HEARTLAND ENVIRONMENTAL SERVICES, INC.

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NWS EARLE
5090.3a

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Seven (7) water sample and no (0) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
3-M002	911009401
4-M102	911009402
1-M002	911009403
5-M002	911009404
5-M202	911009405
2-M002	911009406
6-M002	911009407

Heartland ESI has reviewed the data for the samples listed above TAL Metals (under the limited scope requirements) using Region II Data Validation Protocol, February 1990 revision. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

TAl Metals reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

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DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110094**, the analysis of seven (7) field water sample and no (0) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The USEPA CLP analytical protocol was followed as required with the exception that the Laboratory failed to submit Forms 5,6 and 9 in this package. The Laboratory should insert these missing pages to complete this data package. The QC data for this package can be found in SDG #107.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in Region II Protocol.

Calibration

1. The CRDL Standard for Selenium was below 50%. All positive and non-detect results are rejected if within the concentration range as applied by the Region II Protocol.

2. The CRDL Standards for Cadmium, Copper, Manganese and Silver were below the lower control limit. All positive and non-detect results within the affected range are qualified as estimated, "J" or "UJ".

3. The CRDL Standard for Zinc was above 150%. All positive results are rejected if within the concentration range as pplied by the Region II Protocol.

Preparation and Field Blanks

No deficiencies in this section.

Interferences

No significant interferences were observed.

Metals Data Assessment Narrative (continued - Page 2)

Interferences

No significant interferences were observed.

Spike Recovery

4. The Matrix Spike recovery for Arsenic was below 30%. All positive and non-detect results are rejected.

5. The Matrix Spike recovery for Selenium was below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

Duplicate

6. The Duplicate analysis for Iron was outside the control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

LCS

No deficiencies in this section.

Serial Dilution

7. The Serial dilutions for Chromium, Iron, Manganese, Sodium and Zinc were outside the control limit. All positive results are qualified as estimated,"J".

MSA

8. The following analytes exhibited low recovery during the GFAA spiking procedures. All data is qualified as estimated, "J" or "UJ".

Analyte	Samples
Arsenic	1-M002.
Selenium	4-M002 and 1-M002.

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SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	Se	+/U	R	1
All Water Samples	Cd,Cu,Mn, and Ag	+/U	J/UJ	2
All Water Samples	Zn	+	R	3
All Water Samples	As	+/U	R	4
All Water Samples	Se	+/U	J/UJ	5
All Water Samples	Fe	+/U	J/UJ	6
All Water Samples	Cr,Fe,Mn, Na and Zn.	+	J	7
2-M002 4-M002 and 1-M002.	As Se	+/U	J/UJ	8

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP094

Matrix (soil/water): WATER Lab Sample ID: 911009401

Level (low/med): LOW Date Received: 10/23/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~		~~F~~	R4
7440-39-3	Barium	16.00	U		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	68.10			P	J7
7440-48-4	Cobalt				NR	
7440-50-8	Copper	16.80	B		P	J2
7439-89-6	Iron	7420.00			P	J6,7
7439-92-1	Lead	5.90			F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	7.40	B		P	J2,7
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~		~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	9120.00			P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	~~32.40~~			~~P~~	R3
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

4-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP094

Matrix (soil/water): WATER Lab Sample ID: 911009402

Level (low/med): LOW Date Received: 10/23/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~		~~F~~	R4
7440-39-3	Barium	47.20	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	1060.00			P	J7
7440-48-4	Cobalt				NR	
7440-50-8	Copper	35.10			P	J2
7439-89-6	Iron	161000.00			P	J6,7
7439-92-1	Lead	35.10		S	F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	225.00			P	J7
7439-97-6	Mercury	.14	B		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	4540.00	B		P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	231.00			P	J7
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

1-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP094

Matrix (soil/water): WATER Lab Sample ID: 911009403

Level (low/med): LOW Date Received: 10/23/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~		~~W~~	~~F~~	R4
7440-39-3	Barium	80.50	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	133.00			P	J7
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.30	B		P	J2
7439-89-6	Iron	22600.00			P	J6,7
7439-92-1	Lead	6.70			F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	217.00			P	J7
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	23200.00			P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	124.00			P	J7
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

5-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP094

Matrix (soil/water): WATER Lab Sample ID: 911009404

Level (low/med): LOW Date Received: 10/23/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~10.40~~			~~F~~	R4
7440-39-3	Barium	27.80	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	5.40			P	J2
7440-70-2	Calcium				NR	
7440-47-3	Chromium	530.00			P	J7
7440-48-4	Cobalt				NR	
7440-50-8	Copper	46.80			P	J2
7439-89-6	Iron	62700.00			P	J6,7
7439-92-1	Lead	109.00			F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	83.10			P	J7
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~		~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	4450.00	B		P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	170.00			P	J7
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

5-M202

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP094

Matrix (soil/water): WATER Lab Sample ID: 911009405

Level (low/med): LOW Date Received: 10/23/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~		~~F~~	R4
7440-39-3	Barium	16.00	U		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	108.00			P	J6,7
7439-92-1	Lead	2.00	U		F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	2.00	U		P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~		~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	334.00	B		P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	~~17.30~~	~~B~~		~~P~~	R3
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

2-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP094

Matrix (soil/water): WATER Lab Sample ID: 911009406

Level (low/med): LOW Date Received: 10/23/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~		~~F~~	R4
7440-39-3	Barium	59.70	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	86.30			P	J7
7440-48-4	Cobalt				NR	
7440-50-8	Copper	22.80	B		P	J2
7439-89-6	Iron	9440.00			P	J6,7
7439-92-1	Lead	2.40	B		F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	40.90			P	J2,7
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~		~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	2550.00	B		P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	233.00			P	J7
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

6-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP094

Matrix (soil/water): WATER Lab Sample ID: 911009407

Level (low/med): LOW Date Received: 10/23/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~		~~F~~	R4
7440-39-3	Barium	63.00	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	54.50			P	J7
7440-48-4	Cobalt				NR	
7440-50-8	Copper	11.10	B		P	
7439-89-6	Iron	50400.00			P	J6,7
7439-92-1	Lead	7.90			F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	140.00			P	J7
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~		~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	5130.00			P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	266.00			P	J7
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report (CCS) - Present?	[ ]		✓
ACTION: If no, contact RSCC.			
A.1.2 Record of Communication (from RSCC) - Present?	[ ]		✓
ACTION: If no, request from RSCC.			
A.1.3 Trip Report - Present and complete?	[ ]		✓
ACTION: If no, contact RSCC for trip report.			
A.1.4 Sample Traffic Report - Present or on file?	[ ]		✓
Legible?	[ ]		✓
ACTION: If no, request from Regional Sample Control Center (RSCC).			
A.1.5 Cover Page - Present?	[✓]		
Is cover page properly filled in and signed by the lab manager or the manager's designee?	[✓]		
ACTION: If no, prepare Telephone Record Log, and contact laboratory.			
Do numbers of samples correspond to numbers on Record of Communication?	[ ]		✓
Do sample numbers on cover page agree with sample numbers on:			
(a) Traffic Report Sheet?	[ ]		✓
(b) Form I's?	[✓]		
ACTION: If no for any of the above, contact RSCC for clarification.			

	YES	NO	N/A
A.1.6 Form I (Final Data) - Are all Form I's present and complete?	[✓]	__	__
ACTION: If no, prepare telephone record log and contact laboratory for submittal.			
Are correct units (ug/l for waters and mg/kg for soils) indicated on Form I's?	[✓]	__	__
Are soil sample results for each parameter corrected for percent solids?	[__]	__	✓
Are EPA sample # s and corresponding laboratory sample ID # s the same as on the Cover Page, Form I's and in the raw data?	[✓]	__	__
Are computation/transcription errors less than 10% of reported values?	[✓]	__	__
Are all "less than IDL" values properly coded with "U"?	[✓]	__	__
Was a brief physical description of samples given on Form I's?	[✓]	__	__
Were the result qualifiers used correctly with final data?	[✓]	__	__
ACTION: If no for any of the above, prepare Telephone Record Log, and contract laboratory for corrected data.			
Were any samples diluted beyond requirements of contract?	__	[✓]	__
If yes, were dilutions noted on Form I's?	[✓]	__	__
ACTION: If no, note under Contract-Problem/Non-Compliance of the "Data Assessment Narrative".			
A.1.7 Holding Times - (aqueous and soil samples)			
(Examine sample traffic reports and digestion/distillation logs.)			
Mercury analysis (28 days). . . . . exceeded?	__	[✓]	__
Cyanide distillation (14 days). . . . . exceeded?	__	[__]	✓

	YES	NO	N/A
Other Metals analysis (6 months). . . . exceeded?	___	[✓]	___

NOTE: Prepare a list of all samples and analytes for which holding times have been exceeded. Specify the number of days from date of collection to the date of preparation (from raw data). Attach to checklist.

ACTION: If yes, reject (red-line) values less than Instrument Detection Limit (IDL) and flag as estimated (J) the values above IDL even though sample(s) was preserved properly.

A.1.8 Raw Data

		YES	NO	N/A
A.1.8.1	Digestion Log* for flame AA/ICP (Form XIII) present?	[✓]	___	___
	Digestion Log for furnace AA Form XIII present?	[✓]	___	___
	Distillation Log for mercury Form XIII present?	[✓]	___	___
	Distillation Log for cyanides Form XIII present?	[___]	___	✓
	Are pH values (pH<2 for all metals, pH>12 for cyanide) present?	[✓]	___	___
	*Weights, dilutions and volumes used to obtain values.			
	Percent solids calculation present for soils/sediments?	[___]	___	✓
	Are preparation dates present on Digestion Log?	[✓]	___	___
A.1.8.2	Measurement read out record present? ICP	[✓]	___	___
	Flame AA	[___]	___	✓
	Furnace AA	[✓]	___	___
	Mercury	[✓]	___	___
	Cyanides	[___]	___	✓

	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	[✓]	__	__
Legible?	[✓]	__	__
Properly Labeled?	[✓]	__	__

ACTION: If no for any of the above, write Telephone Record Log and contact laboratory. Flag metal data as estimated if pH of sample is greater than 2. Flag cyanide data as estimated if pH sample is less than 12.

A.1.9 Data Validation and Verification

1.9.1 Calibration

	YES	NO	N/A
A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	[✓]	__	__
Is record of 5 point calibration present for Hg analysis?	[✓]	__	__

ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.1.2 Is record of 4 point calibration present for:			
Flame AA?	[__]	__	✓
Furnace AA?	[✓]	__	__
Cyanides?	[__]	__	✓

NOTE: 1. If less than 4 standards are measured in absorbance mode, then the remaining standards in concentration mode must be run immediately after calibration and be within ±10% of true value.
2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRDL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
ACTION: Flag associated data as estimated if standards are not within ±10% of true values (except CRDL calibration standard). Do not flag the data as estimated in linear range indicated by good recovery of standard.			
A.1.9.1.3 Is correlation *coefficient less than 0.995 for:			
Mercury Analysis?	___	[✓]	___
Cyanide Analysis?	___	[___]	✓
Atomic Absorption Analysis?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.2 Form II A (Initial and Continuing Calibration Verification)	✓		
A.1.9.2.1 Present and complete for every metal and cyanide?	[___]	___	___
Present and complete for AA and ICP when both are used for same analyte?	[✓]	___	___
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
A.1.9.2.2 Circle all values on data summary sheet that are outside contract windows. Are all calibration standards (initial and continuing) within control limits?			
Metals 90-110%	[✓]	___	___
Hg - 80-120%	[✓]	___	___
Cyanides 85-115%	[___]	___	✓

* The reviewer will calculate correlation coefficient.

	YES	NO	N/A
ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with %R between 75-89% (65-79% for Hg; 70-84% for CN) or 111-125% (121-135% for Hg; 116-130% for CN) recovery and nearest good calibration standard. Qualify results <IDL as estimated (UJ), if the ICV or CCV %R is 75-89% (CN, 70-84% ; HG, 65-79%). Reject (red-line) as unacceptable data if recovery of the ICV or CCV is outside the range 75-125% (CN, 70-130%; Hg, 65-135%). Qualify five samples on either side of verification standard out of control limits.			
Was continuing calibration performed every 10 samples or every 2 hours?	[✓]	__	__
ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).			
Was ICV for cyanides distilled?	[__]	__	✓
ACTION: If no, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".			
A.1.9.3 Form II B (CRDL Standards for AA and ICP) -			
A.1.9.3.1 Was a CRDL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?	[✓]	__	__
*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?	[__]	__	✓
Was a 2xCRDL (or 2xIDL when IDL>CRDL) analyzed (CRI) for each ICP run? (Note: CRI for AL,Ba,Ca,Fe,Mg,Na,or K is not required.)	[✓]	__	__

ACTION: If no for any of the above, flag as estimated all data falling within the affected ranges. The affected ranges are:
AA Analysis - **True Value ± CRDL
ICP Analysis - **True Value ± 2CRDL
CN Analysis - **True Value ± 0.5 x True Value.

* Find the results of mid-range standard in the raw data.
**True value of CRA, CRI or mid-range standard. Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/A
A.1.9.3.2	Was CRI analyzed after ICV/ICB and before the final CCV/CCB, and for every four hours of ICP run?	[✓]		
	ACTION: If no, write in Contract Problem/Non-Compliance Section of the "Data Assessment Narrative".			
A.1.9.3.3	Circle all values on summary sheet that are outside acceptance windows.			
	Are CRA and CRI standards within control limits: Metals 80 - 120%R?	[ ]	✓	
	Is mid-range standard within control limits: Cyanide 80 - 120%R?	[ ]		✓
	ACTION: Flag as estimated all data within the affected ranges if the recovery of the standard is between 50-79%; flag only positive data if the recovery is between 121-150%; reject (red line) all data if the recovery is less than 50%; reject only positive data if the recovery is greater than 150%.			
A.1.9.4	Form III (Initial and Continuing Calibration Blanks)			
A.1.9.4.1	Present and complete?	[✓]		
	For both AA and ICP when both are used for same analyte?	[✓]		
	Was an initial calibration blank analyzed?	[✓]		
	Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	[✓]		
	ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/non-compliance section of the Data Assessment Narrative.			

		YES	NO	N/A
A.1.9.4.2	Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IDL when IDL > CRDL). Are all calibration blanks (when IDL<CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	[✓]		
	Are all calibration blanks less than two times Instrument Detection Limit (when IDL>CRDL)?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all positive data less than or equal to calibration blank values analyzed between calibration blank with value over CRDL (or 2xIDL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.

A.1.9.5 FORM III (Preparation Blank) -

(Note: The preparation blank for mercury is the same as the calibration blank.)

		YES	NO	N/A
A.1.9.5.1	Was one prep. blank analyzed for: each 20 samples?	[✓]		
	each batch?	[✓]		
	each matrix type?	[✓]		
	both AA and ICP when both are used for same analyte?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all associated positive data <10 x IDLs for which prep. blank was not analyzed.

NOTE: If only one blank was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).

		YES	NO	N/A
A.1.9.5.2	Is concentration of prep. blank greater than CRDL when IDL is less than or equal to CRDL?		[✓]	
	If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?		[✓]	

		YES	NO	N/A
	ACTION: If yes, reject (red-line) all associated data greater than CRDL concentration but less than ten times the prep. blank value found in the raw data.			
A.1.9.5.3	Do concentrations of prep. blank fall below two times IDL when IDL is greater than CRDL?	[✓]		
	ACTION: If no, reject (red-line) all positive data that has a concentration less than 10 times the prep. blank value in the raw data.			
A.1.9.5.4	Is concentration of prep. blank below the negative CRDL?		[✓]	
	ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6	Form IV (ICP Interference Check Sample)			
A.1.9.6.1	Present and complete?	[✓]		
	(NOTE: Not required for furnace AA, flame AA, mercury, cyanide and Ca, Mg, K and Na.)			
	Was ICS analyzed at beginning and end of run (or at least twice every 8 hours)?	[✓]		
	ACTION: If no, flag as estimated (J) all samples for which AL, Ca, Fe, or Mg is higher than in ICS.			
A.1.8.6.2	Circle all values on Data Summary Sheet that are more than + 20% of true or established mean value. Are all Interference Check Sample results inside of control limits (+ 20%)?	[✓]		
	If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	[✓]		
	ACTION: If no, flag as estimated (J) those positive results for which ICS recovery is between 121-150%; flag all sample results as estimated if ICS recovery falls within 50-79%; reject (red-line) those sample results for which ICS recovery is less than 50%; if ICS recovery is above 150%, reject positive results only (not flagged with a "U").			

		YES	NO	N/A
A.1.9.7	Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)- (Note: Not required for Ca, Mg, K, and Na (both matrices), Al, and Fe (soil only.)			
A.1.9.7.1	Present and complete for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each conc. range (i.e. low, med., high)?	[✓]	__	__
	For both AA and ICP when both are used for same analyte?	[✓]	__	__
	ACTION: If no for any of the above, flag as estimated (J) all positive data less than four times spiking level for which spiked sample was not analyzed.			
	NOTE: If one spiked sample was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.9.7.2	Was field blank used for spiked sample?	__	[✓]	__
	ACTION: If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
	NOTE: Matrix spike analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.7.3	Circle all values on Data Summary Sheet that are outside control limits (75% to 125%). Are all recoveries within control limits?	[__]	✓	__
	If no, is sample concentration greater than or equal to four times spike concentration?	[__]	✓	__
	ACTION: If yes, disregard spike recoveries for analytes whose concentrations are greater than or equal to four times spike added. If no, circle those analytes on Form V for which sample concentration is less than four times the spike concentration.			

	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	[✓]	__	__

ACTION: If no, write in the Contract - Problem/Non - Compliance section of "Data Assessment Narrative".

A.1.9.7.4 Aqueous

Are any spike recoveries:

	YES	NO	N/A
(a) less than 30%?	✓	[__]	__
(b) between 30-74%?	✓	[__]	__
(c) between 126-150%?	__	[✓]	__
(d) greater than 150%?	__	[✓]	__

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 126-150%, flag as estimated (J) all associated aqueous data not flagged with a "U"; if greater than 150%, reject (red-line) all associated aqueous data not flagged with a "U".

NOTE: If pre-digestion spike result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, disregard spike recovery on Form V. Flag the associated data as estimated(J).

A.1.9.7.5 Soil/Sediment

Are any spike recoveries:

	YES	NO	N/A
(a) less than 10%?	__	[__]	✓
(b) between 10-74%?	__	[__]	✓
(c) between 126-200%?	__	[__]	✓
(d) greater than 200%?	__	[__]	✓

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 126-200%, flag as estimated all associated data was not flagged with a "U"; if greater than 200%, reject all associated data not flagged with a "U".

		YES	NO	N/A
A.1.9.8	Form VI (Lab Duplicates)			
A.1.9.8.1	Present and complete for: each 20 samples?	[✓]	___	___
	each matrix type?	[✓]	___	___
	each concentration range (i.e. low, med., high)?	[✓]	___	___
	both AA and ICP when both are used for same analyte?	[✓]	___	___

ACTION: If no for any the above, flag as estimated (J) all data >CRDL* for which duplicate sample was not analyzed.

Note: 1. If one duplicate sample was analyzed for more than 20 samples, then first 20 samples do not have to be flagged as estimated.
2. If percent solids for soil sample and its duplicate differ by more than 1%, prepare a Form VI for each duplicate pair, report concentrations in Hg/L on wet weight basis and calculate RPD or Difference for each analyte.

A.1.9.8.2	Was field blank used for duplicate analysis?	___	[✓]	___

ACTION: If yes, flag all data >CRDL* as estimated (J) for which field blank was used as duplicate.

NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.

A.1.9.8.3	Are all values within control limits (RPD 20% or difference < ±CRDL)?	[___]	✓	___
	If no, are all results outside the control limits flagged with an * on Form I's and VI?	[___]	✓	___

ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".

NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than IDL.

* Substitute IDL for CRDL when IDL > CRDL.

	YES	NO	N/A
2. If lab duplicate result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, do not apply precision criteria.			
A.1.9.8.4 Is any value for sample duplicate pair less than CRDL* and other value greater than or equal to 10 x *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5 Aqueous Circle all values on Data Summary Sheet that are: RPD > 50%, or Difference > ± CRDL*.			
Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	✓	[_ _]	_ _
Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.8.6 Soil/Sediment Circle all values on Data Summary Sheet that are: RPD > 100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than or equal to 5 times *CRDL) : > 100%?	___	[_ _]	✓
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) : > 2x*CRDL?	___	[_ _]	✓

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

		YES	NO	N/A
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9	Field Duplicates			
A.1.9.9.1	Were field duplicates analyzed?	[✓]		
	ACTION: If yes, prepare a Form VI for each aqueous field duplicate pair. Prepare a Form VI for each soil duplicate pair, if percent solids for sample and its duplicate differ by more than 1%; report concentrations of soils in ug/l on wet weight basis and calculate RPDs or Difference for each analyte.			
	NOTE: 1. Do not calculate RPD when both values are less than IDL. 2. Flag all associated data only for field duplicate pair.			
A.1.9.9.2	Is any value for sample duplicate pair less than *CRDL and other value greater than or equal to 10 x *CRDL?		[✓]	
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9.3	Aqueous			
	Circle all values on Form VI for field duplicates that are: RPD > 50%, or Difference > ± CRDL*			
	Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?		[✓]	
	Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?		[✓]	
	ACTION: If yes, flag the associated data as estimated.			

* Substitute IDL for CRDL when IDL > CRDL.

** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.9.4 Soil/Sediment			
Circle all values on Form VI for field duplicates that are: RPD >100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than 5 times *CRDL) : >100%?	___	[✓]	___
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x *CRDL): >2x *CRDL?	___	[✓]	___

ACTION: If yes, flag the associated data as estimated.

A.1.9.10 Form VII (Laboratory Control Sample) (Note: LCS - not required for aqueous Hg and cyanide analyses.)

A.1.9.10.1 Was one LCS prepared and analyzed for: every 20 water samples?	[✓]	__	___
every 20' solid samples?	[___]	__	✓
both AA and ICP when both are used for same analyte?	[✓]	__	___

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory for submittal of results of LCS. Flag as estimated (J) all data for which LCS was not analyzed.

NOTE: If only one LCS was analyzed for more than 20 samples, then first 20 samples close to LCS do not have to be flagged as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

**Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.10.2 Aqueous LCS			
Circle all LCS values outside control limits (80 - 120%- except aqueous Ag and Sb).			
Is any LCS recovery: less than 50%?	___	[✓]	___
between 50% and 79%?	___	[✓]	___
between 121% and 150%?	___	[✓]	___
greater than 150%?	___	[✓]	___

ACTION: Less than 50%, reject (red-line) all data; between 50% and 79%, flag all associated data as estimated (J); between 121% and 150%, flag all positive (not flagged with a "U") results as estimated; greater than 150%, reject all positive results.

A.1.9.10.3 Solid LCS

NOTE: 1. If "Found" value of LCS is rejectable due to duplicate injections or analytical spike recovery criteria, regardless of LCS recovery, flag the associated data as estimated (J).
2. If IDL of an analyte is equal to or greater than true value of LCS, disregard the "Action" below even though LCS is out of control limits.

Is LCS "Found" value higher than the control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated positive data as estimated.

Is LCS "Found" value lower than the Control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated data as estimated.

		YES	NO	N/A
A.1.9.11	Form IX (ICP Serial Dilution) -			
	NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IDL.			
A.1.9.11.1	Was Serial Dilution analysis performed for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each concentration range (i.e. low, med.)?	[✓]	__	__
	ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIDLs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DPO report.			
A.1.9.11.2	Was field blank(s) used for Serial Dilution Analysis?	__	[✓]	__
	ACTION: If yes, flag all associated data ≥ 10 x IDL as estimated (J).			
	NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.11.3	Are results outside control limit flagged with an "E" on Form I's and Form IX when initial concentration on Form IX is equal to 50 times IDL or greater.	[✓]	__	__
	ACTION: If no, write in the contract-problem/non-compliance section of the "Data Assessment Narrative".			
A.1.9.11.4	Circle all values on Data Summary Sheet that are outside control limit for initial concentrations equal to or greater than 10 x IDLs only. Are any % difference values: > 10%?	✓	[__]	__
	≥ 100%?	__	[✓]	__

		YES	NO	N/A
	ACTION: Flag as estimated (J) all associated equal to or greater than 10xIDLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xIDLs for which PD is greater than or equal to 100%.			
A.1.9.12	Furnace Atomic Absorption (AA) QC Analysis			
A.1.9.12.1	Are duplicate injections present in furnace raw data (except during full Method of Standard Addition) for each sample analyzed by GFAA?	[✓]	__	__
	ACTION: If no, reject the data on Form I's for which duplicate injections were not performed.			
.1.9.12.2	Do the duplicate injection readings agree within 20% Relative Standard Deviation (RSD) or Coefficient of Variation (CV) for concentration greater than CRDL?	[✓]	__	__
	Was a dilution analyzed for sample with post digestion spike recovery less than 40%?	[✓]	__	__
	ACTION: If no for any of the above, flag all the associated data as estimated (J).			
A.1.9.12.3	Is *post digestion spike recovery less than 10% or greater than 150% for any result?	__	[✓]	__
	ACTION: If yes, reject (red-line) the affected data if recovery is <10%; reject data not flagged with "U" if spike recovery is >150%.			
	NOTE: Reject the data only if the affected sample was not subsequently analyzed by Method of Standard Addition.			

* Post digestion spike is not required on the pre-digestion spiked sample when predigestion spike recovery is within control limits of 75-125% or when SR>4xSA.

		YES	NO	N/A
A.1.9.13	Form VIII (Method of Standard Addition Results)			
A.1.9.13.1	Present?	[✓]		
	If no, is any Form I result coded with "S" or a "+"?		[✓]	
	ACTION: If yes, write request on Telephone Record Log and contact laboratory for submittal of Form VIII.			
A.1.9.13.2	Is coefficient of correlation for MSA less than 0.990 for any sample?		[✓]	
	ACTION: If yes, reject (red-line) affected data.			
A.1.9.13.3	Was *MSA required for any sample but not performed?		[✓]	
	Is coefficient of correlation for MSA less than 0.995?		[✓]	
	Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?		[✓]	
	ACTION: If yes for any of the above, flag all the associated data as estimated (J).			
A.1.9.13.4	Was proper quantitation procedure followed correctly as outlined in the SOW on page E-16 through E-17?	[✓]		
	ACTION: If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14	Dissolved/Total or Inorganic/Total Analytes -			
A.1.9.14.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)..		[✓]	
	Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?		[✓]	

* MSA is not required on LCS and prep. blank.

	YES	NO	N/A

NOTE: 1. If yes, prepare a list comparing differences between all dissolved (or inorganic) and total analytes. Compute the differences as a percent of the total analyte only when dissolved concentration is greater than CRDL as well as total concentration.
2. Apply the following questions only if inorganic (or dissolved) results are (i) above CRDL, and (ii) greater than total constituents.
3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.

A.1.9.14.2 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 10%? ___ [✓] ___

A.1.9.14.3 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%? ___ [✓] ___

ACTION: If more than 10%, flag both dissolved (or inorganic) and total values as estimated (J); if more than 50%, reject (red-line) the data for both values.

A.1.9.15 Form I to IX

A.1.9.15.1 Are all the Form I through Form IX labeled with:

Laboratory name?	[✓]	___	___
Case/SAS number?	[✓]	___	___
EPA sample No.?	[✓]	___	___
SDG No.?	[✓]	___	___
Contract No.?	[✓]	___	___
Correct units?	[✓]	___	___
Matrix?	[✓]	___	___

ACTION: If no for any of the above, note under contract problem/non-compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.15.2 Do any computation/transcription errors exceed 10% of reported values on Forms I-IX for:			
(NOTE: Check all forms against raw data.)			
(a) all analytes analyzed by ICP?	___	[✓]	___
(b) all analytes analyzed by GFAA?	___	[✓]	___
(c) all analytes analyzed by AA Flame?	___	[ ]	✓
(d) Mercury?	___	[✓]	___
(e) Cyanide?	___	[ ]	✓

ACTION: If yes, prepare Telephone Log, contact laboratory for corrected data and correct errors with red pencil and initial.

A.1.9.16 Form I (Field Blank) -

Circle all field blank values on Data Summary Sheet that are greater than CRDL, 2 x IDL when IDL > CRDL.

Do concentrations of field blank(s) fall below CRDL (or 2 x IDL when IDL > CRDL) for all parameters of associated aqueous and soil samples?	[✓]	___	___
If no, was field blank value already rejected due to other QC criteria?	[✓]	___	___

ACTION: If no, reject (except field blank results) all associated positive sample data less than or equal to five times the field blank value.

	YES	NO	N/A
A.1.9.17 Form X, XI, XII (Verification of Instrumental Parameters).			
A.1.9.17.1 Is verification report present for:			
Instrument Detection Limits (quarterly)?	[✓]		
ICP Interelement Correction Factors (annually)?	[✓]		
ICP Linear Ranges (quarterly)?	[✓]		
ACTION: If no, contact DPO of the lab.			
A.1.9.17.2 Form X (Instrument Detection Limits) - (Note: IDL is not required for Cyanide.)			
Are IDLs present for: all the analytes?	[✓]		
all the instruments used?	[✓]		
For both AA and ICP when both are used for same analyte?	[✓]		
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
Is IDL greater than CRDL for any analyte?		[✓]	
If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?	[✓]		
ACTION: If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.			

