, the Contract Laboratory will be required to take corrective actions. Should the Contract Laboratory fail to solve the problems satisfactorily in a timely manner, additional task orders will not be issued until such time as corrective actions are completed to the satisfaction of the Contracting Officer. If the Contract Laboratory is suspended or debarred by another government regulatory agency, the contract may be terminated for convenience by the District.

In addition to any performance evaluation samples submitted by the Contracting Officer during this project, the Contract Laboratory shall be a participant in performance audit programs offered through federal agencies such as the EPA, and other such programs offered or mandated at the state level. Results of these audits shall be furnished to the Contracting Officer as soon as they become available.

SECTION 4 GENERAL LABORATORY REQUIREMENTS

Per ER 1110-1-263, each laboratory performing work for USACE shall comply with ISO/IEC Guide 25. This may be accomplished by the application of the USACE laboratory validation as identified in ER 1110-1-263. Procedures for the laboratory validation process are described in EM 200-1-1. The following laboratory requirements are pursuant to meeting the standards established within the noted references. Individual project requirements may be more or less stringent than those described in the following sections.

4.1 Laboratory quality system

A laboratory must establish, implement, and maintain a quality system appropriate for the type, range, and volume of analytical services it provides. The elements of this quality system shall be documented within a Laboratory Quality Assurance Plan (LQAP) or related documentation. Laboratory management is responsible for communicating the stated policies and practices to laboratory personnel, ensuring all information is clearly understood and implemented. The laboratory shall perform periodic audits of activities to verify compliance with the quality system. When deviations are discovered, the laboratory shall take immediate corrective action to remedy the situation or practice, notifying any client whose work may have been affected.

4.2 Laboratory Quality Assurance Plan (LQAP)

The laboratory shall prepare a written LQAP, which describes the general and specific procedures used within the laboratory to achieve scientifically valid and legally defensible data. *This documentation requirement pertains exclusively to the laboratory and is not considered equivalent to the Quality Assurance Project Plan (QAPP), which is an integral part of the project-related SAP.* The Quality Management Plan shall present the policies, organization, objectives, functional guidelines, and specific QA and QC activities of the laboratory designed to achieve the data quality requirements when running performance-based methods, such as the SW-846 methods. SOPs pertaining to each [element-analysis](#) shall be included or referenced as part of this Quality Management Plan and shall describe the specific operational and analytical procedures as normally implemented by the laboratory. This plan shall include, at a minimum, the following elements:

- Table of Contents, and applicable lists of references and glossaries, and appendices.
- QA policy, objectives, and commitments, any allowable departures from documented policies.
- Organization structure and personnel — include descriptions of key personnel, identify relationships between management, operations, support, and QA personnel.
- Facilities and equipment.
- Document control — notebook policy, sample tracking and custody procedures, LQAP and SOP organization and control.
- Scope of analytical methodologies provided— sample preparatory and determinative procedures available; methods implementation/calibration procedures and frequency, standards preparation procedures, traceability of measurements and procedures employed, decision processes/procedures/responsibility for initiation of corrective action.
- Data generation — data collection procedures, data reduction procedures, data evaluation procedures, data reporting/authorization procedures.
- Quality control — solvent/reagent checks, reference material analysis, internal QC checks, retesting or corrective action implementation, verification of electronic data management systems.
- QA — determination and monitoring of method QA performance, systems/internal audits, customer complaints resolution, performance/external audits, inter-laboratory comparisons and proficiency programs, corrective action procedures, and QA reporting procedures.
- Procedures to ensure that all records required under this contract are retained, as well as procedures for control and maintenance of documentation through a document control system which ensures that all standard operating procedures (SOPs), manuals, or documents clearly indicate the time period during which the procedure or document was in force.
- Identification of the laboratory's approved signatories; at a minimum, the title page of the QA Manual must have the signed and dated concurrence, (with appropriate titles) of all responsible parties including the QA manager(s), technical director(s), and the agent who is in charge of all laboratory activities such as the laboratory director or laboratory manager.
- The laboratory's procedures for achieving traceability of measurements.
- A list of all test methods under which the laboratory performs its accredited testing.
- Mechanisms for ensuring that the laboratory reviews all new work to ensure that it has the appropriate facilities and resources before commencing such work.
- Reference to the calibration and/or verification test procedures used.

- Procedures for handling submitted samples.
- Reference to the major equipment and reference measurement standards used as well as the facilities and services used by the laboratory in conducting tests.
- Reference to procedures for calibration, verification and maintenance of equipment.
- Reference to verification practices which may include interlaboratory comparisons, proficiency testing programs, use of reference materials and internal quality control schemes.
- Procedures to be followed for feedback and corrective action whenever testing discrepancies are detected, or departures from documented policies and procedures occur;
- The laboratory management arrangements for exceptionally permitting departures from documented policies and procedures or from standard specifications.
- Procedures for dealing with complaints.
- Procedures for protecting confidentiality (including national security concerns), and proprietary rights.
- Procedures for audits and data review.
- Processes/procedures for establishing that personnel are adequately experienced in the duties they are expected to carry out and are receiving any needed training.
- Reference to procedures for reporting analytical results.

4.3 Laboratory organization, management, and analytical personnel responsibilities

The laboratory shall have sufficient personnel with appropriate education, current training, and experience to fulfill their assigned duties. The laboratory shall promote independence of judgment and integrity with well-defined responsibilities outlined for each individual within the laboratory organization. Personnel training records shall be maintained by the laboratory.

4.3.1 Laboratory Management

Laboratory management shall, at a minimum, have a technical director/manager responsible for overall technical operations. The technical director shall have a minimum of a bachelor's degree in chemistry or any related scientific/engineering discipline, and a minimum of 2 years of laboratory experience. The laboratory management shall have sufficient authority and resources to fulfill their duties accordingly. Management staff shall be responsible for actively supporting the following at a minimum: implementing the policy and practices defined within the LQAP, maintaining accurate SOPs and enforcing their use in the laboratory, participating in inter-laboratory comparisons and proficiency testing, certifying that personnel performing all tests have proper education and training, providing appropriate management and supervisory support to ensure adequate supervision of technical staff, providing a contingency plan that identifies backup personnel for key laboratory positions (i.e., technical director/manager, QA officer/manager, etc.) in the event of personnel absence, having policy and procedures in place that ensure protection of clients' confidential information and proprietary rights, and maintaining a work environment that emphasizes the importance of data quality.

4.3.2 Laboratory Quality Assurance Officer

The laboratory shall, at a minimum, have a QA officer/manager, responsible for the laboratory quality system. The laboratory QA officer shall be responsible for maintaining the quality system and overseeing the QA aspects of the data. The QA officer shall work independently of the laboratory production management and have direct access to the highest level of management for decisions on laboratory policy and resources. In laboratories with limited staff (i.e., <10 technical personnel) the QA officer may also perform duties as the technical director or deputy technical director. QA officer shall, at a minimum, serve as a focal point for QA issues, perform oversight and QA review for all nonconformance reports, perform QA review for a percentage of laboratory analytical batches or project data packages, evaluate data objectively, independent of laboratory management influence, possess a general knowledge of the methods for which data review is performed, conduct internal audits on the entire technical operation annually, and monitor laboratory method performance by control charts/ranges evaluation, promoting method improvements as necessary. This individual shall have a minimum of a bachelor's degree in chemistry or any related scientific/engineering discipline and be familiar with all laboratory operations. A minimum of 3 years of laboratory experience, including at least 1 year of applied experience with QA principles and practices in an analytical laboratory, is required. In addition, a working knowledge of general statistical concepts is recommended to support data review and method performance monitoring responsibilities.

4.3.3 Organic Chemistry Section

If applicable, the laboratory shall maintain an Organic Chemistry Section with appropriate personnel, facilities and instrumentation to conduct the work required. The following disciplines must be clearly represented and staffed as project testing dictates.

4.3.3.1 Organic chemistry section supervisor(s). The GC/MS, GC, or Sample Preparation Laboratory Supervisors are responsible for all technical efforts of their respective sections, providing sufficient oversight of activities to ensure that data meet all terms and conditions expressed for the project. These individuals shall possess documentation supporting demonstration of performance for all areas for which they provide supervision. In addition, they shall have a minimum of a bachelor's degree in chemistry or any related scientific/engineering discipline and a minimum of 3 years of laboratory experience, including at least 1 year of supervisory experience.

4.3.3.2 GC/MS analyst. Qualifications for these individuals should be a minimum of 1 year of experience in operating and maintaining GC/MS with a bachelor's degree in chemistry or in any related scientific/engineering discipline, or in lieu of the bachelor's degree, 3 years of experience in operating and maintaining the GC/MS and interpreting GC/MS data.

4.3.3.3 Gas chromatography (GC)/high performance liquid chromatography (HPLC) analyst(s). Qualifications for these individuals should be a minimum of 1 year of experience in operating and maintaining GC/HPLC equipment with a bachelor's degree in chemistry or a related scientific/engineering discipline, or in lieu of the bachelor's degree, 3 years of experience in operating and maintaining the GC/HPLC and interpreting GC/HPLC data.

4.3.3.4 Extraction/concentration technician. Qualifications for these individuals should be a minimum of a high school diploma and 1 year of college general chemistry. These individuals should also have a minimum of 1 year of experience in extraction/concentration.

4.3.4 Inorganic Chemistry Section

If applicable, the laboratory shall maintain an Inorganic Chemistry Section with the appropriate personnel, facilities, and instrumentation to conduct the work required for the project. The following disciplines must be clearly represented and staffed as project testing dictates.

4.3.4.1 Inorganic section supervisor(s). The metals, wet chemistry, or sample preparation laboratory supervisor(s) is responsible for all technical efforts of the respective laboratories, providing sufficient oversight of activities to ensure that data meet all terms and conditions for each project. These individuals shall possess documentation supporting demonstration of performance for all areas for which they provide supervision. In addition, they shall have a minimum of a bachelor's degree in chemistry or any related scientific/engineering discipline and a minimum of 3 years of laboratory experience, including at least 1 year of supervisory experience.

4.3.4.2 Inductively coupled plasma (ICP) analyst. Qualifications for these individuals should be a minimum of a bachelor's degree in chemistry or any related scientific/engineering discipline with 1 year of experience in operating and maintaining ICP instrumentation, or in lieu of the educational requirement, three additional years of experience in operating and maintaining ICP instrumentation.

4.3.4.3 Atomic absorption (AA) analyst. Qualifications of these individuals should be a minimum of a bachelor's degree in chemistry or any related scientific/engineering discipline with 1 year of experience in operating and maintaining AA instrumentation for graphite furnace, flame, and cold vapor AA, or in lieu of the educational requirement, three additional years of experience in operating and maintaining AA instrumentation, including graphite furnace, flame, and cold vapor techniques.

4.3.4.4 Inorganic sample preparation technician. Qualifications for these individuals should be a minimum of a high school diploma and a college level course in general chemistry or equivalent. These individuals should also have a minimum of 1 year of experience in sample preparation in an analytical laboratory.

4.3.5 Wet chemistry analyst

Qualifications of these individuals should be a minimum of a bachelor's degree in chemistry or any related scientific/engineering discipline. These individuals should also have a minimum of 1 year of experience with classical chemistry laboratory procedures in conjunction with the education qualifications, or in lieu of the educational requirement, 2 years of additional equivalent experience.

4.3.6 Radiochemical techniques analyst.

If applicable to the needs of a specific project, qualifications of these individuals shall be a minimum of a bachelor's degree in chemistry/physics or any related scientific/engineering discipline with 1 year of experience in performing radiochemical analyses, or in lieu of the educational requirement, three additional years of experience in operating and maintaining radiochemical instrumentation.

4.3.7 Technical staff backup

The laboratory shall have a minimum of one chemist available at any time as a backup technical person for each analytical area to ensure continuous operations and accomplish the work required. These individuals shall have similar education and experience requirements to the primary analyst.

4.3.8 Sample custodian

The laboratory shall also maintain and staff support positions for Sample Custodian. Qualifications for these individuals shall be at a minimum of a high school diploma and appropriate on-the-job training.

4.3.9 Information Management Specialist

The IM Specialist must have a minimum of three years in laboratory information systems (LIMS) management, and a minimum of three projects that demonstrates relevant laboratory information systems management within the last three years on projects similar to the proposed responsibilities for this project. Experience must include: 1) The ability to generate a well-formed SEDD XML file and validate it against DTDs or schemas that will be provided; 2) Skill in interfacing instrument systems with LIMS. The IM specialist is also required to perform checks of the EDD for contract compliance and resolve all discrepancies prior to delivering the EDD to the Corps at the required turn-around-time.

4.4 Laboratory facility and equipment

4.4.1 Laboratory facility requirements

The laboratory shall provide a secure testing facility that can accommodate the proper performance for the type, range, and volume of analytical services it provides. Facility entries must be controlled and monitored as necessary to assure restricted access, especially for areas affecting the quality of activities or data. The design of the facility must provide effective separation of incompatible testing activities and adequate energy sources, lighting, heating/cooling, and ventilation to ensure stability of voltage, temperature, humidity, or other pertinent environmental conditions. This may involve inclusion of an area under positive pressure for analysis of volatile organic compounds (VOC). Adequate monitoring of environmental conditions and general housekeeping shall be maintained to avoid any influence on the testing activities performed.

4.4.2 Laboratory equipment requirements.

The laboratory shall provide sufficient equipment, instruments, and related supplies for proper performance of work. All equipment used shall be reflective of the measurement accuracy necessary. The laboratory shall ensure that all equipment and supplies purchased are inspected, a unique identifier assigned to it, and the equipment verified as compliant with all relevant requirements prior to their initial use. Records of all suppliers used to obtain support services and materials shall be maintained.

4.4.2.1 Equipment preventive maintenance. To minimize downtime and interruption of analytical work, preventive maintenance shall be routinely performed on each analytical instrument. Designated laboratory personnel shall be trained in routine maintenance procedures for all major instrumentation. When repairs are necessary, the equipment shall be taken out of service, repairs performed by either trained staff or trained service engineers, and an evaluation of the impact on previous calibrations or tests performed. It is generally recommended that maintenance contracts be maintained on all major analytical instruments. Detailed SOPs shall be on file or the information incorporated into method SOPs/LQAP that describe preventive maintenance procedures and schedules. The laboratory shall maintain detailed logs for each instrument documenting the preventive maintenance and repairs performed.

4.4.2.2 Equipment backup capabilities. Backup instruments shall be designated in case of an extended breakdown for an analytical instrument. It is the laboratory's responsibility to have a backup plan in force to ensure that all sample holding times can be met. This plan can include rental of backup instruments or the use of another USACE validated laboratory for a given procedure. All equipment outside of the laboratory's permanent control shall be evaluated to ensure that all relevant requirements are met prior to its initial use. ***Before any subcontracting is performed, USACE must be informed and approval given (in writing) by the USACE CO or COR.*** The laboratory shall ensure, and be able to document, that all subcontractors employed are competent to perform the duties requested and comply with all of the requirements established within this guidance and EM 200-1-1, as appropriate.

4.4.2.3 Laboratory equipment records. The laboratory shall maintain appropriate records or documentation for all instruments and support equipment to identify type of equipment; manufacturer's name or equipment make, model, and any serial numbers or unique identifiers; dates received and placed into service; condition when purchased (new, used, etc.); current location; manufacturer instructions/manuals; history of any damage, modification, or repair; instrument maintenance logs; and calibration/calibration verification run logs.

4.5 Laboratory SOP

Laboratories shall be required to maintain written, approved laboratory-specific SOPs for all methods and general operations. Laboratory-specific SOPs that fully detail the actual procedures and documentation used to implement performance-based methods are required. Simply referencing a given method or method number is not sufficient. Overall, these SOPs should be based on the guidance published by USEPA (EPA QA/G-6). The SOPs shall be written narrative, stepwise descriptions of laboratory operating procedures. The SOPs shall accurately describe the equipment and the actual procedures used in the laboratory. Copies of the SOPs shall be readily available to the appropriate laboratory personnel. Calculations that are performed external to an instrument or in its automation software shall be documented in the SOPs. The SOPs shall also identify an appropriate estimation of uncertainty for all measurements by the designation of appropriate class/grade of equipment within the SOP, or by the number of significant figures recorded based upon the accuracy of the equipment used. The format for SOPs may vary depending upon the kind of activity for which they are prepared. However, at a minimum, the following sections shall be included: Title/Signature/Effective Date page; Scope and Application; Method Summary; Sample Preservation, Containers, Handling, and Storage; Interferences and Potential Problems; Equipment and Apparatus; Reagents and Solutions; Procedures; Calculations; Quality Assurance/Quality Control; Corrective Actions, Data Evaluation; MDL Studies/Sensitivity Assessment; Health and Safety; Sample Disposal; References; and Example Forms. Laboratory SOPs shall be given unique identification (ID) numbers. These SOPs shall be controlled documents that are reviewed annually or updated as necessary whenever procedure/method changes are made and a new version number assigned. Retired SOPs shall be maintained on file by the laboratory in case data quality questions arise later.

4.6 Document Control Procedures

The laboratory shall maintain records documenting all phases of sample handling from sample receipt to final analysis. Accountable documents used by laboratories include, but are not limited to, logbooks, chain-of-custody records, sample work sheets, bench sheets, instrument printout, and other documents relating to the sample or sample analysis. The laboratory shall use a document numbering and identification system for all documents/logs. All observations and results recorded by the laboratory shall be recorded on either preprinted laboratory forms or permanently bound laboratory logbooks, or entered into secure computer systems. Observations including noting basis for any manual integrations performed are recommended. Pages in both the bound and unbound logbooks shall be sequentially numbered. Preprinted laboratory forms shall contain

the name of the laboratory and be dated (month/day/year) and signed by the person(s) performing the activity at the time the activity was performed. Permanently bound laboratory logbooks shall be dated and signed by the person performing the activity at the time the activity was performed. All logbook entries shall be in chronological order. All entries shall be recorded in indelible ink. Unused portions of the logbooks shall be "z'd" out. Corrections to logbooks shall be made by drawing a single line through the error and entering the correct information. Corrections and additions shall be dated and initialed. Computer forms shall contain the name of the laboratory and be dated and signed by the person performing the activity at the time the form is printed. Computer systems must be established to maintain the integrity of the data, i.e., verified to ensure accurate capture, processing, manipulation, recording, and reporting of data, configured to restrict access and provide for appropriate backups and audit trails, etc. The laboratory shall retain on record all original observations, calculations and derived data, calibration records, and a copy of the test report for a minimum of five (5) years, or as specified by project requirements if longer periods are defined. In the event of laboratory closure, all records shall be transferred to the appropriate USACE clients.

4.6.1 Standard preparation log

Standard preparation logs shall document the preparation of all calibration standards and spiking standards associated with the respective analysis (e.g., the initial calibration, CCV, and initial calibration verification (ICV) standards as well as the MS, LCS, surrogate, and postdigestion spike (PDS) spiking standards). The laboratory shall maintain complete internal documentation for all standards and reagents used that allows traceability back to the original source. At a minimum, the standard preparation logs must clearly specify the following for all standards:

- Sources (e.g., manufacturer and lot number for commercial stock solutions)
- Composition (e.g., initial and final concentration of all target analytes, type and purity of standards)
- Preparation and expiration dates
- Unique ID number of the standard
- Reagents and solvents added to standards (including source and lot numbers)
- Name of preparer

When a standard is prepared via the dilution of a stock solution, the spiking volume and concentration of the stock solution and the final volume and concentration of the diluted standard shall be specified and documented accordingly. Manufacturer certificates for commercially purchased stock standards must be maintained. When the laboratory prepares its own stock solutions, calculations and conversion factors shall be shown in the standard preparation log (e.g., a general formula or sample calculations).

4.6.2 Sample preparation log

Sample preparation logs shall document all significant sample preparation activities. All reagents/standards used shall be clearly identified (e.g., with lot numbers) on the appropriate laboratory bench log sheets. The sample preparation logs must include the following information:

- Sample and batch ID numbers
- Matrix

- Preparatory method (method or laboratory SOP ID number)
- Date of sample preparation
- Initial volume or weight of the sample processed
- Final volume of the sample processed (after digestion, extraction, or cleanup)
- Percent moisture (for solid samples)
- Reagents and solvents added to the samples (including source and lot numbers)
- Any pH and preservation checks and adjustments performed
- Spiking standards (ID number of the LCS, and MS spiking solutions, volume added, and the final spike concentration)
- Name of analyst

4.6.3 Instrument run log

Instrument run logs shall be maintained for each instrument to enable a complete reconstruction of the analytical run sequence. Run sequence logs must indicate the unique identifier appropriated for the instrument used to generate the data, the date of analysis, and the aliquot volume of the sample analyzed (e.g., the injection volume for chromatographic methods). The time of analysis must be specified for chromatographic methods. The order in which field and QC samples are collected and presented shall be consistent with the temporal order in which the analyses were performed. Run logs must clearly indicate which field and batch QC samples are associated with each ICV and CCV. Instrumental analysis logs are particularly important since they provide the basic link between the sample analyses and QC data. Computer logs may be used if all of the preceding information is captured.

4.6.4 Computer/instrument outputs

Computer/instrument printouts or other independent information can be incorporated into logbooks if such printouts can be permanently affixed to the appropriate logbook.

4.6.5 Electronic data management

Electronic data management systems shall be verified by the laboratory to ensure accurate data transfer, reduction, and reporting. All aspects of the data management system shall be fully documented as compliant with USEPA Good Automated Laboratory Practices (GALP) requirements (EPA 2185).

4.7 Laboratory quality assurance procedures

The Contract Laboratory shall ensure the quality of results by maintaining an integrated QA system of activities involving the planning, implementation, assessment, reporting, and quality improvement of data. Refer to ISO/IEC Guide 25 and American National Standards Institute/American Society for Quality Control for additional information. These activities are typically performed or facilitated by the Contract Laboratory QA Officer and include the performance of periodic audits (system and technical); participation in proficiency testing programs/inter-laboratory comparisons, routine analysis of certified reference materials or second source reference materials, and monitoring method performance (sensitivity, precision and bias) through an evaluation of the MDL study or MDL check sample, and batch QC sample (MB, LCS) control ranges/charts.