	YES	NO	N/A
A.1.9.17.3 Form XI (Linear Ranges)			
Was any sample result higher than high linear range of ICP.	___	[✓]	___
Was any sample result higher than the highest calibration standard for non-ICP parameters?	___	[✓]	___
If yes for any of the above, was the sample diluted to obtain the result on Form I?	[✓]	___	___
ACTION: If no, flag the result reported on Form I as estimated(J).			
A.1.9.18 Percent Solids of Sediments			
Is soil content in sediment(s) less than 50%?	___	[✓]	___
ACTION: If yes, qualify as estimated all data not previously rejected or flagged due to other QC criteria.			

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Feb. 1990
Number: HW-2
Revision: 10

Case#	NW3	Site	Naval Weapons Station	Matrix:	Soil ____
SDG#	CLP 094	Lab	Roy F. Weston		Water ✓
Contractor	Roy F. Weston	Reviewer	Heartland EST		Other ____

A.2.1 The case description and exceptions, if any, are noted below with reason(s) for rejection or qualification as estimated value(s) J.

1. CRDL Selenium <50% all data rejected.
2. CRDL Cadmium, Copper, Manganese and Silver recoveries above control limit. All positive results are estimated.
3. CRDL Zinc >150%. All positive results are rejected.
4. Matrix Spike recovery for Arsenic was <30%. All data rejected.
5. Matrix Spike recovery for Selenium was below control limit. All data estimated.
6. Duplicate Analysis for Iron was outside control limit. All data estimated.
7. Serial Dilution for Chromium, Iron, Manganese, Sodium and Zinc were outside of the control limit. All positive results are estimated.
8. The analytical spikes for Arsenic (1-M002)

A.2.1 (continuation)

and Selenium (4-M002 and 1-M002) was below the lower control limit. All data is estimated.

PBH 2/27/92

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Feb. 1990
Number: HW-2
Revision: 10

PBH 2/27/92

2.2 Contract-Problems/Non-Compliance

Forms 5, 6 and 9 are not filled out. QC results are in a different data package. Samples were not flagged accordingly to QC recoveries

PBH 2/27/92

M&B Reviewer: _____ Date: _____
Signature

Contractor Reviewer: Paul B Hively Date: 2/27/92
Signature

Verified by: Christopher D. Scapellato Date: 3/2/92

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 094

SITE/STUDY DESCRIPTION: Naval Weapon Station SAMPLE NOS: 3-M002, 4-M002, 1-M002, 5-M002, 5-M202, 2-M002, 6-M002.

FIELD DUP. #'S: _____ LAB DUP. #'S: 2-M002 Field Blank _____ MATRIX SPIKE #: 2-M002

SERIAL DILUTION SAMPLE NO. 2-M002 COMPLETION DATE: 2/27/91 REVIEWERS INITIALS: PBH

	X		I	IIA				IIB		III				IV		V	VI	VII	IX	
Parameter	Detection Limits UG/L CRDL	IDL	Field Blank	Calib. Ver. %R Init	Continued 1	2	3	CRDL Std Ver. %R Init	Fin	Calibration Blanks Init	Continued 1	2	3	PBL EAN P	N	ICP ICS %R Init	Fin	MS Matrix	Lab Dup RPD Diff	LCS %R	Ser Dil %D	Method
Al	200		NA																			
Sb	60																					
As	10	2		108	101	98	100	81		U	U	U	U	U			10	200	96			F
Ba	200	16		102	103	101	100			U	U	U	U	U		87	87	101	5.2	98	100	P
Be	5																					
Cd	5	2		105	108	104	104	127	81	U	U	U	U	U		95	99	104		105		P
Ca	5000																					
Cr	10	4		99	101	101	101	80	105	U	U	U	U	U		96	100	104	12.3	98	14.9	P
Co	50																					
Cu	25	6		103	105	104	103	126	127	U	U	U	U	U		98	99	99	3.2	98	46	P
Fe	100	46		100	103	102	104			U	U	U	U	U		97	100	-240	26	99	36	P
Pb	3	3		103	101	103	102	80		U	U	U	U	U				75	4.4	96		F
Mg	5000																					
Mn	15	2		100	101	102	102	124	130	U	3	U	U	U		106	107	99	17.8	98	29	P
Hg	0.2			102	102	101	103			U	U	U	U	U				94	3.5	96		CV
Ni	40																					
K	5000																					
Se	5	7		104	99	103	102	28		U	U	U	U	U				43		84		F
Ag	10	3		102	104	103	102	128	112	U	U	U	U	U		96	98	75		100		P
Na	5000	110		102	103	101	101			U	U	U	167	U					1.3	98	29	P
Tl	10																					
V	50																					
Zn	20	6		101	104	104	104	150	168	U	U	U	U	7		84	93	102	8.7	100	23	P
CN	10																					

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APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 044

SITE/STUDY DESCRIPTION: _____ SAMPLE NOS: _____

Field Blank _____

FIELD DUP. #'S: _____ LAB DUP. #'S: _____ MATRIX SPIKE #: _____

SERIAL DILUTION SAMPLE NO. _____ COMPLETION DATE: 2/27/92 REVIEWERS INITIALS: PBH

	X		I	IIA				IIB		III				IV		V		VI	VII	IX	
Parameter	Detection Limits UG/L		Field Blank	Calib. Ver. %R				CRDL Std Ver. % R		Calibration Blanks				PBL EAN	ICP ICS % R		MS tpix	Lab Dup RPD Diff	LCS	Ser Dil	Meth
					Continued						Continued										
	CRDL	IDL		Init	1	2	3	Init	Fin	Init	1	2	3		Init	Fin			% R	% D	
Al	200		NA																		
Sb	60																				
As	10	2			100	100	100	126			U	U	U	U							F
Ba	200	16			99	102					U	U		U							P
Be	5																				
Cd	5	2			102	104					U	U		U							P
Ca	5000																				
[illegible]	10	4			101	104					U	U		U							P
Co	50																				
Cu	25	6			102	105					U	U		U							P
Fe	100	46			102	108					U	U		U							P
Pb	3	3			103	102	105				U	U	U	U							F
Mg	5000																				
Mn	15	2			101	103					U	U		U							P
Hg	0.2				101	101					U	U		U							CV
Ni	40																				
K	5000																				
Se	5	2			98	101	99	44			U	U	U	U							F
Ag	10	3			102	104					U	U		U							P
Na	5000	110			100	104					117	145		U							P
Tl	10																				
V	50																				
Zn	20	6			103	108					U	U		U							P
CN	10																				

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CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited scope) Date: 2/27/92 Case #: NWS

Site: Naval Weapons Station Lab Name: Roy Weston

Reviewer's Initials: PBH Number of Samples: 7

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Inter-ferences	Spike Recovery	Duplicates Lab	Duplicates Field	Detection Limits	LCS	Serial Dilution	MSA	Total Analytes	Rejection
ICP		1											1	
Flame AA														
Furnace AA		1				1							2	
Mercury														
Total		2				1							3	
Other														

Analytes Flagged as Estimated (J) Due to Exceeding Criteria For:*

ICP		4					1				5		10	
Flame AA														
Furnace AA						1						1	2	
Mercury														
Total		4				1	1				5	1	12	
Other														

Note:
Asterisk (*) Indicates additional exceedances of review criteria.

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.7: CLP Data Assessment Checklist
Inorganic Analysis

Date: Feb. 1990
Number: HW-2
Revision: 10

INORGANIC REGIONAL DATA ASSESSMENT

Region II

CASE NO. NWS

SITE Naval Weapons Station

LABORATORY Roy F. Weston

NO. OF SAMPLES/ MATRIX 7 waters

SDG# CLP 097

REVIEWER (IF NOT ESD) Heartland EST

SOW# 390

REVIEWER'S NAME Paul B. Humby

DPO: ACTION _____ FYI _____

COMPLETION DATE 2/27/92

DATA ASSESSMENT SUMMARY

		ICP	AA	Hg	CYANIDE
1.	HOLDING TIMES	O	O	O	NA
2.	CALIBRATIONS	Z	Z	↓	↓
3.	BLANKS	O	O	↓	↓
4.	ICS	↓	O	↓	↓
5.	LCS	↓	O	↓	↓
6.	DUPLICATE ANALYSIS	↓	O	↓	↓
7.	MATRIX SPIKE	↓	Z	↓	↓
8.	MSA	↓	O	↓	↓
9.	SERIAL DILUTION	↓	↓	↓	↓
10.	SAMPLE VERIFICATION	↓	O	↓	↓
11.	OTHER QC	↓	O	↓	↓
12.	OVERALL ASSESSMENT	↓	O	↓	↓

O = Data has no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS:

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Five (5) water sample and one (1) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
1-M002	911010701
1-M102	911010702
2-M002	911010703
2-M002MS	911010703MS
2-M002D	911010703D
3-M002	911010704
4-M002	911010705

Heartland ESI has reviewed the data for the samples listed above TAL Metals (under the limited scope requirements) using Region II Data Validation Protocol, February 1990 revision. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

TAl Metals reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110107**, the analysis of five (5) field water sample and one (1) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The USEPA CLP analytical protocol was followed as required.

Specific QA/QC deficiency **Findings** are listed numerically in the following categories:

Holding Times

The holding times were met as specified in Region II Protocol.

Calibration

1. The CRDL Standard for Selenium was below 50%. All positive and non-detect results are rejected if within the concentration range as applied by the Region II Protocol.

2. The CRDL Standards for Cadmium, Copper, Manganese and Silver were below the lower control limit. All positive and non-detect results within the affected range are qualified as estimated, "J" or "UJ".

3. The CRDL Standard for Zinc was above 150%. All positive results are rejected if within the concentration range as pplied by the Region II Protocol.

Preparation and Field Blanks

No deficiencies in this section.

Interferences

No significant interferences were observed.

Metals Data Assessment Narrative (continued - Page 2)

Interferences

No significant interferences were observed.

Spike Recovery

4. The Matrix Spike recovery for Arsenic was below 30%. All positive and non-detect results are rejected.

5. The Matrix Spike recovery for Selenium was below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

Duplicate

6. The Duplicate analysis for Iron was outside the control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

LCS

No deficiencies in this section.

Serial Dilution

7. The Serial dilutions for Chromium, Iron, Manganese, Sodium and Zinc were outside the control limit. All positive results are qualified as estimated,"J".

MSA

8. The following analytes exhibited low recovery during the GFAA spiking procedures. All data is qualified as estimated, "J" or "UJ".

Analyte	Samples
Arsenic	2-M002.

HEARTLAND ENVIRONMENTAL SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	Se	+/U	R	1
All Water Samples	Cd,Cu,Mn, and Ag	+/U	J/UJ	2
All Water Samples	Zn	+	R	3
All Water Samples	As	+/U	R	4
All Water Samples	Se	+/U	J/UJ	5
All Water Samples	Fe	+/U	J/UJ	6
All Water Samples	Cr,Fe,Mn, Na and Zn.	+	J	7
2-M002	As	+/U	J/UJ	8

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

1-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP107

Matrix (soil/water): WATER Lab Sample ID: 911010701

Level (low/med): LOW Date Received: 10/23/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~	~~N~~	~~F~~	R 4
7440-39-3	Barium	18.70	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.30	B		P	J2
7439-89-6	Iron	13500.00		*E	P	J6,7
7439-92-1	Lead	2.00	U		F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	122.00		E	P	J7
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~N~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	2410.00	B	E	P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	~~20.00~~			~~P~~	R3
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

1-M102

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP107

Matrix (soil/water): WATER Lab Sample ID: 911010702

Level (low/med): LOW Date Received: 10/23/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~	~~N~~	~~F~~	R4
7440-39-3	Barium	20.20	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	17000.00		*E	P	J6,7
7439-92-1	Lead	2.00	U		F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	126.00		E	P	J7
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~N~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	2270.00	B	E	P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	~~11.20~~	~~B~~		~~P~~	R3
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

2-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP107

Matrix (soil/water): WATER Lab Sample ID: 911010703

Level (low/med): LOW Date Received: 10/23/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.90~~	~~B~~	~~NW~~	~~F~~	R4
7440-39-3	Barium	54.80	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	51.70			P	J7
7440-48-4	Cobalt				NR	
7440-50-8	Copper	34.10			P	J2
7439-89-6	Iron	91300.00		*E	P	J6,7
7439-92-1	Lead	6.90			F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	110.00		E	P	J7
7439-97-6	Mercury	.41			CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~N~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	5660.00		E	P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	66.80			P	J7
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP107

Matrix (soil/water): WATER Lab Sample ID: 911010704

Level (low/med): LOW Date Received: 10/23/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~	~~N~~	~~F~~	R4
7440-39-3	Barium	16.00	U		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	3200.00		*E	P	J6,7
7439-92-1	Lead	2.00	U		F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	3.20	B	E	P	J2,7
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~N~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	3640.00	B	E	P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	~~16.70~~	~~B~~		~~P~~	R3
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

4-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP107

Matrix (soil/water): WATER Lab Sample ID: 911010705

Level (low/med): LOW Date Received: 10/23/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~4.70~~	~~B~~	~~N~~	~~F~~	R4
7440-39-3	Barium	214.00			P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	8.10			P	J2
7440-70-2	Calcium				NR	
7440-47-3	Chromium	168.00			P	J7
7440-48-4	Cobalt				NR	
7440-50-8	Copper	79.30			P	
7439-89-6	Iron	167000.00		*E	P	J6,7
7439-92-1	Lead	28.10			F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	331.00		E	P	J7
7439-97-6	Mercury	1.86			CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~N~~	~~F~~	R1
7440-22-4	Silver	36.40			P	
7440-23-5	Sodium	3060.00	B	E	P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	163.00			P	J7
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report (CCS) - Present?	[ ]		✓
ACTION: If no, contact RSCC.			
A.1.2 Record of Communication (from RSCC) - Present?	[ ]		✓
ACTION: If no, request from RSCC.			
A.1.3 Trip Report - Present and complete?	[ ]		✓
ACTION: If no, contact RSCC for trip report.			
A.1.4 Sample Traffic Report - Present or on file?	[ ]		✓
Legible?	[ ]		✓
ACTION: If no, request from Regional Sample Control Center (RSCC).			
A.1.5 Cover Page - Present?	[✓]		
Is cover page properly filled in and signed by the lab manager or the manager's designee?	[✓]		
ACTION: If no, prepare Telephone Record Log, and contact laboratory.			
Do numbers of samples correspond to numbers on Record of Communication?	[ ]		✓
Do sample numbers on cover page agree with sample numbers on:			
(a) Traffic Report Sheet?	[ ]		✓
(b) Form I's?	[✓]		
ACTION: If no for any of the above, contact RSCC for clarification.			

	YES	NO	N/A
A.1.6 Form I (Final Data) - Are all Form I's present and complete?	[✓]	__	__
ACTION: If no, prepare telephone record log and contact laboratory for submittal.			
Are correct units (ug/l for waters and mg/kg for soils) indicated on Form I's?	[✓]	__	__
Are soil sample results for each parameter corrected for percent solids?	[__]	__	✓
Are EPA sample # s and corresponding laboratory sample ID # s the same as on the Cover Page, Form I's and in the raw data?	[✓]	__	__
Are computation/transcription errors less than 10% of reported values?	[✓]	__	__
Are all "less than IDL" values properly coded with "U"?	[✓]	__	__
Was a brief physical description of samples given on Form I's?	[✓]	__	__
Were the result qualifiers used correctly with final data?	[✓]	__	__
ACTION: If no for any of the above, prepare Telephone Record Log, and contract laboratory for corrected data.			
Were any samples diluted beyond requirements of contract?	__	[✓]	__
If yes, were dilutions noted on Form I's?	[✓]	__	__
ACTION: If no, note under Contract-Problem/Non-Compliance of the"Data Assessment Narrative".			

A.1.7 Holding Times - (aqueous and soil samples)

(Examine sample traffic reports and digestion/distillation logs.)

Mercury analysis (28 days). . . . . exceeded?	__	[✓]	__
Cyanide distillation (14 days). . . . . exceeded?	__	[__]	✓

	YES	NO	N/A
Other Metals analysis (6 months). . . . exceeded?	___	[✓]	___

NOTE: Prepare a list of all samples and analytes for which holding times have been exceeded. Specify the number of days from date of collection to the date of preparation (from raw data). Attach to checklist.

ACTION: If yes, reject (red-line) values less than Instrument Detection Limit (IDL) and flag as estimated (J) the values above IDL even though sample(s) was preserved properly.

A.1.8 Raw Data

A.1.8.1	Digestion Log* for flame AA/ICP (Form XIII) present?	[✓]	___	___
	Digestion Log for furnace AA Form XIII present?	[✓]	___	___
	Distillation Log for mercury Form XIII present?	[✓]	___	___
	Distillation Log for cyanides Form XIII present?	[___]	___	✓
	Are pH values (pH<2 for all metals, pH>12 for cyanide) present?	[✓]	___	___
	*Weights, dilutions and volumes used to obtain values.			
	Percent solids calculation present for soils/sediments?	[___]	___	✓
	Are preparation dates present on Digestion Log?	[✓]	___	___
A.1.8.2	Measurement read out record present? ICP	[✓]	___	___
	Flame AA	[___]	___	✓
	Furnace AA	[✓]	___	___
	Mercury	[✓]	___	___
	Cyanides	[___]	___	✓

	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	[✓]	__	__
Legible?	[✓]	__	__
Properly Labeled?	[✓]	__	__

ACTION: If no for any of the above, write Telephone Record Log and contact laboratory. Flag metal data as estimated if pH of sample is greater than 2. Flag cyanide data as estimated if pH sample is less than 12.

A.1.9 Data Validation and Verification

1.9.1 Calibration

	YES	NO	N/A
A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	[✓]	__	__
Is record of 5 point calibration present for Hg analysis?	[✓]	__	__

ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.1.2 Is record of 4 point calibration present for:			
Flame AA?	[__]	__	✓
Furnace AA?	[✓]	__	__
Cyanides?	[__]	__	✓

NOTE:
1. If less than 4 standards are measured in absorbance mode, then the remaining standards in concentration mode must be run immediately after calibration and be within ±10% of true value.
2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRDL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
ACTION: Flag associated data as estimated if standards are not within ±10% of true values (except CRDL calibration standard). Do not flag the data as estimated in linear range indicated by good recovery of standard.			
A.1.9.1.3 Is correlation *coefficient less than 0.995 for:			
Mercury Analysis?	___	[✓]	___
Cyanide Analysis?	___	[___]	✓
Atomic Absorption Analysis?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.2 Form II A (Initial and Continuing Calibration Verification)-			
A.1.9.2.1 Present and complete for every metal and cyanide?	[✓]	___	___
Present and complete for AA and ICP when both are used for same analyte?	[✓]	___	___
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
A.1.9.2.2 Circle all values on data summary sheet that are outside contract windows. Are all calibration standards (initial and continuing) within control limits?			
Metals 90-110%	[✓]	___	___
Hg - 80-120%	[✓]	___	___
Cyanides 85-115%	[___]	___	✓

* The reviewer will calculate correlation coefficient.

	YES	NO	N/A
ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with %R between 75-89% (65-79% for Hg; 70-84% for CN) or 111-125% (121-135% for Hg; 116-130% for CN) recovery and nearest good calibration standard. Qualify results <IDL as estimated (UJ), if the ICV or CCV %R is 75-89% (CN, 70-84% ; HG, 65-79%). Reject (red-line) as unacceptable data if recovery of the ICV or CCV is outside the range 75-125% (CN, 70-130%; Hg, 65-135%). Qualify five samples on either side of verification standard out of control limits.			
Was continuing calibration performed every 10 samples or every 2 hours?	[✓]	__	__
ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).			
Was ICV for cyanides distilled?	[__]	__	✓
ACTION: If no, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".			

A.1.9.3 Form II B (CRDL Standards for AA and ICP) -

	YES	NO	N/A
A.1.9.3.1 Was a CRDL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?	[✓]	__	__
*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?	[__]	__	✓
Was a 2xCRDL (or 2xIDL when IDL>CRDL) analyzed (CRI) for each ICP run? (Note: CRI for AL,Ba,Ca,Fe,Mg,Na,or K is not required.)	[✓]	__	__

ACTION: If no for any of the above, flag as estimated all data falling within the affected ranges. The affected ranges are:
AA Analysis - **True Value ± CRDL
ICP Analysis - **True Value ± 2CRDL
CN Analysis - **True Value ± 0.5 x True Value.

* Find the results of mid-range standard in the raw data.
**True value of CRA, CRI or mid-range standard. Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/A
A.1.9.3.2	Was CRI analyzed after ICV/ICB and before the final CCV/CCB, and for every four hours of ICP run?	[✓]		

ACTION: If no, write in Contract Problem/Non-Compliance Section of the "Data Assessment Narrative".

A.1.9.3.3 Circle all values on summary sheet that are outside acceptance windows.

Are CRA and CRI standards within control limits: Metals 80 - 120%R?	[ ]	✓	
Is mid-range standard within control limits: Cyanide 80 - 120%R?	[ ]		✓

ACTION: Flag as estimated all data within the affected ranges if the recovery of the standard is between 50-79%; flag only positive data if the recovery is between 121-150%; reject (red line) all data if the recovery is less than 50%; reject only positive data if the recovery is greater than 150%.

A.1.9.4 Form III (Initial and Continuing Calibration Blanks)

A.1.9.4.1	Present and complete?	[✓]		
	For both AA and ICP when both are used for same analyte?	[✓]		
	Was an initial calibration blank analyzed?	[✓]		
	Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	[✓]		

ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/non-compliance section of the Data Assessment Narrative.

		YES	NO	N/A
A.1.9.4.2	Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IDL when IDL > CRDL). Are all calibration blanks (when IDL<CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	[✓]		
	Are all calibration blanks less than two times Instrument Detection Limit (when IDL>CRDL)?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all positive data less than or equal to calibration blank values analyzed between calibration blank with value over CRDL (or 2xIDL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.

A.1.9.5 FORM III (Preparation Blank) -

(Note: The preparation blank for mercury is the same as the calibration blank.)

A.1.9.5.1	Was one prep. blank analyzed for: each 20 samples?	[✓]		
	each batch?	[✓]		
	each matrix type?	[✓]		
	both AA and ICP when both are used for same analyte?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all associated positive data <10 x IDLs for which prep. blank was not analyzed.

NOTE: If only one blank was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).

A.1.9.5.2	Is concentration of prep. blank greater than CRDL when IDL is less than or equal to CRDL?		[✓]	
	If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?		[✓]	

		YES	NO	N/A
	ACTION: If yes, reject (red-line) all associated data greater than CRDL concentration but less than ten times the prep. blank value found in the raw data.			
A.1.9.5.3	Do concentrations of prep. blank fall below two times IDL when IDL is greater than CRDL?	[✓]		
	ACTION: If no, reject (red-line) all positive data that has a concentration less than 10 times the prep. blank value in the raw data.			
A.1.9.5.4	Is concentration of prep. blank below the negative CRDL?		[✓]	
	ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6	Form IV (ICP Interference Check Sample)			
A.1.9.6.1	Present and complete?	[✓]		
	(NOTE: Not required for furnace AA, flame AA, mercury, cyanide and Ca, Mg, K and Na.)			
	Was ICS analyzed at beginning and end of run (or at least twice every 8 hours)?	[✓]		
	ACTION: If no, flag as estimated (J) all samples for which AL, Ca, Fe, or Mg is higher than in ICS.			
A.1.8.6.2	Circle all values on Data Summary Sheet that are more than + 20% of true or established mean value. Are all Interference Check Sample results inside of control limits (+ 20%)?	[✓]		
	If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	[✓]		
	ACTION: If no, flag as estimated (J) those positive results for which ICS recovery is between 121-150%; flag all sample results as estimated if ICS recovery falls within 50-79%; reject (red-line) those sample results for which ICS recovery is less than 50%; if ICS recovery is above 150%, reject positive results only (not flagged with a "U").			

		YES	NO	N/A
A.1.9.7	Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)- (Note: Not required for Ca, Mg, K, and Na (both matrices), Al, and Fe (soil only.)			
A.1.9.7.1	Present and complete for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each conc. range (i.e. low, med., high)?	[✓]	__	__
	For both AA and ICP when both are used for same analyte?	[✓]	__	__
	ACTION: If no for any of the above, flag as estimated (J) all positive data less than four times spiking level for which spiked sample was not analyzed.			
	NOTE: If one spiked sample was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.9.7.2	Was field blank used for spiked sample?	__	[✓]	__
	ACTION: If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
	NOTE: Matrix spike analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.7.3	Circle all values on Data Summary Sheet that are outside control limits (75% to 125%). Are all recoveries within control limits?	[__]	✓	__
	If no, is sample concentration greater than or equal to four times spike concentration?	[__]	✓	__
	ACTION: If yes, disregard spike recoveries for analytes whose concentrations are greater than or equal to four times spike added. If no, circle those analytes on Form V for which sample concentration is less than four times the spike concentration.			

	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	[✓]	__	__

ACTION: If no, write in the Contract - Problem/Non - Compliance section of "Data Assessment Narrative".

A.1.9.7.4 Aqueous

Are any spike recoveries:

	YES	NO	N/A
(a) less than 30%?	✓	[ ]	__
(b) between 30-74%?	✓	[ ]	__
(c) between 126-150%?	__	[✓]	__
(d) greater than 150%?	__	[✓]	__

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 126-150%, flag as estimated (J) all associated aqueous data not flagged with a "U"; if greater than 150%, reject (red-line) all associated aqueous data not flagged with a "U".

NOTE: If pre-digestion spike result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, disregard spike recovery on Form V. Flag the associated data as estimated(J).

A.1.9.7.5 Soil/Sediment

Are any spike recoveries:

	YES	NO	N/A
(a) less than 10%?	__	[ ]	✓
(b) between 10-74%?	__	[ ]	✓
(c) between 126-200%?	__	[ ]	✓
(d) greater than 200%?	__	[ ]	✓

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 126-200%, flag as estimated all associated data was not flagged with a "U"; if greater than 200%, reject all associated data not flagged with a "U".

		YES	NO	N/A
A.1.9.8	Form VI (Lab Duplicates)			
A.1.9.8.1	Present and complete for: each 20 samples?	[✓]	___	___
	each matrix type?	[✓]	___	___
	each concentration range (i.e. low, med., high)?	[✓]	___	___
	both AA and ICP when both are used for same analyte?	[✓]	___	___

ACTION: If no for any the above, flag as estimated (J) all data >CRDL* for which duplicate sample was not analyzed.

Note: 1. If one duplicate sample was analyzed for more than 20 samples, then first 20 samples do not have to be flagged as estimated.
2. If percent solids for soil sample and its duplicate differ by more than 1%, prepare a Form VI for each duplicate pair, report concentrations in Hg/L on wet weight basis and calculate RPD or Difference for each analyte.

A.1.9.8.2	Was field blank used for duplicate analysis?	___	[✓]	___

ACTION: If yes, flag all data >CRDL* as estimated (J) for which field blank was used as duplicate.

NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.

A.1.9.8.3	Are all values within control limits (RPD 20% or difference < ±CRDL)?	[___]	✓	___
	If no, are all results outside the control limits flagged with an * on Form I's and VI?	[___]	✓	___

ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".

NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than IDL.

* Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/A
	2. If lab duplicate result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, do not apply precision criteria.			
A.1.9.8.4	Is any value for sample duplicate pair less than CRDL* and other value greater than or equal to 10 x *CRDL?	___	[✓]	___
	ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5	Aqueous Circle all values on Data Summary Sheet that are: RPD > 50%, or Difference > ± CRDL*.			
	Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	✓	[_ _]	_ _
	Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[✓]	___
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.8.6	Soil/Sediment Circle all values on Data Summary Sheet that are: RPD > 100%, or Difference > 2 x CRDL*			
	Is any RPD (where sample and duplicate are both greater than or equal to 5 times *CRDL) : > 100%?	___	[_ _]	✓
	Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) : > 2x*CRDL?	___	[___]	✓

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

		YES	NO	N/A
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9	Field Duplicates			
A.1.9.9.1	Were field duplicates analyzed?	[✓]		

ACTION: If yes, prepare a Form VI for each aqueous field duplicate pair. Prepare a Form VI for each soil duplicate pair, if percent solids for sample and its duplicate differ by more than 1%; report concentrations of soils in ug/l on wet weight basis and calculate RPDs or Difference for each analyte.

NOTE:
1. Do not calculate RPD when both values are less than IDL.
2. Flag all associated data only for field duplicate pair.

A.1.9.9.2	Is any value for sample duplicate pair less than *CRDL and other value greater than or equal to 10 x *CRDL?		[✓]	

ACTION: If yes, flag the associated data as estimated.

A.1.9.9.3 Aqueous

Circle all values on Form VI for field duplicates that are:

RPD > 50%, or
Difference > ± CRDL*

	Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?		[✓]	
	Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?		[✓]	

ACTION: If yes, flag the associated data as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.9.4 Soil/Sediment			
Circle all values on Form VI for field duplicates that are: RPD >100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than 5 times *CRDL) : >100%?	___	[✓]	___
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x *CRDL): >2x *CRDL?	___	[✓]	___

ACTION: If yes, flag the associated data as estimated.