4.8 MDL/MQL

4.8.1 Method Detection Limit (MDL)

The MDL is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte. For this contract the Contract Laboratory shall, at a minimum, perform MDL studies during initial method setups and whenever the basic chemistry of the procedures is changed. The MDLs shall be preparatory-method-specific and include any cleanup methods used. Since it is not practical to establish an MDL for each specific matrix received at any given laboratory, MDLs shall be determined for all target analytes in an interference-free matrix, typically reagent water for aqueous samples, and a purified solid matrix (e.g., sand) for soil/sediment samples. The Contract Laboratory may determine MDLs using procedures presented in 40 CFR, Part 136, Appendix B, or equivalent statistical approach. The validity of the MDL study is verified per CFR requirements by comparing the analyte values to the calculated MDL. If the analyte values are below the calculated MDL or greater than ten (10) times the calculated MDL, an unacceptable bias may be induced; and the MDL cannot be reported. ***To ensure that valid MDL values are determined, the Contract Laboratory shall analyze an MDL check sample by spiking an interference-free matrix with all target analytes at about two times the calculated MDL.*** The MDL check sample shall be taken through all the preparatory and determinative steps used to establish the calculated MDL values, to verify a response is detected. If any of the target analytes are not detected, then the concentration shall be increased in another MDL check sample, and the analysis repeated until the failed target analytes are detectable. The detectable target analyte concentrations shall then be used in lieu of the calculated MDL values to establish the lowest detected concentration for samples taken through all appropriate method procedures. ***The Contract Laboratory will then demonstrate continued method detection capability by analyzing the MDL check sample on a quarterly basis, in addition to the annual MDL study.*** When multiple instruments or confirmation columns are used for the same method, separate MDL studies may be replaced by the analysis of an MDL check sample on all instruments/columns. The MDL check sample shall be analyzed after major instrument maintenance or changes in instrumentation or instrumental conditions to verify the current sensitivity of the method. ***When low-level detection in a project matrix is critical the NWS project chemist can request that the Contract Laboratory perform a MDL check sample in project-specific matrices.***

4.8.2 Method Reporting Limit (MRL)

Due to the significant amount of error (approximately ± 100 percent) associated with results calculated at the MDL and the fact the MDL may not be attainable within project matrices, the method reporting limit (MRL) for work performed under this contract, shall be established at a factor of five to ten times the MDL for the majority of target analytes, but no lower than three times the MDL for any target analyte. The statistical error (± 20 -30 percent) associated with this area of the calibration curve is notably reduced from the MDL. The appropriate factor applied to the MDL to establish the MRL shall be based upon discussions between the Contract Laboratory and the NWS project chemist. Ideally this MRL shall have an associated error comparable to the method-prescribed continuing calibration verification (CCV) acceptance limits. This may not be feasible, however, due to a lower concentration range of interest. This approach, however is not appropriate for multicomponent target analytes. Due to the identification of multicomponent target analytes (e.g., polychlorinated biphenyls (PCBs), chlorodane, toxaphene, gasoline, etc.) being based upon a recognizable pattern, the MRL shall be based upon the MDL as well as the concentration at which the pattern is reliably "identifiable". Thus the MRL represents the value at which the Contract Laboratory has demonstrated the ability to reliably quantitate target analytes within a prescribed performance criterion for the

method, and establishes the lowest concentration at which the data may be reported without qualification as an estimated value (i.e., J-flag).

USACE requires the following:

- *The MRL is set at the lowest standard used for the initial calibration curve (or low-level calibration verification standard) or higher for each target analyte. The lowest standard or low-level calibration verification standard must be at least three times the MDL or greater.*
- *Target analyte values detected and reported below the MRL must be flagged as an estimated quantity (i.e., J-flag)*

SECTION 5: CONTRACT LABORATORY SAMPLE HANDLING REQUIREMENTS

5.1 Sample Receipt Requirements

Samples will be shipped, from the project sites to the Contract Laboratory. The Contract Laboratory shall accommodate overnight shipping of all samples and containers to and from the Seattle District job sites or Area Offices and make arrangements to receive samples on weekends, if necessary, at no additional charge. The government or USACE contractor will notify the Contract Laboratory at least 48 hours in advance if weekend pickups or deliveries will be required.

5.2 Sample Receipt Notification

Each cooler sent to the Contract Laboratory will be accompanied by a chain-of-custody (COC) record. USACE personnel or USACE contractors will be responsible for the generation of a completed COC form. Upon receipt at the Contract Laboratory, the laboratory shall accurately document disposition and custody of the samples during each phase of the analytical process. The Contract Laboratory shall fax or email in PDF format each COC form to the Seattle District Project Chemist within 24 hours of sample receipt. If a USACE contractor submitted samples, copies of COCs will be submitted to both the Seattle District Project Chemist and the USACE contractor within 24 hours of sample receipt. If sample coolers are received on a Friday after noon or on a Saturday or Sunday, the COC and Cooler Receipt Form shall be faxed/emailed to the Seattle District Project Chemist by 10 AM the next business day.

5.3 Sample Receipt Documentation

The receiving laboratory's chain-of-custody, sample storage, and distribution for analysis shall be documented per specific Contract Laboratory LQAPs and shall comply with all EPA and USACE sample handling and chain-of-custody procedures and protocols. Complete documentation of all incoming sample shipments is expected. This will include, at a minimum, the following:

- Signing for sample shipments.
- Receiving and reviewing all shipments for completeness and accuracy against enclosed forms and letters.
- Signing and dating the enclosed chain-of-custody forms
- Logging the temperature of the cooler and temperature blank.

All thermometers must have a 0.1°C accuracy and a complete calibration log must be maintained for each device used.. If an IR instrument is used to measure temperature, the laboratory must document a unique instrument ID on the sample receipt sheet as well as maintaining complete calibration logs for that instrument

- Logging all shipments of samples into appropriate log books and/or computer systems.
- Contacting the NWS project chemist immediately for resolution of any problems that may have been noted.
- Individual cooler receipt forms will be used for each cooler to verify and document any problems noted.

Each Cooler Receipt Form shall be faxed or emailed to the Seattle District Project Chemist and one individual at a USACE contractor, if applicable, within 24 hours of sample receipt

5.4 Sample Preservation

5.4.1 Field Samples

The requirements for preservation of soil and water samples will be documented in the LQAP or the site-specific Sampling and Analysis Plan (SAP). Also, these requirements are listed in the text of the analytical method (SW-846 or other). The Contract Laboratory shall verify the field sample preservation of each sample received and document this inspection on the Cooler Receipt Form. Preservation of VOC samples shall be checked at the time of sample analysis. All deviations from preservation requirements shall be noted in the narrative portion of the data report.

All pH measurements shall be made by pipetting liquid from the sample container onto short-range pH paper.

5.4.2 Lab Samples

The Contract Laboratory shall provide an adequate, contamination-free, secure, and well-ventilated work space for the receipt of samples. All samples and their associated extracts must be stored under conditions that will preserve their integrity and preservation and demonstrated to be free from all potential contaminants. Sufficient refrigerator space must be provided for the proper storage of all appropriate samples and their associated extracts for a minimum of sixty (60) days after receipt of the final data report by the Contracting Officer for those samples. After that time, the Contract Laboratory is responsible for the disposal of the samples in compliance with all federal, state, and local regulations at no additional expense to the Government.

5.5 Holding Times

All samples shall be handled in such a manner that all sample extraction and analysis holding times are met. Sufficient time shall also be allowed for the reanalysis of samples within holding times should calibration, method, or quality control failures occur. These holding times are stated in the text of the test methods. SW-846 defines holding times from the date the sample is collected in the field.

Extraction/digestion holding times shall be defined from the date/time of sample collection in the field to the date/time when the sample is first exposed to the extraction/digestion solvent. Analysis holding times shall be defined from the date/time of sample extraction to the date/time of sample analysis. It is required that laboratories maintain documentation that clearly show the dates (and times when applicable) for all sample handling/manipulation processes. Samples shall be analyzed as soon as possible after sample collection.

Published holding times are generally considered maximum times that samples may be held before analysis and still be considered compliant with method guidelines. Sufficient time shall be allowed for the reparation or reanalysis of samples within holding times should calibration, method, or quality control failures occur.

5.6 Sample Integrity

The Contract Laboratory shall maintain the integrity of the samples received, their associated extracts, and the data generated under this contract as it is used to make major decisions regarding the public health and environmental welfare. In addition, the data may be used in litigation. The Contract Laboratory shall maintain sample and extract chain-of-custody within the laboratory throughout sample handling, preparation, and analysis through the use of appropriate documentation and forms. All data generated will be maintained in such a manner as to support potential litigation activities.

5.7 Return of Shipping Materials

The Contract Laboratory shall return the original sample cooler and any ice packs and/or other reusable coolant materials to the **owner** in a timely manner (overnight air is not required) at the Contract Laboratory's expense.

6 GENERAL ANALYSIS REQUIREMENTS

6.1 Project Application

The requirements presented in this guidance shall be applied to all analytical methods unless specifically overridden by project-specific requirements. Target analyte lists are provided in Tables 3-1 (metals) and 3-2 (organics). Specific data quality objectives (DQOs) are project dependent and will be made available to the Contract Laboratory with each task order.

6.2 Method Development/Initial Demonstration of Capability

For each method performed, the laboratory shall maintain documentation that demonstrates each analyst's ability to perform the method within the sensitivity and precision/bias limits as stated in the published method, and any requirements outlined within the LQAP. Repeat these procedures when there is significant change in the method, instrumentation, or personnel. For each new method the laboratory shall perform and maintain documentation for the following:

- Develop a detailed SOP before implementation of that method. Refer to Section 4.1 for requirements.
- Evaluate method sensitivity by performing an initial MDL study for each matrix per 4.8.1. Due to the difficulty in obtaining a solid interference-free matrix for metals determinations, process spiked reagent water for both the aqueous and solid digestion methods to estimate aqueous and solid MDLs for graphite furnace atomic absorption (GFAA) and ICP analyses.
- Determine an appropriate MRL for each compound and matrix based upon the calculated MDL and the guidance established in Section 4.8.2.

- Perform an initial demonstration for the method, noting all key employees' (i.e., technicians and analysts) ability to perform the method within the precision/bias limits as stated in the published method. A minimum of four laboratory control samples shall be carried through the method at the same time, or over a period of consecutive days. This control sample shall be obtained from an outside source, if available, or from a lot independent of the calibration standards. The concentration of each target analyte shall be approximately 10 times the MDL. Using the four results, calculate the mean recovery and standard deviation for each parameter or target analyte of interest. Compare the method precision and bias of the laboratory to the method performance summary presented within the published reference method. If any target analytes exceed the acceptance range, the performance is unacceptable. For all unacceptable target analytes or parameters, corrective actions shall be taken to locate the source of the problem, and the test should be repeated. The laboratory must maintain documentation for each analyst performing analysis.

6.3 Continuing Demonstration of Capability

All analysts shall be required to demonstrate their continuing capability to perform any given method by ensuring the following:

- All applicable SOPs are kept current and represent the current implementation of the method by the laboratory.
- The sensitivity of each method is demonstrated quarterly by analyzing the MDL check sample, and annually by an MDL study.
- Any adjustments to the MRL based upon noted changes in method sensitivity are made.
- A minimum of one blind PE sample is analyzed successfully on an annual basis.
- The precision and bias of the method are demonstrated by analyzing laboratory control samples and other QC check samples with each batch of samples processed, and monitored by review of method control ranges/charts.

6.4 Data Integrity Program

The Contract Laboratory shall maintain an organized program to assure the integrity of analytical data. For the purposes of this contract data integrity will be defined as the ability to faithfully reproduce the events of the analytical process leading to a data report and obtain the same result. Several alternatives are available for the Contract Laboratory to meet the requirement for a data integrity program. The Contract Laboratory may implement Good Automated Laboratory Practices (USEPA, 1995) or General Requirements for the Competence of Calibration and Testing Laboratories (ISO/IEC Guide 25-1990) as a means of partially satisfying the requirements of this contract for maintenance of a data integrity program.

6.4.1 Minimum Requirements

At a minimum the Contract Laboratory data integrity program must contain the following elements:

- A. Ethics Policy. The Contract Laboratory shall have a formal ethics policy that is signed by a senior executive within the laboratory organization. All laboratory personnel involved in USACE projects shall be required to read the laboratory ethics policy and records shall be maintained to demonstrate that this requirement is met. All laboratory personnel involved in USACE projects shall

sign a similar statement indicating that they will conform with the laboratory ethics policy and inform laboratory management if they become aware of questionable acts committed by other laboratory personnel.

B. Ethics Training. The Contract Laboratory shall have a formal ethics training program that provides for periodic, documented training of all laboratory staff in the practical implementation of the corporate ethics policy. In addition to providing training in the theoretical rationale underlying the corporate standards for ethical conduct, the ethics training shall provide for practical illustrations typical of the environmental laboratory that are illustrative of appropriate ethical conduct.

C. Laboratory Self-Audit. At periodic intervals the Contract Laboratory Quality Assurance staff shall perform an audit of the laboratory compliance with standard operating procedures for data reduction processes. This audit shall be conducted by selecting a representative set of analyses (one sample delivery group) and tracking the process of analysis of these samples through the entire laboratory from sample receiving to data reporting. Special emphasis shall be placed upon reprocessing all data required to verify that the analytical system was in control and consistent with Contract Laboratory standard operating procedures. This effort shall include, as appropriate for the analysis, reprocessing of all initial calibration data, instrument performance data, continuing calibration data, batch quality control data, and sample analyses. Reprocessed results shall be compared to the originally derived results to determine if there are any significant differences between the two. This type of self-audit must be performed on a quarterly basis. Documentation of this review process shall be available for inspection by the Contracting Officer.

E. Project Specific Laboratory Self-Audit. As directed by the Contracting Officer the Contract Laboratory shall perform self auditing for specific projects as described above for one sample delivery group (not to exceed 20 samples). Documentation of project specific self audits shall be delivered to the Contracting Officer with the data packages for the project that it is requested for. This activity shall not be requested at a frequency greater than once every three months.

F. All aspects of the Contract Laboratory data integrity program as required by these specifications shall be performed at no additional expense to the Government.

6.4.2 Data Fraud/Inappropriate Practices

The data produced by a laboratory typically provide the primary basis for environmental cleanup decisions and enforcement actions. The data may also end up in court. The laboratory must be aware of requirements and be able to show that requirements were met. Documentation that would clearly show how all analytical values were obtained must be maintained by the laboratory for 5 years.

6.4.2.1 Data Fraud. Data fraud can be loosely defined as a gross deviation from contract-specified or method-specified analytical practices, combined with the intent to conceal the deviation. The difference between poor analytical judgment and fraud may be assessed in the documentation of intent within laboratory records. Gross deviations from specified procedures shall be investigated for potential fraud, and findings of fraud shall be prosecuted to the fullest extent of the law. The following are examples of fraudulent practices:

- Inappropriate use of manual integrations to meet calibration or method QC criteria. For example, peak shaving or peak enhancement are considered fraudulent activities if performed solely to meet QC requirements.

- Time travel of analyses to meet method 12-hour clock requirements.
- Falsification of results to meet method requirements.
- Reporting of results without analyses to support (e.g., dry-labbing).

6.4.2.2 Inappropriate Practices. Inappropriate practices may include the following:

- Selective exclusion of data to meet QC criteria (i.e., initial calibration points dropped without technical or statistical justification).
- The repetitive analysis of QC samples and the reporting of only the best result to avoid corrective actions. For example if two or more CCVs are analyzed in an automated run sequence. The last CCV passed but the first CCV fails, then it would be inappropriate to report only the second CCV, and to not perform appropriate corrective actions.
- Multiple instrument or method blanks should not be analyzed prior to other QC samples as a means to address carry-over problems, when these blanks are not analyzed before environmental samples also. QC samples must be analyzed in a manner that is representative of the manner in which environmental samples are analyzed, and not given preferential treatment.
- Misrepresentation of laboratory performance by presenting calibration data or QC limits within data reports that are not linked to the data set reported, or QC control limits presented within LQAP that are not indicative of historical laboratory performance or used for batch control.
- Notation of matrix interference as basis for exceeding acceptance limits (typically without implementing corrective actions) in interference-free matrices (e.g., MB or LCS).
- Manual integration of peaks when other techniques are better suited.

To avoid miscommunication, the Contract Laboratory must have an SOP that presents correct procedures for manual integrations. As well as clearly documenting all errors, mistakes, and basis for manual integrations within the case narrative, when manual integrations are necessary. To include corrective actions taken, when necessary, and provide appropriate peer review of this information. ***Notification shall also be made to the contracting officer or NWS project chemist so that appropriate corrective actions can be initiated.*** It is requested that the laboratory shall also maintain an electronic audit trail that clearly shows all changes to data, who made the change, date, and why.

If inappropriate practices are discovered during the course of data use, validation or data review, the NWS project chemist can reject the data per section 3.7.3. If multiple inappropriate practices are discovered, the USACE Chemistry CX will be notified and investigations for corrective actions instigated. Per EM 200-1-1, if corrective actions are not acceptable, there is the possibility that USACE validation could be revoked.

6.5 Analytical Standards Preparation and Traceability

The Contract Laboratory shall have, in-house, the appropriate standards for all target analytes. These standards can either be prepared from neat high purity bulk materials or purchased as certified solutions. A critical element in the generation of quality data is the purity/quality and the traceability of the standard solutions and reagents used in the analytical operations. Primary reference standards and standard solutions used by the Contract Laboratory shall be obtained from reliable commercial sources (i.e., National Institute of Standards and Technology (NIST), USEPA, etc.) to ensure the highest purity possible. Certificates shall be available upon request that verify the purity or concentration of each standard. The use of correction factors

for all standards that are not at least 99.9 percent pure for inorganics and 96 percent pure for organics will be required. Care shall be exercised in the proper storage and handling of all standards and standard solutions. The Contract Laboratory shall continuously monitor the purity or quality of reagents and standard solutions through a series of well-documented procedures. Requirements for standards re-preparation shall be based on unacceptable performance. For example, initial calibration standards shall be verified with a freshly prepared ICV. For analyses that allow analytical sequence initiation by a CCV, the frequency of standard re-preparation will be based on whether standard performance is compliant with the method acceptance criteria. The quality of CCVs failing to meet method criteria shall be verified against a freshly prepared CCV. In general, stock and working standards shall be checked regularly for signs of deterioration, such as discoloration, formation of precipitates, or change in concentration. All standards and standard solutions are required to meet the requirements of the 'Shell for Analytical Chemistry'.

6.6 Sample Screening

It is highly recommended that the Contract Laboratory screen samples or extracts by methods of their choice to determine which target analytes are present and at approximately what levels.

6.7 Target analyte listings

Target analyte lists are identified within Table 3.1 and 3-2. Deviations to these lists need to be requested from the NWS project chemist prior to the submittal of samples to the Contract Laboratory. Confirmation needs to be obtained in writing from the NWS project chemist.

6.7.1 Method 8021

VOC by GC/photoionization detector/Hall electrolytic conductivity detector (HECD). The target analyte list for Method 8021 includes those analytes previously associated with deleted SW-846 Methods 8010 and 8020 and some additional target analytes. *Therefore, depending upon project requirements, the entire 8021 target analyte list or a subset may be specified for the project. The following target analyte lists may apply: the full 8021 target analyte list; HVOs (halogenated volatile compounds) (compound list from deleted Method 8010); AVOs (aromatic volatile compounds) (compound list from deleted Method 8020); or BTEX (benzene, toluene, ethylbenzene, and xylene).*

6.7.2 Method 8081

Pesticides by GC/electron capture detector (ECD). *Note whether multicomponent pesticides (i.e., chlordane and toxaphene) are actually analytes of concern.* The additional instrument and method QC samples required for these multiple-component analytes significantly increase the level of effort for this method. *It shall also be determined if chlordane quantitation shall be performed and reported as technical chlordane or the individual chlordane isomers (i.e., alpha and gamma chlordane).* In the absence of guidance to the contrary, assume that quantitation is required for toxaphene and the individual chlordane isomers (rather than for technical chlordane).

6.7.3 Method 8082: PCBs by GC/ECD.

All samples must be analyzed for the PCB compounds as Aroclors unless specified by NWS project chemist.

6.7.4 Method 8330

Explosives by HPLC. Due to the lack of resolution between 2,4-DNT and 2,6-DNT, and between 2-Am-DNT and 4-Am-DNT, reporting of these compounds may be combined and reported as isomeric pairs at the discretion of the USACE project chemist.

6.8 Analytical Methods Summary

The EPA SW-846 is comprised of inorganic, organic and wet chemistry methods. The methods are updated as necessary to incorporate changes in technology and quality control procedures. ***This specification has deliberately omitted method revision numbers from the analytical method designations to enforce its application to any revision of the method in use by USACE. Note also that many of the QA/QC principles and policies included herein apply to methods not directly addressed.*** Technical details on the implementation of the eight methods and default limits for performance-based QC parameters are presented. When this information is not available or adequately defined, then the Contract Laboratory shall default to using the latest promulgated [or recently published](#) revision of the appropriate SW-846 method and application of the QC acceptance limits described herein as the default USACE requirements. The following guidance also outlines general requirements that apply uniformly to all methods by subject heading and any additional parameter or method-specific requirements presented in subsequent sections by chemical parameter, analytical technique, or the individual chromatographic method. For general sample handling procedures used during sample preparation, such as requirements for correct sample homogenizing and Contract Laboratory sub-sampling, refer to the guidance established within EM 200-1-3 Appendix I.

6.8.1 Inorganic Analytical Methods

The inorganic methods presented focus exclusively on metals analyses. This encompasses inductively coupled argon plasma-emission spectroscopy (ICP), GFAA, and cold vapor-atomic absorption (CVAA) methodologies. Project inorganic method requirements shall be clearly identified based on project DQOs. ***Note that when the quantitation limit of a metal (e.g., Sb, Pb, As, Tl, and Se by ICP) is higher than the project-required action level, an alternate analytical method capable of achieving a lower quantitation limit for that metal shall be used.*** Baseline inorganic QC requirements are discussed in 'Shell for Analytical Chemistry'. Classical (wet chemistry) techniques are not addressed directly within this guidance. However, the field of conventional, nonmetals analysis involves a variety of instrumental and wet chemical techniques. Instruments include spectrophotometers and other analyzers.