A.1.9.10 Form VII (Laboratory Control Sample) (Note: LCS - not required for aqueous Hg and cyanide analyses.)

A.1.9.10.1 Was one LCS prepared and analyzed for: every 20 water samples?	[✓]	__	___
every 20' solid samples?	[___]	__	✓
both AA and ICP when both are used for same analyte?	[✓]	__	___

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory for submittal of results of LCS. Flag as estimated (J) all data for which LCS was not analyzed.

NOTE: If only one LCS was analyzed for more than 20 samples, then first 20 samples close to LCS do not have to be flagged as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

**Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.10.2 Aqueous LCS			
Circle all LCS values outside control limits (80 - 120%- except aqueous Ag and Sb).			
Is any LCS recovery: less than 50%?	___	[✓]	___
between 50% and 79%?	___	[✓]	___
between 121% and 150%?	___	[✓]	___
greater than 150%?	___	[✓]	___

ACTION: Less than 50%, reject (red-line) all data; between 50% and 79%, flag all associated data as estimated (J); between 121% and 150%, flag all positive (not flagged with a "U") results as estimated; greater than 150%, reject all positive results.

A.1.9.10.3 Solid LCS

NOTE: 1. If "Found" value of LCS is rejectable due to duplicate injections or analytical spike recovery criteria, regardless of LCS recovery, flag the associated data as estimated (J).
2. If IDL of an analyte is equal to or greater than true value of LCS, disregard the "Action" below even though LCS is out of control limits.

Is LCS "Found" value higher than the control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated positive data as estimated.

Is LCS "Found" value lower than the Control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated data as estimated.

		YES	NO	N/A
A.1.9.11	Form IX (ICP Serial Dilution) -			
	NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IDL.			
A.1.9.11.1	Was Serial Dilution analysis performed for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each concentration range (i.e. low, med.)?	[✓]	__	__
	ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIDLs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DFO report.			
A.1.9.11.2	Was field blank(s) used for Serial Dilution Analysis?	__	[✓]	__
	ACTION: If yes, flag all associated data ≥ 10 x IDL as estimated (J).			
	NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.11.3	Are results outside control limit flagged with an "E" on Form I's and Form IX when initial concentration on Form IX is equal to 50 times IDL or greater.	[✓]	__	__
	ACTION: If no, write in the contract-problem/non-compliance section of the "Data Assessment Narrative".			
A.1.9.11.4	Circle all values on Data Summary Sheet that are outside control limit for initial concentrations equal to or greater than 10 x IDLs only. Are any % difference values: > 10%?	✓	[__]	__
	≥ 100%?	__	[✓]	__

	YES	NO	N/A
ACTION: Flag as estimated (J) all associated equal to or greater than 10xIDLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xIDLs for which PD is greater than or equal to 100%.			
A.1.9.12 Furnace Atomic Absorption (AA) QC Analysis			
A.1.9.12.1 Are duplicate injections present in furnace raw data (except during full Method of Standard Addition) for each sample analyzed by GFAA?	[✓]	__	__
ACTION: If no, reject the data on Form I's for which duplicate injections were not performed.			
A.1.9.12.2 Do the duplicate injection readings agree within 20% Relative Standard Deviation (RSD) or Coefficient of Variation (CV) for concentration greater than CRDL?	[✓]	__	__
Was a dilution analyzed for sample with post digestion spike recovery less than 40%?	[✓]	__	__
ACTION: If no for any of the above, flag all the associated data as estimated (J).			
A.1.9.12.3 Is *post digestion spike recovery less than 10% or greater than 150% for any result?	__	[✓]	__
ACTION: If yes, reject (red-line) the affected data if recovery is <10%; reject data not flagged with "U" if spike recovery is >150%.			
NOTE: Reject the data only if the affected sample was not subsequently analyzed by Method of Standard Addition.			

* Post digestion spike is not required on the pre-digestion spiked sample when predigestion spike recovery is within control limits of 75-125% or when SR>4xSA.

		YES	NO	N/A
A.1.9.13	Form VIII (Method of Standard Addition Results)			
A.1.9.13.1	Present?	[✓]	__	__
	If no, is any Form I result coded with "S" or a "+"?	__	[✓]	__
	ACTION: If yes, write request on Telephone Record Log and contact laboratory for submittal of Form VIII.			
A.1.9.13.2	Is coefficient of correlation for MSA less than 0.990 for any sample?	__	[✓]	__
	ACTION: If yes, reject (red-line) affected data.			
A.1.9.13.3	Was *MSA required for any sample but not performed?	__	[✓]	__
	Is coefficient of correlation for MSA less than 0.995?	__	[✓]	__
	Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	__	[✓]	__
	ACTION: If yes for any of the above, flag all the associated data as estimated (J).			
A.1.9.13.4	Was proper quantitation procedure followed correctly as outlined in the SOW on page E-16 through E-17?	[✓]	__	__
	ACTION: If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14	Dissolved/Total or Inorganic/Total Analytes -			
A.1.9.14.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)..	__	[✓]	__
	Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	__	[✓]	__

* MSA is not required on LCS and prep. blank.

	YES	NO	N/A
NOTE: 1. If yes, prepare a list comparing differences between all dissolved (or inorganic) and total analytes. Compute the differences as a percent of the total analyte only when dissolved concentration is greater than CRDL as well as total concentration. 2. Apply the following questions only if inorganic (or dissolved) results are (i) above CRDL, and (ii) greater than total constituents. 3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.			
A.1.9.14.2 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 10%?	___	[✓]	___
A.1.9.14.3 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%?	___	[✓]	___

ACTION: If more than 10%, flag both dissolved (or inorganic) and total values as estimated (J); if more than 50%, reject (red-line) the data for both values.

A.1.9.15 Form I to IX

A.1.9.15.1 Are all the Form I through Form IX labeled with:

	YES	NO	N/A
Laboratory name?	[✓]	___	___
Case/SAS number?	[✓]	___	___
EPA sample No.?	[✓]	___	___
SDG No.?	[✓]	___	___
Contract No.?	[✓]	___	___
Correct units?	[✓]	___	___
Matrix?	[✓]	___	___

ACTION: If no for any of the above, note under contract problem/non-compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.15.2 Do any computation/transcription errors exceed 10% of reported values on Forms I-IX for:			
(NOTE: Check all forms against raw data.)			
(a) all analytes analyzed by ICP?	___	[✓]	___
(b) all analytes analyzed by GFAA?	___	[✓]	___
(c) all analytes analyzed by AA Flame?	___	[ ]	✓
(d) Mercury?	___	[✓]	___
(e) Cyanide?	___	[ ]	✓

ACTION: If yes, prepare Telephone Log, contact laboratory for corrected data and correct errors with red pencil and initial.

A.1.9.16 Form I (Field Blank) -

Circle all field blank values on Data Summary Sheet that are greater than CRDL, 2 x IDL when IDL > CRDL.

Do concentrations of field blank(s) fall below CRDL (or 2 x IDL when IDL > CRDL) for all parameters of associated aqueous and soil samples?	[✓]	___	___
If no, was field blank value already rejected due to other QC criteria?	[✓]	___	___

ACTION: If no, reject (except field blank results) all associated positive sample data less than or equal to five times the field blank value.

	YES	NO	N/A
A.1.9.17 Form X, XI, XII (Verification of Instrumental Parameters).			
A.1.9.17.1 Is verification report present for:			
Instrument Detection Limits (quarterly)?	[✓]		
ICP Interelement Correction Factors (annually)?	[✓]		
ICP Linear Ranges (quarterly)?	[✓]		
ACTION: If no, contact DPO of the lab.			
A.1.9.17.2 Form X (Instrument Detection Limits) - (Note: IDL is not required for Cyanide.)			
Are IDLs present for: all the analytes?	[✓]		
all the instruments used?	[✓]		
For both AA and ICP when both are used for same analyte?	[✓]		
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
Is IDL greater than CRDL for any analyte?		[✓]	
If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?	[✓]		
ACTION: If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.			

	YES	NO	N/A
A.1.9.17.3 Form XI (Linear Ranges)			
Was any sample result higher than high linear range of ICP.	___	[✓]	___
Was any sample result higher than the highest calibration standard for non-ICP parameters?	___	[✓]	___
If yes for any of the above, was the sample diluted to obtain the result on Form I?	[✓]	___	___
ACTION: If no, flag the result reported on Form I as estimated(J).			
A.1.9.18 Percent Solids of Sediments			
Is soil content in sediment(s) less than 50%?	___	[___]	✓
ACTION: If yes, qualify as estimated all data not previously rejected or flagged due to other QC criteria.			

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Feb. 1990
Number: HW-2
Revision: 10

Case#	NWS	Site	Naval Weapons Station	Matrix:	Soil ____
SDG#	CLP 107	Lab	Roy F. Weston		Water ✓
Contractor	Roy F. Weston	Reviewer	Heartland ESI		Other ____

A.2.1 The case description and exceptions, if any, are noted below with reason(s) for rejection or qualification as estimated value(s) J.

1. CRDL Selenium <50% all data rejected.
2. CRDL Cadmium, Copper, Manganese and Silver recovery above control. All positive results are estimated.
3. CRDL Zinc >150%. All positive results are rejected.
4. The Matrix Spike recovery for Arsenic was <30%. All data rejected.
5. The Matrix Spike recovery for Selenium was below control limit. All data estimated.
6. The Duplicate analysis for Iron was outside the control limit. All data estimated.
7. The Serial dilutions for Chromium, Iron, Manganese, Sodium and Zinc were outside of the control limit. All positive results are estimated.

A.2.1 (continuation)

8. The analytical spike for Arsenic for sample 2-M002 was below the lower control limit. All data is estimated.

PBH 2/27/92

PBH 2/27/92

2.2 Contract-Problems/Non-Compliance

PBH 2/27/92

MB Reviewer: _____ Date: _____
Signature

Contractor Reviewer: Paul B. Henly Date: 2/27/92
Signature

Verified by: [illegible] Date: 3/2/92

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 107

SITE/STUDY DESCRIPTION: Naval Weapon Station SAMPLE NOS: 1-M002, 1-M102, 2-M002, 3-M002, 4-M002

FIELD DUP. #'S: _____ LAB DUP. #'S: 2-M002 Field Blank MATRIX SPIKE #: 2-M002

SERIAL DILUTION SAMPLE NO. 2-M002 COMPLETION DATE: 2/27/91 REVIEWERS INITIALS: PB#

Parameter	X Detection Limits UG/L CRDL	IDL	I Field Blank	IIA Calib. Ver. %R Init	Continued 1	2	3	IIB CRDL Std Ver. % R Init	Fin	III Calibration Blanks Init	Continued 1	2	3	PBL PBN	IV ICP ICS % R Init	Fin	V MS Matrix	VI Lab Dup RPD Diff	VII LCS % R	IX Ser Dil % D	Method
Al	200		NA																		
Sb	60																				
As	10	2		108	101	98	100	81		U	U	U	U	U			10	200	96		F
Ba	200	16		102	103	101	100			U	U	U	U	U	87	87	101	5.2	98	100	P
Be	5																				
Cd	5	2		105	108	104	104	127	81	U	U	U	U	U	95	99	104		105		P
Ca	5000																				
Cr	10	4		99	101	101	101	80	105	U	U	U	U	U	96	100	104	12.3	98	14.9	P
Co	50																				
Cu	25	6		103	105	104	103	126	127	U	U	U	U	U	98	99	99	3.2	98	46	P
Fe	100	46		100	103	102	104			U	U	U	U	U	97	100	-290	26	99	36	P
Pb	3	3		103	101	103	102	80		U	U	U	U	U			75	4.4	96		F
Mg	5000																				
Mn	15	2		100	101	101	102	124	130	U	3	U	U	U	106	107	99	17.8	98	29	P
Hg	0.2			102	102	101	103			U	U	U	U	U			94	3.5	96		CV
Ni	40																				
K	5000																				
Se	5	2		104	99	103	102	28		U	U	U	U	U			43		84		F
Ag	10	3		102	104	103	103	123	112	U	U	U	U	U	96	98	75		100		P
Na	5000	110		102	103	101	101			U	U	U	167	U				1.3	98	29	P
Tl	10																				
V	50																				
Zn	20	6	U	101	104	104	104	150	168	U	U	U	U	7	84	93	102	8.7	100	23	P
CN	10																				

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NW5 SOW NO. 390 SAMPLE TYPE/SDG: CLP 107

SITE/STUDY DESCRIPTION: _____ SAMPLE NOS: _____

Field Blank _____

FIELD DUP. #'S: _____ LAB DUP. #'S: _____ MATRIX SPIKE #: _____

SERIAL DILUTION SAMPLE NO. _____ COMPLETION DATE: 2/27/92 REVIEWERS INITIALS: PBH

Parameter	X Detection Limits UG/L CRDL	IDL	I Field Blank	IIA Calib. Ver. %R Init	Continued 1	2	3	IIB CRDL Std Ver. % R Init	Fin	III Calibration Blanks Init	Continued 1	2	3	IV PBL PREP	ANA	IV ICP ICS % R Init	Fin	V Matrix Spik	VI Lab Dup RPD Diff	VII LCS % R	IX Ser Dil % D	Meth
Al	200		NA																			
Sb	60																					
As	10	2			100	100	100	126			U	U	U	U								F
Ba	200	16			99	102					U	U		U								P
Be	5																					
Cd	5	2			102	104					U	U		U								P
Ca	5000																					
Cr	10	4			101	104					U	U		U								P
Co	50																					
Cu	25	6			102	105					U	U		U								P
Fe	100	46			102	103					U	U		U								P
Pb	3	3			103	103	105				U	U	U	U								F
Mg	5000																					
Mn	15	2			101	103					U	U		U								P
Hg	0.2				101	101					U	U		U								CV
Ni	40																					
K	5000																					
Se	5	2		~~44~~	98	101	99	44			U	U	U	U								F
Ag	10	3			102	104					U	U		U								P
Na	5000	110			100	104					117	145		U								P
Tl	10																					
V	50																					
Zn	20	6			103	108					U	U		U								P
CN	10																					

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CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited scope) Date: 2/27/92 Case #: NWS

Site: Naval Weapons Station Lab Name: Roy F. Weston

Reviewer's Initials: PBH Number of Samples: 5

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Inter-ferences	Spike Recovery	Duplicates Lab	Duplicates Field	Detection Limits	LCS	Serial Dilution	MSA	Total Analytes	Rejection
ICP		1											1	
Flame AA														
Furnace AA		1				1							2	
Mercury														
Total		2				1							3	
Other														

Analytes Flagged as Estimated (J) Due to Exceeding Criteria For:*

ICP		4					1				5		10	
Flame AA														
Furnace AA						1						1	2	
Mercury														
Total		4				1	1				5	1	12	
Other														

Note:
Asterisk (*) Indicates additional exceedances of review criteria.

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.7: CLP Data Assessment Checklist
Inorganic Analysis

Date: Feb. 1990
Number: HW-2
Revision: 10

INORGANIC REGIONAL DATA ASSESSMENT

Region II

CASE NO. NWS

SITE Naval Weapons Station

LABORATORY Roy F. Weston

NO. OF SAMPLES/ MATRIX 5 waters

SDG# CLP 107

REVIEWER (IF NOT ESD) Heartland ESI

SOW# 390

REVIEWER'S NAME Paul B. Humbey

DPO: ACTION _____ FYI _____

COMPLETION DATE 2/27/92

DATA ASSESSMENT SUMMARY

		ICP	AA	Hg	CYANIDE
1.	HOLDING TIMES	O	O	O	NA
2.	CALIBRATIONS	Z	Z		
3.	BLANKS	O	O		
4.	ICS				
5.	LCS		O		
6.	DUPLICATE ANALYSIS		O		
7.	MATRIX SPIKE		Z		
8.	MSA		O		
9.	SERIAL DILUTION				
10.	SAMPLE VERIFICATION		O		
11.	OTHER QC		O		
12.	OVERALL ASSESSMENT		O		

O = Data has no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS:

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Two (2) water sample and no (0) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
7-M002	911010801
7-M102	911010802

Heartland ESI has reviewed the data for the samples listed above TAL Metals (under the limited scope requirements) using Region II Data Validation Protocol, February 1990 revision. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

TAI Metals reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110108**, the analysis of two (2) field water sample and no (0) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The USEPA CLP analytical protocol was followed as required with the exception that the Laboratory failed to submit Forms 5,6 and 9 in this package. The Laboratory should insert these missing pages to complete this data package. The QC data for this package can be found in SDG #107.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in Region II Protocol.

Calibration

1. The CRDL Standard for Selenium was below 50%. All positive and non-detect results are rejected if within the concentration range as applied by the Region II Protocol.

2. The CRDL Standards for Cadmium, Copper, Manganese and Silver were below the lower control limit. All positive and non-detect results within the affected range are qualified as estimated, "J" or "UJ".

3. The CRDL Standard for Zinc was above 150%. All positive results are rejected if within the concentration range as pplied by the Region II Protocol.

Preparation and Field Blanks

No deficiencies in this section.

Interferences

No significant interferences were observed.

Metals Data Assessment Narrative (continued - Page 2)

Interferences

No significant interferences were observed.

Spike Recovery

4. The Matrix Spike recovery for Arsenic was below 30%. All positive and non-detect results are rejected.

5. The Matrix Spike recovery for Selenium was below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

Duplicate

6. The Duplicate analysis for Iron was outside the control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

LCS

No deficiencies in this section.

Serial Dilution

7. The Serial dilutions for Chromium, Iron, Manganese, Sodium and Zinc were outside the control limit. All positive results are qualified as estimated,"J".

MSA

8. The following analytes exhibited low recovery during the GFAA spiking procedures. All data is qualified as estimated, "J" or "UJ".

Analyte	Samples
Selenium	7-M002.

HEARTLAND ENVIRONMENTAL SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	Se	+/U	R	1
All Water Samples	Cd,Cu,Mn, and Ag	+/U	J/UJ	2
All Water Samples	Zn	+	R	3
All Water Samples	As	+/U	R	4
All Water Samples	Se	+/U	J/UJ	5
All Water Samples	Fe	+/U	J/UJ	6
All Water Samples	Cr,Fe,Mn, Na and Zn.	+	J	7
7-M002	Se	+/U	J/UJ	8

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

7-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP108

Matrix (soil/water): WATER Lab Sample ID: 911010801

Level (low/med): LOW Date Received: 10/23/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~18.30~~		~~S~~	~~F~~	R4
7440-39-3	Barium	68.80	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	76.60			P	J7
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	36000.00			P	J6,7
7439-92-1	Lead	10.40			F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	150.00			P	J7
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	4370.00	B		P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	~~87.00~~			~~P~~	R3
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

7-M102

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP108

Matrix (soil/water): WATER Lab Sample ID: 911010802

Level (low/med): LOW Date Received: 10/23/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~29.90~~		~~S~~	~~F~~	R4
7440-39-3	Barium	73.30	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	68.10			P	J7
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	39700.00			P	J6,7
7439-92-1	Lead	12.30			F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	167.00			P	J7
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~		~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	4380.00	B		P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	~~94.00~~			~~P~~	R3
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report (CCS) - Present?	[ ]		✓
ACTION: If no, contact RSCC.			
A.1.2 Record of Communication (from RSCC) - Present?	[ ]		✓
ACTION: If no, request from RSCC.			
A.1.3 Trip Report - Present and complete?	[ ]		✓
ACTION: If no, contact RSCC for trip report.			
A.1.4 Sample Traffic Report - Present or on file?	[ ]		✓
Legible?	[ ]		✓
ACTION: If no, request from Regional Sample Control Center (RSCC).			
A.1.5 Cover Page - Present?	[✓]		
Is cover page properly filled in and signed by the lab manager or the manager's designee?	[✓]		
ACTION: If no, prepare Telephone Record Log, and contact laboratory.			
Do numbers of samples correspond to numbers on Record of Communication?	[ ]		✓
Do sample numbers on cover page agree with sample numbers on:			
(a) Traffic Report Sheet?	[ ]		✓
(b) Form I's?	[✓]		
ACTION: If no for any of the above, contact RSCC for clarification.			

	YES	NO	N/A
A.1.6 Form I (Final Data) - Are all Form I's present and complete?	[✓]	__	__
ACTION: If no, prepare telephone record log and contact laboratory for submittal.			
Are correct units (ug/l for waters and mg/kg for soils) indicated on Form I's?	[✓]	__	__
Are soil sample results for each parameter corrected for percent solids?	[__]	__	✓
Are EPA sample # s and corresponding laboratory sample ID # s the same as on the Cover Page, Form I's and in the raw data?	[✓]	__	__
Are computation/transcription errors less than 10% of reported values?	[✓]	__	__
Are all "less than IDL" values properly coded with "U"?	[✓]	__	__
Was a brief physical description of samples given on Form I's?	[✓]	__	__
Were the result qualifiers used correctly with final data?	[✓]	__	__
ACTION: If no for any of the above, prepare Telephone Record Log, and contract laboratory for corrected data.			
Were any samples diluted beyond requirements of contract?	__	[✓]	__
If yes, were dilutions noted on Form I's?	[✓]	__	__
ACTION: If no, note under Contract-Problem/Non-Compliance of the "Data Assessment Narrative".			

A.1.7 Holding Times - (aqueous and soil samples)

(Examine sample traffic reports and digestion/distillation logs.)

Mercury analysis (28 days). . . . . exceeded?	__	[✓]	__
Cyanide distillation (14 days). . . . . exceeded?	__	[__]	✓

	YES	NO	N/A
Other Metals analysis (6 months). . . . exceeded?	___	[✓]	___

NOTE: Prepare a list of all samples and analytes for which holding times have been exceeded. Specify the number of days from date of collection to the date of preparation (from raw data). Attach to checklist.

ACTION: If yes, reject (red-line) values less than Instrument Detection Limit (IDL) and flag as estimated (J) the values above IDL even though sample(s) was preserved properly.

A.1.8 Raw Data

		YES	NO	N/A
A.1.8.1	Digestion Log* for flame AA/ICP (Form XIII) present?	[✓]	___	___
	Digestion Log for furnace AA Form XIII present?	[✓]	___	___
	Distillation Log for mercury Form XIII present?	[✓]	___	___
	Distillation Log for cyanides Form XIII present?	[___]	___	✓
	Are pH values (pH<2 for all metals, pH>12 for cyanide) present?	[✓]	___	___
	*Weights, dilutions and volumes used to obtain values.			
	Percent solids calculation present for soils/sediments?	[___]	___	✓
	Are preparation dates present on Digestion Log?	[✓]	___	___
A.1.8.2	Measurement read out record present? ICP	[✓]	___	___
	Flame AA	[___]	___	✓
	Furnace AA	[✓]	___	___
	Mercury	[✓]	___	___
	Cyanides	[___]	___	✓

	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	[✓]	__	__
Legible?	[✓]	__	__
Properly Labeled?	[✓]	__	__

ACTION: If no for any of the above, write Telephone Record Log and contact laboratory. Flag metal data as estimated if pH of sample is greater than 2. Flag cyanide data as estimated if pH sample is less than 12.

A.1.9 Data Validation and Verification

1.9.1 Calibration

	YES	NO	N/A
A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	[✓]	__	__
Is record of 5 point calibration present for Hg analysis?	[✓]	__	__

ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.1.2 Is record of 4 point calibration present for:			
Flame AA?	[__]	__	✓
Furnace AA?	[✓]	__	__
Cyanides?	[__]	__	✓

NOTE:
1. If less than 4 standards are measured in absorbance mode, then the remaining standards in concentration mode must be run immediately after calibration and be within ±10% of true value.
2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRDL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
ACTION: Flag associated data as estimated if standards are not within ±10% of true values (except CRIL calibration standard). Do not flag the data as estimated in linear range indicated by good recovery of standard.			
A.1.9.1.3 Is correlation *coefficient less than 0.995 for:			
Mercury Analysis?	___	[✓]	___
Cyanide Analysis?	___	[___]	✓
Atomic Absorption Analysis?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.2 Form II A (Initial and Continuing Calibration Verification)-			
A.1.9.2.1 Present and complete for every metal and cyanide?	[✓]	___	___
Present and complete for AA and ICP when both are used for same analyte?	[✓]	___	___
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
A.1.9.2.2 Circle all values on data summary sheet that are outside contract windows. Are all calibration standards (initial and continuing) within control limits?			
Metals 90-110%	[✓]	___	___
Hg - 80-120%	[✓]	___	___
Cyanides 85-115%	[___]	___	✓

* The reviewer will calculate correlation coefficient.

	YES	NO	N/A
ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with %R between 75-89% (65-79% for Hg; 70-84% for CN) or 111-125% (121-135% for Hg; 116-130% for CN) recovery and nearest good calibration standard. Qualify results <IDL as estimated (UJ), if the ICV or CCV %R is 75-89% (CN, 70-84% ; HG, 65-79%). Reject (red-line) as unacceptable data if recovery of the ICV or CCV is outside the range 75-125% (CN, 70-130%; Hg, 65-135%). Qualify five samples on either side of verification standard out of control limits.			
Was continuing calibration performed every 10 samples or every 2 hours?	[✓]	__	__
ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).			
Was ICV for cyanides distilled?	[__]	__	✓
ACTION: If no, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".			

A.1.9.3 Form II B (CRDL Standards for AA and ICP) -

	YES	NO	N/A
A.1.9.3.1 Was a CRDL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?	[✓]	__	__
*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?	[__]	__	✓
Was a 2xCRDL (or 2xIDL when IDL>CRDL) analyzed (CRI) for each ICP run? (Note: CRI for AL,Ba,Ca,Fe,Mg,Na,or K is not required.)	[✓]	__	__

ACTION: If no for any of the above, flag as estimated all data falling within the affected ranges. The affected ranges are:

AA Analysis - **True Value ± CRDL
ICP Analysis - **True Value ± 2CRDL
CN Analysis - **True Value ± 0.5 x True Value.

* Find the results of mid-range standard in the raw data.
**True value of CRA, CRI or mid-range standard. Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/A
A.1.9.3.2	Was CRI analyzed after ICV/ICB and before the final CCV/CCB, and for every four hours of ICP run?	[✓]		

ACTION: If no, write in Contract Problem/Non-Compliance Section of the "Data Assessment Narrative".

A.1.9.3.3 Circle all values on summary sheet that are outside acceptance windows.

Are CRA and CRI standards within control limits: Metals 80 - 120%R?	[ ]	✓	
Is mid-range standard within control limits: Cyanide 80 - 120%R?	[ ]		✓

ACTION: Flag as estimated all data within the affected ranges if the recovery of the standard is between 50-79%; flag only positive data if the recovery is between 121-150%; reject (red line) all data if the recovery is less than 50%; reject only positive data if the recovery is greater than 150%.

A.1.9.4 Form III (Initial and Continuing Calibration Blanks)

A.1.9.4.1	Present and complete?	[✓]		
	For both AA and ICP when both are used for same analyte?	[✓]		
	Was an initial calibration blank analyzed?	[✓]		
	Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	[✓]		

ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/non-compliance section of the Data Assessment Narrative.

		YES	NO	N/A
A.1.9.4.2	Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IDL when IDL > CRDL). Are all calibration blanks (when IDL<CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	[✓]		
	Are all calibration blanks less than two times Instrument Detection Limit (when IDL>CRDL)?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all positive data less than or equal to calibration blank values analyzed between calibration blank with value over CRDL (or 2xIDL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.

A.1.9.5 FORM III (Preparation Blank) -

(Note: The preparation blank for mercury is the same as the calibration blank.)

		YES	NO	N/A
A.1.9.5.1	Was one prep. blank analyzed for: each 20 samples?	[✓]		
	each batch?	[✓]		
	each matrix type?	[✓]		
	both AA and ICP when both are used for same analyte?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all associated positive data <10 x IDLs for which prep. blank was not analyzed.

NOTE: If only one blank was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).

		YES	NO	N/A
A.1.9.5.2	Is concentration of prep. blank greater than CRDL when IDL is less than or equal to CRDL?		[✓]	
	If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?		[✓]	

		YES	NO	N/A
	ACTION: If yes, reject (red-line) all associated data greater than CRDL concentration but less than ten times the prep. blank value found in the raw data.			
A.1.9.5.3	Do concentrations of prep. blank fall below two times IDL when IDL is greater than CRDL?	[✓]		
	ACTION: If no, reject (red-line) all positive data that has a concentration less than 10 times the prep. blank value in the raw data.			
A.1.9.5.4	Is concentration of prep. blank below the negative CRDL?		[✓]	
	ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6	Form IV (ICP Interference Check Sample)			
A.1.9.6.1	Present and complete?	[✓]		
	(NOTE: Not required for furnace AA, flame AA, mercury, cyanide and Ca, Mg, K and Na.)			
	Was ICS analyzed at beginning and end of run (or at least twice every 8 hours)?	[✓]		
	ACTION: If no, flag as estimated (J) all samples for which AL, Ca, Fe, or Mg is higher than in ICS.			
A.1.8.6.2	Circle all values on Data Summary Sheet that are more than + 20% of true or established mean value. Are all Interference Check Sample results inside of control limits (+ 20%)?	[✓]		
	If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	[✓]		
	ACTION: If no, flag as estimated (J) those positive results for which ICS recovery is between 121-150%; flag all sample results as estimated if ICS recovery falls within 50-79%; reject (red-line) those sample results for which ICS recovery is less than 50%; if ICS recovery is above 150%, reject positive results only (not flagged with a "U").			