6.8.2 Organic Analytical Methods

The principles and QC requirements established within SW-846 Method 8000 apply to all organic chromatographic methods (e.g., GC, GC/MS, and HPLC methods). ***Packed-column methods were formally deleted from SW-846 with the promulgation of SW-846 Update III on 13 Jun 1997.*** These methods, in general, possessed less stringent performance criteria (e.g., column resolution is lower and method QC is less stringent) than their associated capillary column method. ***The Contract Laboratory shall default to the use of capillary column methods (e.g., Methods 8260B, 8081A/8082, and 8021B for the deleted Methods 8240, 8080, and 8010/8020, respectively).*** The Contract Laboratory shall not use capillary columns in conjunction with packed column methods in order to apply less stringent QC criterion.

6.8.2.1 Organic Preparatory Methods. Several preparatory method options may exist for each determinative method and matrix. However, comparability of the data generated from different preparatory procedures is

not guaranteed nor likely. ***Therefore, in order to ensure comparability of data generated throughout the life of a project or between different laboratories, proper preparatory methods must be clearly identified for each chemical parameter/matrix and consistent analytical protocols must be maintained.*** Liquid samples may be prepared for extractable organic analyses using a separatory funnel following Method 3510, a continuous liquid-liquid extractor following Method 3520, or solid-phase extraction by Method 3535. Liquid samples for purgeable organic analyses utilizing purge and trap procedures follow Method 5030. Non-aqueous samples should be prepared by solvent dilution techniques following Method 3580 for extractable organic analyses and Method 3585 for purgeable analyses. Solid samples may be processed for extractable organic analyses by soxhlet extraction procedures following Method 3540, automated soxhlet by Method 3541, or pressurized fluid extraction by Method 3545. For petroleum hydrocarbons and organochlorine pesticides/PCBs analyses, a supercritical fluid extraction may be used following Method 3560 and 3562, respectively. Solid samples for purgeable organic analyses utilize Method 5035. ***Several notable changes in the protocols covering soil sampling/analysis preparation have occurred with the promulgation of Method 5035. These changes will require a significant increase in the coordination between field and Contract Laboratory personnel. When the method of preparation is not specified, the Contract Laboratory must obtain this information from the NWS project chemist.*** If no information is provided for the project-specific preparatory methods required, the default preparatory procedures for extractable organic analyses shall follow Method 3520 for aqueous samples; Method 3540 or 3541 for solid samples; and those noted previously for purgeable organic analyses. ***It is anticipated that project field work will entail the use of proper sample handling protocols that result in the acquisition of a representative sample. These include the use of appropriate sample containers, obtaining sufficient sample volumes, and proper preservation techniques based on the anticipated chemical analyses. Refer to 'Shell for Analytical Chemistry' and LQAP for information on proper sample containers, sample volumes, and preservatives if necessary. As noted in Section 5.1 these items are verified upon sample receipt, and any discrepancies notified back through appropriate channels. For chemical parameters that do not allow this assessment during sample login (e.g., VOCs), verification is done post-sample sub-sampling or analysis, and any problems are noted within the case narrative.*** Whenever possible, a quantitative transfer of the entire (1-liter) aqueous liquid sample is made to ensure no loss of target analytes through the adhesion of contaminants on the walls of the sample bottle. A solvent rinse shall be performed to avoid this loss. This procedure, however, may not be possible when significant amounts of sediment are present within the water sample. ***Due to the problems these fines may invoke on the extraction process, recommend that appropriate project technical personnel be contacted to verify the procedures to employ (e.g., decanting water sample, physical separation of the phases and subsequent analysis of each, etc.).***

6.8.2.2 Organic Cleanup Methods. If significant nontarget interference exists, corrective action shall include implementing appropriate cleanup procedures with approval of the NWS project chemist. Dilution techniques should not be used in preference to cleanup procedures for organic methods. The Contract Laboratory shall have a minimum capability of at least one cleanup method for each type of organic analyses for which it provides services. Refer to the individual determinative methods and Method 3600 to identify recommended cleanup methods based on the type and concentration of interferences present, the selectivity of the determinative method, and project method reporting limit requirements. However, analyst professional judgment shall also be used to identify appropriate cleanup techniques to employ. *If cleanup procedures are not routinely employed by a Contract Laboratory, the NWS project chemist must be notified and formally accept the use of cleanup methods on project samples. Pricing for cleanup procedures shall be incorporated into the base price for analyses. PSDDA and Marine sediments which require additional cleanup shall be priced separately.* If organic cleanup methods are performed internal QC samples also must be ran through the cleanup method to demonstrate that analytes of concern are not being lost due to the cleanup method.

7.0 PRELIMINARY METHOD SETUP

In addition to the general items noted in Section 6.2, method initiation must include the following procedures as applicable.

7.1 Inorganic analyses - Method 6010

7.1.1 Linear dynamic range

The upper limit of the linear dynamic range for each ICP must be determined for each analyte wavelength used in order to determine an appropriate concentration for the high calibration standard. This is done for each analyte by analyzing successively higher standard concentrations (approximately 3 to 5 standards) until, because of curvature, the highest analyte concentration is ± 10 percent of the "expected" concentration obtained by extrapolating the calibration line from the lower standards. The concentration chosen for the highest standard must then be chosen below the upper limit of the linear range. The linear dynamic range must be checked initially and whenever there is a significant change in instrumental hardware or operating conditions. If the ICP is routinely calibrated using one standard and a blank, the linear dynamic range must be checked every 6 months.

7.1.2 Inter-element spectral correction factors.

All inter-element spectral correction factors must be determined per method requirements initially and updated at least once every 6 months, based upon failure of the inter-element check standard, or whenever there are significant instrument modifications.

7.2 Organic analyses – SW846 8000 series

Retention time windows are established to compensate for minor shifts in absolute retention times as a result of sample loadings and normal chromatographic variability. The width of the retention time window shall be

carefully established to minimize the occurrence of both false positive and false negative results. Tight retention time windows may result in false negatives or may cause unnecessary reanalysis of samples when surrogates or spiked compounds are erroneously not identified. Excessively wide retention time windows may result in false positive results that cannot be confirmed upon further analysis. Retention time windows must be determined as specified in the latest revision of Method 8000 for all chromatographic methods, except when MS or Fourier transformed infrared (spectroscopy) detectors are employed. Calculate absolute retention time windows for each analyte and surrogate for each chromatographic column employed per method instructions. New retention time windows must be established whenever a new chromatographic column is installed, or when there are significant changes in the operating conditions. The use of reasonable “default” values, programmed into instrument software for the width of the retention time window, is allowed if the Contract Laboratory demonstrates that the calculated 3-sigma width is consistently less than the default width, and the default width is not “excessively large” (i.e., more than 1 to 2 percent of the absolute retention time).

7.2.1 Method 8081

For multicomponent pesticide standards, the analyst shall rely heavily on pattern recognition and the analyst’s experience in the interpretation of the chromatograms.

7.2.2 Method 8082

Absolute retention times will be used when identification of PCBs as Aroclors is performed. Retention time windows must be established as specified in ‘Shell for Analytical Chemistry’ for each surrogate and congeners or for at least 3 to 5 characteristic peaks of each Aroclor. Second column confirmation of all positive detections can be requested by the NWS project chemist at no additional cost to the government.

8.0 INSTRUMENT PERFORMANCE CHECKS

Several methods outline additional QC procedures to verify the instrumentation is in good working condition. These QC samples must be analyzed and meet method-specified acceptable limits prior to commencing sample analyses.

8.1 Method 6010 - Interference check standard (ICS)

An interference check standard (ICS) must be analyzed at the beginning of the analytical sequence to verify the correction factors established in ‘Shell for Analytical Chemistry’ are valid. The ICS typically consists of a set of solutions: ICS-A contains only the interferences (at relatively high concentrations) and ICS-AB contains both the interferences and the analytes of interest. The interferences in both solutions must be present at the concentrations that are at least as high as the high-level calibration standard. The ICS-AB solution must contain the analytes of interest (the metals that are not interferences) at concentrations approximately midlevel. The metals of interest in the ICS-AB solution must be within 20 percent of their expected values. When the ICS check is unacceptable, take corrective action to remedy the failure. Check that the background correction factors applied are appropriate, and readjust if necessary. If the ICS fails immediately after the daily initial calibration, recalibrate and reanalyze the ICS. ~~If the ICP can display overcorrections as negative readings, then the ICS-A solution alone may be used to check for interferences. If the analytes of interest are within two times the absolute value of the MDLs (\pm |MDLs|), the ICS check is acceptable and the ICS-AB~~

~~solution need not be analyzed.~~ For the “B” analytes, if the analytes of interest are within \pm two times the MDL (from zero), 5% of the regulatory limit, or 5% of the measured concentration in the sample (whichever is greater), the ICS check is acceptable and the ICS-AB solution need not be analyzed.

8.2 Method 8081 - Injection Port Inertness Check

Verify injection port inertness by performing percent breakdown checks for 4,4'-DDT and Endrin as specified in Method 8081. The midlevel standard containing only Endrin and 4,4'-DDT must be analyzed at the beginning of the analytical shift/sequence, before the initial calibration or the continuing calibration verification. If the percent breakdown is not ± 15 percent for either DDT or Endrin, perform injector maintenance (e.g., column clipping). Do not proceed with the calibration or analysis until the percent breakdown for each compound is ± 15 percent.

8.3 Methods 8260 and 8270 - Mass Spectrometer (MS) Tuning

Verify that the MS meets standard mass spectral abundance criteria prior to initiation of any analyses by the injection of BFB (4-bromofluorobenzene) tune standard for Method 8260 and DFTPP (decafluorotriphenylphosphine) for Method 8270. The tune standard must be analyzed at the beginning of the analytical shift/sequence and every 12 hours of continuous analysis. The 12-hour clock starts at the time of injection of the tune standard. Recommend evaluating the ion abundance by using any of the following scan scenarios: use one scan at the apex peak, use the mean of the apex and the preceding and following scans or mean of a symmetric pattern of scans about the apex, or use the average across the entire peak. The tune must satisfy the ion abundance acceptance criteria listed within the appropriate method. Background correction shall be compliant with method specifications and employed only for the purpose of correcting for instrument background ions. If a 12-hour tune fails, take corrective action (e.g., clean the MS source) and re-inject the tune standard (BFB/DFTPP). Do not proceed with analysis until the tune is acceptable.

8.4 Method 8270

In order to verify column condition and injection port inertness, the DFTPP tune standard shall contain appropriate volume of 4,4'-DDT, benzidine, and pentachlorophenol as stated within Method 8270.

8.4.1 Injection Port Inertness Check

Similar to Method 8081, the injection port inertness of the GC portion of the GC/MS is evaluated by the percent breakdown of 4,4'-DDT. This procedure is done to verify acceptable instrument performance, regardless of whether DDT is a target analyte. The percent breakdown of 4,4'-DDT to 4,4'-DDE and 4,4'-DDD shall not exceed 20 percent, in order to proceed with calibration procedures.

8.4.2 Column Performance Check

The condition of the GC column is evaluated by the tailing of benzidine and pentachlorophenol. Benzidine and pentachlorophenol must be present at their normal responses, with no visible peak tailing, as demonstrated by the peak tailing factors. The calculation of peak tailing factors can be found on Figure 13 of Method 625, 40 CFR 136, App. A. The acceptance criteria for the peak tailing factor for benzidine is <3.0 and for pentachlorophenol is <5.0 .

9.0 CALIBRATION PROCEDURES AND FREQUENCIES

The calibration of instruments and support equipment is required to ensure that the analytical system is operating correctly and functioning at the proper precision, bias (accuracy), and sensitivity. *The frequencies of calibration and calibration verification are presented in the following sections, based upon the various analytical methods and industry standards, or may be changed based upon project-specific DQOs. USACE Shell* Tables I-1 through I-8 highlight key information on calibration procedures and acceptance limits for each SW-846 method discussed.

9.1 Analytical support areas calibration verification

Suggest referring to ASTM D 5522 for additional details on the following procedures and performance criteria.

9.1.1 Balances

The calibration of analytical balances shall be verified on first daily use at a mass or masses that bracket or are representative of the measurements routinely performed at that balance. The quality of the weights used for this calibration verification shall be documented and shall be in accordance with the quality requirements established within the referenced ASTM standards. Balance calibration verifications shall be documented in appropriate log books. Acceptance criteria shall be clearly identified. Apply a 1 percent performance criterion to top-loading balances, and 0.1 percent to analytical balances. Refer to ASTM D 5522, ASTM E 319, and ASTM E 898 for additional details. Calibration techniques and frequencies will be clearly documented in the appropriate Contract Laboratory SOPs and documentation kept in the appropriate log books.

9.1.2 Refrigerators/Freezers

All refrigerators and freezers shall be monitored for proper temperature by measuring and recording internal temperatures on a daily basis. The calibration of all thermometers used for these measurements shall be verified at least annually against NIST-certified or NIST-traceable thermometers. Electronic thermometers shall be calibrated at least quarterly. Temperatures shall be recorded in appropriate log books. Acceptance ranges shall be clearly identified. Maintain refrigerators to $4\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, and freezers to -10° to $-20\text{ }^{\circ}\text{C}$. Refer to ASTM Method E 77 for additional details. A system must be in-place to notify the Contract Laboratory if the sample storage refrigerators deviate from the $4\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ requirements during the hours that the Contract Laboratory is not open.

9.1.3 Pipets and Other Volumetric Labware

All volumetric devices, glassware, or lab ware shall be regularly inspected. Any cracked or damaged items removed from use. The calibration of variable-volume Eppendorf-type pipets shall be verified at the volume of use, or at two volumes that bracket the range of use on the day of use, or at a minimum of weekly. The calibration of all fixed-volume Eppendorf-type pipets shall be verified monthly. In addition, the accuracy of all nonstandard lab ware (K-D tubes, Zymark tubes, plastic cups, centrifuge tubes, etc.) used to measure the initial sample volume or final volume of sample extracts/digestates must be verified. Accuracy must be verified to within 3 percent. If the check reveals error greater than 3 percent, steps shall be taken to improve the accuracy of these measurements, or use alternative procedures that meet this requirement. It is also recommended that the calibration of all other volumetric glassware (flasks and pipets) be verified at the time

of purchase for each lot of lab ware received. Each calibration check shall consist of at least three measurements, and the average calculated and recorded in appropriate logbooks. Refer to ASTM E 542 and ASTM E 969 for additional details.

9.1.4 Water supply system

The Contract Laboratory shall maintain an appropriate water supply system that can furnish high-purity water capable of meeting the needs of the various analytical areas. The performance of MBs provides an indication of the source water suitability for the analysis. However, the water supply system shall be monitored on a regular basis (i.e., daily or before use) by conductivity readouts or implementation of general chemistry parameters. Appropriate general chemistry parameters shall be based upon the analysis performed at the Contract Laboratory. Refer to ASTM D 1193 for additional details.

9.1.5 Other analytical support equipment

Other support equipment used to maintain appropriate temperatures as prescribed within the analytical method (i.e., hotplates, water baths, etc.) shall be monitored for compliance with the method-specified ranges. Recommend notation of any critical times or temperatures on appropriate bench sheets or laboratory logbooks.

9.2 Initial calibration curve

An analytical instrument is said to be calibrated when an instrumental response can be related to the concentration of an analyte. This relationship may be depicted graphically, and referred to as a “calibration curve.” Initial calibration curves must be established based upon the requisite number of standards identified within the method for each target analyte (and surrogate for organics). The method reporting limit(s) shall be established by the Contract Laboratory at the low standard for each target analyte. All reported concentrations for target analytes shall be within the high and low initial calibration standards. Data generated below the low standard shall be reported as estimated (J-flag) values. Data generated above the high standard shall be diluted into the calibration range and reanalyzed. The frequency requirements for the initial calibration vary among the individual methods and are presented in the following sections. EM200-1-3 Appendix I Tables I-1 through I-8 highlight key information on initial calibrations by method also.

9.2.1 Inorganic analyses

For metals analyses, an initial calibration must be performed at the beginning of each 8-hour analytical shift, and when a CCV fails or significant instrument maintenance is performed. Linearity is acceptable only if the linear regression coefficient r is greater than or equal to 0.995. If r is less than 0.995, take corrective action and recalibrate. The calibration consists of defining the working range by use of a series of standard solutions. The calibration shall be verified on an ongoing basis (every ten to twenty samples at a minimum and at the end of the analysis sequence) to ensure that the system remains within specifications.

9.2.1.1 Method 6010. The term standard may refer to a “mixed” standard solution containing all the metals of interest (when the metals are compatible) or to a set of standard solutions where each standard contains a subset of the compatible metals of interest.

9.2.2 Organic analyses

9.2.2.1 The initial calibration curve. The initial calibration curve is established as specified in the individual methods, using a minimum of five standards for all single-component target analytes and surrogates, and at least three standards for multiple-component target analytes (e.g., toxaphene, chlordane, and PCBs). Once verified, an initial calibration is valid until a CCV fails or significant instrument maintenance is performed. The shapes of calibration curves are typically a linear function between the concentration of each target analyte to the instrument response. However, many method target analyte listings have been expanded to include analytes that cannot be optimized without application of models for quadratic or higher order mathematical functions. When these models are employed, additional standards must be analyzed to accurately delineate the relationship as outlined in Method 8000B.

9.2.2.2 Linearity. Linearity may be determined using linear regression analysis for each target analyte by calculating the correlation coefficient r . The resulting line would normally not be forced through the origin or use the origin as a calibration point unless it is demonstrated that the intercept of the regression line is not statistically different from zero at the 95 percent level of confidence. Another term used to describe the goodness of fit of the line is coefficient of determination r^2 (the squared correlation coefficient). Alternatively for chromatographic methods, the average calibration factor (CF) or response factors (RF) may be calculated for each target analyte. Linearity may be evaluated by calculating the percent relative standard deviation (%RSD) of the CFs/RFs from the initial calibration standards for each target analyte. Linearity is presumed if the correlation coefficient r is equal to or greater than 0.995, if the coefficient of determination r^2 is equal to or greater than 0.99, or if the %RSD is less than or equal to 15 or 20 percent (depending on the method specifications). A visual inspection of the calibration curve shall also be used as a diagnostic tool when nonlinear behavior is observed to verify if there is a large percentage error in any particular portion of the calibration curve. If the visual inspection indicates problems, or if one of these criteria is not met, then the Contract Laboratory shall evaluate the following items for implementation based on an understanding of the detector response/contaminant concentration relationship:

- Check the instrument operating conditions or the initial calibration standards used and make adjustments to achieve a linear calibration curve.
- Narrow the calibration range using the same number of standards as required by the individual method. In general, the highest standard would be lowered first. The consequences of all actions taken must also be addressed, i.e., reduction of the calibration range, raising of the MRL, etc.
- Evaluate the use of a nonlinear calibration curve, when applicable. When nonlinear calibration models are used, the resultant line shall not be forced through the origin and the origin shall not be used as a calibration point. No higher than a third-order (cubic) calibration model shall be used. Note that when a nonlinear calibration model is employed, more data points are needed to maintain at least three degrees of freedom. For example, use of a quadratic function requires a minimum six-point initial calibration curve. The resulting coefficient of determination r^2 shall be greater than or equal to 0.99 for this to be considered acceptable.
- Despite implementation of these alternatives, method limitations may exist that make the acceptance criteria unattainable for all target analytes. Therefore, SW-846 has incorporated an allowance to evaluate the mean of the RSD values for all target analytes in the calibration if this average value is

less than the method acceptance criterion. To avoid the inclusion of target analytes showing gross method failure, this approach may be utilized as long as the target analytes do not exceed the criteria established for poor performers in the method-specific tables in the “Shell for Analytical Chemistry”.

If the averaging option is employed, the Contract Laboratory must communicate the following information within the case narrative: summary of all of the target analytes exceeding method acceptance criteria, the individual RSD results for those compounds, and the mean RSD calculated.

9.3 Initial calibration verification

The initial calibration curve shall be verified as accurate with a standard purchased or prepared from an independent source. This ICV involves the analysis of a standard containing all of the target analytes, typically in the middle of the calibration range, each time the initial calibration is performed. The percent recovery of each target analyte in the ICV is determined from the initial calibration and compared with the specifications for the CCV in each method (except for mercury by CVAA) as outlined in ‘Shell for Analytical Chemistry’.

9.3.1 Method 8081

A separate ICV standard is required for each multiple-component target analyte (e.g., toxaphene and chlordane) if a calibration is performed based upon its presence in samples.

9.3.2 Method 8082

The ICV standards may be limited to contain a mixture of Aroclors 1016 and 1260 or the project-specified Aroclors.

9.4 Initial calibration blanks (ICBs) and continuing calibration blanks (CCBs)

ICBs and CCBs are required for inorganic metals analyses to verify the system is free of contamination. The frequency of ICB/CCB analyses is presented in ‘Shell for Analytical Chemistry’ as prescribed within SW-846 Methods 6010 and 7010/7470/7471. The concentrations of each target analyte in the ICB/CCB must be less than or equal to the MDL as presented in ‘Shell for Analytical Chemistry’. Samples must not be analyzed until the ICB is acceptable, and all results must be bracketed by passing CCBs to be considered valid.

9.5 Continuing calibration verification (CCV)

CCVs are analyzed to determine whether the analytical system is working properly, and if a new initial calibration (and the reanalysis of sample extracts) is required. Calibration verification differs in concept and practice from continuing calibration. In this latter technique, a standard is analyzed and new response factors are calculated, or a new calibration curve is drawn from the analysis of the continuing calibration standard. The former verifies compliance with the initial calibration curve, but does not overwrite the response factors used for the quantitation, nor allows resloping of the calibration curve. Calibration verification shall be used for all analytical methods, calculating a percent drift when the initial calibration is based on regression analysis, and a percent difference when the initial calibration is determined based upon %RSD values. CCV

typically involves the analysis of a single primary source standard in the middle of the calibration range, between the concentrations of low-level and midlevel calibration standards. The frequencies of the CCV vary between methods but are related to the type of detector used and sample matrices analyzed. The analysis of more frequent CCVs is recommended for very sensitive detectors and when analyzing difficult matrices. This frequency is typically presented within SW-846 methods as at the beginning of the analytical shift/sequence; every 12 hours of analyses or every 10 to 20 samples; and may include at the end of the analytical sequence. Refer to 'Shell for Analytical Chemistry' for details on requirements for CCV implementation and acceptance limits for the individual methods. If these QC criteria are not met, take corrective action to inspect the analytical system to determine the cause and perform instrument maintenance to correct the problem before analyzing a second CCV. If the second CCV is acceptable after system maintenance is performed, recalibration is not required but all sample extracts analyzed after the last acceptable CCV must be reanalyzed. If however, the second CCV fails, a new initial calibration must be performed and all associated sample extracts reanalyzed.