		YES	NO	N/A
A.1.9.7	Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)- (Note: Not required for Ca, Mg, K, and Na (both matrices), Al, and Fe (soil only.)			
A.1.9.7.1	Present and complete for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each conc. range (i.e. low, med., high)?	[✓]	__	__
	For both AA and ICP when both are used for same analyte?	[✓]	__	__
	ACTION: If no for any of the above, flag as estimated (J) all positive data less than four times spiking level for which spiked sample was not analyzed.			
	NOTE: If one spiked sample was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.9.7.2	Was field blank used for spiked sample?	__	[✓]	__
	ACTION: If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
	NOTE: Matrix spike analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.7.3	Circle all values on Data Summary Sheet that are outside control limits (75% to 125%). Are all recoveries within control limits?	[__]	✓	__
	If no, is sample concentration greater than or equal to four times spike concentration?	[__]	✓	__
	ACTION: If yes, disregard spike recoveries for analytes whose concentrations are greater than or equal to four times spike added. If no, circle those analytes on Form V for which sample concentration is less than four times the spike concentration.			

	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	[✓]	__	__

ACTION: If no, write in the Contract - Problem/Non - Compliance section of "Data Assessment Narrative".

A.1.9.7.4 Aqueous

Are any spike recoveries:

	YES	NO	N/A
(a) less than 30%?	✓	[__]	__
(b) between 30-74%?	✓	[__]	__
(c) between 126-150%?	__	[✓]	__
(d) greater than 150%?	__	[✓]	__

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 126-150%, flag as estimated (J) all associated aqueous data not flagged with a "U"; if greater than 150%, reject (red-line) all associated aqueous data not flagged with a "U".

NOTE: If pre-digestion spike result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, disregard spike recovery on Form V. Flag the associated data as estimated(J).

A.1.9.7.5 Soil/Sediment

Are any spike recoveries:

	YES	NO	N/A
(a) less than 10%?	__	[__]	✓
(b) between 10-74%?	__	[__]	✓
(c) between 126-200%?	__	[__]	✓
(d) greater than 200%?	__	[__]	✓

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 126-200%, flag as estimated all associated data was not flagged with a "U"; if greater than 200%, reject all associated data not flagged with a "U".

		YES	NO	N/A
A.1.9.8	**Form VI (Lab Duplicates)**			
A.1.9.8.1	Present and complete for: each 20 samples?	[✓]	___	___
	each matrix type?	[✓]	___	___
	each concentration range (i.e. low, med., high)?	[✓]	___	___
	both AA and ICP when both are used for same analyte?	[✓]	___	___

ACTION: If no for any the above, flag as estimated (J) all data >CRDL* for which duplicate sample was not analyzed.

Note: 1. If one duplicate sample was analyzed for more than 20 samples, then first 20 samples do not have to be flagged as estimated.
2. If percent solids for soil sample and its duplicate differ by more than 1%, prepare a Form VI for each duplicate pair, report concentrations in Hg/L on wet weight basis and calculate RPD or Difference for each analyte.

A.1.9.8.2	Was field blank used for duplicate analysis?	___	[✓]	___

ACTION: If yes, flag all data >CRDL* as estimated (J) for which field blank was used as duplicate.

NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.

A.1.9.8.3	Are all values within control limits (RPD 20% or difference < ±CRDL)?	[___]	[✓]	___
	If no, are all results outside the control limits flagged with an * on Form I's and VI?	[___]	[✓]	___

ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".

NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than IDL.

* Substitute IDL for CRDL when IDL > CRDL.

	YES	NO	N/A
2. If lab duplicate result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, do not apply precision criteria.			
A.1.9.8.4 Is any value for sample duplicate pair less than CRDL* and other value greater than or equal to 10 x *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5 Aqueous Circle all values on Data Summary Sheet that are: RPD > 50%, or Difference > ± CRDL*.			
Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	✓	[_ _]	_ _
Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.8.6 Soil/Sediment Circle all values on Data Summary Sheet that are: RPD > 100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than or equal to 5 times *CRDL) : > 100%?	___	[_ _]	✓
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) : > 2x*CRDL?	___	[___]	✓

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

		YES	NO	N/A
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9	Field Duplicates			
A.1.9.9.1	Were field duplicates analyzed?	[✓]		
	ACTION: If yes, prepare a Form VI for each aqueous field duplicate pair. Prepare a Form VI for each soil duplicate pair, if percent solids for sample and its duplicate differ by more than 1%; report concentrations of soils in ug/l on wet weight basis and calculate RPDs or Difference for each analyte.			
	NOTE: 1. Do not calculate RPD when both values are less than IDL. 2. Flag all associated data only for field duplicate pair.			
A.1.9.9.2	Is any value for sample duplicate pair less than *CRDL and other value greater than or equal to 10 x *CRDL?		[✓]	
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9.3	Aqueous			
	Circle all values on Form VI for field duplicates that are: RPD > 50%, or Difference > ± CRDL*			
	Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?		[✓]	
	Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?		[✓]	
	ACTION: If yes, flag the associated data as estimated.			

* Substitute IDL for CRDL when IDL > CRDL.

** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.9.4 Soil/Sediment			
Circle all values on Form VI for field duplicates that are: RPD >100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than 5 times *CRDL) : >100%?	___	[✓]	___
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x *CRDL): >2x *CRDL?	___	[✓]	___

ACTION: If yes, flag the associated data as estimated.

A.1.9.10 Form VII (Laboratory Control Sample) (Note: LCS - not required for aqueous Hg and cyanide analyses.)

A.1.9.10.1 Was one LCS prepared and analyzed for: every 20 water samples?	[✓]	___	___
every 20 solid samples?	[___]	___	✓
both AA and ICP when both are used for same analyte?	[✓]	___	___

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory for submittal of results of LCS. Flag as estimated (J) all data for which LCS was not analyzed.

NOTE: If only one LCS was analyzed for more than 20 samples, then first 20 samples close to LCS do not have to be flagged as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

**Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.10.2 Aqueous LCS			
Circle all LCS values outside control limits (80 - 120%- except aqueous Ag and Sb).			
Is any LCS recovery: less than 50%?	___	[✓]	___
between 50% and 79%?	___	[✓]	___
between 121% and 150%?	___	[✓]	___
greater than 150%?	___	[✓]	___

ACTION: Less than 50%, reject (red-line) all data; between 50% and 79%, flag all associated data as estimated (J); between 121% and 150%, flag all positive (not flagged with a "U") results as estimated; greater than 150%, reject all positive results.

A.1.9.10.3 Solid LCS

NOTE: 1. If "Found" value of LCS is rejectable due to duplicate injections or analytical spike recovery criteria, regardless of LCS recovery, flag the associated data as estimated (J).
2. If IDL of an analyte is equal to or greater than true value of LCS, disregard the "Action" below even though LCS is out of control limits.

Is LCS "Found" value higher than the control limits on Form VII?	___	[_ _]	✓

ACTION: If yes, qualify all associated positive data as estimated.

Is LCS "Found" value lower than the Control limits on Form VII?	___	[_ _]	✓

ACTION: If yes, qualify all associated data as estimated.

		YES	NO	N/A
A.1.9.11	Form IX (ICP Serial Dilution) -			
	NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IDL.			
A.1.9.11.1	Was Serial Dilution analysis performed for: each 20 samples?	[✓]		
	each matrix type?	[✓]		
	each concentration range (i.e. low, med.)?	[✓]		
	ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIDLs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DFO report.			
A.1.9.11.2	Was field blank(s) used for Serial Dilution Analysis?		[✓]	
	ACTION: If yes, flag all associated data ≥ 10 x IDL as estimated (J).			
	NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.11.3	Are results outside control limit flagged with an "E" on Form I's and Form IX when initial concentration on Form IX is equal to 50 times IDL or greater.	[✓]		
	ACTION: If no, write in the contract-problem/non-compliance section of the "Data Assessment Narrative".			
A.1.9.11.4	Circle all values on Data Summary Sheet that are outside control limit for initial concentrations equal to or greater than 10 x IDLs only. Are any % difference values: > 10%?	✓	[ ]	
	≥ 100%?		[✓]	

	YES	NO	N/A
ACTION: Flag as estimated (J) all associated equal to or greater than 10xIDLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xIDLs for which PD is greater than or equal to 100%.			
A.1.9.12 Furnace Atomic Absorbtion (AA) QC Analysis			
A.1.9.12.1 Are duplicate injections present in furnace raw data (except during full Method of Standard Addition) for each sample analyzed by GFAA?	[✓]	__	__
ACTION: If no, reject the data on Form I's for which duplicate injections were not performed.			
.1.9.12.2 Do the duplicate injection readings agree within 20% Relative Standard Deviation (RSD) or Coefficient of Variation (CV) for concentration greater than CRDL?	[✓]	__	__
Was a dilution analyzed for sample with post digestion spike recovery less than 40%?	[✓]	__	__
ACTION: If no for any of the above, flag all the associated data as estimated (J).			
A.1.9.12.3 Is *post digestion spike recovery less than 10% or greater than 150% for any result?	__	[✓]	__
ACTION: If yes, reject (red-line) the affected data if recovery is <10%; reject data not flagged with "U" if spike recovery is >150%.			
NOTE: Reject the data only if the affected sample was not subsequently analyzed by Method of Standard Addition.			

* Post digestion spike is not required on the pre-digestion spiked sample when predigestion spike recovery is within control limits of 75-125% or when SR>4xSA.

		YES	NO	N/A
A.1.9.13	Form VIII (Method of Standard Addition Results)			
A.1.9.13.1	Present?	[✓]		
	If no, is any Form I result coded with "S" or a "+"?		[✓]	
	ACTION: If yes, write request on Telephone Record Log and contact laboratory for submittal of Form VIII.			
A.1.9.13.2	Is coefficient of correlation for MSA less than 0.990 for any sample?		[✓]	
	ACTION: If yes, reject (red-line) affected data.			
A.1.9.13.3	Was *MSA required for any sample but not performed?		[✓]	
	Is coefficient of correlation for MSA less than 0.995?		[✓]	
	Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?		[✓]	
	ACTION: If yes for any of the above, flag all the associated data as estimated (J).			
A.1.9.13.4	Was proper quantitation procedure followed correctly as outlined in the SOW on page E-16 through E-17?	[✓]		
	ACTION: If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14	Dissolved/Total or Inorganic/Total Analytes -			
A.1.9.14.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)..		[✓]	
	Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?		[✓]	

* MSA is not required on LCS and prep. blank.

	YES	NO	N/A
NOTE: 1. If yes, prepare a list comparing differences between all dissolved (or inorganic) and total analytes. Compute the differences as a percent of the total analyte only when dissolved concentration is greater than CRDL as well as total concentration. 2. Apply the following questions only if inorganic (or dissolved) results are (i) above CRDL, and (ii) greater than total constituents. 3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.			
A.1.9.14.2 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 10%?	___	[✓]	___
A.1.9.14.3 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%?	___	[✓]	___

ACTION: If more than 10%, flag both dissolved (or inorganic) and total values as estimated (J); if more than 50%, reject (red-line) the data for both values.

A.1.9.15 Form I to IX

A.1.9.15.1 Are all the Form I through Form IX labeled with:

Laboratory name?	[✓]	___	___
Case/SAS number?	[✓]	___	___
EPA sample No.?	[✓]	___	___
SDG No.?	[✓]	___	___
Contract No.?	[✓]	___	___
Correct units?	[✓]	___	___
Matrix?	[✓]	___	___

ACTION: If no for any of the above, note under contract problem/non-compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.15.2 Do any computation/transcription errors exceed 10% of reported values on Forms I-IX for:			
(NOTE: Check all forms against raw data.)			
(a) all analytes analyzed by ICP?	___	[✓]	___
(b) all analytes analyzed by GFAA?	___	[✓]	___
(c) all analytes analyzed by AA Flame?	___	[ ]	✓
(d) Mercury?	___	[✓]	___
(e) Cyanide?	___	[ ]	✓

ACTION: If yes, prepare Telephone Log, contact laboratory for corrected data and correct errors with red pencil and initial.

A.1.9.16 Form I (Field Blank) -

Circle all field blank values on Data Summary Sheet that are greater than CRDL, 2 x IDL when IDL > CRDL.

Do concentrations of field blank(s) fall below CRDL (or 2 x IDL when IDL > CRDL) for all parameters of associated aqueous and soil samples?	[✓]	___	___
If no, was field blank value already rejected due to other QC criteria?	[✓]	___	___

ACTION: If no, reject (except field blank results) all associated positive sample data less than or equal to five times the field blank value.

	YES	NO	N/A
A.1.9.17 Form X, XI, XII (Verification of Instrumental Parameters).			
A.1.9.17.1 Is verification report present for:			
Instrument Detection Limits (quarterly)?	[✓]		
ICP Interelement Correction Factors (annually)?	[✓]		
ICP Linear Ranges (quarterly)?	[✓]		
ACTION: If no, contact DPO of the lab.			
A.1.9.17.2 Form X (Instrument Detection Limits) - (Note: IDL is not required for Cyanide.)			
Are IDLs present for: all the analytes?	[✓]		
all the instruments used?	[✓]		
For both AA and ICP when both are used for same analyte?	[✓]		
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
Is IDL greater than CRDL for any analyte?		[✓]	
If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?	[✓]		
ACTION: If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.			

	YES	NO	N/A
A.1.9.17.3 Form XI (Linear Ranges)			
Was any sample result higher than high linear range of ICP.	___	[✓]	___
Was any sample result higher than the highest calibration standard for non-ICP parameters?	___	[✓]	___
If yes for any of the above, was the sample diluted to obtain the result on Form I?	[✓]	___	___
ACTION: If no, flag the result reported on Form I as estimated(J).			
A.1.9.18 Percent Solids of Sediments			
Is soil content in sediment(s) less than 50%?	___	[___]	✓
ACTION: If yes, qualify as estimated all data not previously rejected or flagged due to other QC criteria.			

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Feb. 1990
Number: HW-2
Revision: 10

Case#	NWS	Site	Naval Weapons Station	Matrix:	Soil ____
SDG#	CLP 107	Lab	Roy F. Weston		Water ✓
Contractor	Roy F. Weston	Reviewer	Heartland ESI		Other ____

A.2.1 The case description and exceptions, if any, are noted below with reason(s) for rejection or qualification as estimated value(s) J.

1. CRDL Selenium <50% all data rejected.
2. CRDL Cadmium, Copper, Manganese and Silver below control limit. All positive results are estimated.
3. CRDL Zinc >150% All positive results are rejected.

PBH 2/27/92

4. Matrix Spike Recovery for ~~Selenium~~ Arsenic was <30%). All data rejected.
5. Matrix Spike recovery for Selenium was below control limit. All data estimated.
6. Duplicate Analysis for Iron was outside control limit. All data estimated.
7. Serial Dilutions for Chromium, Iron, Manganese, Sodium and Zinc were outside of the control limit. All positive results are estimated.
8. The analytical spike for Selenium for

A.2.1 (continuation)

Sample 7-M002 was below the lower control limit. All data is estimated.

PBH 2/27/92

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Feb. 1990
Number: HW-2
Revision: 10

PBH 2/27/92

2.2 Contract-Problems/Non-Compliance

Forms are not fill out properly. QC was in another package. Date not flagged ~~control~~ correctly.
PBH 2/27/92

M&S Reviewer: _____ Date: _____
Signature

Contractor Reviewer: Paul B. Hornby Date: 2/27/92
Signature

Verified by: [illegible] Date: 3/2/92

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NW5 SOW NO. 390 SAMPLE TYPE/SDG: CLP 108

SITE/STUDY DESCRIPTION: Naval Weapon Station SAMPLE NOS: 7-M002, 7-M102

FIELD DUP. #'S: _____ LAB DUP. #'S: 2-M002 Field Blank _____ MATRIX SPIKE #: 2-M002

SERIAL DILUTION SAMPLE NO. 2-M002 COMPLETION DATE: 2/27/92 REVIEWERS INITIALS: _____

	X		I	IIA				IIB		III				IV		V	VI	VII	IX	
Parameter	Detection Limits UG/L		Field Blank	Calib. Ver. %R				CRDL Std Ver. % R		Calibration Blanks				PBL EAN	ICP ICS % R		MS tpix	Lab Dup RPD Diff	LCS % R	Ser Dil % D	Meth
	CRDL	IDL		Init	Continued 1	2	3	Init	Fin	Init	Continued 1	2	3		Init	Fin					
Al	200		NA																		
Sb	60																				
As	10	2		100	101	98	100	81		U	U	U	U	U			(10)	200	96		F
Ba	200	16		102	103	101	100			U	U	U	U	U	87	87	101	5.2	98	100	P
Be	5																				
Cd	5	2		105	108	104	104	(127)	81	U	U	U	U	U	95	99	104		105		P
Ca	5000																				
[illegible]	10	4		99	101	101	101	80	105	U	U	U	U	U	96	100	104	12.3	98	(14.9)	P
Co	50																				
Cu	25	6		103	105	104	103	(126)	(127)	U	U	U	U	U	98	99	99	3.2	98	46	P
Fe	100	46		100	103	102	104			U	U	U	U	U	97	100	-29	(26)	99	(36)	P
Pb	3	3		103	101	103	102	80		U	U	U	U	U			75	4.4	98		F
Mg	5000																				
Mn	15	2		100	101	101	102	(124)	(130)	U	3	U	U	U	106	107	99	12.8	98	(29)	P
Hg	0.2			102	102	101	103			U	U	U	U	U			94	3.5	96		CV
Ni	40																				
K	5000																				
Se	5	2		104	99	103	102	(28)		U	U	U	U	U			(43)		84		F
Ag	10	3		102	104	103	103	(123)	112	U	U	U	U	U	96	98	75		100		P
Na	5000	110		102	103	101	101			U	U	U	168	U				1.3	98	(29)	P
[illegible]	10																				
V	50																				
Zn	20	6		101	104	104	104	(150)	(168)	U	U	U	U	7	84	93	102	8.7	100	(23)	P
CN	10																				

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NW 5 SOW NO. 390 SAMPLE TYPE/SDG: CLP 102

SITE/STUDY DESCRIPTION: _____ SAMPLE NOS: _____

Field Blank _____

FIELD DUP. #'S: _____ LAB DUP. #'S: _____ MATRIX SPIKE #: _____

SERIAL DILUTION SAMPLE NO. _____ COMPLETION DATE: 2/27/92 REVIEWERS INITIALS: PBH

	X		I	IIA				IIB		III				IV		V		VI	VII	IX	
Parameter	Detection Limits UG/L		Field Blank	Calib. Ver. %R				CRDL Std Ver. % R		Calibration Blanks				PBL PEAN	ICP ICS % R		MS Matrix	Lab Dup RPD/Diff	LCS	Ser Dil	Meth
	CRDL	IDL		Init	Continued 1	2	3	Init	Fin	Init	Continued 1	2	3		Init	Fin			% R	% D	
Al	200		NA																		
Sb	60																				
As	10	2			100	100	100	126			U	U	U	U							F
Ba	200	16			99	102					U	U		U							P
Be	5																				
Cd	5	2			102	104					U	U		U							P
Ca	5000																				
Cr	10	4			101	104					U	U		U							P
Co	50																				
Cu	25	6			102	105					U	U		U							P
Fe	100	46			102	102					U	U		U							P
Pb	3	3			103	103	105				U	U	U	U							F
Mg	5000																				
Mn	15	2			101	103					U	U		U							P
Hg	0.2				101	101					U	U		U							CV
Ni	40																				
K	5000																				
Se	5	2			98	101	99	44			U	U	U	U							F
Ag	10	3			102	104					U	U		U							P
Na	5000	110			100	104					117	145		U							P
Tl	10																				
V	50																				
Zn	20	6			103	108					U	U		U							P
CN	10																				

000034

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (Limited Scope) Date: 2/27/92 Case #: NWS

Site: Naval Weapons Station Lab Name: Roy F. Weston

Reviewer's Initials: PBH Number of Samples: 2

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Inter-ferences	Spike Recovery	Duplicates Lab	Duplicates Field	Detection Limits	LCS	Serial Dilution	MSA	Total Analytes	Rejection
ICP		1											1	
Flame AA														
Furnace AA		1				1							2	
Mercury														
Total		2				1							3	
Other														

Analytes Flagged as Estimated (J) Due to Exceeding Criteria For:*

ICP		4					1				5		10	
Flame AA														
Furnace AA						1						1	2	
Mercury														
Total		4				1	1				5	1	12	
Other														

Note:
Asterisk (*) Indicates additional exceedances of review criteria.

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.7: CLP Data Assessment Checklist
Inorganic Analysis

Date: Feb. 1990
Number: HW-2
Revision: 10

INORGANIC REGIONAL DATA ASSESSMENT

Region II

CASE NO. NWS

SITE Naval Weapons Station

LABORATORY Roy F. Weston

NO. OF SAMPLES/ MATRIX 2 waters

SDG# CLP 108

REVIEWER (IF NOT ESD) Heartland EST

SOW# 390

REVIEWER'S NAME Paul B. Humbry

DPO: ACTION _____ FYI _____

COMPLETION DATE 2/27/91

DATA ASSESSMENT SUMMARY

		ICP	AA	Hg	CYANIDE
1.	HOLDING TIMES	O	O	O	NA
2.	CALIBRATIONS	Z	Z		
3.	BLANKS	O	O		
4.	ICS				
5.	LCS		O		
6.	DUPLICATE ANALYSIS		O		
7.	MATRIX SPIKE		Z		
8.	MSA		O		
9.	SERIAL DILUTION				
10.	SAMPLE VERIFICATION		O		
11.	OTHER QC	X	O		X
12.	OVERALL ASSESSMENT		O		

O = Data has no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS:

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. One (1) water sample and one (1) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
2-M202	911012501
2-M202MS	911012501MS
2-M202D	911012501D

Heartland ESI has reviewed the data for the samples listed above TAL Metals (under the limited scope requirements) using Region II Data Validation Protocol, February 1990 revision. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

TAl Metals reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110125**, the analysis of one (1) field water sample and one (1) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The USEPA CLP analytical protocol was followed as required.

Specific QA/QC deficiency **Findings** are listed numerically in the following categories:

Holding Times

The holding times were met as specified in Region II Protocol.

Calibration

1. The CRDL Standards for Arsenic, Cadmium, Lead and Selenium were below 50%. All positive and non-detect results are rejected if within the concentration range as applied by the Region II Protocol.

2. The CRDL Standards for Chromium, Copper, Manganese and Silver were below the lower control limit. All positive and non-detect results within the affected range are qualified as estimated, "J" or "UJ".

Preparation and Field Blanks

No deficiencies in this section.

Interferences

No significant interferences were observed.

Metals Data Assessment Narrative (continued - Page 2)

Interferences

No significant interferences were observed.

Spike Recovery

No deficiencies in this section.

Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

Serial Dilution

No deficiencies in this section.

MSA

No deficiencies in this section.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	As,Cd,Pb, and Se	+/U	R	1
All Water Samples	Cr,Cu,Mn, and Ag	+/U	J/UJ	2

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

2-M202

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP125

Matrix (soil/water): WATER Lab Sample ID: 911012501

Level (low/med): LOW Date Received: 10/24/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~		~~F~~	R1
7440-39-3	Barium	16.00	U		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	~~3.00~~	~~U~~		~~P~~	R1
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	UJ2
7440-48-4	Cobalt				NR	
7440-50-8	Copper	12.10	B		P	J2
7439-89-6	Iron	57.30	B		P	
7439-92-1	Lead	~~2.00~~	~~U~~		~~F~~	R1
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	2.00	U		P	UJ2
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~		~~F~~	R1
7440-22-4	Silver	10.00	U		P	UJ2
7440-23-5	Sodium	110.00	U		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	11.50	B		P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report (CCS) - Present?	[ ]		✓
ACTION: If no, contact RSCC.			
A.1.2 Record of Communication (from RSCC) - Present?	[ ]		✓
ACTION: If no, request from RSCC.			
A.1.3 Trip Report - Present and complete?	[ ]		✓
ACTION: If no, contact RSCC for trip report.			
A.1.4 Sample Traffic Report - Present or on file?	[ ]		✓
Legible?	[ ]		✓
ACTION: If no, request from Regional Sample Control Center (RSCC).			
A.1.5 Cover Page - Present?	[✓]		
Is cover page properly filled in and signed by the lab manager or the manager's designee?	[✓]		
ACTION: If no, prepare Telephone Record Log, and contact laboratory.			
Do numbers of samples correspond to numbers on Record of Communication?	[ ]		✓
Do sample numbers on cover page agree with sample numbers on:			
(a) Traffic Report Sheet?	[ ]		✓
(b) Form I's?	[✓]		
ACTION: If no for any of the above, contact RSCC for clarification.			

	YES	NO	N/A
A.1.6 Form I (Final Data) - Are all Form I's present and complete?	[✓]	__	__
ACTION: If no, prepare telephone record log and contact laboratory for submittal.			
Are correct units (ug/l for waters and mg/kg for soils) indicated on Form I's?	[✓]	__	__
Are soil sample results for each parameter corrected for percent solids?	[✓]	__	__
Are EPA sample # s and corresponding laboratory sample ID # s the same as on the Cover Page, Form I's and in the raw data?	[✓]	__	__
Are computation/transcription errors less than 10% of reported values?	[✓]	__	__
Are all "less than IDL" values properly coded with "U"?	[✓]	__	__
Was a brief physical description of samples given on Form I's?	[✓]	__	__
Were the result qualifiers used correctly with final data?	[✓]	__	__
ACTION: If no for any of the above, prepare Telephone Record Log, and contract laboratory for corrected data.			
Were any samples diluted beyond requirements of contract?	__	[✓]	__
If yes, were dilutions noted on Form I's?	[✓]	__	__
ACTION: If no, note under Contract-Problem/Non-Compliance of the "Data Assessment Narrative".			
A.1.7 Holding Times - (aqueous and soil samples)			
(Examine sample traffic reports and digestion/distillation logs.)			
Mercury analysis (28 days). . . . . exceeded?	__	[✓]	__
Cyanide distillation (14 days). . . . . exceeded?	__	[__]	✓

	YES	NO	N/A
Other Metals analysis (6 months). . . . exceeded?	___	[✓]	___

NOTE: Prepare a list of all samples and analytes for which holding times have been exceeded. Specify the number of days from date of collection to the date of preparation (from raw data). Attach to checklist.

ACTION: If yes, reject (red-line) values less than Instrument Detection Limit (IDL) and flag as estimated (J) the values above IDL even though sample(s) was preserved properly.

A.1.8 Raw Data

A.1.8.1	Digestion Log* for flame AA/ICP (Form XIII) present?	[✓]	___	___
	Digestion Log for furnace AA Form XIII present?	[✓]	___	___
	Distillation Log for mercury Form XIII present?	[✓]	___	___
	Distillation Log for cyanides Form XIII present?	[___]	___	✓
	Are pH values (pH<2 for all metals, pH>12 for cyanide) present?	[✓]	___	___
	*Weights, dilutions and volumes used to obtain values.			
	Percent solids calculation present for soils/sediments?	[___]	___	✓
	Are preparation dates present on Digestion Log?	[✓]	___	___
A.1.8.2	Measurement read out record present? ICP	[✓]	___	___
	Flame AA	[___]	___	✓
	Furnace AA	[✓]	___	___
	Mercury	[✓]	___	___
	Cyanides	[___]	___	✓

	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	[✓]	__	__
Legible?	[✓]	__	__
Properly Labeled?	[✓]	__	__

ACTION: If no for any of the above, write Telephone Record Log and contact laboratory. Flag metal data as estimated if pH of sample is greater than 2. Flag cyanide data as estimated if pH sample is less than 12.

A.1.9 Data Validation and Verification

A.1.9.1 Calibration

	YES	NO	N/A
A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	[✓]	__	__
Is record of 5 point calibration present for Hg analysis?	[✓]	__	__

ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".

PBH 2/28/92

	YES	NO	N/A
A.1.9.1.2 Is record of 4 point calibration present for: Flame AA?	[✓]	__	✓
Furnace AA?	[✓]	__	__
Cyanides?	[__]	__	✓

NOTE:
1. If less than 4 standards are measured in absorbance mode, then the remaining standards in concentration mode must be run immediately after calibration and be within ±10% of true value.
2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRDL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A

ACTION: Flag associated data as estimated if standards are not within ±10% of true values (except CRDL calibration standard). Do not flag the data as estimated in linear range indicated by good recovery of standard.

A.1.9.1.3 Is correlation *coefficient less than 0.995 for:

	YES	NO	N/A
Mercury Analysis?	___	[✓]	___
Cyanide Analysis?	___	[___]	✓
Atomic Absorption Analysis?	___	[✓]	___

ACTION: If yes, flag the associated data as estimated.

1.9.2 Form II A (Initial and Continuing Calibration Verification)-

	YES	NO	N/A
A.1.9.2.1 Present and complete for every metal and cyanide?	[✓]	___	___
Present and complete for AA and ICP when both are used for same analyte?	[✓]	___	___

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.

A.1.9.2.2 Circle all values on data summary sheet that are outside contract windows. Are all calibration standards (initial and continuing) within control limits?

	YES	NO	N/A
Metals 90-110%	[✓]	___	___
Hg - 80-120%	[✓]	___	___
Cyanides 85-115%	[___]	___	✓

The reviewer will calculate correlation coefficient.

	YES	NO	N/A
ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with %R between 75-89% (65-79% for Hg; 70-84% for CN) or 111-125% (121-135% for Hg; 116-130% for CN) recovery and nearest good calibration standard. Qualify results <IDL as estimated (UJ), if the ICV or CCV %R is 75-89% (CN, 70-84% ; HG, 65-79%). Reject (red-line) as unacceptable data if recovery of the ICV or CCV is outside the range 75-125% (CN, 70-130%; Hg, 65-135%). Qualify five samples on either side of verification standard out of control limits.			
Was continuing calibration performed every 10 samples or every 2 hours?	[✓]		
ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).			
Was ICV for cyanides distilled?	[ ]		✓
ACTION: If no, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".			

A.1.9.3 Form II B (CRDL Standards for AA and ICP) -

A.1.9.3.1 Was a CRDL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?	[✓]		
*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?	[ ]		✓
Was a 2xCRDL (or 2xIDL when IDL>CRDL) analyzed (CRI) for each ICP run? (Note: CRI for AL,Ba,Ca,Fe,Mg,Na,or K is not required.)	[✓]		

ACTION: If no for any of the above, flag as estimated all data falling within the affected ranges. The affected ranges are:
AA Analysis - **True Value ± CRDL
ICP Analysis - **True Value ± 2CRDL
CN Analysis - **True Value ± 0.5 x True Value.

ind the results of mid-range standard in the raw data.
**True value of CRA, CRI or mid-range standard. Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/A
A.1.9.3.2	Was CRI analyzed after ICV/ICB and before the final CCV/CCB, and for every four hours of ICP run?	[✓]		
	ACTION: If no, write in Contract Problem/Non-Compliance Section of the "Data Assessment Narrative".			
A.1.9.3.3	Circle all values on summary sheet that are outside acceptance windows.			
	Are CRA and CRI standards within control limits: Metals 80 - 120%R?	[ ]	✓	
	Is mid-range standard within control limits: Cyanide 80 - 120%R?	[ ]		✓
	ACTION: Flag as estimated all data within the affected ranges if the recovery of the standard is between 50-79%; flag only positive data if the recovery is between 121-150%; reject (red line) all data if the recovery is less than 50%; reject only positive data if the recovery is greater than 150%.			
A.1.9.4	Form III (Initial and Continuing Calibration Blanks)			
A.1.9.4.1	Present and complete?	[✓]		
	For both AA and ICP when both are used for same analyte?	[✓]		
	Was an initial calibration blank analyzed?	[✓]		
	Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	[✓]		
	ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/non-compliance section of the Data Assessment Narrative.			

		YES	NO	N/A
A.1.9.4.2	Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IDL when IDL > CRDL). Are all calibration blanks (when IDL<CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	[✓]		
	Are all calibration blanks less than two times Instrument Detection Limit (when IDL>CRDL)?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all positive data less than or equal to calibration blank values analyzed between calibration blank with value over CRDL (or 2xIDL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.

A.1.9.5 FORM III (Preparation Blank) -

(Note: The preparation blank for mercury is the same as the calibration blank.)

		YES	NO	N/A
A.1.9.5.1	Was one prep. blank analyzed for: each 20 samples?	[✓]		
	each batch?	[✓]		
	each matrix type?	[✓]		
	both AA and ICP when both are used for same analyte?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all associated positive data <10 x IDLs for which prep. blank was not analyzed.

NOTE: If only one blank was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).

		YES	NO	N/A
A.1.9.5.2	Is concentration of prep. blank greater than CRDL when IDL is less than or equal to CRDL?		[✓]	
	If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?		[✓]	

		YES	NO	N/A
	ACTION: If yes, reject (red-line) all associated data greater than CRDL concentration but less than ten times the prep. blank value found in the raw data.			
A.1.9.5.3	Do concentrations of prep. blank fall below two times IDL when IDL is greater than CRDL?	[✓]	__	__
	ACTION: If no, reject (red-line) all positive data that has a concentration less than 10 times the prep. blank value in the raw data.			
A.1.9.5.4	Is concentration of prep. blank below the negative CRDL?	__	[✓]	__
	ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6	Form IV (ICP Interference Check Sample)			
A.1.9.6.1	Present and complete?	[✓]	__	__
	(NOTE: Not required for furnace AA, flame AA, mercury, cyanide and Ca, Mg, K and Na.)			
	Was ICS analyzed at beginning and end of run (or at least twice every 8 hours)?	[✓]	__	__
	ACTION: If no, flag as estimated (J) all samples for which AL, Ca, Fe, or Mg is higher than in ICS.			
A.1.8.6.2	Circle all values on Data Summary Sheet that are more than + 20% of true or established mean value. Are all Interference Check Sample results inside of control limits (+ 20%)?	[✓]	__	__
	If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	[✓]	__	__
	ACTION: If no, flag as estimated (J) those positive results for which ICS recovery is between 121-150%; flag all sample results as estimated if ICS recovery falls within 50-79%; reject (red-line) those sample results for which ICS recovery is less than 50%; if ICS recovery is above 150%, reject positive results only (not flagged with a "U").			

		YES	NO	N/A
A.1.9.7	Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)- (Note: Not required for Ca, Mg, K, and Na (both matrices), Al, and Fe (soil only.)			
A.1.9.7.1	Present and complete for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each conc. range (i.e. low, med., high)?	[✓]	__	__
	For both AA and ICP when both are used for same analyte?	[✓]	__	__
	ACTION: If no for any of the above, flag as estimated (J) all positive data less than four times spiking level for which spiked sample was not analyzed.			
	NOTE: If one spiked sample was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.9.7.2	Was field blank used for spiked sample?	__	[✓]	__
	ACTION: If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
	NOTE: Matrix spike analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.7.3	Circle all values on Data Summary Sheet that are outside control limits (75% to 125%). Are all recoveries within control limits?	[✓]	__	__
	If no, is sample concentration greater than or equal to four times spike concentration?	[✓]	__	__
	ACTION: If yes, disregard spike recoveries for analytes whose concentrations are greater than or equal to four times spike added. If no, circle those analytes on Form V for which sample concentration is less than four times the spike concentration.			

	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	[✓]	__	__

ACTION: If no, write in the Contract - Problem/Non - Compliance section of "Data Assessment Narrative".

A.1.9.7.4 Aqueous

Are any spike recoveries:

(a) less than 30%?	__	[✓]	__
(b) between 30-74%?	__	[✓]	__
(c) between 126-150%?	__	[✓]	__
(d) greater than 150%?	__	[✓]	__

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 126-150%, flag as estimated (J) all associated aqueous data not flagged with a "U"; if greater than 150%, reject (red-line) all associated aqueous data not flagged with a "U".

NOTE: If pre-digestion spike result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, disregard spike recovery on Form V. Flag the associated data as estimated(J).

A.1.9.7.5 Soil/Sediment

Are any spike recoveries:

(a) less than 10%?	__	[__]	✓
(b) between 10-74%?	__	[__]	✓
(c) between 126-200%?	__	[__]	✓
(d) greater than 200%?	__	[__]	✓

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 126-200%, flag as estimated all associated data was not flagged with a "U"; if greater than 200%, reject all associated data not flagged with a "U".

		YES	NO	N/A
A.1.9.8	Form VI (Lab Duplicates)			
A.1.9.8.1	Present and complete for: each 20 samples?	[✓]		
	each matrix type?	[✓]		
	each concentration range (i.e. low, med., high)?	[✓]		
	both AA and ICP when both are used for same analyte?	[✓]		

ACTION: If no for any the above, flag as estimated (J) all data >CRDL* for which duplicate sample was not analyzed.

Note: 1. If one duplicate sample was analyzed for more than 20 samples, then first 20 samples do not have to be flagged as estimated.
2. If percent solids for soil sample and its duplicate differ by more than 1%, prepare a Form VI for each duplicate pair, report concentrations in Hg/L on wet weight basis and calculate RPD or Difference for each analyte.

A.1.9.8.2	Was field blank used for duplicate analysis?		[✓]	

ACTION: If yes, flag all data >CRDL* as estimated (J) for which field blank was used as duplicate.

NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.

A.1.9.8.3	Are all values within control limits (RPD 20% or difference < ±CRDL)?	[✓]		
	If no, are all results outside the control limits flagged with an * on Form I's and VI?	[✓]		

ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".

NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than IDL.

* Substitute IDL for CRDL when IDL > CRDL.

	YES	NO	N/A
2. If lab duplicate result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, do not apply precision criteria.			
A.1.9.8.4 Is any value for sample duplicate pair less than CRDL* and other value greater than or equal to 10 x *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5 Aqueous Circle all values on Data Summary Sheet that are: RPD > 50%, or Difference > ± CRDL*			
Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	___	[✓]	___
Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.8.6 Soil/Sediment Circle all values on Data Summary Sheet that are: RPD > 100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than or equal to 5 times *CRDL) : > 100%?	___	[___]	✓
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) : > 2x*CRDL?	___	[___]	✓

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

		YES	NO	N/A
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9	Field Duplicates			
A.1.9.9.1	Were field duplicates analyzed?	[___]	✓	___
	ACTION: If yes, prepare a Form VI for each aqueous field duplicate pair. Prepare a Form VI for each soil duplicate pair, if percent solids for sample and its duplicate differ by more than 1%; report concentrations of soils in ug/l on wet weight basis and calculate RPDs or Difference for each analyte.			
	NOTE: 1. Do not calculate RPD when both values are less than IDL. 2. Flag all associated data only for field duplicate pair.			
A.1.9.9.2	Is any value for sample duplicate pair less than *CRDL and other value greater than or equal to 10 x *CRDL?	___	[✓]	___
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9.3	Aqueous			
	Circle all values on Form VI for field duplicates that are: RPD > 50%, or Difference > ± CRDL*			
	Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	___	[✓]	___
	Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[✓]	___
	ACTION: If yes, flag the associated data as estimated.			

* Substitute IDL for CRDL when IDL > CRDL.

** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.9.4 Soil/Sediment			
Circle all values on Form VI for field duplicates that are: RPD >100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than 5 times *CRDL) : >100%?	___	[✓]	___
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x *CRDL): >2x *CRDL?	___	[✓]	___

ACTION: If yes, flag the associated data as estimated.

1.9.10 Form VII (Laboratory Control Sample) (Note: LCS - not required for aqueous Hg and cyanide analyses.)

A.1.9.10.1 Was one LCS prepared and analyzed for: every 20 water samples?	[✓]	___	___
every 20 solid samples?	[___]	___	✓
both AA and ICP when both are used for same analyte?	[✓]	___	___

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory for submittal of results of LCS. Flag as estimated (J) all data for which LCS was not analyzed.

NOTE: If only one LCS was analyzed for more than 20 samples, then first 20 samples close to LCS do not have to be flagged as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

**Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.10.2 Aqueous LCS			
Circle all LCS values outside control limits (80 - 120%- except aqueous Ag and Sb).			
Is any LCS recovery: less than 50%?	___	[✓]	___
between 50% and 79%?	___	[✓]	___
between 121% and 150%?	___	[✓]	___
greater than 150%?	___	[✓]	___

ACTION: Less than 50%, reject (red-line) all data; between 50% and 79%, flag all associated data as estimated (J); between 121% and 150%, flag all positive (not flagged with a "U") results as estimated; greater than 150%, reject all positive results.

A.1.9.10.3 Solid LCS

NOTE: 1. If "Found" value of LCS is rejectable due to duplicate injections or analytical spike recovery criteria, regardless of LCS recovery, flag the associated data as estimated (J).
2. If IDL of an analyte is equal to or greater than true value of LCS, disregard the "Action" below even though LCS is out of control limits.

Is LCS "Found" value higher than the control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated positive data as estimated.

Is LCS "Found" value lower than the Control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated data as estimated.

		YES	NO	N/A
A.1.9.11	Form IX (ICP Serial Dilution) -			
	NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IDL.			
A.1.9.11.1	Was Serial Dilution analysis performed for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each concentration range (i.e. low, med.)?	[✓]	__	__
	ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIDLs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DPO report.			
A.1.9.11.2	Was field blank(s) used for Serial Dilution Analysis?	__	[✓]	__
	ACTION: If yes, flag all associated data ≥ 10 x IDL as estimated (J).			
	NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.11.3	Are results outside control limit flagged with an "E" on Form I's and Form IX when initial concentration on Form IX is equal to 50 times IDL or greater.	[✓]	__	__
	ACTION: If no, write in the contract-problem/non-compliance section of the "Data Assessment Narrative".			
A.1.9.11.4	Circle all values on Data Summary Sheet that are outside control limit for initial concentrations equal to or greater than 10 x IDLs only. Are any % difference values: > 10%?	__	[✓]	__
	≥ 100%?	__	[✓]	__

	YES	NO	N/A
ACTION: Flag as estimated (J) all associated equal to or greater than 10xIDLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xIDLs for which PD is greater than or equal to 100%.			
A.1.9.12 Furnace Atomic Absorbtion (AA) QC Analysis			
A.1.9.12.1 Are duplicate injections present in furnace raw data (except during full Method of Standard Addition) for each sample analyzed by GFAA?	[✓]		
ACTION: If no, reject the data on Form I's for which duplicate injections were not performed.			
A.1.9.12.2 Do the duplicate injection readings agree within 20% Relative Standard Deviation (RSD) or Coefficient of Variation (CV) for concentration greater than CRDL?	[✓]		
Was a dilution analyzed for sample with post digestion spike recovery less than 40%?	[✓]		
ACTION: If no for any of the above, flag all the associated data as estimated (J).			
A.1.9.12.3 Is *post digestion spike recovery less than 10% or greater than 150% for any result?		[✓]	
ACTION: If yes, reject (red-line) the affected data if recovery is <10%; reject data not flagged with "U" if spike recovery is >150%.			
NOTE: Reject the data only if the affected sample was not subsequently analyzed by Method of Standard Addition.			

* Post digestion spike is not required on the pre-digestion spiked sample when predigestion spike recovery is within control limits of 75-125% or when SR>4xSA.

		YES	NO	N/A
A.1.9.13	Form VIII (Method of Standard Addition Results)			
A.1.9.13.1	Present?	[✓]		
	If no, is any Form I result coded with "S" or a "+"?		[✓]	
	ACTION: If yes, write request on Telephone Record Log and contact laboratory for submittal of Form VIII.			
A.1.9.13.2	Is coefficient of correlation for MSA less than 0.990 for any sample?		[✓]	
	ACTION: If yes, reject (red-line) affected data.			
A.1.9.13.3	Was *MSA required for any sample but not performed?		[✓]	
	Is coefficient of correlation for MSA less than 0.995?		[✓]	
	Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?		[✓]	
	ACTION: If yes for any of the above, flag all the associated data as estimated (J).			
A.1.9.13.4	Was proper quantitation procedure followed correctly as outlined in the SOW on page E-16 through E-17?	[✓]		
	ACTION: If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14	Dissolved/Total or Inorganic/Total Analytes -			
A.1.9.14.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)..		[✓]	
	Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?		[✓]	

* MSA is not required on LCS and prep. blank.

	YES	NO	N/A
NOTE: 1. If yes, prepare a list comparing differences between all dissolved (or inorganic) and total analytes. Compute the differences as a percent of the total analyte only when dissolved concentration is greater than CRDL as well as total concentration. 2. Apply the following questions only if inorganic (or dissolved) results are (i) above CRDL, and (ii) greater than total constituents. 3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.			
A.1.9.14.2 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 10%?	___	[✓]	___
A.1.9.14.3 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%?	___	[✓]	___

ACTION: If more than 10%, flag both dissolved (or inorganic) and total values as estimated (J); if more than 50%, reject (red-line) the data for both values.

A.1.9.15 Form I to IX

A.1.9.15.1 Are all the Form I through Form IX labeled with:

	YES	NO	N/A
Laboratory name?	[✓]	___	___
Case/SAS number?	[✓]	___	___
EPA sample No.?	[✓]	___	___
SDG No.?	[✓]	___	___
Contract No.?	[✓]	___	___
Correct units?	[✓]	___	___
Matrix?	[✓]	___	___

ACTION: If no for any of the above, note under contract problem/non-compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.15.2 Do any computation/transcription errors exceed 10% of reported values on Forms I-IX for:			
(NOTE: Check all forms against raw data.)			
(a) all analytes analyzed by ICP?	___	[✓]	___
(b) all analytes analyzed by GFAA?	___	[✓]	___
(c) all analytes analyzed by AA Flame?	___	[ ]	✓
(d) Mercury?	___	[✓]	___
(e) Cyanide?	___	[ ]	✓

ACTION: If yes, prepare Telephone Log, contact laboratory for corrected data and correct errors with red pencil and initial.

A.1.9.16 Form I (Field Blank) -

Circle all field blank values on Data Summary Sheet that are greater than CRDL, 2 x IDL when IDL > CRDL.

Do concentrations of field blank(s) fall below CRDL (or 2 x IDL when IDL > CRDL) for all parameters of associated aqueous and soil samples?	[✓]	___	___
If no, was field blank value already rejected due to other QC criteria?	[✓]	___	___

ACTION: If no, reject (except field blank results) all associated positive sample data less than or equal to five times the field blank value.

	YES	NO	N/A
A.1.9.17 Form X, XI, XII (Verification of Instrumental Parameters).			
A.1.9.17.1 Is verification report present for:			
Instrument Detection Limits (quarterly)?	[✓]		
ICP Interelement Correction Factors (annually)?	[✓]		
ICP Linear Ranges (quarterly)?	[✓]		
ACTION: If no, contact DPO of the lab.			
A.1.9.17.2 Form X (Instrument Detection Limits) - (Note: IDL is not required for Cyanide.)			
Are IDLs present for: all the analytes?	[✓]		
all the instruments used?	[✓]		
For both AA and ICP when both are used for same analyte?	[✓]		
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
Is IDL greater than CRDL for any analyte?		[✓]	
If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?	[✓]		
ACTION: If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.			

	YES	NO	N/A
A.1.9.17.3 Form XI (Linear Ranges)			
Was any sample result higher than high linear range of ICP.	___	[✓]	___
Was any sample result higher than the highest calibration standard for non-ICP parameters?	___	[✓]	___
If yes for any of the above, was the sample diluted to obtain the result on Form I?	[✓]	___	___
ACTION: If no, flag the result reported on Form I as estimated(J).			
A.1.9.18 Percent Solids of Sediments			
Is soil content in sediment(s) less than 50%?	___	[___]	✓
ACTION: If yes, qualify as estimated all data not previously rejected or flagged due to other QC criteria.			

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Feb. 1990
Number: HW-2
Revision: 10

Case#	NWS	Site	Naval Weapons Station	Matrix: Soil	
SDG#	CLP 125	Lab	Roy F. Weston	Water	✓
Contractor	Roy F. Weston	Reviewer	Heartland ESI	Other	

A.2.1 The case description and exceptions, if any, are noted below with reason(s) for rejection or qualification as estimated value(s) J.

1. CRDLs for Arsenic, Cadmium, Lead and Selenium were below 50%. All data rejected.
2. CRDLs for Chromium, Copper, Manganese and Silver were below control limit. All data estimated.

PBH 2/28/92

PBH 2/28/92

2.2 Contract-Problems/Non-Compliance

PBH 2/28/92

M&B Reviewer: _____ Date: _____
Signature

Contractor Reviewer: Paul B. Hurley Date: 2/28/92
Signature

Verified By: Kristen D. Langellier Date: 3/2/92

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 125

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 2-M202

FIELD DUP. #'S: LAB DUP. #'S: 2-M202 Field Blank MATRIX SPIKE #: 2M202

SERIAL DILUTION SAMPLE NO. 2-M202 COMPLETION DATE: 2/21/92 REVIEWERS INITIALS: PBV

Parameter	X Detection Limits UG/L CRDL	IDL	I Field Blank	IIA Calib. Ver. %R Init	Continued 1	2	3	IIB CRDL Std Ver. % R Init	Fin	III Calibration Blanks Init	Continued 1	2	3	IV PBRLEAP PN	ICP ICS % R Init	Fin	V MSptrxk	VI Lab Dup RPD/Diff	VII LCS % R	IX Ser Dil % D	M th
Al	200		NA																		
Sb	60																				
As	10	2		103	102	102	96	5		U	U	U	U	U			78		86		F
Ba	200	16		100	101	100	102			U	U	U	U	U	85	84	101		96		P
Be	5																				
Cd	5	2		95	96	97	103	29	15	U	U	U	U	U	94	96	99		91		P
Ca	5000																				
[illegible]	10	4		98	98	97	99	51	60	U	U	U	U	U	95	94	97		91		P
Co	50																				
Cu	25	6		101	101	99	102	66	71	U	U	U	U	U	95	95	95	200	92	100	P
Fe	100	46		99	101	98	101			U	U	U	U	U	91	91	94	200	94	100	P
Pb	3	3		103	102	103	105	0		U	U	U	U	U			104		98		F
Mg	5000																				
Mn	15	2		98	98	97	100	50	51	U	U	U	U	U	92	88	99		93		P
Hg	0.2			101	102	101	101			U	U	U	U	U					96		CV
Ni	40																				
K	5000																				
Se	5	2		102	102	100	100	4		U	U	U	U	U			105		90		F
Ag	10	3		103	105	104	107	50	57	U	U	U	U	U	98	99	100		96		P
Na	5000	10		101	101	99	98			U	U	U	U	U					95		P
[illegible]	10																				
V	50																				
Zn	20	6		99	99	97	99	97	101	U	U	U	U	U	86	87	97	200	94	170	P
CN	10																				

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 125

SITE/STUDY DESCRIPTION: _____ SAMPLE NOS: _____

Field Blank _____

FIELD DUP. #'S: _____ LAB DUP. #'S: _____ MATRIX SPIKE #: _____

SERIAL DILUTION SAMPLE NO. _____ COMPLETION DATE: 2/28/92 REVIEWERS INITIALS: PBH

	X		I	IIA				IIB		III				IV		V	VI	VII	IX	
Parameter	Detection Limits UG/L		Field Blank	Calib. Ver. %R				CRDL Std Ver. % R		Calibration Blanks				PB RL EP AN	ICP ICS % R		MS Matrix	Lab Dup RPD Diff	LCS % R	Ser Dil % D	Method
	CRDL	IDL		Init	Continued 1	2	3	Init	Fin	Init	Continued 1	2	3		Init	Fin					
Al	200		NA																		
Sb	60																				
As	10	2			99	103	103				U	U	U								F
Ba	200	16			99						U										P
Be	5																				
Cd	5	2			104						U										P
Ca	5000																				
[illegible]	10	4			97						U										P
Co	50																				
Cu	25	6			101						U										P
Fe	100	46			99						U										P
Pb	3	3																			
Mg	5000																				
Mn	15	2			99						U										P
Hg	0.2				101	101					U	U		U							CV
Ni	40																				
K	5000																				
Se	5	2			101	100	104				U	U	U								F
Ag	10	3			106						U										P
Na	5000	10			98						U										P
[illegible]	10																				
V	50																				
Zn	20	6	U		99						U										P
CN	10																				

000032

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited Scope) Date: 2/28/92 Case #: NWS

Site: Naval Weapons Station Lab Name: Roy F. Weston

Reviewer's Initials: PBH Number of Samples: 1

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Interferences	Spike Recovery	Duplicates Lab	Duplicates Field	Detection Limits	LCS	Serial Dilution	MSA	Total Analytes	Rejection
ICP		1											1	
Flame AA														
Furnace AA		3											3	
Mercury														
Total		4											4	
Other														

Analytes Flagged as Estimated (J) Due to Exceeding Criteria For:*

ICP		4											4	
Flame AA														
Furnace AA														
Mercury														
Total		4											4	
Other														

Note:
Asterisk (*) indicates additional exceedances of review criteria.

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.7: CLP Data Assessment Checklist
Inorganic Analysis

Date: Feb. 1990
Number: HW-2
Revision: 10

INORGANIC REGIONAL DATA ASSESSMENT

Region II

CASE NO. NWS

SITE Naval Weapons Station

LABORATORY Roy F. Weston

NO. OF SAMPLES/ MATRIX 1 water

SDG# CLP 125

REVIEWER (IF NOT ESD) Heartland EST

SOW# 390

REVIEWER'S NAME Paul B. Humby

DPO: ACTION _____ FYI _____

COMPLETION DATE 2/28/92

DATA ASSESSMENT SUMMARY

		ICP	AA	Hg	CYANIDE
1.	HOLDING TIMES	O	O	O	NA
2.	CALIBRATIONS	Z	Z		
3.	BLANKS	O	O		
4.	ICS				
5.	LCS				
6.	DUPLICATE ANALYSIS				
7.	MATRIX SPIKE				
8.	MSA				
9.	SERIAL DILUTION				
10.	SAMPLE VERIFICATION				
11.	OTHER QC				
12.	OVERALL ASSESSMENT				

O = Data has no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS:

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Eight (8) water sample and one (1) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
1-M002	911012601
2-M002	911012603
2-M102	911012604
3-M002	911012605
4-M002	911012606
4-M002MS	911012606MS
4-M002	911012606D
4-M202	911012607
5-M002	911012608
6-M002	911012609

Heartland ESI has reviewed the data for the samples listed above TAL Metals (under the limited scope requirements) using Region II Data Validation Protocol, February 1990 revision. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

TAl Metals reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110126**, the analysis of eight (8) field water sample and one (1) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The USEPA CLP analytical protocol was followed as required.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in Region II Protocol.

Calibration

1. The CRDL Standard for Selenium was below 50%. All positive and non-detect results are rejected if within the concentration range as applied by the Region II Protocol.

2. The CRDL Standards for Cadmium, Copper, Manganese and Silver were below the lower control limit. All positive and non-detect results within the affected range are qualified as estimated, "J" or "UJ".

3. The CRDL Standard for Zinc was above 150%. All positive results are rejected if within the concentration range as pplied by the Region II Protocol.

Preparation and Field Blanks

No deficiencies in this section.

Interferences

No significant interferences were observed.

Metals Data Assessment Narrative (continued - Page 2)

Interferences

No significant interferences were observed.

Spike Recovery

4. The Matrix Spike recovery for Arsenic was below 30%. All positive and non-detect results are rejected.

5. The Matrix Spike recovery for Selenium was below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

Duplicate

6. The Duplicate analysis for Iron was outside the control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

LCS

No deficiencies in this section.

Serial Dilution

7. The Serial dilutions for Chromium, Iron, Manganese, Sodium and Zinc were outside the control limit. All positive results are qualified as estimated,"J".

MSA

8. The following analytes exhibited low recovery during the GFAA spiking procedures. All data is qualified as estimated, "J" or "UJ".