9.5.1 Inorganic analyses

A calibration verification pair of a CCV and CCB must be analyzed after every 10 samples (including batch QC samples) and at the end of the analytical sequence as outlined in 'Shell for Analytical Chemistry'. Refer to 'Shell for Analytical Chemistry' for a summary of CCV implementation and QC requirements.

9.5.2 Organic analyses

Calibration verification must be analyzed as outlined in 'Shell for Analytical Chemistry', in addition to the following:

- For certain organic analyses, additional CCVs at low- and high-level concentrations are recommended, due to the instability of their detectors (e.g., HECD, ECD). Measurement quality objectives (acceptance limits) for the high-level CCV shall be in accordance with the midlevel CCV criteria. ***This criterion, however, may not be achievable for the low-level CCV. If low-level detection is critical based on project action levels or decision levels, appropriate measurement quality objectives shall be determined based on an acceptable level of error to support the use of the data.***
- For methods that contain multi-component target analytes (e.g., PCBs), typically only a subset of these analytes would be used in the CCV.
- For GC/HPLC methods, concepts similar to that presented for initial calibrations apply. However, methods may possess limitations for certain target analytes that make the stated method acceptance criteria unattainable. Therefore, SW-846 has incorporated an allowance to evaluate the mean of the percent difference (%D) or percent drift values for all reported target analytes in the calibration verification standard to verify whether it is less than the method acceptance criteria. To avoid the inclusion of target analytes showing gross method failure, this approach may be utilized as long as the target analytes do not exceed the criteria established for poor performers in the 'Shell for Analytical Chemistry'. ***In addition, the Contract Laboratory must communicate this information within the case narrative to the client. Provide a summary of all of the target analytes exceeding method acceptance criteria, the individual %D values for those compounds, and the mean %D calculated.***
- For GC/HPLC methods, compare the retention time of each analyte in the CCV with the absolute retention time windows established in 'Shell for Analytical Chemistry'. Each analyte must fall within its respective retention time window. If this criterion is not met, the chromatographic system must

be adjusted to allow another CCV to meet the criterion, or a new initial calibration performed and new retention time windows established.

9.5.2.1 Method 8021

The electrolytic conductivity detector (EDC) can be unstable resulting in drift. Therefore, when analysis includes the HVO target analytes, it is recommended that the analyst alternate the midlevel CCV with high- and low-level CCVs.

9.5.2.2 Method 8081

Due to the instability and potential drift of the ECD it is recommended that the analyst alternate the midlevel CCV with high- and low-level CCVs. Incorporating periodic multi-component pesticide CCVs (i.e., toxaphene and chlordane), is also recommended when applicable.

9.5.2.3 Method 8082

When quantitating for PCBs as Aroclors, a midlevel CCV standard containing a mixture of Aroclors 1016 and 1260 (or Aroclors of interest) must be analyzed. When quantitating for individual PCB congeners, the CCV standard must contain all congener target analytes. Due to the instability and potential drift of the ECD, the following procedures are also highly recommended. Suggest alternating the midlevel CCV with high- and low-level CCVs as noted in Section 9.5.2.

9.5.2.4 Methods 8260 and 8270

Apply the principles as stated in Section 9.5.2, in addition to the following items:

- Evaluate the RFs of the SPCCs (System Performance Check Compound) in the CCV. If the SPCCs do not satisfy the minimum response factor requirements specified by Method 8260/8270, take corrective action and reinject the CCV. However, if CCV remains unacceptable, a new initial calibration must be performed.
- Evaluate the responses and retention times of the internal standards in the CCV as soon as possible.
- If the retention time for any internal standard changes by more than 30 seconds, or the extracted ion current profile area changes by a factor of two (-50 percent to +100 percent) from that of the midpoint standard of a current initial calibration, inspect the mass spectrometer for malfunctions and take corrective action. Reanalyze any affected samples if required.
- Evaluate the concentration of each target analyte and surrogate in the CCV.
- Verify that the percent drift or percent difference for the CCCs and all project-specified contaminants of concern are within ± 20 percent of their expected values. Evaluate remaining target analytes to assess instrument stability and survey the need for performing instrument maintenance.

It is further recommended that a CCV be analyzed at the end of the analytical sequence.

10.0 LABORATORY QUALITY CONTROL PROCEDURES

The Contract Laboratory overall method performance shall be monitored by the inclusion of various internal quality control checks that allow an evaluation of method control (batch QC), and the effect of the sample matrix on the data being generated (matrix-specific QC). Batch QC is based on the analysis of a laboratory

control sample (LCS) to generate accuracy (precision and bias) data and MB data to assess the potential for cross-contamination. Matrix-specific QC shall be based on the use of an actual environmental sample for precision and bias determinations from the analysis of MSs, MS duplicates, matrix duplicates, and surrogate spikes, etc. The overall quality objectives are to implement procedures for laboratory analysis and reporting of data that are indicative of the degree of quality consistent with their intended use. ***Measurement quality objectives given as QC sample acceptance limits and ranges are default values established within the ‘Shell for Analytical Chemistry’ guidance, Contract Laboratory generated, or Method specified.*** Contract Laboratory-generated control ranges are also used for an internal evaluation of method performance and control. ***Deviations from any of these target ranges will result in the implementation of appropriate corrective measures and an assessment of the impact on the usability of the data in the decision-making process.***

10.1 Sample Batching

The basic unit for application of Contract Laboratory quality control is the batch. Samples shall be prepared, analyzed, and reported in batches and be traceable to their respective batches. Batch sizes are normally limited to 20 field samples of a similar matrix but can exceed this by incorporating additional QC samples. Each batch shall be uniquely identified within the laboratory. Samples prepared together would normally be analyzed together on a single instrument. Samples taken from the same site would normally be grouped together for batching purposes within the constraints imposed by the method holding times. However, laboratories may find it necessary to group multiple clients’ samples into a single batch. Under these circumstances, additional batch QC samples may be needed that evaluate the effect of the matrix from each site on method performance. Field QC samples, i.e., trip blanks, rinsates, etc., shall not knowingly be used for batch QC purposes.

10.1.1 Preparation Batch

The preparation batch shall be defined as samples of the same or similar matrix that are prepared together by the same person or group of people within the same time period or within limited continuous time periods, following the same method, using the same type of equipment and same lots of reagents. The Contract Laboratory shall have sufficient quantities of extraction/digestion lab ware to meet these requirements. Each preparation batch shall contain the requisite number and type of calibration solutions, blanks, QC samples, and regular analytical samples as defined by the analytical method. These requirements shall be completely defined in the Contract Laboratory SOPs and are summarized in part in the following sections. The use of cleanup methods would be included as part of the preparation batch. All field and batch-specific QC samples within the batch shall be subjected to all preparatory and cleanup procedures employed.

10.1.2 Analysis batch (sequence)

The analysis batch or sequence or instrument run sequence shall be defined as samples that are analyzed together within the same time period or in continuous time periods on one instrument under the control of one continuing calibration verification. Analysis sequences are bracketed by the appropriate continuing calibration verification standards and other QC samples as defined by the analytical method. In general, if an instrument is not used for periods of time or shut down (e.g., overnight, etc.), then a new analysis sequence shall be initiated. Each analysis sequence shall contain the requisite number and type of calibration solutions, QC samples, and regular analytical samples as defined by the analytical method. These requirements shall be completely defined in the laboratories’ SOPs and are summarized in part in the following sections.

For samples that are purged and then analyzed immediately, the preparation batch and analysis sequences are combined. For this situation, the batch would normally be defined by the loading of samples into the various purge tubes. This definition has been interpreted differently however. For instance, the loading of purge tubes may be performed all at one time, or may continue throughout the day. In order to ensure ambient environmental conditions throughout the potential loading process, USACE requires a minimum of an MB run every 4 hours, or twice a day when samples are loaded throughout the day.

10.2 Preparation Batch QC Samples

A summary of the minimum required QC samples for each preparation batch follows. All calibrations and QC samples analyzed shall be uniquely identified and traceable to that unique sample preparation batch. Additional QC samples may be required per the method.

10.2.1 Method Blank (MB)

MBs are analyzed to assess background interference or contamination that exists in the analytical system that might lead to the reporting of elevated concentration levels or false positive data. The MB is defined as an interference-free blank matrix similar to the sample matrix to which all reagents are added in the same volumes or proportions as used in sample preparation and carried through the complete sample preparation, cleanup, and determinative procedures. For aqueous analyses, analyte-free reagent water would typically be used. For soil analyses, a purified solid matrix (e.g., sand) would typically be used, except for metals analyses. The results of the MB analysis are evaluated, in conjunction with other QC information, to determine the acceptability of the data generated for that batch of samples. Refer to 'Shell for Analytical Chemistry Section' I.11.4.1 for measurement quality objectives/corrective action scenarios for the MB. Sample results shall not be corrected for blank contamination.

10.2.2 Laboratory Control Samples (LCS)

The LCS is analyzed to assess general method performance based on the ability of the Contract Laboratory to successfully recover the target analytes from a control matrix. The LCS is similar in composition to the MB. Aqueous analyses use analyte-free reagent water. For soil analyses, a purified solid matrix (e.g., Ottawa sand, sodium sulfate, or other purified solid) would typically be used. However, due to the difficulty in obtaining a solid matrix that is metals-free, analyte-free reagent water is taken through the appropriate digestion procedures for metals analyses. The LCS is spiked with all single-component target analytes before it is carried through the preparation, cleanup, and determinative procedures. ***When multicomponent target analytes are reported, a separate LCS may be necessary if specified by project documents. For Method 8082, the LCS must be spiked with at least one PCB (e.g., 1016/1260 mixture), any project-specified PCBs, or all congeners to support the LCS evaluation.*** The use of solid standard reference materials as the LCS is discouraged for they do not typically include all target analytes, and the acceptance limits associated with them are wide due to the heterogeneity of the spiked matrix. Suggest instead the use of an interference-free matrix (e.g., purified solid or sodium sulfate). When samples are not subjected to a separate preparatory procedure (i.e., purge and trap VOC analyses, or aqueous Hg analysis), the CCV may be used as the LCS, provided the CCV acceptance limits are used for evaluation. ***The spiking levels for the LCS would normally be set at the project-specific action limits assuming that the low standard used for the initial calibration was below this limit. If the low standard used was at this limit or if the site action levels were unknown, then the spiking levels would be set between the low- and mid-level standards.*** The results of the LCS are evaluated, in conjunction with other QC information, to determine the acceptability of the data generated for that batch of samples. Refer to 'Shell for Analytical Chemistry Section I.11.4.2 for measurement quality

objectives/corrective action scenarios for the LCS. The Contract Laboratory shall also maintain control charts or tables for these samples to monitor the precision and bias for the method. The precision shall be evaluated by comparing the results of duplicate LCSs.

10.2.3 Matrix spikes (MS)

The MS is used to assess the performance of the method as applied to a particular project matrix. A MS is an environmental sample to which known concentrations of certain target analytes have been added before sample manipulation, the preparation, cleanup, and determinative procedures have been implemented. All target analytes within Table 6.2 shall be spiked in the MS. The spike concentrations of the target analytes will normally be set at the same level as the LCS. For solid samples, care shall be taken to ensure that the original field sample is properly divided into homogeneous fractions when allowed by the method. *Aqueous and 5035 preserved samples require the submittal of an additional sample for several chemical parameters, especially organic analyses. Therefore, the sample to be used for the MS shall be specified in the field to ensure that sufficient sample is available to perform the test.* From the Contract Laboratory perspective, preparation batches require MS frequency at one per preparation batch. The merging of these MS frequencies is often difficult for the Contract Laboratory to implement. For instance, batches consisting of samples from multiple sites may require additional MSs to meet project requirements of evaluating the samples within the batch because an MS from one site cannot be used to evaluate the matrix effects on samples from other sites. *Projects must consider the method(s) employed, previous knowledge of the matrix, and other matrix-specific QC samples to help decide an appropriate frequency for MSs for a given project. As a consequence, an MS may not be included with each shipment of samples submitted to the Contract Laboratory.* The results of the MS are evaluated in conjunction with other QC information to determine the effect of the matrix on the bias of the analysis. Refer to 'Shell for Analytical Chemistry' Section I.11.4.3 for measurement quality objectives/corrective action scenarios for the MS. *When critical decisions are based on the MS sample recoveries, control charts could be maintained for these samples to monitor the bias of the method for each particular matrix.* Sample results shall not be corrected for MS QC excursions.

Field specified MS/MSD shall be indicated on the Chain of Custody. When indicated on the Chain of Custody MS/MSD shall be run on the indicated samples. If insufficient numbers of MS/MSD samples are indicated on the Chain of Custody the Contract Laboratory shall run MS/MSD on other similar samples. All results will need to be reported even if non USACE samples are used for MS/MSD.

10.2.3.1 Method 6010. Unless superseded by project DQOs, it is not necessary to perform matrix spikes for Na, K, Ca, and Mg for aqueous samples or Na, K, Ca, Mg, Fe, Mn, and Al for soil samples. The native concentrations of these low-toxicity metals are usually relatively high.

10.2.3.2 Method 8081. The MS shall be prepared for all single-component pesticides. Multi-component pesticides need not be included within the MS, unless required by Task Order.

10.2.4 Matrix duplicate (MD) or matrix spike duplicate (MSD)

The MD or MSD are used to assess the performance of the method as applied to a particular matrix and to provide information on the homogeneity of the matrix. An MSD is a duplicate of the MS as previously described. An MD is an environmental sample that is either divided into two separate aliquots by the Contract Laboratory, or requires the submittal of an additional sample. When applicable, care shall be taken to ensure that the sample is properly divided into homogeneous fractions. Both the MD and MSD are carried through the complete sample preparation, cleanup, and determinative procedures. *The requirements for the*

frequency of MDs or MSDs would normally be specified in the project-specific DQOs. The normal use of these QC samples would follow the same requirements as described for the MS. *An MD shall be included with each preparation batch of samples processed where target analytes were expected to be present (e.g., inorganic methods).* *An MSD would normally be included with each preparation batch of samples processed where target analytes were not expected to be present (e.g., organic methods).* The results of the MD or MSD are evaluated, in conjunction with other QC information, to determine the effect of the matrix on the precision of the analysis. Refer to ‘Shell for Analytical Chemistry’ Section I.11.4.4 for measurement quality objectives/corrective action scenarios for the MD or MSD. Control charts can be maintained for these samples to monitor the precision of the method for each particular matrix if required by the project.

10.2.5 Surrogates

Surrogates are analyzed to assess the ability of the method to successfully recover these specific nontarget analytes from an actual matrix. Surrogates are organic compounds that are similar to the analytes of interest in chemical behavior but are not normally found in environmental samples. Surrogates to be used are identified within the determinative methods. Other compounds may be chosen and used as surrogates, depending on the analysis requirements, whether they are representative of the compounds being analyzed, and whether they cover the chromatographic range of interest. These compounds shall be spiked into all samples and accompanying QC samples requiring GC, liquid chromatography, or GC/MS analysis prior to any sample manipulation. As a result, the surrogates are used in much the same way that MSs are used, but cannot replace the function of the MS. The results of the surrogates are evaluated, in conjunction with other QC information, to determine the effect of the matrix on the bias of the individual sample determinations. Refer to ‘Shell for Analytical Chemistry’ Section I.11.4.5 for measurement quality objectives/corrective action scenarios for surrogates. Control charts or tables shall be maintained for surrogates contained within the LCS or MB to monitor the accuracy of the method for each particular matrix. Sample results shall not be corrected for surrogate excursions.

10.2.5.1 Method 8330. Explosives analysis by Method 8330 is an exception, in that the surrogate used is actually a target analyte. Care should be exercised by the Contract Laboratory with the choice of surrogate used, for the potential remains for coelution with target analytes present within the samples. If 3,4-DNT is used as the surrogate, it must not coelute with TNT. If it is not possible to obtain adequate resolution between 3,4-DNT and TNT, another surrogate shall be chosen (e.g., 1,2-DNB).

10.2.6 Standard reference materials

The Contract Laboratory is encouraged to analyze additional natural matrix standard reference materials and participate in external PE programs.

10.3 Analysis sequence of QC samples

Certain inorganic analyses (metals by ICP and GFAA) incorporate the following additional QC samples to assess method performance without the influence of the preparatory procedures.

10.3.1 Post digestion spikes (PDS)

PDSs are performed on every sample as a recovery test for Method 7010, and one per batch (on the sample chosen for MS) for Method 6010. However, duplicate injections of each environmental sample may be avoided when the PDS is performed for each sample for ICP analysis following Method 6010. PDSs are

prepared by the addition of the primary source standard to an aliquot of the digestate for the same metals and at approximately the same concentration as is used for the MS - i.e., between the low and mid-level standards. Refer to 'Shell for Analytical Chemistry' Section I.11.4.6 for measurement quality objectives/corrective action scenarios for PDSs.

10.3.2 Serial dilutions (SD)

A 5X (1:4) SD test may be performed for an analyte to evaluate matrix interference if the analyte concentration in the original (undiluted) sample is at least 50 times the MDL. SD-matrix effects are suspected if the RPD between the undiluted and diluted result is greater than 10 percent. If this criterion is not met, further confirmation of the interference via implementation of PDS is necessary when matrix interference is suspected, and the calculation of the result through the use of method of standard additions when matrix interference is suspected/confirmed.

10.3.2.1 SD Reporting. When SDs are used to address matrix interference, all diluted results shall be reported. However, the reported result must be qualified (i.e., D-flag) and the dilution factor specified. The associated MRLs must also be adjusted based on the dilution factor.

11.0 MEASUREMENT QUALITY OBJECTIVES AND CORRECTIVE ACTIONS

When errors, deficiencies, or out-of-control situations exist, the Contract Laboratory's QA program shall include a system of QC activities that measure the system performance to verify that it meets stated requirements and objectives. When the analytical system performance does not meet defined standards, the Contract Laboratory shall employ systematic procedures, called corrective actions, to resolve problems and restore proper functioning to the analytical system(s). Contract Laboratory personnel are alerted that corrective actions are necessary under the following conditions:

- QC data are outside the measurement quality objectives for precision and bias.
- Blanks or laboratory control samples contain contaminants above acceptable levels.
- Undesirable trends are detected in spike recoveries or RPD between duplicates.
- There are unusual changes in method detection limits.
- Deficiencies are detected by the QA department during internal or external audits or from the results of PE samples.
- Inquiries concerning data quality are received from a project manager.

Corrective actions are often handled at the bench level by the analyst, who reviews the sample preparation procedures for possible errors and checks the instrument calibration, spike, calibration mixes, instrument sensitivity, and so on. If the problem persists or cannot be identified, the matter is referred to the Contract Laboratory supervisor, manager, or QA department for further investigation. ***Poor performance by the Contract Laboratory may result in payment penalties or work being repeated at the contractor's expense. Once resolved, full documentation of the corrective action procedure shall be filed with the project-specific records.*** The following sections identify measurement quality objectives and the corrective actions necessary. When qualification of data is necessary (e.g., flagging), refer to Section 13.3 for details on flagging conventions. The following shall be required:

11.1 Incoming samples

Problems noted during sample receipt shall be documented on an appropriate form (the “Cooler Receipt Form”). *The USACE project chemist shall be contacted immediately for problem resolution.*

11.2 Sample holding times

If samples cannot be prepared or analyzed within the method-required holding times, the USACE project chemist shall be immediately notified so that an appropriate corrective action plan can be generated.

The requirement for holding times shall be 100%. **If any sample exceeds the holding time specified by EPA SW-846 (or other guidance documents for other analyses) that sample shall be resampled and reanalyzed at the expense of the Contract Laboratory.** USACE will insure that all samples are delivered to the Contract Laboratory within 50% of the regulatory specified holding time after sampling. For samples with 24 hour holding times USACE will ensure that samples will be delivered within 20 hours of the time of sampling. For samples with 48 hour holding times USACE will ensure that samples will be delivered within 36 hours of sample collection. For analytes that do not have regulatory specified holding times samples will be delivered as soon as possible. For projects involving analyses of hexavalent chromium USACE will make every effort to inform the Contract Laboratory of the status of sampling activities in the field such that the Contract Laboratory is informed as to the number of samples that will arrive and the timing for delivery. On a case-by-case basis if coordination fails and the Contract Laboratory anticipates that holding times will not be met this assessment shall be communicated immediately to sampling personnel such that additional sample volumes can be obtained. **Failure of the Contract Laboratory to meet 24 hr. holding times associated with a failure to communicate with the NWS project chemist regarding the status of sample analyses will result in resampling and reanalysis at the expense of the Contract Laboratory for all affected samples.**

11.3 Instrument calibration

Sample analysis shall not be allowed until all initial calibrations, initial calibration verifications, and instrument blanks meet the appropriate requirements. All CCVs that do not meet method requirements shall result in a review of the calibration, rerun of the appropriate calibration standard for the failed analytes, and, if necessary, reanalysis of all samples affected back to the previous acceptable CCV check for the target analytes that failed. Continued failure of the CCV shall result in the construction of a new initial calibration curve followed by the reanalysis of all samples affected. *If results are reported when a calibration criterion has been exceeded, then all results reported shall be flagged, and a discussion of the impact included within the case narrative.* Instrument blanks shall be implemented as outlined in the prescribed method.

11.4 Method QC samples

Each preparatory batch and analysis sequence must include the appropriate batch and matrix-specific QC samples and standards: i.e., MB, LCS, MS, MD, MSD, surrogate spikes, and other method-specified QC. *All QC shall meet the appropriate project-specific measurement quality objectives and associated corrective actions.* In the absence of such criteria or actions, the corrective actions as described in the following sections shall be required. Failure of method QC shall result in the review of all affected data. If no errors can be noted, the affected sample(s) may need to be reanalyzed or reprepared and reanalyzed within method holding times, if possible. *All reparation and reanalysis necessary due to method failure shall be*

performed at no cost to the Government. If the situation is not corrected and results reported, then the corresponding data shall be flagged and a discussion of the impact included within the case narrative. The USACE project chemist shall be notified as soon as possible to discuss possible corrective actions should unusually difficult sample matrices be encountered.

11.4.1 Method blanks (MBs)

These criteria shall be used to evaluate the acceptability of the MB. The concentration of all target analytes shall be below one half of the reporting limit (MRL) for each target analyte, or less than 5 percent of the regulatory limit associated with that analyte, or less than 5 percent of the sample result for the same analyte, whichever is greater for the MB to be acceptable. When this criterion is exceeded, corrective action shall be taken to find/reduce/eliminate the source of this contamination in the MB. However, sample corrective action may be limited to qualification for blank contamination (i.e., B-flag). When the concentrations of any target analytes within the MB are above one-half the MRL for the majority of target analytes or above MRL for target analytes known to be common laboratory contaminants, assess the effect this may have had on the samples. If an analyte is found only in the MB, but not in any batch samples, no further corrective action may be necessary. Steps shall be taken to find/reduce/eliminate the source of this contamination in the MB. The case narrative shall also discuss the situation. If an analyte is found in the MB and in some, or all, of the other batch samples, additional corrective action is required to reanalyze the MB, and any samples containing the same contaminant. If the contamination remains, the contaminated samples of the batch shall be reprepared and reanalyzed with a new MB and batch-specific QC samples. Sporadic cases of contamination may be difficult to control; however, daily contamination would not be acceptable.

11.4.2 Laboratory Control Samples (LCSs)

The LCS is evaluated by comparing the percent recovery for all of the target analytes to the recovery measurement quality objectives as determined by method specified ranges, ‘Shell for Analytical Chemistry’ specified ranges or laboratory established ranges. If target analytes are outside the acceptance windows, corrective action is required. Project DQOs will dictate the corrective actions necessary. Initially, the effect the QC failure has on the samples shall be evaluated. Regardless of this assessment, steps shall be taken to find the source of the problem and correct it. The case narrative shall discuss the corrective action taken and any other information. Typically, the LCS would be reanalyzed for the failed analytes only. If the second analysis fails, then the LCS, MB, and all associated samples of the batch would be reprepared and reanalyzed for the failed analytes only. *If sufficient sample is not available for reparation and reanalysis or if the corrective action is ineffective, the sample results reported within that batch shall be flagged accordingly, and a discussion of the impact included within the case narrative. For methods that report several (>5) target analytes, a small percentage of sporadic marginal failures may be tolerated (i.e., will not trigger re-extraction and analysis of the entire batch). The number of target analytes reported for the method will dictate the number of allowable QC failures as given in ‘Shell for Analytical Chemistry’ table I-15.* Refer to the individual Shell method tables (Tables I-1 through I-8) for details of this concept as it pertains to each of the methods discussed. The marginal failure allowance entails the application of an expanded acceptance criterion.

11.4.3 Matrix Spike (MS) Samples

The MS is evaluated by comparing the recovery for target analytes to the recovery windows established within ‘Shell for Analytical Chemistry’. MS data evaluation is more complex than MB or LCS data evaluation since MSs measure matrix effects in addition to sample preparation and analysis errors. The

heterogeneity of soil, grab samples, and sequentially collected water samples further complicates the evaluation since matrix-specific bias assumes that the native concentrations in the duplicate analyses are constant. In addition concentrations of the target analytes in the sample can also far exceed the spike amounts added, making the resulting recoveries invalid. MSs that fail to meet the appropriate acceptance criteria would indicate that a potential matrix effect is present. If the native concentration of target analytes in the sample chosen for spiking is high relative to the spiking concentration, the differences between the native concentration of the unspiked sample and the spiked samples may not be significant, making the bias measures unrepresentative of the true method and matrix performance. ***For this reason, if the native concentration is two or more times the spiking level, corrective actions would be based on project DQOs.*** Regardless, steps shall be taken to find the cause of failure and corrective actions be taken to remedy it. If possible, respike the sample as outlined in the following sections at a higher level (e.g., at two to four times the sample concentration), then reanalyze the sample based on project-specific requirements. A review of the MSD result, if available, may confirm the matrix effect, if it is the same direction and same order of magnitude. If the native concentration is low, and the MS/MSD recoveries confirm matrix interference, reanalyze the MS/MSD sample/extract after employing cleanup procedures (organic analyses) or dilution techniques to minimize matrix interference. ***If the matrix effect cannot be resolved, discuss the impact on the data within the case narrative.***

11.4.3.1 Inorganic Analyses. Corrective action for unacceptable MS recoveries for ICP and GFAA analyses shall include implementation of a PDS of the same sample that the MS was prepared. In that way, information is obtained to identify whether matrix interference is occurring during the digestion or analytical procedures. Refer to ‘Shell for Analytical Chemistry’ Section 11.4.6 for guidance on the evaluation of MS in conjunction with the PDS.

11.4.3.2 Organic Analyses. When multiple (>5) target analytes are reported, the acceptance criteria may allow for the sporadic marginal failure of a few target analytes included within the MS without requiring reanalysis. When only a subset of target analytes is included in the MS, allow only one sporadic marginal failure. Reference ‘Shell for Analytical Chemistry’ Section 9.3 and Tables I-1 through I-8 for information on the number of sporadic failures allowed and the expanded acceptance criteria to be applied.

11.4.4 Matrix Dup and MSD Samples

The MSD is evaluated using the same bias criteria as described for the MS. The MD or MSD is evaluated by comparing the precision for all target analytes to the windows as determined by project-specific DQOs, or as stated herein. These criteria shall be applied only to concentrations of target analytes that are above the MRL of each analyte. MDs or MSDs that fail to meet the appropriate acceptance criteria would indicate that a potential matrix effect is present. Corrective actions shall be performed as described for the MS.

11.4.5 Surrogate

A surrogate is evaluated by comparing its recovery in each sample to the windows as determined by ‘Shell for Analytical Chemistry’ Tables I-3 through I-8. Surrogate spikes in matrix-specific samples that fail to meet the appropriate acceptance criteria would indicate that a potential matrix effect is present. If significant nontarget interference occurs, corrective action shall include implementing additional cleanup procedures and reanalyses. ***If this does not reduce the interference, discuss the impact on the data within the case narrative. Recommendations to the client may include method modifications, such as reparation and reanalysis with smaller sample aliquots to reduce the effects of the matrix.*** The consequences to detection

limits must also be considered in this instance. Surrogate failures in MBs or LCSs are indicative of a general method failure and shall be thoroughly investigated as noted in ‘Shell for Analytical Chemistry’.

11.4.6 Post-Digestion Spike Samples

Default recovery control limits for the PDS are noted in ‘Shell for Analytical Chemistry’. Similar to the MS, if historic data or information on native sample concentrations is available, the MS or PDS shall be spiked at a concentration at least twice the native sample concentration for the following evaluation to be considered valid. Professional judgment shall be used to determine the corrective action necessary when the MS recovery for an analyte fails but the PDS recovery passes. *For instance, when the MS recovery fails because it falls below the lower control limit but the PDS recovery passes, confirmatory redigestion and reanalysis may not be required if allowed by project DQOs.* When both the MS and PDS indicate matrix interference is present, the Contract Laboratory must attempt to correct for the interference by the use of method of standard additions, an internal standard technique for ICP (e.g., with yttrium), a different matrix modifier for GFAA, or different digestion or analytical procedures to achieve a representative result, before qualifying the sample for matrix interference. This does not apply to sporadic failures but rather to target analytes exhibiting out-of-control recoveries on consecutive batches. Also, verify overall batch control for the analysis by evaluation of the LCS.

11.5 Calculation Errors

Reports shall be reissued if calculation or reporting errors are noted with any given data package in a timely fashion and at no cost to the government. The corrected case narrative shall clearly state the reason(s) for re-issuance of the report.

11.6 Onsite Audits

A corrective actions report shall be required that addresses any deficiencies noted during audits conducted. *If corrective actions are needed for major deficiencies that would affect data quality, the Contract Laboratory shall notify USACE of other projects that may be affected.*

12.0 TARGET ANALYTE IDENTIFICATION, QUANTITATION, AND CONFIRMATION

12.1 Target Analyte Identification

Employ procedures presented within the individual determinative methods for determining presence and identification of target analytes within samples. *For GC/MS analyses and any samples containing extraneous peaks not associated with the calibration standards, the USACE project chemist must be notified immediately. At the request of the project chemist, a scan against a mass spectral library (typically ~75,000 compounds) shall be performed for the purposes of tentative identification.* Based upon the degree of match, evidence of similar pattern, and analyst professional judgment, the first 20 compounds shall be reported as Tentatively Identified Compounds (TICs), with the analytical values and the degree of match estimated.

~~TIC reporting shall be required for all GC/MS analyses unless written release from the NWS project chemist is on file.~~

12.2 Target analyte quantitation

All samples shall be quantitated using the initial calibration curve, following procedures outlined within the determinative methods. Sample results that exceed the range of the initial calibration high standard must be diluted and reanalyzed, results shall be reported with a data flag indicating calibration curve exceedence. Sample analyte values reported below the MRL must be flagged as estimated quantities (i.e., J-flag). All dilutions must be applied to the sample results and reported accordingly. Solid samples are to be determined on a dry-weight basis. Sample target analyte values shall be reported to three significant figures.

12.2.1 Inorganic Analyses

Quantitative results are calculated using the mean value from the set of duplicate injections for Method 7010 or the mean value from multiple exposures for Method 6010. Also recommend the Contract Laboratory review the RPDs for duplicate injections/multiple exposures of samples exhibiting quantifiable concentrations. If the %RPD/%RSD is consistently >20 percent and highly variable for concentrations greater than the low-level calibration standard, corrective action shall be taken. When matrix interference is suspected/confirmed, the use of method of standard additions must be used to calculate the sample result. The Contract Laboratory shall at a minimum use a series of three standard additions containing 50, 100, and 150 percent of the expected concentration. As outlined within the method, plot the absorbance of each solution at the concentration of the known standards. The concentration of the sample is then obtained from extrapolating the resulting line back to zero absorbance.

12.2.2 Organic Analyses

The Contract Laboratory shall make a reasonable attempt to correct for any matrix interference encountered. Dilutions should not be routinely used in preference to cleanup methods to address matrix interference. When matrix interference is present, samples should be processed using at least one cleanup method as outlined by the determinative method. Refer to Section Shell I.6.8.2.2 for information on recommended cleanup methods. *If the cleanup and reanalysis do not reduce the matrix interference, discuss the impact on the data within the case narrative.*

12.3 Target analyte confirmation

Chromatography is a technique that relies upon the comparison of retention times between standards and unknown peaks for qualitative identification. Unless mass spectrometry is used as the detector, tentative identification is based solely on the retention time of an unknown peak falling within the prescribed retention time window of a known standard. Second column or mass spectrometric confirmation for all GC sample analyses involving identification of discrete peaks with detected concentrations will be required at no additional charge to the government. If second column or mass spectrometric confirmation is not performed as required the corresponding sample results shall be rejected. For instance, PCB analysis requires second column confirmation when the Aroclor identification is in doubt, when a mixture of Aroclors are present, or when the pattern is weathered. It is recommended that confirmation techniques involve the use of another analytical technique (i.e., GC/MS), or a second dissimilar column. *A different type of detector may also be used.* When the second dissimilar column is used, it shall be calibrated in the same manner as the primary column. After the target analyte has been identified, compare the primary and confirmatory results for

agreement according to a method-prescribed criterion. Analytical results would normally be reported from the primary column unless interferences were noted. If quantitative results are reported from the confirmation column, the documentation from the analysis of all appropriate QC samples on the confirmation column shall also be required within the data package.

13 DATA REDUCTION, REVIEW, AND REPORTING

13.1 Data Reduction

Data reduction procedures, whether performed by the instrument or manually, shall follow methodologies outlined within the Contract Laboratory SOP or analytical method. Project-specific variations of the general procedures, statistical approach, or formulas may be identified, depending on project-specific requirements. Automated procedures shall be verified as required by EPA's guidance on GALP (EPA 2185): all software shall be tested with a sample set of data to verify its correct operation via accurate capture, processing, manipulation, transfer, recording, and reporting of data.

13.2 Data Review

All analytical data generated by the Contract Laboratory shall be extensively reviewed prior to report release to assure the validity of the reported data. This internal data evaluation process shall cover the areas of data generation, reduction, and a minimum three levels of documented review. For each level, the review process shall be documented using an appropriate checklist that is signed and dated by the reviewer. The analyst who generates the analytical data has the prime responsibility for the correctness and completeness of the data. Each step of this review process involves evaluation of data quality based on both the results of the QC data and the professional judgment of those conducting the review. This application of technical knowledge and experience to the data evaluation is essential in ensuring that data of known quality are generated consistently. All data generated and reduced shall follow well-documented in-house protocols.

13.2.1 Level 1 Analyst Review

Each analyst reviews the quality of his/her work based on an established set of guidelines. The review criteria as established in each method, in this guidance, or within the Contract Laboratory shall be used. This review shall, at a minimum, ensure the following:

- Sample preparation information is correct and complete.
- Analysis information is correct and complete.
- The appropriate SOPs have been followed.
- Analytical results are correct and complete.
- Raw data, including all manual integrations, have been correctly interpreted.
- QC samples are within established control limits.
- Special sample preparation and analytical requirements have been met.
- Data transfers were verified.

- Documentation is complete (e.g., all anomalies in the preparation and analysis have been documented, anomaly forms are complete, holding times are documented, etc.). Level 1 analyst review shall be documented by using a checklist and by the signature of the reviewer and date.

13.2.2 Level 2 Peer Review

Level 2 reviews shall be performed by a supervisor, another analyst, or data review specialist who has documentation that supports demonstration of performance for all areas for which he/she provides review. The function of this review is to provide an independent, complete peer review of the analytical batch data package. This review shall also be conducted according to an established set of guidelines and is structured to ensure the following:

- All appropriate Contract Laboratory SOPs have been referenced.
- Calibration data are scientifically sound, appropriate to the method, and completely documented.
- QC samples are within established guidelines.
- Qualitative identification of sample components is correct.
- Quantitative results, including calculations and any associated flags, are correct.
- Raw data, including manual integrations, have been correctly interpreted.
- Documentation is complete and correct (e.g., anomalies in the preparation and analysis have been documented, nonconformance forms are complete, holding times are documented, etc.).
- The data are ready for incorporation into the final report.

Level 2 reviews shall be structured so that all calibration data and QC sample results are reviewed and all of the analytical results are checked back to the raw data or bench sheets. If no problems are found with the data package, the review is complete. If any problems are found with the data package, then all sample results shall be returned to the analyst and rechecked. All errors and corrections noted shall be documented. Level 2 peer reviews shall also be documented on a checklist with the signature of the reviewer and date.

13.2.3 Level 3 Administrative Review

Level 3 reviews are performed by the program administrator or designee at the Contract Laboratory. This review shall provide a total overview of the data package, including sample receipt, to ensure its consistency and compliance with project-specific requirements. All errors noted shall be corrected and documented. Based on the errors noted, samples may need to be reprepared and reanalyzed. Level 3 administrative reviews shall also be documented on a checklist with the signature of the reviewer and date.

13.2.4 QA Review

QA review is performed by the QA Officer or QA Branch. This review is not part of the normal production data review process. The QA Officer would typically review at least 10 percent of the data produced by the Contract Laboratory using the procedures as outlined in the Level 3 data reviews. Additional technical details shall be reviewed in this QA review, similar to Levels 1 and 2, along with a total package review, i.e., correlation of results from differing but related chemical parameters. The data packages reviewed would be randomly selected by the QA Officer. Nonconformance reports would be required for any errors noted.

13.3 Data Qualifiers

Data qualifiers shall be added by the Contract Laboratory during the data generation/ review process. These qualifiers will be applied when measurement quality objectives defined in ‘Shell for Analytical Chemistry’ Section I.11 are not met and corrective action is not successful or when corrective action is not performed. All flags used by the Contract Laboratory shall be defined completely within the chemical data reportable packages. The following example data qualifiers are suggested for use:

- U = Nondetect when analyte concentration is below MRL.
- J = Estimated concentration when analyte concentration falls below the MRL (i.e., lowest calibration standard).
- B = Blank contamination when any associated blanks are above the MDL.
- Q = Data requires usability review due to the exceedence of method-specific holding times, calibration, or batch QC data associated with the samples does not meet stated measurement quality objectives.

The contracting officer or NWS project chemist shall be notified as soon as possible to discuss possible corrective actions should data be ‘Q’ qualified.

13.4 Data Reporting Requirements

The chemistry data package shall contain enough information to demonstrate that the project data quality objectives have been fulfilled. In general, one shall be able to determine the precision, bias, representativeness, comparability, and sensitivity of the data from information contained in the data package. This description applies to both primary and referee laboratory packages. The amount of information required to demonstrate attainment of DQOs depends upon the acceptable level of uncertainty for the intended data use. In general, the type of data package required will fall into one of three general categories: Definitive, Performance-Based, and Comprehensive. All reported data packages must be retained by the Contract Laboratory for a minimum of five (5) years. In the event of Contract Laboratory closure, all applicable documents must be transferred to the contracting officer.

Unless otherwise stated in a task order, chromatography must be provided for all pattern recognition analyses. Chromatographs for all samples (detects and non-detects) shall be presented at an attenuation where features of the chromatography are clearly visible. Chromatographs of standards used for identification of patterns or carbon ranges must also be included in the data package.

13.4.1 Definitive Data Package

The definitive data package format allows for the review of the data by an independent organization. However, this data package does not allow for complete independent reconstruction of the analytical data. As discussed in more detail in the following sections, the definitive data package shall include a cover sheet, table of contents, case narrative, the analytical results, laboratory reporting limits, sample management records, and internal laboratory QA/QC information. The Contract Laboratory data package shall be organized such that the analytical results are reported on a per-batch basis unless otherwise specified.

13.4.1.1 Cover sheet. The cover sheet shall specify the following information:

- Title of report.

- Name and location of Contract Laboratory (to include a point of contact, phone, email and facsimile numbers).
- Name and location of any subcontractor laboratories, and appropriate test method performed.
- Contract number and Task Order number.
- Client name and address.
- Project name (as provided on Task Order), COE Work Order # and site location.
- Statement of data authenticity and official signature and title of person authorizing report release.
- Amendments to previously released reports shall clearly identify the serial number for the previous report and state the reason(s) for reissuance of the report.

13.4.1.2 Table of Contents. Contract Laboratory data packages shall be organized in a format that allows for easy identification and retrieval of information. An index or table of contents shall be included for this purpose. Electronic deliverable shall also have a hyper linked Table of Contents.

13.4.1.3 Case narrative. A case narrative shall be included in each report. The case narrative shall contain a table(s) summarizing samples received, providing a correlation between field sample numbers and laboratory sample numbers, and identifying which analytical test methods were performed and by which laboratories. Samples that were received but not analyzed shall also be identified. Extractions or analyses that are performed out of holding times shall be appropriately noted. The case narrative shall define all data qualifiers or flags used. Deviations of any calibration standards or QC sample results from appropriate acceptance limits shall be noted and associated corrective actions taken by the Contract Laboratory shall be discussed. Any other factors that could affect the sample results (e.g., air bubbles in VOC sample vials, excess headspace in soil VOC containers, the presence of multiple phases, sample temperature and sample pH excursions, container type or volume, etc.) shall be noted. The COE task order #, Project Name, Contract Laboratory Project Number (SDG) and Contract Laboratory Name will be included.

13.4.1.4 Analytical results. The results for each sample shall contain the following information at a minimum. (Information need not be repeated if noted elsewhere in the data package).

- Contract Laboratory name and location (city and state).
- Project name and unique ID number.
- Field sample ID number as written on custody form.
- Contract Laboratory sample ID number.
- Matrix (soil, water, oil, etc.).
- Sample description.
- Sample preservation or condition at receipt.
- Date sample collected.
- Date sample received.
- Date sample extracted or prepared.
- Date sample analyzed.
- Analysis time when holding time limit <48 hours.

- Method (and SOP) numbers for all preparation, cleanup, and analysis procedures employed.
- Preparation, analysis, and other batch numbers.
- Analyte or parameter.
- Method reporting limits adjusted for sample-specific factors (e.g., aliquot size, dilution/concentration factors, moisture content).
- Method reporting limits (low-level standard concentration).
- Method detection limits.
- Analytical results with correct number of significant figures.
- All confirmation data.
- Any data qualifiers assigned.
- Concentration units.
- Dilution factors. All reported data shall reflect any dilutions or concentrations. The dilution factor, if applicable, shall be noted on the analytical report. If neat and/or diluted results are available, data from all runs shall be recorded and reported.
- Percent moisture or percent solids (all soils, sediments, sludges, etc. are to be reported on a dry weight basis).
- Chromatograms, as needed.
- Sample aliquot analyzed.
- Final extract volume.

13.4.1.5 Laboratory reporting limits. The Contract Laboratory may use a reporting limit expressed in terms of detection limit, quantitation limit, regulatory action level, or project-specific threshold limits. However, the Contract Laboratory's use of these terms must be well defined.

13.4.1.6 Sample management records. These types of records include the documentation accompanying the samples (i.e., original chain-of-custody record, shipping documents, laboratory notification sheets), records generated by the Contract Laboratory that detail the condition of the samples upon receipt at the Contract Laboratory (i.e., sample cooler receipt forms, any telephone conversation records, etc.), and any records generated to document sample custody, transfer, analysis, and disposal.