Analyte	Samples
Arsenic	2-M002, 4-M002 and 5-M002.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	Se	+/U	R	1
All Water Samples	Cd,Cu,Mn, and Ag	+/U	J/UJ	2
All Water Samples	Zn	+	R	3
All Water Samples	As	+/U	R	4
All Water Samples	Se	+/U	J/UJ	5
All Water Samples	Fe	+/U	J/UJ	6
All Water Samples	Cr,Fe,Mn, Na and Zn.	+	J	7
1-M002, 4-M002 and 5-M002.	As	+/U	J/UJ	8

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

1-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP126

Matrix (soil/water): WATER Lab Sample ID: 911012601

Level (low/med): LOW Date Received: 10/24/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~	~~NW~~	~~F~~	R4
7440-39-3	Barium	42.50	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	4660.00		*E	P	J6,7
7439-92-1	Lead	2.00	U	*	F	J6
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	33.60		*	P	J2,6
7439-97-6	Mercury	.18	B		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~N~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	2730.00	B		P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	~~32.20~~			~~P~~	R3
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

2-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP126

Matrix (soil/water): WATER Lab Sample ID: 911012603

Level (low/med): LOW Date Received: 10/24/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~	~~N~~	~~F~~	R4
7440-39-3	Barium	16.00	U		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	25000.00		*E	P	J6,7
7439-92-1	Lead	2.00	U	*	F	J6
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	254.00		*	P	J6
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~N~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	4750.00	B		P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	~~13.50~~	~~B~~	~~*~~	~~P~~	R3
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

2-M102

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP126

Matrix (soil/water): WATER Lab Sample ID: 911012604

Level (low/med): LOW Date Received: 10/24/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~	~~N~~	~~F~~	R4
7440-39-3	Barium	16.00	U		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	25300.00		*E	P	J6,7
7439-92-1	Lead	2.00	U	*	F	J6
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	274.00		*	P	J6
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~N~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	5190.00			P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	~~16.10~~	~~B~~		~~P~~	R3
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP126

Matrix (soil/water): WATER Lab Sample ID: 911012605

Level (low/med): LOW Date Received: 10/24/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~	~~N~~	~~F~~	R4
7440-39-3	Barium	16.00	U		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	2900.00		*E	P	J6,7
7439-92-1	Lead	2.00	U	*	F	J6
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	22.70		*	P	J2,6
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~N~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	2270.00	B		P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	~~26.70~~			~~P~~	R3
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

4=M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP126

Matrix (soil/water): WATER Lab Sample ID: 911012606

Level (low/med): LOW Date Received: 10/24/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~	~~NW~~	~~F~~	R4
7440-39-3	Barium	51.00	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	15.90			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	14.10	B		P	J2
7439-89-6	Iron	23400.00		*E	P	J6,7
7439-92-1	Lead	6.90		*	F	J6
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	139.00		*	P	J6
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~N~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	2540.00	B		P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	68.40			P	J7
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

4-M202

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP126

Matrix (soil/water): WATER Lab Sample ID: 911012607

Level (low/med): LOW Date Received: 10/24/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~	~~N~~	~~F~~	R4
7440-39-3	Barium	16.00	U		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	64.10	B	*E	P	J6,7
7439-92-1	Lead	2.00	U	*	F	J6
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	2.00	U	*	P	J6
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~N~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	161.00	B		P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	~~12.70~~	~~B~~		~~P~~	R4
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

5-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP126

Matrix (soil/water): WATER Lab Sample ID: 911012608

Level (low/med): LOW Date Received: 10/24/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~	~~NW~~	~~F~~	R4
7440-39-3	Barium	20.80	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	3850.00		*E	P	J6,7
7439-92-1	Lead	2.00	U	*	F	J6
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	58.30		*	P	J6
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~N~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	2960.00	B		P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	~~20.00~~			~~P~~	R4
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

6-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP126

Matrix (soil/water): WATER Lab Sample ID: 911012609

Level (low/med): LOW Date Received: 10/24/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~	~~N~~	~~F~~	R4
7440-39-3	Barium	26.30	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	1090.00		*E	P	J6,7
7439-92-1	Lead	2.00	U	*	F	J6
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	45.60		*	P	J6
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~N~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	2650.00	B		P	J7
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	~~32.10~~			~~P~~	R4
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

	YES	NO	N.A.
A.1.1 Contract Compliance Screening Report (CCS) - Present?	[ ]		✓
ACTION: If no, contact RSCC.			
A.1.2 Record of Communication (from RSCC) - Present?	[ ]		✓
ACTION: If no, request from RSCC.			
A.1.3 Trip Report - Present and complete?	[ ]		✓
ACTION: If no, contact RSCC for trip report.			
A.1.4 Sample Traffic Report - Present or on file?	[ ]		✓
Legible?	[ ]		✓
ACTION: If no, request from Regional Sample Control Center (RSCC).			
A.1.5 Cover Page - Present?	[✓]		✓ PBH
Is cover page properly filled in and signed by the lab manager or the manager's designee?	[✓]		✓ 2/28/92
ACTION: If no, prepare Telephone Record Log, and contact laboratory.			
Do numbers of samples correspond to numbers on Record of Communication?	[ ]		✓
Do sample numbers on cover page agree with sample numbers on:			
(a) Traffic Report Sheet?	[ ]		✓
(b) Form I's?	[✓]		
ACTION: If no for any of the above, contact RSCC for clarification.			

	YES	NO	N/A
A.1.6 Form I (Final Data) - Are all Form I's present and complete?	[✓]		
ACTION: If no, prepare telephone record log and contact laboratory for submittal.			
Are correct units (ug/l for waters and mg/kg for soils) indicated on Form I's?	[✓]		
Are soil sample results for each parameter corrected for percent solids?	[ ]		✓
Are EPA sample # s and corresponding laboratory sample ID # s the same as on the Cover Page, Form I's and in the raw data?	[✓]		
Are computation/transcription errors less than 10% of reported values?	[✓]		
Are all "less than IDL" values properly coded with "U"?	[✓]		
Was a brief physical description of samples given on Form I's?	[✓]		
Were the result qualifiers used correctly with final data?	[✓]		
ACTION: If no for any of the above, prepare Telephone Record Log, and contract laboratory for corrected data.			
Were any samples diluted beyond requirements of contract?		[✓]	
If yes, were dilutions noted on Form I's?	[✓]		
ACTION: If no, note under Contract-Problem/Non-Compliance of the "Data Assessment Narrative".			

A.1.7 Holding Times - (aqueous and soil samples)

(Examine sample traffic reports and digestion/distillation logs.)

Mercury analysis (28 days). . . . . exceeded?		[✓]	
Cyanide distillation (14 days). . . . . exceeded?		[ ]	✓

	YES	NO	N/A
Other Metals analysis (6 months). . . . exceeded?	___	[✓]	___

NOTE: Prepare a list of all samples and analytes for which holding times have been exceeded. Specify the number of days from date of collection to the date of preparation (from raw data). Attach to checklist.

ACTION: If yes, reject (red-line) values less than Instrument Detection Limit (IDL) and flag as estimated (J) the values above IDL even though sample(s) was preserved properly.

A.1.8 Raw Data

		YES	NO	N/A
A.1.8.1	Digestion Log* for flame AA/ICP (Form XIII) present?	[✓]	__	___
	Digestion Log for furnace AA Form XIII present?	[✓]	__	___
	Distillation Log for mercury Form XIII present?	[✓]	__	___
	Distillation Log for cyanides Form XIII present?	[___]	__	✓
	Are pH values (pH<2 for all metals, pH>12 for cyanide) present?	[✓]	__	___
	*Weights, dilutions and volumes used to obtain values.			
	Percent solids calculation present for soils/sediments?	[___]	__	✓
	Are preparation dates present on Digestion Log?	[✓]	__	___
A.1.8.2	Measurement read out record present? ICP	[✓]	___	___
	Flame AA	[___]	__	✓
	Furnace AA	[✓]	__	___
	Mercury	[✓]	___	___
	Cyanides	[___]	__	✓

	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	[✓]	__	__
Legible?	[✓]	__	__
Properly Labeled?	[✓]	__	__

ACTION: If no for any of the above, write Telephone Record Log and contact laboratory. Flag metal data as estimated if pH of sample is greater than 2. Flag cyanide data as estimated if pH sample is less than 12.

A.1.9 Data Validation and Verification

A.1.9.1 Calibration

	YES	NO	N/A
1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	[✓]	__	__
Is record of 5 point calibration present for Hg analysis?	[✓]	__	__

ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.1.2 Is record of 4 point calibration present for:			
Flame AA?	[__]	__	✓
Furnace AA?	[✓]	__	__
Cyanides?	[__]	__	✓

NOTE:
1. If less than 4 standards are measured in absorbance mode, then the remaining standards in concentration mode must be run immediately after calibration and be within ±10% of true value.
2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRDL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
ACTION: Flag associated data as estimated if standards are not within ±10% of true values (except CRDL calibration standard). Do not flag the data as estimated in linear range indicated by good recovery of standard.			
A.1.9.1.3 Is correlation *coefficient less than 0.995 for:			
Mercury Analysis?	___	[✓]	___
Cyanide Analysis?	___	[___]	✓
Atomic Absorption Analysis?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.2 Form II A (Initial and Continuing Calibration Verification)-			
A.1.9.2.1 Present and complete for every metal and cyanide?	[✓]	___	___
Present and complete for AA and ICP when both are used for same analyte?	[✓]	___	___
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
A.1.9.2.2 Circle all values on data summary sheet that are outside contract windows. Are all calibration standards (initial and continuing) within control limits?			
Metals 90-110%	[✓]	___	___
Hg - 80-120%	[✓]	___	___
Cyanides 85-115%	[___]	___	✓

* The reviewer will calculate correlation coefficient.

	YES	NO	N/A
ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with %R between 75-89% (65-79% for Hg; 70-84% for CN) or 111-125% (121-135% for Hg; 116-130% for CN) recovery and nearest good calibration standard. Qualify results <IDL as estimated (UJ), if the ICV or CCV %R is 75-89% (CN, 70-84% ; HG, 65-79%). Reject (red-line) as unacceptable data if recovery of the ICV or CCV is outside the range 75-125% (CN, 70-130%; Hg, 65-135%). Qualify five samples on either side of verification standard out of control limits.			
Was continuing calibration performed every 10 samples or every 2 hours?	[✓]		
ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).			
Was ICV for cyanides distilled?	[ ]		✓
ACTION: If no, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".			

A.1.9.3 Form II B (CRDL Standards for AA and ICP) -

	YES	NO	N/A
A.1.9.3.1 Was a CRDL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?	[✓]		
*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?	[ ]		✓
Was a 2xCRDL (or 2xIDL when IDL>CRDL) analyzed (CRI) for each ICP run? (Note: CRI for AL,Ba,Ca,Fe,Mg,Na,or K is not required.)	[✓]		

ACTION: If no for any of the above, flag as estimated all data falling within the affected ranges. The affected ranges are:

AA Analysis - **True Value ± CRDL
ICP Analysis - **True Value ± 2CRDL
CN Analysis - **True Value ± 0.5 x True Value.

* Find the results of mid-range standard in the raw data.
**True value of CRA, CRI or mid-range standard. Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N.A.
A.1.9.3.2	Was CRI analyzed after ICV/ICB and before the final CCV/CCB, and for every four hours of ICP run?	[✓]		

ACTION: If no, write in Contract Problem/Non-Compliance Section of the "Data Assessment Narrative".

A.1.9.3.3 Circle all values on summary sheet that are outside acceptance windows.

Are CRA and CRI standards within control limits: Metals 80 - 120%R?	[ ]	✓	
Is mid-range standard within control limits: Cyanide 80 - 120%R?	[ ]		✓

ACTION: Flag as estimated all data within the affected ranges if the recovery of the standard is between 50-79%; flag only positive data if the recovery is between 121-150%; reject (red line) all data if the recovery is less than 50%; reject only positive data if the recovery is greater than 150%.

A.1.9.4 <u>Form III (Initial and Continuing Calibration Blanks)</u>

A.1.9.4.1	Present and complete?	[✓]		
	For both AA and ICP when both are used for same analyte?	[✓]		
	Was an initial calibration blank analyzed?	[✓]		
	Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	[✓]		

ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/non-compliance section of the Data Assessment Narrative.

		YES	NO	N/A
A.1.9.4.2	Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IDL when IDL > CRDL). Are all calibration blanks (when IDL<CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	[✓]		
	Are all calibration blanks less than two times Instrument Detection Limit (when IDL>CRDL)?	[✓]		
	ACTION: If no for any of the above, flag as estimated (J) all positive data less than or equal to calibration blank values analyzed between calibration blank with value over CRDL (or 2xIDL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.			
A.1.9.5	FORM III (Preparation Blank) -			
	(Note: The preparation blank for mercury is the same as the calibration blank.)			
A.1.9.5.1	Was one prep. blank analyzed for: each 20 samples?	[✓]		
	each batch?	[✓]		
	each matrix type?	[✓]		
	both AA and ICP when both are used for same analyte?	[✓]		
	ACTION: If no for any of the above, flag as estimated (J) all associated positive data <10 x IDLs for which prep. blank was not analyzed.			
	NOTE: If only one blank was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.9.5.2	Is concentration of prep. blank greater than CRDL when IDL is less than or equal to CRDL?		[✓]	
	If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?		[✓]	

		YES	NO	N/A
	ACTION: If yes, reject (red-line) all associated data greater than CRDL concentration but less than ten times the prep. blank value found in the raw data.			
A.1.9.5.3	Do concentrations of prep. blank fall below two times IDL when IDL is greater than CRDL?	[✓]	__	__
	ACTION: If no, reject (red-line) all positive data that has a concentration less than 10 times the prep. blank value in the raw data.			
A.1.9.5.4	Is concentration of prep. blank below the negative CRDL?	__	[✓]	__
	ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6	Form IV (ICP Interference Check Sample)			
A.1.9.6.1	Present and complete?	[✓]	__	__
	(NOTE: Not required for furnace AA, flame AA, mercury, cyanide and Ca, Mg, K and Na.)			
	Was ICS analyzed at beginning and end of run (or at least twice every 8 hours)?	[✓]	__	__
	ACTION: If no, flag as estimated (J) all samples for which AL, Ca, Fe, or Mg is higher than in ICS.			
A.1.8.6.2	Circle all values on Data Summary Sheet that are more than + 20% of true or established mean value. Are all Interference Check Sample results inside of control limits (+ 20%)?	[✓]	__	__
	If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	[✓]	__	__
	ACTION: If no, flag as estimated (J) those positive results for which ICS recovery is between 121-150%; flag all sample results as estimated if ICS recovery falls within 50-79%; reject (red-line) those sample results for which ICS recovery is less than 50%; if ICS recovery is above 150%, reject positive results only (not flagged with a "U").			

		YES	NO	N/A
A.1.9.7	Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)- (Note: Not required for Ca, Mg, K, and Na (both matrices), Al, and Fe (soil only.)			
A.1.9.7.1	Present and complete for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each conc. range (i.e. low, med., high)?	[✓]	__	__
	For both AA and ICP when both are used for same analyte?	[✓]	__	__
	ACTION: If no for any of the above, flag as estimated (J) all positive data less than four times spiking level for which spiked sample was not analyzed.			
	NOTE: If one spiked sample was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.9.7.2	Was field blank used for spiked sample?	__	[✓]	__
	ACTION: If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
	NOTE: Matrix spike analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.7.3	Circle all values on Data Summary Sheet that are outside control limits (75% to 125%). Are all recoveries within control limits?	[__]	✓	__
	If no, is sample concentration greater than or equal to four times spike concentration?	[__]	✓	__
	ACTION: If yes, disregard spike recoveries for analytes whose concentrations are greater than or equal to four times spike added. If no, circle those analytes on Form V for which sample concentration is less than four times the spike concentration.			

	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	[✓]	[ ]	[ ]

ACTION: If no, write in the Contract - Problem/Non - Compliance section of "Data Assessment Narrative".

A.1.9.7.4 Aqueous

Are any spike recoveries:

	YES	NO	N/A
(a) less than 30%?	✓	[ ]	[ ]
(b) between 30-74%?	✓	[ ]	[ ]
(c) between 126-150%?	[ ]	[✓]	[ ]
(d) greater than 150%?	[ ]	[✓]	[ ]

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 126-150%, flag as estimated (J) all associated aqueous data not flagged with a "U"; if greater than 150%, reject (red-line) all associated aqueous data not flagged with a "U".

A.1.9.7.5 Soil/Sediment

Are any spike recoveries:

	YES	NO	N/A
(a) less than 10%?	[ ]	[ ]	✓
(b) between 10-74%?	[ ]	[ ]	✓
(c) between 126-200%?	[ ]	[ ]	✓
(d) greater than 200%?	[ ]	[ ]	✓

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 126-200%, flag as estimated all associated data was not flagged with a "U"; if greater than 200%, reject all associated data not flagged with a "U".

		YES	NO	N/A
A.1.9.8	Form VI (Lab Duplicates)			
A.1.9.8.1	Present and complete for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each concentration range (i.e. low, med., high)?	[✓]	__	__
	both AA and ICP when both are used for same analyte?	[✓]	__	__

ACTION: If no for any the above, flag as estimated (J) all data >CRDL* for which duplicate sample was not analyzed.

Note: 1. If one duplicate sample was analyzed for more than 20 samples, then first 20 samples do not have to be flagged as estimated.
2. If percent solids for soil sample and its duplicate differ by more than 1%, prepare a Form VI for each duplicate pair, report concentrations in Hg/L on wet weight basis and calculate RPD or Difference for each analyte.

A.1.9.8.2	Was field blank used for duplicate analysis?	__	[✓]	__

ACTION: If yes, flag all data >CRDL* as estimated (J) for which field blank was used as duplicate.

NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.

A.1.9.8.3	Are all values within control limits (RPD 20% or difference < ±CRDL)?	[__]	[✓]	__
	If no, are all results outside the control limits flagged with an * on Form I's and VI?	[__]	[✓]	__

ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".

NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than IDL.

* Substitute IDL for CRDL when IDL > CRDL.

	YES	NO	N/A
2. If lab duplicate result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, do not apply precision criteria.			
A.1.9.8.4 Is any value for sample duplicate pair less than CRDL* and other value greater than or equal to 10 x *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5 Aqueous Circle all values on Data Summary Sheet that are: RPD > 50%, or Difference > ± CRDL*			
Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	✓	[ ]	___
Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.8.6 Soil/Sediment Circle all values on Data Summary Sheet that are: RPD > 100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than or equal to 5 times *CRDL) : > 100%?	___	[ ]	✓
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) : > 2x*CRDL?	___	[ ]	✓

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A

ACTION: If yes, flag the associated data as estimated.

A.1.9.9 Field Duplicates

A.1.9.9.1 Were field duplicates analyzed? [✓] ___ ___

ACTION: If yes, prepare a Form VI for each aqueous field duplicate pair. Prepare a Form VI for each soil duplicate pair, if percent solids for sample and its duplicate differ by more than 1%; report concentrations of soils in ug/l on wet weight basis and calculate RPDs or Difference for each analyte.

NOTE: 1. Do not calculate RPD when both values are less than IDL.
2. Flag all associated data only for field duplicate pair.

1.9.9.2 Is any value for sample duplicate pair less than *CRDL and other value greater than or equal to 10 x *CRDL? ___ [✓] ___

ACTION: If yes, flag the associated data as estimated.

A.1.9.9.3 Aqueous

Circle all values on Form VI for field duplicates that are:
RPD > 50%, or
Difference > ± CRDL*

Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL? ___ [✓] ___

Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL? ___ [✓] ___

ACTION: If yes, flag the associated data as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A

A.1.9.9.4 Soil/Sediment

Circle all values on Form VI for field duplicates that are:
RPD >100%, or

Difference > 2 x CRDL*

Is any RPD (where sample and duplicate are both greater than 5 times *CRDL) :

>100%?	___	[✓]	___

Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x *CRDL):

>2x *CRDL?	___	[✓]	___

ACTION: If yes, flag the associated data as estimated.

A.1.9.10 Form VII (Laboratory Control Sample) (Note: LCS - not required for aqueous Hg and cyanide analyses.)

A.1.9.10.1 Was one LCS prepared and analyzed for:

every 20 water samples?	[✓]	___	___
every 20 solid samples?	[___]	___	✓
both AA and ICP when both are used for same analyte?	[✓]	___	___

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory for submittal of results of LCS. Flag as estimated (J) all data for which LCS was not analyzed.

NOTE: If only one LCS was analyzed for more than 20 samples, then first 20 samples close to LCS do not have to be flagged as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

**Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.10.2 Aqueous LCS			
Circle all LCS values outside control limits (80 - 120%- except aqueous Ag and Sb).			
Is any LCS recovery: less than 50%?	___	[✓]	___
between 50% and 79%?	___	[✓]	___
between 121% and 150%?	___	[✓]	___
greater than 150%?	___	[✓]	___

ACTION: Less than 50%, reject (red-line) all data; between 50% and 79%, flag all associated data as estimated (J); between 121% and 150%, flag all positive (not flagged with a "U") results as estimated; greater than 150%, reject all positive results.

A.1.9.10.3 Solid LCS

NOTE: 1. If "Found" value of LCS is rejectable due to duplicate injections or analytical spike recovery criteria, regardless of LCS recovery, flag the associated data as estimated (J).
2. If IDL of an analyte is equal to or greater than true value of LCS, disregard the "Action" below even though LCS is out of control limits.

	YES	NO	N/A
Is LCS "Found" value higher than the control limits on Form VII?	___	[_ _]	✓

ACTION: If yes, qualify all associated positive data as estimated.

	YES	NO	N/A
Is LCS "Found" value lower than the Control limits on Form VII?	___	[_ _]	✓

ACTION: If yes, qualify all associated data as estimated.

		YES	NO	N/A
A.1.9.11	Form IX (ICP Serial Dilution) -			
	NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IDL.			
A.1.9.11.1	Was Serial Dilution analysis performed for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each concentration range (i.e. low, med.)?	[✓]	__	__
	ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIDLs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DPO report.			
A.1.9.11.2	Was field blank(s) used for Serial Dilution Analysis?	__	[✓]	__
	ACTION: If yes, flag all associated data ≥ 10 x IDL as estimated (J).			
	NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.11.3	Are results outside control limit flagged with an "E" on Form I's and Form IX when initial concentration on Form IX is equal to 50 times IDL or greater.	[✓]	__	__
	ACTION: If no, write in the contract-problem/non-compliance section of the "Data Assessment Narrative".			
A.1.9.11.4	Circle all values on Data Summary Sheet that are outside control limit for initial concentrations equal to or greater than 10 x IDLs only. Are any % difference values: > 10%?	✓	[__]	__
	≥ 100%?	__	[✓]	__

	YES	NO	N/A
ACTION: Flag as estimated (J) all associated equal to or greater than 10xIDLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xIDLs for which PD is greater than or equal to 100%.			
A.1.9.12 Furnace Atomic Absorbtion (AA) QC Analysis			
A.1.9.12.1 Are duplicate injections present in furnace raw data (except during full Method of Standard Addition) for each sample analyzed by GFAA?	[✓]		
ACTION: If no, reject the data on Form I's for which duplicate injections were not performed.			
A.1.9.12.2 Do the duplicate injection readings agree within 20% Relative Standard Deviation (RSD) or Coefficient of Variation (CV) for concentration greater than CRDL?	[✓]		
Was a dilution analyzed for sample with post digestion spike recovery less than 40%?	[✓]		
ACTION: If no for any of the above, flag all the associated data as estimated (J).			
A.1.9.12.3 Is *post digestion spike recovery less than 10% or greater than 150% for any result?		[✓]	
ACTION: If yes, reject (red-line) the affected data if recovery is <10%; reject data not flagged with "U" if spike recovery is >150%.			
NOTE: Reject the data only if the affected sample was not subsequently analyzed by Method of Standard Addition.			

* Post digestion spike is not required on the pre-digestion spiked sample.

		YES	NO	N/A
A.1.9.13	Form VIII (Method of Standard Addition Results)			
A.1.9.13.1	Present?	[✓]	__	__
	If no, is any Form I result coded with "S" or a "+"?	__	[✓]	__
	ACTION: If yes, write request on Telephone Record Log and contact laboratory for submittal of Form VIII.			
A.1.9.13.2	Is coefficient of correlation for MSA less than 0.990 for any sample?	__	[✓]	__
	ACTION: If yes, reject (red-line) affected data.			
A.1.9.13.3	Was *MSA required for any sample but not performed?	__	[✓]	__
	Is coefficient of correlation for MSA less than 0.995?	__	[✓]	__
	Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	__	[✓]	__
	ACTION: If yes for any of the above, flag all the associated data as estimated (J).			
A.1.9.13.4	Was proper quantitation procedure followed correctly as outlined in the SOW on page E-16 through E-17?	[✓]	__	__
	ACTION: If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14	Dissolved/Total or Inorganic/Total Analytes -			
A.1.9.14.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s).	__	[✓]	__
	Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	__	[✓]	__

* MSA is not required on LCS and prep. blank.

	YES	NO	N/A
NOTE: 1. If yes, prepare a list comparing differences between all dissolved (or inorganic) and total analytes. Compute the differences as a percent of the total analyte only when dissolved concentration is greater than CRDL as well as total concentration. 2. Apply the following questions only if inorganic (or dissolved) results are (i) above CRDL, and (ii) greater than total constituents. 3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.			
A.1.9.14.2 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 10%?	___	[✓]	___
A.1.9.14.3 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%?	___	[✓]	___

ACTION: If more than 10%, flag both dissolved (or inorganic) and total values as estimated (J); if more than 50% reject (red-line) the data for both values.

A.1.9.15 Form I to IX

A.1.9.15.1 Are all the Form I through Form IX labeled with:

Laboratory name?	[✓]	___	___
Case/SAS number?	[✓]	___	___
EPA sample No.?	[✓]	___	___
SDG No.?	[✓]	___	___
Contract No.?	[✓]	___	___
Correct units?	[✓]	___	___
Matrix?	[✓]	___	___

ACTION: If no for any of the above, note under contract problem/non-compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.15.2 Do any computation/transcription errors exceed 10% of reported values on Forms I-IX for:			
(NOTE: Check all forms against raw data.)			
(a) all analytes analyzed by ICP?	___	[✓]	___
(b) all analytes analyzed by GFAA?	___	[✓]	___
(c) all analytes analyzed by AA Flame?	___	[ ]	✓
(d) Mercury?	___	[✓]	___
(e) Cyanide?	___	[ ]	✓

ACTION: If yes, prepare Telephone Log, contact laboratory for corrected data and correct errors with red pencil and initial.

A.1.9.16 Form I (Field Blank) -

Circle all field blank values on Data Summary Sheet that are greater than CRDL, 2 x IDL when IDL > CRDL.

Do concentrations of field blank(s) fall below CRDL (or 2 x IDL when IDL > CRDL) for all parameters of associated aqueous and soil samples?	[✓]	___	___
If no, was field blank value already rejected due to other QC criteria?	[✓]	___	___

ACTION: If no, reject (except field blank results) all associated positive sample data less than or equal to five times the field blank value.

	YES	NO	N/A
A.1.9.17 Form X, XI, XII (Verification of Instrumental Parameters).			
A.1.9.17.1 Is verification report present for:			
Instrument Detection Limits (quarterly)?	[✓]	__	__
ICP Interelement Correction Factors (annually)?	[✓]	__	__
ICP Linear Ranges (quarterly)?	[✓]	__	__
ACTION: If no, contact DPO of the lab.			
A.1.9.17.2 Form X (Instrument Detection Limits) - (Note: IDL is not required for Cyanide.)			
Are IDLs present for: all the analytes?	[✓]	__	__
all the instruments used?	[✓]	__	__
For both AA and ICP when both are used for same analyte?	[✓]	__	__
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
Is IDL greater than CRDL for any analyte?	__	[✓]	__
If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?	[✓]	__	__
ACTION: If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.			

	YES	NO	N/A
A.1.9.17.3 Form XI (Linear Ranges)			
Was any sample result higher than high linear range of ICP.	___	[✓]	___
Was any sample result higher than the highest calibration standard for non-ICP parameters?	___	[✓]	___
If yes for any of the above, was the sample diluted to obtain the result on Form I?	[✓]	___	___
ACTION: If no, flag the result reported on Form I as estimated(J).			
A.1.9.18 Percent Solids of Sediments			
Is soil content in sediment(s) less than 50%?	___	[___]	✓
ACTION: If yes, qualify as estimated all data not previously rejected or flagged due to other QC criteria.			

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Feb. 1990
Number: HW-2
Revision: 10

Case#	NWS	Site	Naval Weapon Station	Matrix: Soil	
SDG#	CLP 126	Lab	Roy F. Weston	Water	✓
Contractor	Roy F. Weston	Reviewer	Heartland ESI	Other	

A.2.1 The case description and exceptions, if any, are noted below with reason(s) for rejection or qualification as estimated value(s) J.

1. CRDL Selenium <50% all data rejected.
2. CRDL Cadmium, Copper, Manganese and Silver recoveries above control limit. All positive results are estimated.
3. CRDL Zinc >150%. All positive results are rejected.
4. The Matrix spike recovery for Arsenic was <30%, All data rejected.
5. The Matrix spike recovery for Selenium was below the lower control limit. All data is estimated.
6. The Duplicate analyses for Iron, ~~Sodium~~ Lead PBH and ~~Zinc~~ Manganese PBH were outside the control limits. All Data is estimated. 2/28/92
7. The Serial dilutions for Iron, Sodium and Zinc were outside the control limits. All positive results are estimated

A.2.1 (continuation)

8. The analytical spikes for Arsenic (1-M002, 4-M002 and 5-M002) were below the lower control limit. All data is estimated.