13.4.1.7 QA/QC information. The minimum data package must include the calibration, calibration verification, and internal laboratory QA/QC data with their respective acceptance criteria. The data packages shall include all batch QC results, instrument QC results (e.g., initial calibration verification, continuing calibration verification, and instrument performance checks), MDL studies (on request), and raw data (e.g., run logs, sample preparation logs, standard preparation logs, and printed instrumental output such as chromatograms for fuel methods). The data package shall also include the Contract Laboratory's method quantitation and reporting limits for project-specific parameters. The calibration data shall include a summary of the ICV, all calibration verification standards, and any performance standards analyzed in conjunction with the test method. All calibration deviations shall be discussed within the case narrative. The data package shall correlate the method QC data with the corresponding environmental samples on a per-preparation batch basis with batch numbers clearly shown. Method QC data must include all spike target concentration levels; the measured spike concentration and calculated recoveries; all measures of precision, including relative percent difference; and all control limits for bias and precision. This would include laboratory performance

information such as results for MBs, recoveries for LCSs, and recoveries for QC sample surrogates; and matrix-specific information such as MD RPDs, MS and MSD recoveries, MS/MSD RPDs, field sample surrogate recoveries, SDs, and PDS, etc. At a minimum, internal QC samples shall be analyzed and reported at rates specified in the specific methods, within USACE guidance, or as specified in the contract, whichever is greater. Any deviations from the measurement quality objectives shall be noted. Also include any data review, nonconformance, or corrective action forms within the data package.

13.4.2 Performance-Based Data Package

The requirements for the performance-based data package are the same as those defined within the definitive data package with the addition of the following items: all appropriate project action level(s) and DQOs and appropriate preparatory and analysis logs.

13.4.3 Comprehensive Data Package

A comprehensive data package contains sufficient information to completely reconstruct the chemical analyses that were performed. Hence, comprehensive data packages include all batch QC results, instrument QC results (e.g., initial calibration verification, continuing calibration verification, and instrument performance checks), MDL studies, and raw data (e.g., run logs, sample preparation logs, standard preparation logs, and printed instrumental output such as chromatograms). Typically, comprehensive data packages are required if third-party data validation is to be performed. The data validation guidelines for performance-based methods established in other USACE guidance on data review and data validation, USEPA national functional guidelines, USEPA regional functional guidelines, and project-specific guidelines for validation may all have distinct reporting formats. The appropriate validation guidelines should be consulted to determine what type of data package is required.

13.4.3.1 Chemistry data package deliverable time schedule. A schedule for data delivery should be established so that data packages are provided as needed for chemical QA assessment. This includes identifying the anticipated number or frequency of these data packages in light of project objectives, i.e., the amount of data produced or project duration.

13.4.4 Electronic Data Deliverables

SEDD is the required electronic deliverable format (see section 3.5). It should be noted that the valid values and specific data elements required for each task order may vary depending on project-specific requirements.

TABLES

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TABLE 3-1: ANALYTICAL METHODS LISTING

ITEM NUMBER	DESCRIPTION	METHOD
0001	Organic Analyses	
0001AA	Halogenated/Aromatic Volatile Organics	EPA 602/8021
0001AB	PCBs in water and soil	EPA 608/8082
0001AC	Organochlorine Pesticides	EPA 608/8081
0001AD	Organophosphorus Pesticides	EPA 8141
0001AE	Chlorinated Herbicides	EPA 8151
0001AF	Volatile Organics	EPA 624/524.2/8260
0001AG	Volatile Organics + 10 TICs	EPA 624/8260
0001AH	Volatile Organics, low-level (full scan)	EPA 624/8260
0001AI	Pentachlorophenol	EPA 625/8270
0001AJ	Phenols	EPA 625/8270
0001AK	Semi-Volatile Organics (BNAs)	EPA 625/8270
0001AL	Semi-Volatile Organics (BNAs) + 20 TICs	EPA 625/8270
0001AM	Semi-Volatile Organics (BNAs), low-level (full scan)	EPA 625/8270
0001AN	Polynuclear Aromatic Hydrocarbons	EPA 625/8270
0001AO	Polynuclear Aromatic Hydrocarbons, low-level (full scan)	EPA 625/8270
0001AP	Dioxins / Furans	EPA 8290
0001AQ	Polynuclear Aromatic Hydrocarbons	EPA 8310
0001AR	Explosives	EPA 8330
0001AS	1,4-Dioxane	EPA 8260 (modified) or 8270 (modified)
0001AT	Perchlorate (LC/MS/MS)	EPA 8321A/331.0
0001AU	Perchlorate (IC)	EPA 314.0
0001AV	Tributyltin	Krone
0001AW	Tributyltin in pore water (includes extraction)	Krone
0001AX	EDB & EDC	EPA 504/8011
0001AY	Hydrocarbon Dissolved Gases	RSK 175

0002	Underground Storage Tank Analyses	
0002AA	Hydrocarbon Identification Method for Soil and Water	NWTPH-HCID
0002AB	Volatile Petroleum Products Method for Soil and Water Analyses	NWTPH-Gx
0002AC	Semivolatile Petroleum Products Method for Soil and Water Analyses	NWTPH-Dx
0002AD	Method for the Determination fo Volatile Petroleum Hydrocarbons (VPH) Fractions	VPH Fractions
0002AE	Method for the Determination of Extractable Petroleum Hydrocarbons (EPH) Fractions	EPH Fractions
0002AF	VOCs (benzene, ethyl benzene toluene, total xylenes, n-hexane, MTBE, EDB, EDC)	EPA 8260
0002AG	Naphthalenes	EPA 8260
0002AH	Oil and Grease (Gravimetric)	EPA 413.1
0002AI	Oil and Grease (IR)	EPA 413.2
0002AJ	Total Recoverable Petroleum Hydrocarbons	EPA 418.1
0002AK	Hexane Extractable Hydrocarbons	EPA 1664
0002AK	Total Lead	EPA 6010
0002AL	Wear Metals (cadmium, chromium, lead, nickel, zinc)	EPA 6010
0002AM	Carcinogenic PAHs	EPA 8270
0002AN	PCBs	EPA 8082
0003	Metals Packages	
0003AA	RCRA List as Total Metals: As, Ba, Cd, Cr, Pb, Se, Ag by ICP Hg by AA	EPA 6010 EPA 7470/7471
0003AB	EPA Priority Pollutant Metals in water: Ag, Be, Cr, Cu, Ni, Zn by ICP Sb, As, Cd, Pb, Se, Tl by ICP-MS Hg by AA	EPA 200.7/6010 EPA 200.8/6020 EPA 245.2/7470
0003AC	EPA Priority Pollutant Metals in soil or water: Ag, Be, Cr, Cu, Ni, Zn, Sb, As, Cd, Pb, Se, Tl Hg by AA	EPA 6010 EPA 7470/7471
0003AD	CLP Target Analyte List (TAL) Metals: Al, Ba, Be, Ca, Cr, Co, Cu, Fe, Mg Mn, Ni, K, Ag, Na, V, Zn, by ICP Sb, As, Cd, Pb, Se, Tl, by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471
0003AE	TCLP Metals (Extraction and Analysis) As, Ba, Cd, Cr, Pb, Ag, Se by ICP Hg by AA	EPA 6010A EPA 7470
0003AF	RCRA List to Meet MTCA Requirements: BA, Cr, Ag, Se by ICP AS, Cd, Pb by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471
0004	Spectrophotometry	

0004AA	Flame Atomic Absorption (FAA, full method list)	EPA 7000
0004AB	Graphite Furnace (GFAA, full method list)	EPA 7000
0004AC	Mercury, Cold Vapor AA (Including Prep)	EPA 7470/7471
0004AD	Chromium, Hexavalent (Including Prep)	EPA 7196
0005	Spectroscopy (ICP):	
Individual Metals by ICP...		
0005AA	Aluminum (Al)	EPA 6010
0005AB	Silver (Ag)	
0005AC	Arsenic (As)	
0005AD	Boron (B)	
0005AE	Barium (Ba)	
0005AF	Beryllium (Be)	
0005AG	Calcium (Ca)	
0005AH	Cadmium (Cd)	
0005AI	Cobalt (Co)	
0005AJ	Chromium (Cu)	
0005AK	Copper (Cu)	
0005AL	Iron (Fe)	
0005AM	Potassium (K)	
0005AN	Magnesium (Mg)	
0005AO	Manganese (Mn)	
0005AP	Molybdenum (Mo)	
0005AQ	Sodium (Na)	
0005AR	Nickel (Ni)	
0005AS	Lead (Pb)	
0005AT	Antimony (Sb)	
0005AU	Selenium (Se)	
0005AV	Tin (Sn)	
0005AW	Titanium (Ti)	
0005AX	Thallium (Tl)	
0005AY	Vanadium (V)	
0005AZ	Zinc (Zn)	

0006	Spectroscopy (ICP):	
Individual Metals by ICP-MS...		
0006AA	Aluminum (Al)	EPA 6020
0006AB	Silver (Ag)	
0006AC	Arsenic (As)	
0006AD	Boron (B)	
0006AE	Barium (Ba)	
0006AF	Beryllium (Be)	
0006AG	Calcium (Ca)	
0006AH	Cadmium (Cd)	
0006AI	Cobalt (Co)	
0006AJ	Chromium (Cu)	
0006AK	Copper (Cu)	
0006AL	Iron (Fe)	
0006AM	Potassium (K)	
0006AN	Magnesium (Mg)	
0006AO	Manganese (Mn)	
0006AP	Molybdenum (Mo)	
0006AQ	Sodium (Na)	
0006AR	Nickel (Ni)	
0006AS	Lead (Pb)	
0006AT	Antimony (Sb)	
0006AU	Selenium (Se)	
0006AV	Tin (Sn)	
0006AW	Titanium (Ti)	
0006AX	Thallium (Tl)	
0006AY	Vanadium (V)	
0006AZ	Zinc (Zn)	

0007	General Chemistry	
0007AA	Biochemical Oxygen Demand	EPA 405.1
0007AB	Bromide	EPA 320.1/300.0
0007AC	Carbonate	EPA 310.1/310.2
0007AD	Chemical Oxygen Demand	EPA 410.1/410.4
0007AE	Chloride	EPA 325.2/300.0
0007AF	Chlorine - Residual	EPA 330.5
0007AG	Conductivity	EPA 120.1
0007AH	Corrosivity to Steel	EPA 1110
0007AI	Cyanide - Total	EPA 335.3
0007AJ	Cyanide - Amenable	EPA 335.3
0007AK	Flashpoint	EPA 1010/1021
0007AL	Fluoride	EPA 340.2/300.0
0007AM	Hardness - Total	EPA 130.2/130.1
0007AN	Hardness - Ca and Mg	SM2340B
0007AO	Major Anions (full method list)	EPA 300 Series
0007AP	Major Cations (Na, K, Ca, and Mg for aqueous samples or Na, K, Ca, Mg, Fe, Mn, and Al for soil samples)	EPA 6010/7000
0007AQ	Moisture	EPA CLP
0007AR	Nitrogen - Nitrate	EPA 353.2/300.0
0007AS	Nitrogen - Nitrite	EPA 354.1/353.2/300.0
0007AT	Nitrogen - Nitrate and Nitrite	EPA 353.2/300.0
0007AU	Nitrogen - Total Kjeldahl	EPA 351.3/351.4
0007AV	Paint Filter Liquids Test	EPA 9096
0007AW	pH	EPA 9040/9045/150.1
0007AX	Phenolic Compounds	EPA 420.1/420.2
0007AY	Phosphate - Ortho	EPA 365.2/365.1/300.0
0007AZ	Phosphate - Total	EPA 365.4
0007BA	Salinity	SM252D
0007BB	Silicon Dioxide (Silica)	EPA 270.1
0007BC	Solids - Dissolved	EPA 160.1
0007BD	Solids - Suspended	EPA 160.2
0007BE	Solids - total	EPA 160.3
0007BF	Solids - Settleable	EPA 160.5
0007BG	Specify Gravity	ASTM D854/SM2710F
0007BH	Sulfate	EPA 374.2/300.0

0007BI	Sulfide	EPA 376.2
0007BJ	Sulfite	EPA 377.1
0008	PSDDA and Marine Sediment Parameters	
0008AA	Grain Size Distribution	ASTM D422
0008AB	Nitrogen - Ammonia	EPA 350.1/350.2
0008AC	Metals: Cu, Zn by ICP As, Cd, Cr, Pb, Ag by ICP-MS Hg by AA	EPA 6010 EPA 6020 EPA 7470/7471
0008AD	Solids - Volatile	EPA 160.4
0008AE	Semivolatile Organics: Phthalate Esters, LPAHs, HPAHs, Phenols, Chlorinated benzenes, Misc. Compounds	EPA 8270
0008AF	PCBs	EPA 8081
0008AG	Tributyltin (water or sediment)	Krone (GC-MS)
0008AH	Tributyltin in pore water (includes extraction)	Krone (GC-MS)
0009	General Chemistry	
0009AA	Surfactant Test (MBAS)	EPA 425.1
0009AB	Temperature	EPA 170.1
0009AC	TOC	EPA 9060
0009AD	TOX	EPA 9020
0009AE	Turbidity	EPA 180.1
0010	Misc	
0010AA	Methanol kit for 5035	EPA 5035
0010AB	NaHSO ₄ kit for low-level volatiles	EPA 5035
0011	Hourly Services	
0011AA	Identification of unknowns, etc.	
0012	Data Deliverables	
N/A	Definitive (hard copy), Adobe, SEDD (2A or 2B) - Include in base analysis cost.	N/A
0012AB	Comprehensive (hard copy), Adobe, SEDD (2A or 2B)	
0013	Cost Multiplier for Miscellaneous Expedited Sample Analysis	
013AA	24 hour	
0013AB	48 hour	
0013AC	72 hour	
0013AD	7 day	
0013AE	14 day	
0013AF	21 days = Standard turn-around-time (Include in bases analysis cost).	

Note: Unless otherwise specified in a task order, project-specific Matrix Spike (MS)/Matrix Spike Duplicate (MSD) are required. The cost of MS/MD shall be included as part of the base analysis cost.

TABLE 3-2: TARGET COMPOUND LIST	
METHOD 8021 – VOLATILE AROMATIC COMPOUNDS	
Target Compound	CAS Registry No.
Benzene ^{2,3}	71-43-2
Bromobenzene ¹	108-86-1
Bromochloromethane	74-97-5
Bromodichloromethane ¹	75-27-4
Bromoform ¹	75-25-2
Bromomethane ^{1,5}	74-83-9
n-Butylbenzene	104-51-8
sec-Butylbenzene	135-98-8
tert-Butylbenzene	98-06-6
Carbon tetrachloride ¹	56-23-5
Chlorobenzene ^{1,2}	108-90-7
Chloroethane ^{1,5}	75-00-3
Chloroform ¹	67-66-3
Chloromethane ^{1,5}	74-87-3
2-Chlorotoluene	95-49-8
4-Chlorotoluene	106-43-4
Dibromochloromethane ¹	124-48-1
1,2-Dibromo-3-chloropropane ⁴	96-12-8
1,2-Dibromoethane	106-93-4
Dibromomethane ¹	74-95-3
1,2-Dichlorobenzene ^{1,2}	95-50-1
1,3-Dichlorobenzene ^{1,2}	541-73-1
1,4-Dichlorobenzene ^{1,2}	106-46-7
Dichlorodifluoromethane ^{1,5}	75-71-8
1,1-Dichloroethane ¹	75-34-3
1,2-Dichloroethane ¹	107-06-2
1,1-Dichloroethene ¹	75-35-4
cis-1,2-Dichloroethene	156-59-2
trans-1,2-Dichloroethene ¹	156-60-5
1,2-Dichloropropane ¹	78-87-5
1,3-Dichloropropane	142-28-9
2,2-Dichloropropane	594-20-7
1,1-Dichloropropene	563-58-6
cis-1,3-Dichloropropene ¹	10061-01-5
trans-1,3-Dichloropropene ¹	10061-02-6
Ethyl Benzene ^{2,3}	100-41-4

TABLE 3-2: TARGET COMPOUND LIST	
Hexachlorobutadiene	87-68-3
Isopropylbenzene (Cumene)	98-82-8
p-Isopropyltoluene (p-Cumene)	99-87-6
Methylene chloride ¹	75-09-2
Naphthalene	91-20-3
n-Propylbenzene	103-65-1
Styrene	100-42-5
1,1,1,2-Tetrachloroethane ¹	630-20-6
1,1,2,2-Tetrachloroethane ¹	79-34-5
Tetrachloroethene ¹	127-18-4
Toluene ^{2,3}	108-88-3
1,2,3-Trichlorobenzene	87-61-6
1,2,4-Trichlorobenzene	120-82-1
1,1,1-Trichloroethane ¹	71-55-6
1,1,2-Trichloroethane ¹	79-00-5
Trichloroethene (trichloroethylene) ¹	79-01-6
Trichlorofluoromethane ^{1,5}	75-69-4
1,2,3-Trichloropropane ¹	96-18-4
1,2,4-Trimethylbenzene	95-63-6
1,3,5-Trimethylbenzene	108-67-8
Vinyl chloride ^{1,5}	75-01-4
o-Xylene ^{2,3}	95-47-6
m-Xylene ^{2,3}	108-38-3
p-Xylene ^{2,3}	106-42-3
METHOD 8081 ORGANOCHLORINE PESTICIDES	
Aldrin	309-00-2
Alpha-BHC	319-84-6
Beta-BHC	319-85-7
Gamma-BHC (Lindane)	58-89-9
Delta-BHC	319-86-8
Alpha-Chlordane	5103-71-9
Gamma-Chlordane	5103-74-2
4,4'-DDD	72-54-8
4,4'-DDE	72-55-9
4,4'-DDT	50-29-3
Dieldrin	60-57-1
Endosulfan I	959-98-8
Endosulfan II	33213-65-9

TABLE 3-2: TARGET COMPOUND LIST	
Endosulfan sulfate	1031-07-8
Endrin	72-20-8
Endrin aldehyde	7421-93-4
Endrin ketone	53494-70-5
Heptachlor	76-44-8
Heptachlor epoxide	1024-57-3
Methoxychlor	72-43-5
Toxaphene	8001-35-2
METHOD 8082 PCBS AS AROCLORS	
Aroclor-1016	12674-11-2
Aroclor-1221	11104-28-2
Aroclor-1232	11141-16-5
Aroclor-1242	53469-21-9
Aroclor-1248	12672-29-6
Aroclor-1254	11097-69-1
Aroclor-1260	11096-82-5
METHOD 8082 PCB CONGENERS	
2-Chlorobiphenyl	2051-60-7
2,3-Dichlorobiphenyl	16605-91-7
2,2',5-Trichlorobiphenyl	37680-65-2
2,4',5-Trichlorobiphenyl	16606-02-3
2,2',3,5'-Tetrachlorobiphenyl	41464-39-5
2,2',5,5'-Tetrachlorobiphenyl	35693-99-3
2,3',4,4'-Tetrachlorobiphenyl	32598-10-0
2,2',3,4,5'-Pentachlorobiphenyl	38380-02-8
2,2',4,5,5'-Pentachlorobiphenyl	37680-73-2
2,3,3',4',6-Pentachlorobiphenyl	38380-03-9
2,2',3,4,4',5'-Hexachlorobiphenyl	35065-28-2
2,2',3,4,5,5'-Hexachlorobiphenyl	52712-04-6
2,2',3,5,5',6-Hexachlorobiphenyl	52663-63-5
2,2',4,4',5,5'-Hexachlorobiphenyl	35065-27-1
2,2',3,3',4,4',5-Heptachlorobiphenyl	35065-30-6
2,2',3,4,4',5, 5'-Heptachlorobiphenyl	35065-29-3
2,2',3,4,4',5',6-Heptachlorobiphenyl	52663-69-1
2,2',3,4',5,5',6-Heptachlorobiphenyl	52663-68-0
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	40186-72-9

METHOD 8260 VOLATILE ORGANIC COMPOUNDS	
Acetone ¹	67-64-1
Benzene	71-43-2
Bromobenzene	108-86-1
Bromochloromethane	74-97-5
Bromodichloromethane	75-27-4
Bromoform	75-25-2
Bromomethane ¹	74-83-9
2-Butanone (methyl ethyl ketone) ¹	78-93-3
n-Butylbenzene	104-51-8
sec-Butylbenzene	135-98-8
tert-Butylbenzene	98-06-6
Carbon disulfide ¹	75-15-0
Carbon tetrachloride	56-23-5
Chlorobenzene	108-90-7
Chloroethane ¹	75-00-3
Chloroform	67-66-3
Chloromethane ¹	74-87-3
2-Chlorotoluene	95-49-8
4-Chlorotoluene	106-43-4
Dibromochloromethane	124-48-1
1,2-Dibromo -3-chloropropane ¹	96-12-8
1,2-Dibromoethane	106-93-4
Dibromomethane	74-95-3
1,2-Dichlorobenzene	95-50-1
1,3-Dichlorobenzene	541-73-1
1,4-Dichlorobenzene	106-46-7
Dichlorodifluoromethane ¹	75-71-8
1,1-Dichloroethane	75-34-3
1,2-Dichloroethane	107-06-2
1,1-Dichloroethene	75-35-4
cis-1,2-Dichloroethene	156-59-2
trans-1,2-Dichloroethene	156-60-5
1,2-Dichloropropane	78-87-5
1,3-Dichloropropane	142-28-9
2,2-Dichloropropane	594-20-7
1,1-Dichloropropene	563-58-6
cis-1,3-Dichloropropene	10061-01-5

trans-1,3-Dichloropropene	10061-02-6
Ethyl Benzene	100-41-4
Hexachlorobutadiene	87-68-3
2-Hexanone ¹	591-78-6
Iodomethane	74-88-4
Isopropylbenzene (Cumene)	98-82-8
p-Isopropyltoluene (p-Cumene)	99-87-6
Methylene chloride	75-09-2
4-Methyl-2-pentanone ¹	108-10-1
Naphthalene	91-20-3
n-Propylbenzene	103-65-1
Styrene	100-42-5
1,1,1,2-Tetrachloroethane	630-20-6
1,1,2,2-Tetrachloroethane	79-34-5
Tetrachloroethene	127-18-4
Toluene	108-88-3
1,2,3-Trichlorobenzene	87-61-6
1,2,4-Trichlorobenzene	120-82-1
1,1,1-Trichloroethane	71-55-6
1,1,2-Trichloroethane	79-00-5
Trichloroethene (trichloroethylene)	79-01-6
Trichlorofluoromethane ¹	75-69-4
1,2,3-Trichloropropane	96-18-4
1,2,4-Trimethylbenzene	95-63-6
1,3,5-Trimethylbenzene	108-67-8
Vinyl chloride ^{1,2}	75-01-4
o-Xylene	95-47-6
m-Xylene	108-38-3
p-Xylene	106-42-3
METHOD 8270 FORBASE/NEUTRAL FRACTION COMPOUNDS	
Acenaphthene	83-32-9
Acenaphthylene	208-96-8
Acetophenone	98-86-2
Aniline ¹	62-53-3
Anthracene	120-12-7
Benzidine ¹	92-87-5
Benzo(a)anthracene	56-55-3
Benzo(b)fluoranthene	205-99-2
Benzo(k)fluoranthene	207-08-9

Benzo(g,h,i)perylene	191-24-2
Benzo(a)pyrene	50-32-8
Benzyl alcohol ¹	100-51-6
4-Bromophenyl phenyl ether	101-55-3
Butyl benzyl phthalate	85-68-7
4-Chloroaniline ¹	106-47-8
bis(2-Chloroethoxy)methane	111-91-1
bis(2-Chloroethyl) ether	111-44-4
bis(2-Chloroisopropyl) ether	108-60-1
2-Chloronaphthalene	91-58-7
4-Chlorophenyl phenyl ether	7005-72-3
Chrysene	218-01-9
Dibenz(a,h)anthracene	53-70-3
Dibenzofuran	132-64-9
Di-n-butyl phthalate	84-74-2
1,2-Dichlorobenzene	95-50-1
1,3-Dichlorobenzene	541-73-1
1,4-Dichlorobenzene	106-46-7
3,3'-Dichlorobenzidine	91-94-1
Diethyl phthalate ¹	84-66-2
Dimethyl phthalate	131-11-3
2,4-Dinitrotoluene	121-14-2
2,6-Dinitrotoluene	606-20-2
Di-n-octyl phthalate	117-84-0
Diphenyl amine	122-39-4
1,2-Diphenylhydrazine	122-66-7
bis(2-Ethylhexyl) phthalate	117-81-7
Fluoranthene	206-44-0
Fluorene	86-73-7
Hexachlorobenzene	118-74-1
Hexachlorobutadiene	87-68-3
Hexachlorocyclopentadiene ¹	77-47-4
Hexachloroethane	67-72-1
Hexachloropropene	1888-71-7
Indeno(1,2,3-cd)pyrene	193-39-5
Isophorone	78-59-1
2-Methylnaphthalene	91-57-6
Naphthalene	91-20-3
2-Naphthylamine	91-59-8

2-Nitroaniline ¹	88-74-4
3-Nitroaniline ¹	99-09-2
4-Nitroaniline ¹	100-01-6
Nitrobenzene	98-95-3
N-Nitroso-dimethylamine ¹	62-75-9
N-Nitrosodiphenylamine ^{1,2}	86-30-6
N-Nitroso-di-n-propylamine	621-64-7
N-Nitrosopyrrolidine	930-55-2
Phenanthrene	85-01-8
Pyrene	129-00-0
Pyridine	110-86-1
1,2,4,5-tetrachlorobenzene	95-94-3
1,2,4-Trichlorobenzene	120-82-1

ATTACHMENT 1

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Final Analytical Services Agreement

For

Analytical Laboratory, Inc.