PBH 2/28/92

PBH 2/28/92

2.2 Contract-Problems/Non-Compliance

PBH 2/28/92

MMB Reviewer: _____ Date: _____
Signature

Contractor Reviewer: Paul B. Hively Date: 2/28/92
Signature

Verified by: Christopher O. Langellier Date: 3/2/92

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 126

SITE/STUDY DESCRIPTION: Naval Weapon Station SAMPLE NOS: 1-M002, 2-M002, 2M102, 3-M002, 4-M002, 4-M202, 5-M002, 6-M002

FIELD DUP. #'S: _____ LAB DUP. #'S: 4-M002 Field Blank _____ MATRIX SPIKE #: 4-M002

SERIAL DILUTION SAMPLE NO. 4-M002 COMPLETION DATE: 2/28/90 REVIEWERS INITIALS: PBK

	X		I	IIA				IIB		III				IV		V	VI	VII	IX	
Parameter	Detection Limits UG/L CRDL	IDL	Field Blank	Calib. Ver. %R Init	Continued 1	2	3	CRDL Std Ver. Init	%R Fin	Calibration Blanks Init	Continued 1	2	3	PBL PREP	ICP ICS %R Init	Fin	MS Spik % R	Lab Dup RPD Diff	LCS %R	Ser Dil %D	Meth
Al	200		NA																		
Sb	60																				
As	10	2		108	101	98	100	81		U	U	U	U	U			27		96		F
Ba	200	16		102	103	101	100			U	U	U	U	U	87	87	106	46	97	100	P
Be	5																				
Cd	5	2		105	108	104	104	127	81	U	U	U	U	U	95	99	107	200	105		P
Ca	5000																				
Cr	10	4		99	101	101	101	80	105	U	U	U	U	U	96	100	110	101	98	100	P
Co	50																				
Cu	25	6		103	105	104	103	126	127	U	U	U	U	U	98	99	105	200	98	100	P
Fe	100	46		100	103	102	104			U	U	U	U	U	97	100	16	119	99	29	P
Pb	3	3		103	101	103	102	80		U	U	U	U	U			91	68	96		F
Mg	5000																				
Mn	15	2		100	101	101	102	124	130	U	3	U	U	U	106	107	113	80	98	9	P
Hg	0.2			102	102	101	103			U	U	U	U	U			105		96		CV
Ni	40																				
K	5000																				
Se	5	2		104	99	103	102	28		U	U	U	U	U			62		84		F
Ag	10	3		102	104	103	103	123	112	U	U	U	U	U	98	90	98		100		P
Na	5000	10		102	103	101	101			U	U	U	167	U				6	98	10	P
Tl	10																				
V	50																				
Zn	20	6		101	104	104	104	150	168	U	U	U	U	7	89	93	112	22	100	12	P
CN	10																				

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 126

SITE/STUDY DESCRIPTION: _____ SAMPLE NOS: _____

Field Blank _____

FIELD DUP. #'S: _____ LAB DUP. #'S: _____ MATRIX SPIKE #: _____

SERIAL DILUTION SAMPLE NO. _____ COMPLETION DATE: 2/28/92 REVIEWERS INITIALS: PBU

Parameter	X Detection Limits UG/L CRDL	IDL	I Field Blank	IIA Calib. Ver. %R Init	Continued 1	2	3	IIB CRDL Std Ver. % R Init	Fin	III Calibration Blanks Init	Continued 1	2	3	IV PBL PREP AN	ICP ICS % R Init	Fin	V MS Matrix Spik	VI Lab Dup RPD Diff	VII LCS % R	IX Ser Dil % D	Meth
Al	200		NA																		
Sb	60																				
As	10	2			100	100	100	126			U	U	U	U							F
Ba	200	6			99	102					U	U		U							P
Be	5																				
Cd	5	C			102	104					U	U		U							P
Ca	5000																				
Cr	10	4			101	104					U	U		U							P
Co	50																				
Cu	25	6			102	105					U	U		U							P
Fe	100	46			102	104					U	U		U							P
Pb	3	3			103	103	105				U	U	U	U							F
Mg	5000																				
Mn	15	2			101	103					U	U		U							P
Hg	0.2				101	101					U	U		U							CU
Ni	40																				
K	5000																				
Se	5	2			98	101	99	44			U	U	U	U							F
Ag	10	3			102	104					U	U		U							P
Na	5000	110			100	104					117	145		U							P
Tl	10																				
V	50																				
Zn	20	6			103	107					U	U		U							P
CN	10																				

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limital scope) Date: 2/28/92 Case #: NWS

Site: Lab Name: Roy F. Weston

Reviewer's Initials: Number of Samples:

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Inter-ferences	Spike Recovery	Duplicates Lab	Duplicates Field	Detection Limits	LCS	Serial Dilution	MSA	Total Analytes	Rejection
ICP		1											1	
Flame AA														
Furnace AA		1				1							2	
Mercury														
Total		2				1							3	
Other														

Analytes Flagged as Estimated (J) Due to Exceeding Criteria For:*

ICP		4					1				5		10	
Flame AA														
Furnace AA						1						1	2	
Mercury														
Total		4				1	1				5	1	12	
Other														

Note:
Asterisk (*) Indicates additional exceedances of review criteria.

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.7: CLP Data Assessment Checklist
Inorganic Analysis

Date: Feb. 1990
Number: HW-2
Revision: 10

INORGANIC REGIONAL DATA ASSESSMENT

Region II

CASE NO. NWS

SITE Naval Weapons Station

LABORATORY Roy F. Weston

NO. OF SAMPLES/ MATRIX 8 waters

SDG# CLP 126

REVIEWER (IF NOT ESD) Heartland ESI

SOW# 390

REVIEWER'S NAME Paul B. Hunsberg

DPO: ACTION _____ FYI _____

COMPLETION DATE 2/28/92

DATA ASSESSMENT SUMMARY

		ICP	AA	Hg	CYANIDE
1.	HOLDING TIMES	O	O	O	NA
2.	CALIBRATIONS	Z	Z		
3.	BLANKS	O	O		
4.	ICS				
5.	LCS		O		
6.	DUPLICATE ANALYSIS		O		
7.	MATRIX SPIKE		Z		
8.	MSA		O		
9.	SERIAL DILUTION				
10.	SAMPLE VERIFICATION		O		
11.	OTHER QC		O		
12.	OVERALL ASSESSMENT		O		

O = Data has no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS:

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Six (6) water sample and no (0) Matrix Spike and Duplicate pair were analyzed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
1-M002	911014901
2-M002	911014902
3-M002	911014903
4-M002	911014904
3-M202	911014905
5-M002	911014906

Heartland ESI has reviewed the data for the samples listed above TAL Metals (under the limited scope requirements) using Region II Data Validation Protocol, February 1990 revision. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

TAL Metals reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110149**, the analysis of six (6) field water samples and no (0) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The USEPA CLP analytical protocol was followed as required with the exception of the following problem. The Laboratory failed to submit Forms 5,6 and 9 for this data package. In the narrative they stated that the Quality Control samples associated with this report were in another data package. They should at least submit these forms for insertion into this package due to the fact that all CLP packages should stand on their own merit. The QC data for this data package can be found in SDG #125.

Specific QA/QC deficiency **Findings** are listed numerically in the following categories:

Holding Times

The holding times were met as specified in Region II Protocol.

Calibration

1. The CRDL Standards for Arsenic, Cadmium, Lead and Selenium were below 50%. All positive and non-detect results are rejected if within the concentration range as applied by the Region II Protocol.

2. The CRDL Standards for Chromium, Copper, Manganese and Silver were below the lower control limit. All positive and non-detect results within the affected range are qualified as estimated, "J" or "UJ".

Preparation and Field Blanks

No deficiencies in this section.

Interferences

No significant interferences were observed.

Metals Data Assessment Narrative (continued - Page 2)

Interferences

No significant interferences were observed.

Spike Recovery

No deficiencies in this section.

Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

Serial Dilution

No deficiencies in this section.

MSA

3. The following analytes exhibited low recovery during the GFAA spiking procedures. All data is qualified as estimated, "J" or "UJ".

Analyte	Samples
Arsenic	1-M002,2-M002,3-M002,4-M002,3-M003 AND 5-M002
Selenium	1-M002,2-M002,3-M002,4-M002,3-M202 AND 5-M002
Lead	3-M002, 4-M002 and 5-M002.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	As,Cd,Pb, and Se	+/U	R	1
All Water Samples	Cr,Cu,Mn, and Ag	+/U	J/UJ	2
1-M002,2-M002,3-M002, 4-M002,3-M202 AND 5-M002.	As	+/U	J/UJ	3
1-M002,2-M002,3-M002, 4-M002,3-M202 AND 5-M002.	Se			
3-M002, 4-M002 and 5-M002	Pb			

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

1-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP149

Matrix (soil/water): WATER Lab Sample ID: 911014901

Level (low/med): LOW Date Received: 10/25/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-39-3	Barium	65.40	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	~~3.00~~	~~U~~		~~P~~	R1
7440-70-2	Calcium				NR	
7440-47-3	Chromium	7.50	B		P	J2
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	UJ2
7439-89-6	Iron	289.00			P	
7439-92-1	Lead	~~2.00~~	~~U~~		~~F~~	R1
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	16.60			P	J2
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	UJ2
7440-23-5	Sodium	2230.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	23.40			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

2-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP149

Matrix (soil/water): WATER Lab Sample ID: 911014903

Level (low/med): LOW Date Received: 10/25/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.10~~	~~B~~	~~W~~	~~F~~	R1
7440-39-3	Barium	44.30	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	~~3.00~~	~~U~~		~~P~~	R1
7440-70-2	Calcium				NR	
7440-47-3	Chromium	213.00			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	UJ2
7439-89-6	Iron	32000.00			P	
7439-92-1	Lead	20.30		S	F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	35.10			P	UJ2
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	UJ2
7440-23-5	Sodium	3020.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	58.80			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP149

Matrix (soil/water): WATER Lab Sample ID: 911014904

Level (low/med): LOW Date Received: 10/25/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-39-3	Barium	36.90	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	~~3.00~~	~~U~~		~~P~~	R1
7440-70-2	Calcium				NR	
7440-47-3	Chromium	80.00			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	UJ2
7439-89-6	Iron	9560.00			P	
7439-92-1	Lead	6.80		W	F	J3
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	20.60			P	J2
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	UJ2
7440-23-5	Sodium	2700.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	59.70			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

4-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP149

Matrix (soil/water): WATER Lab Sample ID: 911014905

Level (low/med): LOW Date Received: 10/25/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-39-3	Barium	39.10	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	~~3.00~~	~~U~~		~~P~~	R1
7440-70-2	Calcium				NR	
7440-47-3	Chromium	14.40			P	J2
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	UJ2
7439-89-6	Iron	2180.00			P	
7439-92-1	Lead	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	15.40			P	J2
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	UJ2
7440-23-5	Sodium	5100.00			P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	120.00			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3-M202

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP149

Matrix (soil/water): WATER Lab Sample ID: 911014906

Level (low/med): LOW Date Received: 10/25/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-39-3	Barium	16.00	U		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	~~3.00~~	~~U~~		~~P~~	R1
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	UJ2
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	UJ2
7439-89-6	Iron	46.00	U		P	
7439-92-1	Lead	~~2.00~~	~~U~~		~~F~~	R1
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	2.00	U		P	UJ2
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	UJ2
7440-23-5	Sodium	110.00	U		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	6.00	U		P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

5-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP149

Matrix (soil/water): WATER Lab Sample ID: 911014907

Level (low/med): LOW Date Received: 10/25/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-39-3	Barium	35.80	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	~~3.00~~	~~U~~		~~P~~	R1
7440-70-2	Calcium				NR	
7440-47-3	Chromium	16.80			P	J2
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	UJ2
7439-89-6	Iron	3420.00			P	
7439-92-1	Lead	~~2.60~~	~~B~~	~~W~~	~~F~~	R1
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	18.50			P	J2
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	UJ2
7440-23-5	Sodium	2710.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	24.60			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report (CCS) - Present?	[ ]		✓
ACTION: If no, contact RSCC.			
A.1.2 Record of Communication (from RSCC) - Present?	[ ]		✓
ACTION: If no, request from RSCC.			
A.1.3 Trip Report - Present and complete?	[ ]		✓
ACTION: If no, contact RSCC for trip report.			
A.1.4 Sample Traffic Report - Present or on file?	[ ]		✓
Legible?	[ ]		✓
ACTION: If no, request from Regional Sample Control Center (RSCC).			
A.1.5 Cover Page - Present?	[✓]		
Is cover page properly filled in and signed by the lab manager or the manager's designee?	[✓]		
ACTION: If no, prepare Telephone Record Log, and contact laboratory.			
Do numbers of samples correspond to numbers on Record of Communication?	[ ]		✓
Do sample numbers on cover page agree with sample numbers on:			
(a) Traffic Report Sheet?	[ ]		✓
(b) Form I's?	[✓]		
ACTION: If no for any of the above, contact RSCC for clarification.			

	YES	NO	N/A
A.1.6 Form I (Final Data) - Are all Form I's present and complete?	[✓]	__	__
ACTION: If no, prepare telephone record log and contact laboratory for submittal.			
Are correct units (ug/l for waters and mg/kg for soils) indicated on Form I's?	[✓]	__	__
Are soil sample results for each parameter corrected for percent solids?	[__]	__	✓
Are EPA sample # s and corresponding laboratory sample ID # s the same as on the Cover Page, Form I's and in the raw data?	[✓]	__	__
Are computation/transcription errors less than 10% of reported values?	[✓]	__	__
Are all "less than IDL" values properly coded with "U"?	[✓]	__	__
Was a brief physical description of samples given on Form I's?	[✓]	__	__
Were the result qualifiers used correctly with final data?	[✓]	__	__
ACTION: If no for any of the above, prepare Telephone Record Log, and contract laboratory for corrected data.			
Were any samples diluted beyond requirements of contract?	__	[✓]	__
If yes, were dilutions noted on Form I's?	[✓]	__	__
ACTION: If no, note under Contract-Problem/Non-Compliance of the "Data Assessment Narrative".			

A.1.7 Holding Times - (aqueous and soil samples)

(Examine sample traffic reports and digestion/distillation logs.)

Mercury analysis (28 days). . . . . exceeded?	__	[✓]	__
Cyanide distillation (14 days). . . . . exceeded?	__	[__]	✓

	YES	NO	N/A
Other Metals analysis (6 months). . . . exceeded?	___	[✓]	___

NOTE: Prepare a list of all samples and analytes for which holding times have been exceeded. Specify the number of days from date of collection to the date of preparation (from raw data). Attach to checklist.

ACTION: If yes, reject (red-line) values less than Instrument Detection Limit (IDL) and flag as estimated (J) the values above IDL even though sample(s) was preserved properly.

A.1.8 Raw Data

		YES	NO	N/A
A.1.8.1	Digestion Log* for flame AA/ICP (Form XIII) present?	[✓]	___	___
	Digestion Log for furnace AA Form XIII present?	[✓]	___	___
	Distillation Log for mercury Form XIII present?	[✓]	___	___
	Distillation Log for cyanides Form XIII present?	[___]	___	✓
	Are pH values (pH<2 for all metals, pH>12 for cyanide) present?	[✓]	___	___
	*Weights, dilutions and volumes used to obtain values.			
	Percent solids calculation present for soils/sediments?	[___]	___	✓
	Are preparation dates present on Digestion Log?	[✓]	___	___
A.1.8.2	Measurement read out record present? ICP	[✓]	___	___
	Flame AA	[___]	___	✓
	Furnace AA	[✓]	___	___
	Mercury	[✓]	___	___
	Cyanides	[___]	___	✓

	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	[✓]	__	__
Legible?	[✓]	__	__
Properly Labeled?	[✓]	__	__

ACTION: If no for any of the above, write Telephone Record Log and contact laboratory. Flag metal data as estimated if pH of sample is greater than 2. Flag cyanide data as estimated if pH sample is less than 12.

A.1.9 Data Validation and Verification

A.1.9.1 Calibration

	YES	NO	N/A
A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	[✓]	__	__
Is record of 5 point calibration present for Hg analysis?	[✓]	__	__

ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.1.2 Is record of 4 point calibration present for:			
Flame AA?	[__]	__	✓
Furnace AA?	[✓]	__	__
Cyanides?	[__]	__	✓

NOTE:
1. If less than 4 standards are measured in absorbance mode, then the remaining standards in concentration mode must be run immediately after calibration and be within ±10% of true value.
2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRDL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
ACTION: Flag associated data as estimated if standards are not within ±10% of true values (except CRDL calibration standard). Do not flag the data as estimated in linear range indicated by good recovery of standard.			
A.1.9.1.3 Is correlation *coefficient less than 0.995 for:			
Mercury Analysis?	___	[✓]	___
Cyanide Analysis?	___	[___]	✓
Atomic Absorption Analysis?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
.1.9.2 Form II A (Initial and Continuing Calibration Verification)-			
A.1.9.2.1 Present and complete for every metal and cyanide?	[✓]	___	___
Present and complete for AA and ICP when both are used for same analyte?	[✓]	___	___
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
A.1.9.2.2 Circle all values on data summary sheet that are outside contract windows. Are all calibration standards (initial and continuing) within control limits?			
Metals 90-110%	[✓]	___	___
Hg - 80-120%	[✓]	___	___
Cyanides 85-115%	[___]	___	✓

* The reviewer will calculate correlation coefficient.

	YES	NO	N/A
ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with %R between 75-89% (65-79% for Hg; 70-84% for CN) or 111-125% (121-135% for Hg; 116-130% for CN) recovery and nearest good calibration standard. Qualify results <IDL as estimated (UJ), if the ICV or CCV %R is 75-89% (CN, 70-84% ; HG, 65-79%). Reject (red-line) as unacceptable data if recovery of the ICV or CCV is outside the range 75-125% (CN, 70-130%; Hg, 65-135%). Qualify five samples on either side of verification standard out of control limits.			
Was continuing calibration performed every 10 samples or every 2 hours?	[✓]	__	__
ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).			
Was ICV for cyanides distilled?	[__]	__	✓
ACTION: If no, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".			

A.1.9.3 Form II B (CRDL Standards for AA and ICP) -

A.1.9.3.1 Was a CRDL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?	[✓]	__	__
*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?	[__]	__	✓
Was a 2xCRDL (or 2xIDL when IDL>CRDL) analyzed (CRI) for each ICP run? (Note: CRI for AL,Ba,Ca,Fe,Mg,Na,or K is not required.)	[✓]	__	__

ACTION: If no for any of the above, flag as estimated all data falling within the affected ranges. The affected ranges are:
AA Analysis - **True Value ± CRDL
ICP Analysis - **True Value ± 2CRDL
CN Analysis - **True Value ± 0.5 x True Value.

ind the results of mid-range standard in the raw data.
**True value of CRA, CRI or mid-range standard. Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/A
A.1.9.3.2	Was CRI analyzed after ICV/ICB and before the final CCV/CCB, and for every four hours of ICP run?	[✓]		
	ACTION: If no, write in Contract Problem/Non-Compliance Section of the "Data Assessment Narrative".			
A.1.9.3.3	Circle all values on summary sheet that are outside acceptance windows.			
	Are CRA and CRI standards within control limits: Metals 80 - 120%R?	[ ]	✓	
	Is mid-range standard within control limits: Cyanide 80 - 120%R?	[ ]		✓
	ACTION: Flag as estimated all data within the affected ranges if the recovery of the standard is between 50-79%; flag only positive data if the recovery is between 121-150%; reject (red line) all data if the recovery is less than 50%; reject only positive data if the recovery is greater than 150%.			
A.1.9.4	Form III (Initial and Continuing Calibration Blanks)			
A.1.9.4.1	Present and complete?	[✓]		
	For both AA and ICP when both are used for same analyte?	[✓]		
	Was an initial calibration blank analyzed?	[✓]		
	Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	[✓]		
	ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/non-compliance section of the Data Assessment Narrative.			

		YES	NO	N/A
A.1.9.4.2	Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IDL when IDL > CRDL). Are all calibration blanks (when IDL<CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	[✓]		
	Are all calibration blanks less than two times Instrument Detection Limit (when IDL>CRDL)?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all positive data less than or equal to calibration blank values analyzed between calibration blank with value over CRDL (or 2xIDL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.

A.1.9.5 FORM III (Preparation Blank) -

(Note: The preparation blank for mercury is the same as the calibration blank.)

A.1.9.5.1	Was one prep. blank analyzed for: each 20 samples?	[✓]		
	each batch?	[✓]		
	each matrix type?	[✓]		
	both AA and ICP when both are used for same analyte?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all associated positive data <10 x IDLs for which prep. blank was not analyzed.

NOTE: If only one blank was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).

A.1.9.5.2	Is concentration of prep. blank greater than CRDL when IDL is less than or equal to CRDL?		[✓]	
	If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?		[✓]	

		YES	NO	N/A
	ACTION: If yes, reject (red-line) all associated data greater than CRDL concentration but less than ten times the prep. blank value found in the raw data.			
A.1.9.5.3	Do concentrations of prep. blank fall below two times IDL when IDL is greater than CRDL?	[✓]	__	__
	ACTION: If no, reject (red-line) all positive data that has a concentration less than 10 times the prep. blank value in the raw data.			
A.1.9.5.4	Is concentration of prep. blank below the negative CRDL?	__	[✓]	__
	ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6	Form IV (ICP Interference Check Sample)			
A.1.9.6.1	Present and complete?	[✓]	__	__
	(NOTE: Not required for furnace AA, flame AA, mercury, cyanide and Ca, Mg, K and Na.)			
	Was ICS analyzed at beginning and end of run (or at least twice every 8 hours)?	[✓]	__	__
	ACTION: If no, flag as estimated (J) all samples for which AL, Ca, Fe, or Mg is higher than in ICS.			
A.1.8.6.2	Circle all values on Data Summary Sheet that are more than + 20% of true or established mean value. Are all Interference Check Sample results inside of control limits (+ 20%)?	[✓]	__	__
	If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	[✓]	__	__
	ACTION: If no, flag as estimated (J) those positive results for which ICS recovery is between 121-150%; flag all sample results as estimated if ICS recovery falls within 50-79%; reject (red-line) those sample results for which ICS recovery is less than 50%; if ICS recovery is above 150%, reject positive results only (not flagged with a "U").			

		YES	NO	N/A
A.1.9.7	Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)- (Note: Not required for Ca, Mg, K, and Na (both matrices), Al, and Fe (soil only.)			
A.1.9.7.1	Present and complete for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each conc. range (i.e. low, med., high)?	[✓]	__	__
	For both AA and ICP when both are used for same analyte?	[✓]	__	__
	ACTION: If no for any of the above, flag as estimated (J) all positive data less than four times spiking level for which spiked sample was not analyzed.			
	NOTE: If one spiked sample was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.9.7.2	Was field blank used for spiked sample?	__	[✓]	__
	ACTION: If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
	NOTE: Matrix spike analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.7.3	Circle all values on Data Summary Sheet that are outside control limits (75% to 125%). Are all recoveries within control limits?	[__]	✓	__
	If no, is sample concentration greater than or equal to four times spike concentration?	[__]	✓	__
	ACTION: If yes, disregard spike recoveries for analytes whose concentrations are greater than or equal to four times spike added. If no, circle those analytes on Form V for which sample concentration is less than four times the spike concentration.			

	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	[✓]	__	__

ACTION: If no, write in the Contract - Problem/Non - Compliance section of "Data Assessment Narrative".

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A.1.9.7.4 Aqueous

Are any spike recoveries:

PDH

(a) less than 30%?	X	[✓]	__
(b) between 30-74%?	__	[✓]	__
(c) between 126-150%?	__	[✓]	__
(d) greater than 150%?	__	[✓]	__

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 126-150%, flag as estimated (J) all associated aqueous data not flagged with a "U"; if greater than 150%, reject (red-line) all associated aqueous data not flagged with a "U".

NOTE: If pre-digestion spike result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, disregard spike recovery on Form V. Flag the associated data as estimated(J).

A.1.9.7.5 Soil/Sediment

Are any spike recoveries:

(a) less than 10%?	__	[__]	✓
(b) between 10-74%?	__	[__]	✓
(c) between 126-200%?	__	[__]	✓
(d) greater than 200%?	__	[__]	✓

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 126-200%, flag as estimated all associated data was not flagged with a "U"; if greater than 200%, reject all associated data not flagged with a "U".

		YES	NO	N/A
A.1.9.8	Form VI (Lab Duplicates)			
A.1.9.8.1	Present and complete for: each 20 samples?	[✓]		
	each matrix type?	[✓]		
	each concentration range (i.e. low, med., high)?	[✓]		
	both AA and ICP when both are used for same analyte?	[✓]		

ACTION: If no for any the above, flag as estimated (J) all data >CRDL* for which duplicate sample was not analyzed.

Note: 1. If one duplicate sample was analyzed for more than 20 samples, then first 20 samples do not have to be flagged as estimated.
2. If percent solids for soil sample and its duplicate differ by more than 1%, prepare a Form VI for each duplicate pair, report concentrations in Hg/L on wet weight basis and calculate RPD or Difference for each analyte.

A.1.9.8.2	Was field blank used for duplicate analysis?		[✓]	

ACTION: If yes, flag all data >CRDL* as estimated (J) for which field blank was used as duplicate.

NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.

A.1.9.8.3	Are all values within control limits (RPD 20% or difference < ±CRDL)?	[✓]		
	If no, are all results outside the control limits flagged with an * on Form I's and VI?	[✓]		

ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".

NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than IDL.

* Substitute IDL for CRDL when IDL > CRDL.

	YES	NO	N/A
2. If lab duplicate result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, do not apply precision criteria.			
A.1.9.8.4 Is any value for sample duplicate pair less than CRDL* and other value greater than or equal to 10 x *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5 Aqueous Circle all values on Data Summary Sheet that are: RPD > 50%, or Difference > ± CRDL*			
Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	___	[✓]	___
Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.8.6 Soil/Sediment Circle all values on Data Summary Sheet that are: RPD > 100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than or equal to 5 times *CRDL) : > 100%?	___	[__]	✓
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) : > 2x*CRDL?	___	[__]	✓

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

		YES	NO	N/A
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9	Field Duplicates			
A.1.9.9.1	Were field duplicates analyzed?	[___]	✓	___

ACTION: If yes, prepare a Form VI for each aqueous field duplicate pair. Prepare a Form VI for each soil duplicate pair, if percent solids for sample and its duplicate differ by more than 1%; report concentrations of soils in ug/l on wet weight basis and calculate RPDs or Difference for each analyte.

NOTE:
1. Do not calculate RPD when both values are less than IDL.
2. Flag all associated data only for field duplicate pair.

A.1.9.9.2	Is any value for sample duplicate pair less than *CRDL and other value greater than or equal to 10 x *CRDL?	___	[✓]	___

ACTION: If yes, flag the associated data as estimated.

A.1.9.9.3 Aqueous

Circle all values on Form VI for field duplicates that are:
RPD > 50%, or
Difference > ± CRDL*

Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	___	[✓]	___
Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[✓]	___

ACTION: If yes, flag the associated data as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.9.4 Soil/Sediment			
Circle all values on Form VI for field duplicates that are: RPD >100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than 5 times *CRDL) : >100%?	___	[✓]	___
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x *CRDL): >2x *CRDL?	___	[✓]	___

ACTION: If yes, flag the associated data as estimated.

A.1.9.10 Form VII (Laboratory Control Sample) (Note: LCS - not required for aqueous Hg and cyanide analyses.)

A.1.9.10.1 Was one LCS prepared and analyzed for: every 20 water samples?	[✓]	___	___
every 20 solid samples?	[___]	___	✓
both AA and ICP when both are used for same analyte?	[✓]	___	___

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory for submittal of results of LCS. Flag as estimated (J) all data for which LCS was not analyzed.

NOTE: If only one LCS was analyzed for more than 20 samples, then first 20 samples close to LCS do not have to be flagged as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

**Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.10.2 Aqueous LCS			
Circle all LCS values outside control limits (80 - 120%- except aqueous Ag and Sb).			
Is any LCS recovery: less than 50%?	___	[✓]	___
between 50% and 79%?	___	[✓]	___
between 121% and 150%?	___	[✓]	___
greater than 150%?	___	[✓]	___

ACTION: Less than 50%, reject (red-line) all data; between 50% and 79%, flag all associated data as estimated (J); between 121% and 150%, flag all positive (not flagged with a "U") results as estimated; greater than 150%, reject all positive results.

A.1.9.10.3 Solid LCS

NOTE: 1. If "Found" value of LCS is rejectable due to duplicate injections or analytical spike recovery criteria, regardless of LCS recovery, flag the associated data as estimated (J).
2. If IDL of an analyte is equal to or greater than true value of LCS, disregard the "Action" below even though LCS is out of control limits.

Is LCS "Found" value higher than the control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated positive data as estimated.

Is LCS "Found" value lower than the Control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated data as estimated.

		YES	NO	N/A
A.1.9.11	Form IX (ICP Serial Dilution) -			
	NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IDL.			
A.1.9.11.1	Was Serial Dilution analysis performed for: each 20 samples?	[✓]		
	each matrix type?	[✓]		
	each concentration range (i.e. low, med.)?	[✓]		
	ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIDLs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DPO report.			
A.1.9.11.2	Was field blank(s) used for Serial Dilution Analysis?		[✓]	
	ACTION: If yes, flag all associated data ≥ 10 x IDL as estimated (J).			
	NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.11.3	Are results outside control limit flagged with an "E" on Form I's and Form IX when initial concentration on Form IX is equal to 50 times IDL or greater.	[✓]		
	ACTION: If no, write in the contract-problem/non-compliance section of the "Data Assessment Narrative".			
A.1.9.11.4	Circle all values on Data Summary Sheet that are outside control limit for initial concentrations equal to or greater than 10 x IDLs only. Are any % difference values: > 10%?		[✓]	
	≥ 100%?		[✓]	

	YES	NO	N/A
ACTION: Flag as estimated (J) all associated equal to or greater than 10xIDLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xIDLs for which PD is greater than or equal to 100%.			
A.1.9.12 Furnace Atomic Absorbtion (AA) QC Analysis			
A.1.9.12.1 Are duplicate injections present in furnace raw data (except during full Method of Standard Addition) for each sample analyzed by GFAA?	[✓]		
ACTION: If no, reject the data on Form I's for which duplicate injections were not performed.			
A.1.9.12.2 Do the duplicate injection readings agree within 20% Relative Standard Deviation (RSD) or Coefficient of Variation (CV) for concentration greater than CRDL?	[✓]		
Was a dilution analyzed for sample with post digestion spike recovery less than 40%?	[✓]		
ACTION: If no for any of the above, flag all the associated data as estimated (J).			
A.1.9.12.3 Is *post digestion spike recovery less than 10% or greater than 150% for any result?		[✓]	
ACTION: If yes, reject (red-line) the affected data if recovery is <10%; reject data not flagged with "U" if spike recovery is >150%.			
NOTE: Reject the data only if the affected sample was not subsequently analyzed by Method of Standard Addition.			

* Post digestion spike is not required on the pre-digestion spiked sample when predigestion spike recovery is within control limits of 75-125% or when SR>4xSA.