Street Name

Seattle, WA #####

POC –Client manager name

Phone: ###-###-####

Fax: ###-###-####

e-mail: @@@@

Project Name: "HTRW Example Project"

Task Order: #####

Controlling Documents:

1 - "USACE Shell" (in EM 200-1-3, February 2001), for method performance, PQLs and corrective action criteria

<http://www.usace.army.mil/inet/usace-docs/eng-manuals/em200-1-3/toc.htm>

2 - "Analytical Methods for Petroleum Hydrocarbons", Publication No. ECY 97-602 (June 1997)

3 - "Project Name Quality Assurance Project Plan" (date)

Location: *Somewhere, WA*

PR&C Number: %####.

Approximate Sampling Dates: *day, month, year*

USACE Sampling Lead: *Sampler Name Phone: 206-764-xxxx FAX: 206-764-xxxx*

USACE Chemist: *Chemist Name Phone: 206-764-xxxx FAX: 206-764-xxxx*

Scope								
Analyte Name	Parameter		Sample Quantity (Matrix)	Lab	Deliverable (Preliminary:Final)	TAT (Preliminary:Final)	Unit Price	Quantity Price
	Extraction Method	Instrument Method						
GRO	NWTPH-Gx		0 to 12 (soil)	XYZ	RO:Summary	=48 hour: =14 calendar days	\$amount	\$amount
DRO (diesel, motor oil)	NWTPH -Dx		0 to 12 (soil)	XYZ	RO:Summary	=48 hour: =14 calendar days	\$amount	\$amount
VOC (BTEX, MTBE)	5330B	SW 8260B	0 to 12 (soil)	XYZ	RO:Summary	=48 hour: =14 calendar days	\$amount	\$amount
Total Organic Carbon	N/A	9060B	20-25 (water)	XYZ	RO:Summary ^a	=14 calendar days	\$amount	\$amount
PAHs	3550B	8270C	5-10 (water)	XYZ	RO:Comprehensive ^b	≤ 21 calendar days	\$amount	\$amount
PCBs	3550B	8082	0-12 (soil)	XYZ	RO:Comprehensive ^b	≤ 21 calendar days	\$amount	\$amount
RCRA metals	3050B	6010B/7000	1 (soil)	XYZ	RO: Comprehensive ^b	≤ 21 calendar days	\$amount	\$amount
TCLP	1311	6010B/7470A	1 (soil)	XYZ	RO: Comprehensive ^b	≤ 21 calendar days	\$amount	\$amount
Other Charges:								
							TOTAL = \$ amount(s)	

Key:

SW = EPA SW-846 Method (Update III)
RO = results only (preliminary Data)

Summary = "level III" data package
^a = SEDD 2A EDD

Lab Name = XYZ
^b = SEDD 2B EDD

Sampling Containers, Preservation and Hold-Time				
Analysis Name	Container	Required Sample Amount	Preservation	Hold -Time
NWTPH-Gx	3, 40 ml VOAs	Fill container	4 ±2°C	=14 calendar days
NWTPH-Dx (diesel, motor oil)	20oz glass jar with Teflon lined lid	Fill container	4 ±2°C	=14 calendar days
SW 8260 (BTEX, MTBE)	3, 40 ml VOA filled to top	Fill container	4 ±2°C HCL to pH <2	=14 calendar days
Total Organic Carbon	1, 500ml amber glass	Fill container	4 ±2°C, H ₂ SO ₄	=14 calendar days
PAHs	1, 1 Liter amber glass	Fill container	4 ±2°C	=21 calendar days
PCBs	1, 250 ml wide-mouth glass jar	Fill container	4 ±2°C	=21 calendar days
RCRA metals	1, 250 ml wide-mouth glass jar	Fill container	4 ±2°C	=21 calendar days
TCLP	1, 250 ml wide-mouth glass jar	Fill container	4 ±2°C	=21 calendar days
Temperature Blank	20 oz glass jar	Fill container	4 ±2°C	NA

Note: % Moisture aliquot will be taken from sample containers.

Sample Loading:

All samples will be delivered to the laboratory during normal business hours by Sampler or other USACE employee on or about day, month, year.

Other Requirements:

Sample containers, coolers, packaging material, chain-of-custodies, temperature blank and scoopula to be supplied by XYZ Lab x days in advance to *Sampler Name* at the NWS office.

Method Performance Notes:

- 1 - Project-specific MS/MSDs are required.
- 2 – Use Shell limits for method performance criteria where applicable. Apply laboratory limits when not provided in Shell.
- 3 - PQLs must meet MTCA A requirements.
- 4 - Corrective actions must be performed per the USACE Shell (see above).
- 5 – Report all results on a dry weight basis.

Deliverables and Invoicing:

- 1 - See the contract for final hardcopy deliverables format.
- 2 – Send preliminary results in PDF format via email to *Project Chemist*.
- 3 - Sample Receipt Forms + Chain-of-Custody – fax on receipt to 206-764-3706 (attention *Project Chemist*).
- 4 – Send all final deliverables (EDD and hard-copy) to *Project Chemist*.

Laboratory Qualifications:

The laboratory must hold a current USACE and State of Washington validation for the parameters of concern. Photocopies of applicable documentation should be delivered to the USACE project chemist in PDF format prior to the start of work.

Project Scope Approved By:

USACE Project Chemist

Project Chemist

Date

Laboratory Client Manager

Client Manager

Date

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PROPOSAL SUBMISSION AND EVALUATION

1. INTRODUCTION.

A. Invitation Your firm is invited to submit a proposal for the project entitled "**Analytical Laboratory Services for Environmental Sample Analysis in the states of Washington, Oregon, Idaho and Montana for the Seattle District, U. S. Army Corps of Engineers**". Contractors are required to prepare and submit proposals that will be evaluated in accordance with this section of the solicitation. This solicitation is issued as a Request For Proposal (RFP). Proposals will be evaluated based upon technical merit and cost. The Government intends to procure this service requirement on a competitive basis in accordance with the provisions set forth in this RFP, and make award on initial offers, without further discussions or additional information. Up to three Indefinite Delivery Indefinite Quantity Firm fixed-price contract will be awarded to the firm(s) submitting the proposal that: a) conforms to this request for proposals (RFP); b) is considered to offer the best value to the Government in terms of the evaluation factors, including price; and, c) is determined to be in the best interest of the Government. The award will result in a contract that consists of a Base plus four (4) Option Periods. It is very important to read all sections of this RFP prior to assembling your proposal, in order for you to submit a successful proposal.

B. Project Description The Analytical Services support for the U.S. Army Corps of Engineers, Seattle District, is for the chemical analysis of soil, air, soil vapor, dredge materials, treatment system process streams, sediment, sludge, ground water, surface water, and other environmental samples. These samples have typically been collected from various hazardous and toxic waste site cleanup projects. Others may typically be collected from various hazardous and toxic waste site cleanup projects. Others may be emergency operations samples for characterization of unknowns including chemical and biological agents. Chemical analysis and reporting services will be performed by the Contract Laboratory in support of the hazardous waste investigations, remediation programs, and emergency operations conducted by, or on behalf of the Seattle District (NWS). The purpose of this project is to enable the performance, under a single contract mechanism, of analytical services for various projects as needed. Individual task orders will be issued for each analytical services scope under this contract. Each task order will contain specific scope-related information such as number and type of analyses required, test method references, project deliverable requirements, project timing, applicable shipping information, etc. (Attachment 1). Upon receipt of a project scope of work, the contractor laboratory will develop and submit a cost estimate to the USACE point of contact. Following USACE approval of this cost estimate, a task order will be issued to the contract laboratory for the project work.

2. SUBMITTAL REQUIREMENTS.

A. General Requirements. Proposals shall be submitted in two parts: (a) technical proposal, and (b) price proposal. Each shall be submitted in a separate envelope or package with the type of proposal (i.e., technical or price) clearly printed on the outside of the envelope or package.

Proposals must set forth full, accurate, and complete information as required by this RFP. Absence of information will be deemed as if no support for that criterion was provided. Offerors submitting proposals should limit submission to data essential for evaluation of proposals so that a minimum of time and money is expended in preparing information required by the Request for Proposals (RFP). Data submitted must reflect the offeror's interpretation of criteria contained in the RFP. Proposals are to be on 8 ½ x 11-inch paper, to the maximum extent practicable, and submitted in standard letter (8½ x 11-inch) hardback loose-leaf binders. Contents of binders shall be tabbed and labeled to afford easy identification from the proposal Table of Contents. Pages shall be numbered consecutively. No material shall be incorporated by reference or reiteration of the RFP. Any such material will not be considered for evaluation. It shall be presented in a manner, which allows it to "STAND ALONE" without need for evaluators to reference other documents. Arrangements, layout plans, and notes may all be combined together on single sheets in order to simplify presentation, so long as clarity is maintained. Unnecessarily elaborate brochures or other presentation materials beyond those sufficient to present complete and effective responses are not desired and may be construed as an indication of the proposer's lack of cost-consciousness. Elaborate artwork, expensive paper and bindings, and expensive/extensive visual and other presentation aids are neither necessary nor wanted. Offeror's are encouraged to structure their proposal submission using guidelines presented in Paragraph B below, of this Section. However, to minimize effort expended by the Offeror's, other formats will be accepted so long as requested information is provided. Penalty for making false statements in proposals is prescribed in 18 U.S.C. 1001.

B. Technical Proposal Format. Submit 5 copies, consisting of the **original and 4 copies.** As a minimum, each copy of the technical proposal should follow the general format specified below. Pages should be numbered from beginning to end, without repeating for new sections.

1. **Cover Letter:** The Technical Proposal Cover Letter, including deviations and betterments, should be the first page of your technical proposal and must show the following:

- a. Solicitation number;
- b. Name, address, telephone and facsimile numbers of the Offeror, and electronic address, if available.
- c. Names, titles, telephone and facsimile numbers, and electronic addresses, if available, of persons authorized to negotiate on the Offeror's behalf with the Government in connection with this solicitation.
- d. Names, title, and signature of the person authorized to sign the proposal.
- e. A statement that the offer has an **acceptance period of 90 calendar days** from the date the offer is submitted.
- g. Deviations from the RFP: Offerors shall specifically identify, in their cover letter in a section entitled "Deviations", all deviations from the minimum RFP requirements, and if required to submit a Final Proposal Revision, all changes made to their original proposal. All

alternates shall be specifically addressed and expanded upon in the proposal or Final Proposal Revision. Deviations must not result in an Offeror's proposal that does not meet minimum RFP criteria. .

h. Identification of Items Exceeding RFP Requirements: Offeror's should specifically identify in an attachment to their cover letter a list entitled "Identification of Items Exceeding RFP Requirements" all items that exceed the minimum RFP requirements and, if required to submit a Final Proposal Revision, all changes made to their original proposal that exceed RFP minimum requirements. All of these items should be specifically addressed and expanded upon in the proposal or Final Proposal Revision.

i. Amendments: **Acknowledge all amendments** by number and date of issue **in your cover letter**. NOTE: If discussions are held, acknowledge all amendments issued on the cover letter submitted with your revised proposals or final proposal revisions.

2. **Table of Contents:** List all sections contained in the technical proposal. A separate section shall be provided for each evaluation criterion. Any additions or revisions to the proposal shall include an updated Table of Contents for each set.

3. **Technical Data:** Consisting of outline specifications and supporting data shall be furnished as part of the formal proposal and shall meet all requirements of the RFP, technical specifications and referenced regulations. It shall be specific and complete, and demonstrate thorough understanding of the requirements. It shall include, where applicable, complete explanations of procedures and the program you propose to follow. Additionally, it shall demonstrate the merit of the technical approach offered and shall be an orderly, specific, and complete document in every detail, and should demonstrate a thorough understanding of the requirement. It should include, where applicable, diagrams, charts, ;and complete explanations of the schedules or procedures you propose to follow.

C. Price Proposal Format. The contents of your price proposal should include the Pricing Schedule with prices for all line items (original). To include, completion and submission of Section K, Representations, Certifications and Other Statements of Offerors, acknowledgement of all amendments, Standard Form (SF) 33, Solicitation, Offer & Award, and the Corporate Certificate located at the beginning of the solicitation. Ensure that the SF 33 is signed by an official authorized to bind for your firm.

3. EVALUATION FACTORS – Proposals will be evaluated on the basis of two criteria: **TECHNICAL** and **PRICE**.

A. Technical Evaluation Criteria:

1. Organization Experience/Technical Capability with Similar Services;
2. Quality of Management Approach;
3. Past Performance.

B. Price: Price will be evaluated for reasonableness, but not rated. Price will be a factor in establishing the competitive range prior to discussions and in making the final determination for award.

4. TECHNICAL MERIT RATINGS. Proposals will be evaluated using the following adjectival descriptions below. Evaluators will apply the appropriate adjective to each criterion (and sub-criterion) rated. The evaluator's narrative explanation must clearly establish that the Offeror's proposal meets the definitions established below:

A. Outstanding – Information submitted demonstrates Offeror’s potential to significantly exceed performance or capability standards. The Offeror has clearly demonstrated an understanding of all aspects of the requirements to the extent that timeliness and highest quality performance is anticipated. Demonstrates exceptional strengths that will significantly benefit the Government. The Offeror's qualifications meet the fullest expectations of the Government. The Offeror has convincingly demonstrated that the RFP requirements have been analyzed, evaluated, and synthesized into approaches, plans and techniques that, when implemented, should result in outstanding, effective, efficient, and economical performance under the Contract. An assigned rating within "Outstanding" indicates that, in terms of the specific criterion (or sub-criterion), the submittal contains essentially no significant weaknesses, deficiencies or disadvantages; demonstrate the least level of risk. Very significantly exceeds most or all solicitation requirements. **Very high probability of success.**

B. Above Average – Information submitted demonstrates Offeror’s potential to exceed performance or capability standards. Have one or more strengths that will benefit the Government. The areas in which the Offeror exceeds the requirements are anticipated to result in a high level of efficiency or productivity or quality. The Offeror's qualifications are adequately responsive with minor deficiencies but no major deficiencies noted. An assigned rating within "Above Average" indicates that, in terms of the specific criterion (or sub-criterion), any deficiencies noted are of a minor nature that should not seriously affect the Offeror's performance. The submittal demonstrates that the requirements of the RFP are well understood and the approach will likely result in a high quality of performance which represents low risk to the Government. A rating within "Above Average" is used when there are no indications of exceptional features or innovations that could prove to be beneficial, or contrarily, weaknesses that could diminish the quality of the effort or increase the risks of failure. Disadvantages are minimal. The submittal contains excellent features that will likely produce results very beneficial to the Government. Fully meets all RFP requirements and significantly exceed many of the RFP requirements. Response exceeds a “Satisfactory” rating. **High probability of success.**

C. Satisfactory (Neutral) – Information submitted demonstrates Offeror’s potential to meet performance or capability standards. Acceptable solution. Meets minimum standard requirements. Few or no advantages or strengths. The Offeror's qualifications contain weaknesses in several areas that are not offset by strengths in other areas. A rating of "Satisfactory" indicates that, in terms of the specific criterion (or sub-criterion), the Offeror may satisfactorily complete the proposed tasks, but there is at least a moderate risk that s/he will not be successful. Equates to Neutral. Good probability of success as there is sufficient confidence that a fully compliant level of performance will be achieved. Meets all RFP requirements.

Complete and comprehensive proposal; exemplifies an understanding of the scope and depth of the task requirements and the Offeror's understanding of the Government's requirements. Response exceeds a "Marginal" rating. **No significant advantages or disadvantages.**

D. Marginal – Information submitted demonstrates the Offeror's potential to marginally meet performance or capability standards necessary for minimal but acceptable contract performance. The submittal is not adequately responsive or does not address the specific criterion (or sub-criterion). The Offeror's interpretation of the Government's requirements is so superficial, incomplete, vague, incompatible, incomprehensible, or incorrect as to be Unsatisfactory. The assignment of a rating within the bounds of "Marginal" indicates that the evaluator feels that mandatory corrective action would be required to prevent significant deficiencies from affecting the overall project. The Offeror's qualifications demonstrate an acceptable understanding of the requirements of the RFP and the approach will likely result in an adequate quality of performance, which represents a moderate level of risk to the Government. Low probability of success, although the submittal has a reasonable chance of becoming at least acceptable. Response exceeds an "Unsatisfactory" rating. **Significant disadvantages.**

E. Unsatisfactory – Fails to meet performance or capability standards. Unacceptable. Requirements can only be met with major changes to the submittal. The submittal does not meet the minimum requirements of the RFP. There is no reasonable expectation that acceptable performance would be achieved. Offeror's qualifications have many deficiencies and/or gross omissions; failure to provide a reasonable, logical approach to fulfilling much of the Government's requirements; failure to meet many of the minimum requirements. The Offeror's qualifications submittals are so unacceptable that they would have to be completely revised in order to attempt to make it other than unacceptable; demonstrates an unacceptable level of risk. **Very significant disadvantages.**

5. TECHNICAL PROPOSAL MINIMUM REQUIREMENTS AND EVALUATION METHOD:

A. ORGANIZATION EXPERIENCE/TECHNICAL CAPABILITY WITH SIMILAR SERVICES: *(Criterion A is Significantly More Important than Criterion B, Quality of Management Approach; Criterion B is Comparatively Equal to Criterion C, Past Performance. Sub-criterion 1 is Equally Important to Sub-criterion 2 and 3 under this Criterion.)*

DEFINITIONS:

LABORATORY PROJECT MANAGERS (PMs): Laboratory Project Manager(s) are responsible for ~~preparing the requirements are met~~ execution of analyses by the laboratory, and advising internal personnel and customers of variances. The PM will provide technical guidance and necessary laboratory related information to the lab personnel and to the client, and provide peer review of the final document to ensure accuracy of the information and data. ~~These individuals shall have a minimum of a Bachelor's degree in chemistry or any related scientific/engineering discipline. A minimum of three years of laboratory project management experience shall be required.~~

QUALITY MANAGER/LABORATORY QUALITY ASSURANCE OFFICER (QAO):

The Laboratory Quality Manager or Quality Control/Assurance (QC/QA) Manager Officer or similar will be responsible for overseeing the QC/QA aspects of the data and serve as the focal point for QA/QC. ~~This individual shall have a minimum of a Bachelor's degree in chemistry or any related scientific/engineering discipline. A minimum of three years of laboratory experience, including at least one year of applied experience with QC/QA principles and practices in an analytical laboratory, shall be required.~~

INFORMATION MANAGEMENT (IM) SPECIALIST: The -IM Specialist responsibilities shall include oversight of the Laboratory Information Management System (LIMS) and generation of EDDs. This individual shall also be responsible for performing checks of the EDD and resolving all discrepancies prior to delivery.

REPORTING LIMITS AND METHOD DETECTION LIMIT STUDIES:

The proposed analytical laboratory must provide reporting and detection limits for the analytical parameters to be used in this contract as part of the proposal. The detection and reporting limits should be consistent with the best currently available technology and instrumentation in the industry using the test methods. If lower detection limits are available for certain parameters by using extra sample volume (for example using 25-mL purge sample rather than 5-mL purge sample for aqueous VOCs), or other adjustment, this should be noted.

USACE typically uses federal and state regulations from states where NWS typically performs work in, such as Washington, Oregon, Idaho and Montana. Depending on the project, one or more of the following types of federal or state criteria listed below are employed:

- MTCA
- Federal/State drinking water standards
- Groundwater and surface water quality standards
- TCLP criteria
- Residential or non-residential soil cleanup standards
- Sediment quality standards

Applicable regulatory criteria vary depending on the task order. USACE typically will supply these criteria in the task order scope and require that the reporting/detection limits are capable of meeting these applicable criteria.

The laboratory must also submit the most recent method detection limit (MDL) studies and Method Quantitation Limits (MQLs) for all analyses list in Tables 3-1 and 3-2.

Sub-criterion 1: Organizational Chart and Key Personnel

a. Organizational Chart: Offerors shall provide an organizational chart clearly showing the Laboratory Staff, as the personnel who will be utilized in the project's required services

in accordance with the Statement of Work; and their responsibilities for this project. The Organizational Chart for the proposed Laboratory Analysis Team shall include sufficient personnel with appropriate education, current training and experience to fulfill their assigned duties, stated in the Statement of Work, paragraph 4.3.

b. Laboratory Project Manager (PM): The Laboratory Project Manager shall have a minimum of a Bachelor's degree in chemistry or any related scientific/engineering discipline; must have a minimum of three years laboratory project management experience, and a minimum of three projects that demonstrates relevant laboratory experience within the last three years on projects similar to the proposed responsibilities for this project.

c. Laboratory Quality Assurance -Officer (QAO): The ~~Q~~-QAO shall have a minimum of a Bachelor's degree in chemistry or any related scientific/engineering discipline; and a minimum of three projects that demonstrates relevant laboratory experience and at least one year of applied experience within the last three years with Quality Control principles and practices in an analytical laboratory.

d. Information Management (IM) Specialist – The IM Specialist must have a minimum of three years in laboratory information systems (LIMS) management, and a minimum of three projects that demonstrates relevant laboratory information systems management within the last three years on projects similar to the proposed responsibilities for this project. Experience must include: 1) The ability to generate a well-formed SEDD XML file and validate it against DTDs or schemas that will be provided; 2) Skill in interfacing instrument systems with LIMS. The IM specialist is also required to perform checks of the EDD for contract compliance and resolve all discrepancies prior to delivering the EDD to the Corps at the required turn-around-time.

SUBMITTAL REQUIREMENTS :

a. In addition to resumes for the above personnel, Offerors shall submit resumes for the Organics, Inorganics and Wet Chemistry Group Leaders as well as the ~~Quality Assurance Manager~~Laboratory Quality Assurance Officer on typical sample analysis projects (see Section 4.3). The proposal should clearly present the credentials of each person. It is important that each resume include the relevant project experience mentioned in the previous criterion, above. Include all relevant educational qualifications. Resume should be no more than two (2) pages per individual and submitted in a format similar to the one below. It is expected that each key individual in your proposal will be the individual who performs work under this potential contract. Because selection will be partly based on this criterion, the Government reserves the right to approve substitutions in personnel during the contract period.

b. Summary of the Duties and Responsibilities of Key Personnel. In addition to the resumes, the Offeror shall provide a summary of the duties and responsibilities of these individuals. As a minimum, this sub-factor should include data on the following Resume Format:

Name/Title of Project:

1. Summary of the Duties/Responsibilities for this project;
2. Firm Affiliation/Years Affiliated.

Years of Experience (performing duties/functions as proposed for this project):

1. Education (Degree, Year, and Specialization);
2. Active Registrations/Professional/Technical Licenses/Certifications;
3. Specific Qualifications for this project, (see criterion for any special instructions such as a minimum number of projects to list).

List of Relevant Experience, for each project listed, provide :

1. Project Title and Location;
2. Year(s) of experience;
3. Firm Affiliated with during this project;
4. Name of Employing Firm;
5. Duties/Functions (address how this relates to role for solicitation project);
6. Brief Description of Project (address how this relates to solicitation project).

EVALUATION METHOD: The Organizational chart will be evaluated for functionality, completeness and reasonableness and the degree to which the offeror demonstrates an understanding of the aspects required for successfully accomplishing the services described in the solicitation. ~~The more recent experience, and the greater the extent and relevance, of the team members' qualifications, and prior project experience, the higher the rating assigned for this criterion during evaluations~~ Rating will be based on the degree of technical relevance and team member qualifications.

Sub-criterion 2: Reporting and Detection Limits for the Analytical Parameters

Offerors shall demonstrate the organization's capability ~~that has relevant experience~~ to perform the analytical services in accordance with the Statement of Work, by providing a the most current MDLs and MQLs for the analytical parameters listed on the bid schedule. ~~The offeror shall explain how the project information provided is relevant to the proposed acquisition.~~

SUBMITTAL REQUIREMENTS:

~~a. Types of Work Experience Required: Specifically experienced and regularly engaging in the analytical services in accordance with the Statement of Work.~~

~~b. Minimum Project Information:~~

- ~~1. Project title & Location;~~
- ~~2. Dollar value of project;~~
- ~~3. Performance Period (month/year start to month/year end);~~

~~4. Brief Description of the laboratory analysis that meets the requirements of this criterion (explicitly state type of analysis, materials utilized and complexity and special conditions related to the reporting and detection limits required in this criterion.~~

~~5. Current Primary POC for the customer (name, relationship to project, agency/firm affiliation, city and state, phone number);~~

~~6. The firms on the proposed teams that performed this project; and~~

~~7. Work plan used that will demonstrate sufficient detail on how the services of the described analysis compare in complexity to the requirements in this project.~~

~~a. The laboratory shall submit current MDLs and MQLs for all analyses listed on the bid schedule.~~

~~b. The laboratory shall submit a complete raw data package for 8260B and 8330 MDL studies which includes calibration data.~~

EVALUATION METHOD: This criterion will be evaluated against the requirements of the respective methods, the USACE Shell (I3.3.7.1 and I3.3.7.2) and 40 CFR 136 Appendix B. Calibration shall be evaluated against EPA Method 8000C and the USACE Shell (I.9). MQLs will be compared to the values listed in Washington State Department of Ecology Model Toxics Control Act (Chapter 173-340 WAC), the Federal MCLs and EPA Region IX PRGs. MQL which are lower than the respective regulatory level will be rated higher than those which are at or above the regulatory level. for the quantity and quality of experience demonstrated. The greater the relevance and the more recent the prior project experience, the higher the rating assigned during evaluations. Demonstration of experience in completing projects that had the unique characteristics of the proposed project will be evaluated favorably. Projects involving reasonable and realistic Work Plan similar to the one specified in the Statement of Work of the solicitation may be given more consideration.

Sub-criterion 3: Availability of Results from Laboratory Information Management System:

The laboratory must indicate whether it is capable of providing data results in electronic format directly from a Laboratory Information Management System (LIMS) as opposed to manual entry. A list will be provided as part of the proposal that describes parameters for which data results can be generated from the LIMS, as well as parameters for which data results cannot be generated from the LIMS (i.e., manual entry is required).

The laboratory must indicate whether it is capable of using a Laboratory Information Management System (LIMS) to track the status of samples throughout the entire operation sequence of sample handling, analysis, and reporting by the lab. Specifically, the lab should provide a description of how the LIMS is used to control the following major functions:

- Sample receipt and login
- Sample scheduling
- Data acquisition
- Data processing and data approval
- Quality Control data processing
- Final reporting
- Electronic deliverables

SUBMITTAL REQUIREMENTS:

The offeror must submit relevant experience in demonstrating the extent of human manipulation required in each of the above functions, and demonstrate their capability of providing data results in electronic format directly from the LIMS, for a minimum of three years with three projects that demonstrates the relevant experience.

EVALUATION METHOD: The more recent experience, and the greater the extent and relevance, of this offeror's relevant experience, the higher the rating assigned for this criterion during evaluations.

B. QUALITY OF MANAGEMENT APPROACH: *(Criterion B is Comparatively Equal to Criterion C, Past Performance; and Criterion A is Significantly More Important than Criterion B and C. All Sub-criteria are Equally Important under this Criterion.)*

1. Internet Access: The offeror must demonstrate their capability of providing access to data electronically and provide a summary description and information regarding any internet access capabilities that are available to USACE immediately; to include, maintaining and retaining the information for five (5) years following date of analyses. If external data validation is potentially required for any samples analyzed during this 5-year period, USACE will specify the comprehensive (fully data validatable) data package in the task order. The electronic format must have the following specific information:

- Sample status information
- Access to chain of custody forms
- Timely access to analytical results
- Access to historical data
- Generation of analytical reports
- Generation of electronic deliverables

2. Same-Day Courier Services: At a minimum, offeror must demonstrate successful completion of two projects requiring same-day delivery and/or pickup services. This demonstration shall be reflected in the Customer Survey form required in Criterion C, Past Performance.

3. Quality Control Manual: The offeror must provide a Quality Control (QC) Manual. The manual shall be in accordance with the National Environmental Laboratory Accreditation Conference (NELAC) Quality Systems requirements. The Manual must contain the following items:

- a. A quality policy statement, including objectives and commitments, by top management;
- b. The organization and management structure of the laboratory, its place in any parent organization and relevant organizational charts;

- c. The relationship between management, technical operations, support services and the quality system;
- d. Procedures to ensure that all records required under this contract are retained, as well as procedures for control and maintenance of documentation through a document control system which ensures that all standard operating procedures (SOPs), manuals, or documents clearly indicate the time period during which the procedure or document was in force;
- e. Job descriptions of key staff and reference to the job descriptions of other staff;
- f. Identification of the laboratory's approved signatories; at a minimum, the title page of the Quality Control Manual must have the signed and dated concurrence, (with appropriate titles) of all responsible parties including the Quality Manager(s), technical director(s), and the agent who is in charge of all laboratory activities such as the laboratory director or laboratory manager;
- g. The laboratory's procedures for achieving traceability of measurements;
- h. A list of all test methods under which the laboratory performs its accredited testing;
- i. Mechanisms for ensuring that the laboratory reviews all new work to ensure that it has the appropriate facilities and resources before commencing such work;
- j. Reference to the calibration and/or verification test procedures used;
- k. Procedures for handling submitted samples;
- l. Reference to the major equipment and reference measurement standards used as well as the facilities and services used by the laboratory in conducting tests;
- m. Reference to procedures for calibration, verification and maintenance of equipment;
- n. Reference to verification practices which may include inter-laboratory comparisons, proficiency testing programs, use of reference materials and internal quality control schemes;
- o. Procedures to be followed for feedback and corrective action whenever testing discrepancies are detected, or departures from documented policies and procedures occur;
- p. The laboratory management arrangements for exceptionally permitting departures from documented policies and procedures or from standard specifications;
- q. Procedures for dealing with complaints;

- r. Procedures for protecting confidentiality (including national security concerns), and proprietary rights;
- s. Procedures for audits and data review;
- t. Processes/procedures for establishing that personnel are adequately experienced in the duties they are expected to carry out and are receiving any needed training;
- u. Reference to procedures for reporting analytical results;
- v. A Table of Contents, and applicable lists of references and glossaries, and appendices.

SUBMITTAL REQUIREMENTS: Provide the proposed laboratory's plan to execute, schedule and control project progress and resources to ensure high quality material, methods, and maintainability. The offeror must demonstrate the capability to (1) provide adequate quantities and types of equipment units to accomplish the laboratory analysis within specified time periods and (2) coordinate and manage the work with an adequate team of individuals (i.e., team members).

Describe by written narrative your management approach to accomplish the work including a description of your quality control program. Discuss your capability and approach to (1) Review and complete the analysis for contract requirement; (2) Perform activities when requirements are submitted one after another; (3) Protect the samples for a clear analysis; (4) Conform to safety and housekeeping requirements; (5) Coordinate with the Government on delivery of analysis in emergent situations; (6) Coordinate and manage the work of team members.

EVALUATION METHOD: As a minimum, the offeror must demonstrate that the firm has sufficient equipment and personnel to execute the proposed plan. Better ratings will be assigned for technical completeness, specificity, and likelihood of success.

C. PAST PERFORMANCE: At a minimum, a list of references (minimum of five) shall be provided that will reflect the competency of the Laboratory Analysis program and effectiveness of the organization that was provided the reference. The projects may be completed or currently under execution (75% minimum completion). All project listed must have been executed or under execution within the past two years. A point of contact and telephone number, and dollar value for each job must be provided. A Customer Satisfaction Survey shall be submitted for each project (see attached Form).

Customer Satisfaction Survey – The reproducible Customer Satisfaction Survey form located at the end of this section will be used to provide information from your customers for the prime contractor regarding satisfaction, quality of work, and timely performance of the projects listed in the relevant experience examples. To be considered, your past customers (not the offeror) must complete the surveys and mail, hand-deliver, or fax directly to the Contracting Office, for receipt no later than the time and date the proposals are due. Customer Satisfaction Surveys

should only be provided for projects constructed by the prime, listed under relevant experience, and for which a CCAS System evaluation is not available. All Customer Satisfaction Surveys must be **submitted** to the Seattle District, Corps of Engineers **by the customer/agency** providing the information. Surveys submitted by the contractor will not be considered. Please ensure envelopes containing survey forms do not contain the offeror's return address. Offerors shall **submit a list** of all customers to whom Customer Satisfaction Surveys were provided, including current point of contact and phone number.

EVALUATION METHOD: The Government reserves the right to consider all aspects of an offeror's performance history. The Government may also contact previous customers as references, and will use Customer Satisfaction Surveys received from customers. Past performance for projects listed under relevant experience will be evaluated first and higher evaluation ratings will be given for relevant projects with outstanding evaluations. In descending order, lower ratings may be given to evaluations of Above Average, Average, Marginal, and Unacceptable rating for projects that have no relevance or connection to the scope of work anticipated under this contract. The Government may initiate exchanges with an offeror to clarify adverse past performance information when the Offeror has not previously had an opportunity to comment on the evaluation. The Government reserves the right to contact the evaluators of the Customer Satisfaction Surveys submitted. The Government also reserves the right, but is not obligated, to query any Government agencies, databases, and publications for information such as performance evaluations, debarment, terminations, and litigation for evaluation purposes. Firms without any evaluations will be assigned a neutral rating of satisfactory.

6. EVALUATION AND AWARD PROCEDURES

A. **RELATIVE IMPORTANCE DEFINITIONS:** For the purpose of this evaluation, the following terms will be used to establish the relative importance of the criteria:

- **Significantly More Important:** The criterion is at least three (3) times greater in value than another criterion.
- **More Important:** The criterion is at least two (2) times greater in value than another criterion.
- **Comparatively Equal:** The criterion is at least one and one-half (1.5) times greater in value than another criterion.
- **Equal:** The criterion is of the same value as another criterion.

B. EVALUATION.

1) Technical proposals will be evaluated for conformance with the minimum RFP criteria, and for the extent to which they exceed those criteria. While the intent is to keep the offeror's pre-award proposal effort to a minimum, proposals must provide adequate detail for evaluators to determine how the offeror's proposal meets or exceeds the RFP criteria. It must also form sufficient basis for developing a fair and reasonable price proposal.

2) All technical proposals will be evaluated by a Technical Evaluation Team (TET). Pricing data will not be considered during this evaluation. Criteria for the technical evaluation are set forth elsewhere in the solicitation and will be the sole basis for determining the technical merit of proposals. Culmination of the technical evaluation will be assignment of a technical rating for each offer.

3) The TET will utilize the relative importance definitions and technical merit ratings described earlier in this section of the solicitation to perform their technical evaluation.

4) To be considered for award, proposals shall conform to the terms and conditions contained in the RFP. No proposal shall be accepted that does not address all criteria requested in this section of the solicitation or which includes stipulations or qualifying conditions unacceptable to the Government.

5) Price is of secondary importance and will be considered of lower importance than technical factors. Pricing will be independently evaluated to determine reasonableness and to aid in determination of the Offeror's understanding of the work and ability to perform the contract.

C. BEST VALUE ANALYSIS. The Government is more concerned with obtaining superior technical features than with making award at the lowest overall cost to the Government. In determining the best value to the Government, the tradeoff process of evaluation will be utilized. The tradeoff process permits tradeoffs among price and non-price factors, and allows the Government to consider award to other than the lowest priced offeror or other than the highest technically rated offeror. You are advised that greater consideration will be given to the evaluation of technical proposals rather than price. It is pointed out, however, that should technical competence between offerors be considered approximately the same, the cost or price could become more important in determining award.

7. SELECTION AND AWARD WITHOUT DISCUSSIONS

A. It is the intent of the Government to make award based upon initial offers, without further discussions or additional information. Therefore, proposals should be submitted initially on the most favorable terms from a price and technical standpoint. Do not assume you will be afforded the opportunity to clarify, discuss, or revise your proposal. If award is not made on initial offers, discussions will be conducted as described below.

B. Competitive Range. After initial evaluation of proposals, if the Contracting Officer determines that discussions are to be conducted, the Contracting Officer will establish a competitive range comprised of all of the most highly rated proposals, unless the range is further reduced for purposes of efficiency (i.e., the Contracting Officer may determine that the number of most highly rated proposals that might otherwise be included in the competitive range exceeds the number at which an efficient competition can be conducted). Discussions may be held with firms in the competitive range.

C. **During Discussions.** Written or oral (i.e., telephonic) discussions may be conducted by the Government and all offerors in the competitive range. As a result of discussions, offerors may make revisions to their initial offers. If an offeror's proposal is eliminated or otherwise removed from the competitive range during discussions, no further revisions to that offeror's proposal will be accepted or considered. Discussions will culminate in a request for Final Proposal Revisions, the date and time of which will be common to all offerors.

D. **After Discussions.** If discussions are conducted, then after receipt of final proposal revisions, the TET will evaluate supplemental information provided by offers, adjust technical scores previously assigned, and provide a recommendation to the Contracting Officer. Subsequently, and after evaluation of any changed to proposed prices, the Contracting Officer will perform a best-value analysis. Selection will be made on the basis of the responsible offer, which conforms to the RFP and represents the most advantageous offer to the Government, subject to availability of funds.

E. **Selection and Award.** The Government intends to make award based on initial offers. Award of a firm fixed-price task order will be based upon a tradeoff analysis among technical and other pertinent factors (i.e., past performance) and price to determine the best value to the Government in terms of technical factors and price, and the best balance between technical factors and price.

8. **DEBRIEFINGS.**

A. Offerors excluded from the competition before award will receive a notice and may request a debriefing before award by submitting a written request for a debriefing to the Contracting Officer within three (3) days after receipt of the notice of exclusion from the competition.

B. Unsuccessful Offerors shall request post-award debriefing within three (3) days after the date on which the offeror received notification of task order award. Point-by-point comparisons with other offerors' proposals will not be made, and debriefings will not reveal any information that is not releasable under the Freedom of Information Act.

END OF SECTION

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**CUSTOMER SATISFACTION SURVEY (PAGE 1 OF 2) -
W912DW-04-R-0025, Laboratory Analytical Services and Related Efforts
in Support of the U.S. Army Corps of Engineers (USACE), Seattle District**

SECTION 1 -- TO BE COMPLETED BY OFFEROR AND PROVIDED TO REFERENCE

Name of Firm Being Evaluated: _____

Project Title & Location: _____

Project Dollar Value: _____

Year Completed: _____ **Project Manager:** _____

SECTION 2 -- TO BE COMPLETED BY THE CUSTOMER REFERENCE AND MAILED, EMAILED, FAXED OR HAND-DELIVERED DIRECTLY TO:

**U.S. Army Corps of Engineers, Seattle District
Attn: CENWS-CT-CB-CU Attn: Susan Newby
P.O. Box 3755
Seattle, WA 98124-3755**

**FAX: (206) 764-6817
Street Address:
4735 E. Marginal Way S.
Seattle WA 98134-2329**

Forms submitted by other than the customer (i.e., by the offeror), may not be considered.

OVERVIEW: The firm shown above has selected you as a customer reference to provide information on the firm's past performance. Your input is important to this firm and responses are required no later than the time and date proposals are due for inclusion in our evaluation.

Name of Individual completing survey: _____

Firm Name: _____ **Phone Number:** _____

Relationship to this Project: _____

The chart below depicts ratings to be used to evaluate this contractor's performance.

O	AA	S	M	U
Outstanding	Above Average	Satisfactory	Marginal	Unsatisfactory
Performance met all contract requirements and exceeded expectations. Problems, if any, were negligible, and were resolved in a timely and highly effective manner.	Performance met all contract requirements and exceeded some. There were a few minor problems which the contractor resolved in a timely, effective manner.	Performance met contract requirements. There were some minor problems, and corrective actions taken by the contractor were satisfactory.	Performance did not meet some contractual requirements. There were problems, some of a serious nature, for which corrective action was only marginally effective.	Performance did not meet contractual requirements. There were serious problems, and the contractor's corrective actions were ineffective.

CUSTOMER SATISFACTION SURVEY (PAGE 2 OF 2)
W912DW-04-R-0025, Laboratory Analytical Services and Related Efforts
in Support of the U.S. Army Corps of Engineers (USACE), Seattle District

In the following blocks, please indicate your overall level of satisfaction with the work performed by the firm shown in Section 1. Reference the chart outlined on page 1 of this survey. For any marginal or unsatisfactory rating, please provide explanatory narratives in the remarks block. These narratives need not be lengthy; just detailed. If a question is not applicable, circle N/A. If more space is needed, then go to the end of the questionnaire or attach additional pages. Be sure to identify your continued narration with the respect line number, your name and project name.

	Quality of Work	Circle the appropriate rating using the chart on page 1
A	Quality of Service	O AA S M U N/A
B	Quality Control	O AA S M U N/A
C.	Adequacy of Submittals/Reporting	O AA S M U N/A
D.	Identification/correction of deficient work in a timely manner	O AA S M U N/A
E.	Displayed flexibility in responding to your needs	O AA S M U N/A
F.	Organizational structure/functional relationships of the team including subcontractors	O AA S M U N/A
G.	Response time to your requirements	O AA S M U N/A
H.	Extent of participation of small business concerns as subcontractors under this contract	O AA S M U N/A
I.	Overall rating for this project	O AA S M U N/A
J	How well did the contractor & subcontractors adhere to schedule?	<u>O AA S M U N/A</u>
K.	Would you select this contractor again for future projects?	Yes or No (circle one)

REMARKS: (Discuss strengths and weaknesses of the firm)

Thank you for completing this form. Your assistance in providing this information is appreciated.