		YES	NO	N/A
A.1.9.13	Form VIII (Method of Standard Addition Results)			
A.1.9.13.1	Present?	[✓]		
	If no, is any Form I result coded with "S" or a "+"?		[✓]	
	ACTION: If yes, write request on Telephone Record Log and contact laboratory for submittal of Form VIII.			
A.1.9.13.2	Is coefficient of correlation for MSA less than 0.990 for any sample?		[✓]	
	ACTION: If yes, reject (red-line) affected data.			
A.1.9.13.3	Was *MSA required for any sample but not performed?		[✓]	
	Is coefficient of correlation for MSA less than 0.995?		[✓]	
	Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?		[✓]	
	ACTION: If yes for any of the above, flag all the associated data as estimated (J).			
A.1.9.13.4	Was proper quantitation procedure followed correctly as outlined in the SOW on page E-16 through E-17?	[✓]		
	ACTION: If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14	Dissolved/Total or Inorganic/Total Analytes -			
A.1.9.14.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)..		[✓]	
	Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?		[✓]	

* MSA is not required on LCS and prep. blank.

	YES	NO	N/A

NOTE: 1. If yes, prepare a list comparing differences between all dissolved (or inorganic) and total analytes. Compute the differences as a percent of the total analyte only when dissolved concentration is greater than CRDL as well as total concentration.
2. Apply the following questions only if inorganic (or dissolved) results are (i) above CRDL, and (ii) greater than total constituents.
3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.

A.1.9.14.2 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 10%? ___ [✓] ___

A.1.9.14.3 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%? ___ [✓] ___

ACTION: If more than 10%, flag both dissolved (or inorganic) and total values as estimated (J); if more than 50%, reject (red-line) the data for both values.

A.1.9.15 Form I to IX

A.1.9.15.1 Are all the Form I through Form IX labeled with:

	YES	NO	N/A
Laboratory name?	[✓]	___	___
Case/SAS number?	[✓]	___	___
EPA sample No.?	[✓]	___	___
SDG No.?	[✓]	___	___
Contract No.?	[✓]	___	___
Correct units?	[✓]	___	___
Matrix?	[✓]	___	___

ACTION: If no for any of the above, note under contract problem/non-compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.15.2 Do any computation/transcription errors exceed 10% of reported values on Forms I-IX for:			
(NOTE: Check all forms against raw data.)			
(a) all analytes analyzed by ICP?	___	[✓]	___
(b) all analytes analyzed by GFAA?	___	[✓]	___
(c) all analytes analyzed by AA Flame?	___	[ ]	✓
(d) Mercury?	___	[✓]	___
(e) Cyanide?	___	[ ]	✓

ACTION: If yes, prepare Telephone Log, contact laboratory for corrected data and correct errors with red pencil and initial.

A.1.9.16 Form I (Field Blank) -

Circle all field blank values on Data Summary Sheet that are greater than CRDL, 2 x IDL when IDL > CRDL.

Do concentrations of field blank(s) fall below CRDL (or 2 x IDL when IDL > CRDL) for all parameters of associated aqueous and soil samples?	[✓]	___	___
If no, was field blank value already rejected due to other QC criteria?	[✓]	___	___

ACTION: If no, reject (except field blank results) all associated positive sample data less than or equal to five times the field blank value.

	YES	NO	N/A
A.1.9.17 Form X, XI, XII (Verification of Instrumental Parameters).			
A.1.9.17.1 Is verification report present for:			
Instrument Detection Limits (quarterly)?	[✓]		
ICP Interelement Correction Factors (annually)?	[✓]		
ICP Linear Ranges (quarterly)?	[✓]		
ACTION: If no, contact DPO of the lab.			
A.1.9.17.2 Form X (Instrument Detection Limits) - (Note: IDL is not required for Cyanide.)			
Are IDLs present for: all the analytes?	[✓]		
all the instruments used?	[✓]		
For both AA and ICP when both are used for same analyte?	[✓]		
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
Is IDL greater than CRDL for any analyte?		[✓]	
If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?	[✓]		
ACTION: If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.			

	YES	NO	N/A
A.1.9.17.3 Form XI (Linear Ranges)			
Was any sample result higher than high linear range of ICP.	___	[✓]	___
Was any sample result higher than the highest calibration standard for non-ICP parameters?	___	[✓]	___
If yes for any of the above, was the sample diluted to obtain the result on Form I?	[✓]	___	___
ACTION: If no, flag the result reported on Form I as estimated(J).			
A.1.9.18 Percent Solids of Sediments			
Is soil content in sediment(s) less than 50%?	___	[___]	✓
ACTION: If yes, qualify as estimated all data not previously rejected or flagged due to other QC criteria.			

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Feb. 1990
Number: HW-2
Revision: 10

Case#	NWS	Site	Naval Weapons Station	Matrix: Soil	
SDG#	CLP 149	Lab	Roy F Weston	Water	✓
Contractor	Roy F. Weston	Reviewer	Heartland ESI	Other	

A.2.1 The case description and exceptions, if any, are noted below with reason(s) for rejection or qualification as estimated value(s) J.

1. CRDLs for Arsenic, Cadmium, Lead and Selenium were below 50%. All data rejected.
2. CRDLs for Chromium, Copper, Manganese and Silver were below control limit. All data estimated.

PBH 2/28/92

PBH 2/28/92

2.2 Contract-Problems/Non-Compliance

Laboratory failed to submit forms 5, 6 and 9.

PBH 2/28/92

M-B Reviewer: _____ Date: _____
Signature

Contractor Reviewer: Paul B. Hively Date: 2/28/92
Signature

Verified by: Christopher D. Lapolla Date: 3/2/92

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 149

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 1-M002, 2-M002, 3-M002, 4-M002, 3-M202, 5-M002,

FIELD DUP. #'S: _____ LAB DUP. #'S: 2-M202 Field Blank _____ MATRIX SPIKE #: 2-M202

SERIAL DILUTION SAMPLE NO. 2-M202 COMPLETION DATE: 2/28/92 REVIEWERS INITIALS: PBH

Parameter	X Detection Limits UG/L CRDL	IDL	I Field Blank	IIA Calib. Ver. %R Init	Continued 1	2	3	IIB CRDL Std Ver. % R Init	Fin	III Calibration Blanks Init	Continued 1	2	3	PBL PREP	PBL ANA	IV ICP ICS % R Init	Fin	V Matrix Spike	VI Lab Dup RPD Diff	LCS % R	VII	IX Ser Dil % D	Method
Al	200		NA																				
Sb	60																						
As	10	2		103	102	102	96	5		U	U	U	U	U			78		86				F
Ba	200	16		100	101	100	102			U	U	U	U	U		85	84	101		96			P
Be	5																						
Cd	5	2		95	96	97	103	29	15	U	U	U	U	U		94	96	99		91			P
Ca	5000																						
Cr	10	4		98	98	97	99	51	60	U	U	U	U	U		95	94	97		91			P
Co	50																						
Cu	25	6		101	101	99	102	66	71	U	U	U	U	U		95	95	95	200	92		100	P
Fe	100	46		99	101	98	101			U	U	U	U	U		91	91	94	200	94		100	P
Pb	3	3		103	102	103	105	0		U	U	U	U	U				104		98			F
Mg	5000																						
Mn	15	2		98	98	97	100	50	56	U	U	U	U	U		92	88	99		93			P
Hg	0.2			101	107	101	101			U	U	U	U	U						95			CV
Ni	40																						
K	5000																						
Se	5	2		102	102	100	100	4		U	U	U	U	U				105		90			F
Ag	10	3		103	105	104	107	50	57	U	U	U	U	U		98	99	100		96			P
Na	5000	10																					
Tl	10																						
V	50																						
Zn	20	6		99	99	97	99	97	101	U	U	U	U	U		86	87	97	200	94		120	P
CN	10																						

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 149

SITE/STUDY DESCRIPTION: _____ SAMPLE NOS: _____

FIELD DUP. #'S: _____ LAB DUP. #'S: _____ Field Blank _____ MATRIX SPIKE #: _____

SERIAL DILUTION SAMPLE NO. _____ COMPLETION DATE: 2/28/92 REVIEWERS INITIALS: PBH

	X		I	IIA				IIB		III					IV		V	VI	VII	IX	
Parameter	Detection Limits UG/L		Field Blank	Calib. Ver. %R				CRDL Std Ver. % R		Calibration Blanks				PB RE	PB LA P	ICP ICS % R		MS Matrix	Lab Dup RPD/Diff	LCS % R	Ser Dil % D	Meth
	CRDL	IDL		Init	Continued 1	2	3	Init	Fin	Init	Continued 1	2	3		N	Init	Fin					
Al	200		NA																			
Sb	60																					
As	10	2			99	103	103				U	U	U									F
Ba	200	16			99						U											P
Be	5																					
Cd	5	2			104						U											P
Ca	5000																					
Cr	10	4			97						U											P
Co	50																					
Cu	25	6			101						U											P
Fe	100	46			99						U											P
Pb	3	3																				
Mg	5000																					
Mn	15	2			99						U											P
Hg	0.2				101	101					U	U		U								CV
Ni	40																					
K	5000																					
Se	5	2			101	100	104				U	U	U									F
Ag	10	3			106						U											P
Na	5000	10			98						U											P
Tl	10																					
V	50																					
Zn	20	6			99						U											P
CN	10																					

000036

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited scope) Date: 2/28/92 Case #: NWS

Site: Naval Weapons Station Lab Name: Roy F. Weston

Reviewer's Initials: PBH Number of Samples: 6

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Inter-ferences	Spike Recovery	Duplicates Lab	Duplicates Field	Detection Limits	LCS	Serial Dilution	MSA	Total Analytes	Rejection
ICP		1											1	
Flame AA														
Furnace AA		3											3	
Mercury														
Total		4											4	
Other														

Analytes Flagged as Estimated (J) Due to Exceeding Criteria For:*

ICP		4											4	
Flame AA														
Furnace AA														
Mercury														
Total		4											4	
Other														

Note:
Asterisk (*) Indicates additional exceedances of review criteria.

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.7: CLP Data Assessment Checklist
Inorganic Analysis

Date: Feb. 1990
Number: HW-2
Revision: 10

INORGANIC REGIONAL DATA ASSESSMENT

Region II

CASE NO. NWS

SITE Naval Weapons Station

LABORATORY Roy F. Weston

NO. OF SAMPLES/ MATRIX 6 waters

SDG# CLP 149

REVIEWER (IF NOT ESD) Heartland EST

SOW# 390

REVIEWER'S NAME Paul B. Humbug

DPO: ACTION _____ FYI _____

COMPLETION DATE 2/28/92

DATA ASSESSMENT SUMMARY

		ICP	AA	Hg	CYANIDE
1.	HOLDING TIMES	O	O	O	NA
2.	CALIBRATIONS	Z	Z		
3.	BLANKS	O	O		
4.	ICS				
5.	LCS				
6.	DUPLICATE ANALYSIS				
7.	MATRIX SPIKE				
8.	MSA				
9.	SERIAL DILUTION				
10.	SAMPLE VERIFICATION				
11.	OTHER QC				
12.	OVERALL ASSESSMENT				

O = Data has no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS:

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Seven (7) water sample and no (0) Matrix Spike and Duplicate pair were analyzed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
1-M002	911018101
2-M002	911018102
3-M002	911018103
3-M202	911018104
4-M002	911018105
4-M102	911018106
5-M002	911018107

Heartland ESI has reviewed the data for the samples listed above TAL Metals (under the limited scope requirements) using Region II Data Validation Protocol, February 1990 revision. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

TAL Metals reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110181**, the analysis of seven (7) field water samples and no (0) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The USEPA CLP analytical protocol was followed as required with the exception of the following problem. The Laboratory failed to submit Forms 5,6 and 9 for this data package. In the narrative they stated that the Quality Control samples associated with this report were in another data package. They should at least submit these forms for insertion into this package due to the fact that all CLP packages should stand on their own merit. The QC data for this package can be found in SDG #125.

<u>Specific</u> QA/QC deficiency <u>Findings</u> are listed numerically in the following categories:

Holding Times

The holding times were met as specified in Region II Protocol.

Calibration

1. The CRDL Standards for Arsenic, Cadmium, Lead and Selenium were below 50%. All positive and non-detect results are rejected if within the concentration range as applied by the Region II Protocol.

2. The CRDL Standards for Chromium, Copper, Manganese and Silver were below the lower control limit. All positive and non-detect results within the affected range are qualified as estimated, "J" or "UJ".

Preparation and Field Blanks

No deficiencies in this section.

Interferences

No significant interferences were observed.

Metals Data Assessment Narrative (continued - Page 2)

Interferences

No significant interferences were observed.

Spike Recovery

No deficiencies in this section.

Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

Serial Dilution

No deficiencies in this section.

MSA

3. The following analytes exhibited low recovery during the GFAA spiking procedures. All data is qualified as estimated, "J" or "UJ".

Analyte	Samples
Arsenic	2-M002 and 2-M202.
Lead	2-M002 and 3-M002.
Selenium	2-M002, 2-M002 and 2-M202.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	As,Cd,Pb, and Se	+/U	R	1
All Water Samples	Cr,Cu,Mn, and Ag	+/U	J/UJ	2
2-M002 and 2-M202 2-M002 and 3-M002 2-M002, 3-M002 and 2-M202	As Pb Se	+/U	J/UJ	3

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

1-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP181

Matrix (soil/water): WATER Lab Sample ID: 911018101

Level (low/med): LOW Date Received: 10/28/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	39.30			F	
7440-39-3	Barium	60.50	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	~~3.00~~	~~U~~		~~P~~	R1
7440-70-2	Calcium				NR	
7440-47-3	Chromium	46.30			P	J2
7440-48-4	Cobalt				NR	
7440-50-8	Copper	24.50	B		P	J2
7439-89-6	Iron	44900.00			P	
7439-92-1	Lead	31.90			F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	99.20			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~8.90~~		~~S~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	UJ2
7440-23-5	Sodium	4790.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	77.30			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

2-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP181

Matrix (soil/water): WATER Lab Sample ID: 911018102

Level (low/med): LOW Date Received: 10/28/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.10~~	~~B~~	~~W~~	~~F~~	R1
7440-39-3	Barium	49.40	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	~~3.00~~	~~U~~		~~P~~	R1
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	UJ2
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	UJ2
7439-89-6	Iron	9570.00			P	
7439-92-1	Lead	~~3.50~~		~~W~~	~~F~~	R1
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	69.50			P	
7439-97-6	Mercury	.13	B		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	UJ2
7440-23-5	Sodium	25600.00			P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	34.50			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP181

Matrix (soil/water): WATER Lab Sample ID: 911018103

Level (low/med): LOW Date Received: 10/28/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~		~~F~~	R1
7440-39-3	Barium	26.30	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	~~3.00~~	~~U~~		~~P~~	R1
7440-70-2	Calcium				NR	
7440-47-3	Chromium	9.30	B		P	J2
7440-48-4	Cobalt				NR	
7440-50-8	Copper	15.20	B		P	J2
7439-89-6	Iron	9070.00			P	
7439-92-1	Lead	~~6.10~~		~~W~~	~~F~~	R1
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	74.40			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~W~~	~~P~~	R1
7440-22-4	Silver	10.00	U		P	UJ2
7440-23-5	Sodium	4600.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	17.90	B		P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3-M202

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP181

Matrix (soil/water): WATER Lab Sample ID: 911018104

Level (low/med): LOW Date Received: 10/28/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-39-3	Barium	16.00	U		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	~~3.00~~	~~U~~		~~P~~	R1
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	UJ2
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	UJ2
7439-89-6	Iron	46.00	U		P	
7439-92-1	Lead	~~2.00~~	~~U~~		~~F~~	R1
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	2.00	U		P	UJ2
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	UJ2
7440-23-5	Sodium	110.00	U		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	6.00	U		P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

4-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP181

Matrix (soil/water): WATER Lab Sample ID: 911018105

Level (low/med): LOW Date Received: 10/28/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	91.60			F	
7440-39-3	Barium	218.00			P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	~~3.20~~	~~B~~		~~P~~	R1
7440-70-2	Calcium				NR	
7440-47-3	Chromium	217.00			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	94.40			P	
7439-89-6	Iron	183000.00			P	
7439-92-1	Lead	92.00			F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	480.00			P	
7439-97-6	Mercury	.19	B		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~20.00~~	~~U~~		~~F~~	R1
7440-22-4	Silver	10.00	U		P	UJ2
7440-23-5	Sodium	6820.00			P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	280.00			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

4-M102

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP181

Matrix (soil/water): WATER Lab Sample ID: 911018106

Level (low/med): LOW Date Received: 10/28/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	106.00			F	
7440-39-3	Barium	250.00			P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	~~5.60~~			~~P~~	R1
7440-70-2	Calcium				NR	
7440-47-3	Chromium	235.00			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	110.00			P	
7439-89-6	Iron	213000.00			P	
7439-92-1	Lead	152.00			F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	560.00			P	
7439-97-6	Mercury	.17	B		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~20.00~~	~~U~~		~~F~~	R1
7440-22-4	Silver	10.00	U		P	UJ2
7440-23-5	Sodium	6770.00			P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	345.00			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

5-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP181

Matrix (soil/water): WATER Lab Sample ID: 911018107

Level (low/med): LOW Date Received: 10/28/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	196.00			F	
7440-39-3	Barium	416.00			P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	~~8.00~~			~~P~~	R1
7440-70-2	Calcium				NR	
7440-47-3	Chromium	289.00			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	160.00			P	
7439-89-6	Iron	282000.00			P	
7439-92-1	Lead	150.00			F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	682.00			P	
7439-97-6	Mercury	1.04			CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~20.00~~	~~U~~		~~F~~	R1
7440-22-4	Silver	10.00	U		P	UJ2
7440-23-5	Sodium	18800.00			P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	464.00			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report (CCS) - Present?	[ ]		✓
ACTION: If no, contact RSCC.			
A.1.2 Record of Communication (from RSCC) - Present?	[ ]		✓
ACTION: If no, request from RSCC.			
A.1.3 Trip Report - Present and complete?	[ ]		✓
ACTION: If no, contact RSCC for trip report.			
A.1.4 Sample Traffic Report - Present or on file?	[ ]		✓
Legible?	[ ]		✓
ACTION: If no, request from Regional Sample Control Center (RSCC).			
A.1.5 Cover Page - Present?	[✓]		
Is cover page properly filled in and signed by the lab manager or the manager's designee?	[✓]		
ACTION: If no, prepare Telephone Record Log, and contact laboratory.			
Do numbers of samples correspond to numbers on Record of Communication?	[ ]		✓
Do sample numbers on cover page agree with sample numbers on:			
(a) Traffic Report Sheet?	[ ]		✓
(b) Form I's?	[✓]		
ACTION: If no for any of the above, contact RSCC for clarification.			

	YES	NO	N/A
A.1.6 Form I (Final Data) - Are all Form I's present and complete?	[✓]	__	__
ACTION: If no, prepare telephone record log and contact laboratory for submittal.			
Are correct units (ug/l for waters and mg/kg for soils) indicated on Form I's?	[✓]	__	__
Are soil sample results for each parameter corrected for percent solids?	[✓]	__	__
Are EPA sample # s and corresponding laboratory sample ID # s the same as on the Cover Page, Form I's and in the raw data?	[✓]	__	__
Are computation/transcription errors less than 10% of reported values?	[✓]	__	__
Are all "less than IDL" values properly coded with "U"?	[✓]	__	__
Was a brief physical description of samples given on Form I's?	[✓]	__	__
Were the result qualifiers used correctly with final data?	[✓]	__	__
ACTION: If no for any of the above, prepare Telephone Record Log, and contract laboratory for corrected data.			
Were any samples diluted beyond requirements of contract?	__	[✓]	__
If yes, were dilutions noted on Form I's?	[✓]	__	__
ACTION: If no, note under Contract-Problem/Non-Compliance of the "Data Assessment Narrative".			
A.1.7 Holding Times - (aqueous and soil samples)			
(Examine sample traffic reports and digestion/distillation logs.)			
Mercury analysis (28 days). . . . . exceeded?	__	[✓]	__
Cyanide distillation (14 days). . . . . exceeded?	__	[__]	✓

	YES	NO	N/A
Other Metals analysis (6 months). . . . exceeded?	___	[✓]	___

NOTE: Prepare a list of all samples and analytes for which holding times have been exceeded. Specify the number of days from date of collection to the date of preparation (from raw data). Attach to checklist.

ACTION: If yes, reject (red-line) values less than Instrument Detection Limit (IDL) and flag as estimated (J) the values above IDL even though sample(s) was preserved properly.

A.1.8 Raw Data

A.1.8.1	Digestion Log* for flame AA/ICP (Form XIII) present?	[✓]	___	___
	Digestion Log for furnace AA Form XIII present?	[✓]	___	___
	Distillation Log for mercury Form XIII present?	[✓]	___	___
	Distillation Log for cyanides Form XIII present?	[___]	___	✓
	Are pH values (pH<2 for all metals, pH>12 for cyanide) present?	[✓]	___	___
	*Weights, dilutions and volumes used to obtain values.			
	Percent solids calculation present for soils/sediments?	[___]	___	✓
	Are preparation dates present on Digestion Log?	[✓]	___	___
A.1.8.2	Measurement read out record present? ICP	[✓]	___	___
	Flame AA	[___]	___	✓
	Furnace AA	[✓]	___	___
	Mercury	[✓]	___	___
	Cyanides	[___]	___	✓

	YES	NO	N/A
A.1.B.3 Are all raw data to support all sample analyses and QC operations present?	[✓]	__	__
Legible?	[✓]	__	__
Properly Labeled?	[✓]	__	__

ACTION: If no for any of the above, write Telephone Record Log and contact laboratory. Flag metal data as estimated if pH of sample is greater than 2. Flag cyanide data as estimated if pH sample is less than 12.

A.1.9 Data Validation and Verification

A.1.9.1 Calibration

	YES	NO	N/A
A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	[✓]	__	__
Is record of 5 point calibration present for Hg analysis?	[✓]	__	__

ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.1.2 Is record of 4 point calibration present for:			
Flame AA?	[__]	__	✓
Furnace AA?	[✓]	__	__
Cyanides?	[__]	__	✓

NOTE:
1. If less than 4 standards are measured in absorbance mode, then the remaining standards in concentration mode must be run immediately after calibration and be within ±10% of true value.
2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRDL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A

ACTION: Flag associated data as estimated if standards are not within ±10% of true values (except CRDL calibration standard). Do not flag the data as estimated in linear range indicated by good recovery of standard.

A.1.9.1.3 Is correlation *coefficient less than 0.995 for:

Mercury Analysis?	___	[✓]	___
Cyanide Analysis?	___	[___]	✓
Atomic Absorption Analysis?	___	[✓]	___

ACTION: If yes, flag the associated data as estimated.

1.9.2 Form II A (Initial and Continuing Calibration Verification)-

A.1.9.2.1 Present and complete for every metal and cyanide?	[✓]	___	___
Present and complete for AA and ICP when both are used for same analyte?	[✓]	___	___

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.

A.1.9.2.2 Circle all values on data summary sheet that are outside contract windows. Are all calibration standards (initial and continuing) within control limits?

Metals 90-110%	[✓]	___	___
Hg - 80-120%	[✓]	___	___
Cyanides 85-115%	[___]	___	✓

* The reviewer will calculate correlation coefficient.

	YES	NO	N/A
ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with %R between 75-89% (65-79% for Hg; 70-84% for CN) or 111-125% (121-135% for Hg; 116-130% for CN) recovery and nearest good calibration standard. Qualify results <IDL as estimated (UJ), if the ICV or CCV %R is 75-89% (CN, 70-84% ; HG, 65-79%). Reject (red-line) as unacceptable data if recovery of the ICV or CCV is outside the range 75-125% (CN, 70-130%; Hg, 65-135%). Qualify five samples on either side of verification standard out of control limits.			
Was continuing calibration performed every 10 samples or every 2 hours?	[✓]		
ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).			
Was ICV for cyanides distilled?	[ ]		✓
ACTION: If no, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".			

A.1.9.3 Form II B (CRDL Standards for AA and ICP) -

	YES	NO	N/A
A.1.9.3.1 Was a CRDL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?	[✓]		
*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?	[ ]		✓
Was a 2xCRDL (or 2xIDL when IDL>CRDL) analyzed (CRI) for each ICP run? (Note: CRI for AL,Ba,Ca,Fe,Mg,Na,or K is not required.)	[✓]		

ACTION: If no for any of the above, flag as estimated all data falling within the affected ranges. The affected ranges are:
AA Analysis - **True Value ± CRDL
ICP Analysis - **True Value ± 2CRDL
CN Analysis - **True Value ± 0.5 x True Value.

*Find the results of mid-range standard in the raw data.
**True value of CRA, CRI or mid-range standard. Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/A
A.1.9.3.2	Was CRI analyzed after ICV/ICB and before the final CCV/CCB, and for every four hours of ICP run?	[✓]		
	ACTION: If no, write in Contract Problem/Non-Compliance Section of the "Data Assessment Narrative".			
A.1.9.3.3	Circle all values on summary sheet that are outside acceptance windows.			
	Are CRA and CRI standards within control limits: Metals 80 - 120%R?	[ ]	✓	
	Is mid-range standard within control limits: Cyanide 80 - 120%R?	[ ]		✓
	ACTION: Flag as estimated all data within the affected ranges if the recovery of the standard is between 50-79%; flag only positive data if the recovery is between 121-150%; reject (red line) all data if the recovery is less than 50%; reject only positive data if the recovery is greater than 150%.			
A.1.9.4	Form III (Initial and Continuing Calibration Blanks)			
A.1.9.4.1	Present and complete?	[✓]		
	For both AA and ICP when both are used for same analyte?	[✓]		
	Was an initial calibration blank analyzed?	[✓]		
	Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	[✓]		
	ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/non-compliance section of the Data Assessment Narrative.			

		YES	NO	N/A
A.1.9.4.2	Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IDL when IDL > CRDL). Are all calibration blanks (when IDL<CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	[✓]		
	Are all calibration blanks less than two times Instrument Detection Limit (when IDL>CRDL)?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all positive data less than or equal to calibration blank values analyzed between calibration blank with value over CRDL (or 2xIDL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.

A.1.9.5 FORM III (Preparation Blank) -

(Note: The preparation blank for mercury is the same as the calibration blank.)

A.1.9.5.1	Was one prep. blank analyzed for: each 20 samples?	[✓]		
	each batch?	[✓]		
	each matrix type?	[✓]		
	both AA and ICP when both are used for same analyte?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all associated positive data <10 x IDLs for which prep. blank was not analyzed.

NOTE: If only one blank was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).

A.1.9.5.2	Is concentration of prep. blank greater than CRDL when IDL is less than or equal to CRDL?		[✓]	
	If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?		[✓]	

		YES	NO	N/A
	ACTION: If yes, reject (red-line) all associated data greater than CRDL concentration but less than ten times the prep. blank value found in the raw data.			
A.1.9.5.3	Do concentrations of prep. blank fall below two times IDL when IDL is greater than CRDL?	[✓]		
	ACTION: If no, reject (red-line) all positive data that has a concentration less than 10 times the prep. blank value in the raw data.			
A.1.9.5.4	Is concentration of prep. blank below the negative CRDL?		[✓]	
	ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6	Form IV (ICP Interference Check Sample)			
A.1.9.6.1	Present and complete?	[✓]		
	(NOTE: Not required for furnace AA, flame AA, mercury, cyanide and Ca, Mg, K and Na.)			
	Was ICS analyzed at beginning and end of run (or at least twice every 8 hours)?	[✓]		
	ACTION: If no, flag as estimated (J) all samples for which AL, Ca, Fe, or Mg is higher than in ICS.			
A.1.8.6.2	Circle all values on Data Summary Sheet that are more than + 20% of true or established mean value. Are all Interference Check Sample results inside of control limits (+ 20%)?	[✓]		
	If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	[✓]		
	ACTION: If no, flag as estimated (J) those positive results for which ICS recovery is between 121-150%; flag all sample results as estimated if ICS recovery falls within 50-79%; reject (red-line) those sample results for which ICS recovery is less than 50%; if ICS recovery is above 150%, reject positive results only (not flagged with a "U").			

		YES	NO	N/A
A.1.9.7	Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)- (Note: Not required for Ca, Mg, K, and Na (both matrices), Al, and Fe (soil only.)			
A.1.9.7.1	Present and complete for: each 20 samples?	[✓]		
	each matrix type?	[✓]		
	each conc. range (i.e. low, med., high)?	[✓]		
	For both AA and ICP when both are used for same analyte?	[✓]		
	ACTION: If no for any of the above, flag as estimated (J) all positive data less than four times spiking level for which spiked sample was not analyzed.			
	NOTE: If one spiked sample was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.9.7.2	Was field blank used for spiked sample?		[✓]	
	ACTION: If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
	NOTE: Matrix spike analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.7.3	Circle all values on Data Summary Sheet that are outside control limits (75% to 125%). Are all recoveries within control limits?	[✓]		
	If no, is sample concentration greater than or equal to four times spike concentration?	[✓]		
	ACTION: If yes, disregard spike recoveries for analytes whose concentrations are greater than or equal to four times spike added. If no, circle those analytes on Form V for which sample concentration is less than four times the spike concentration.			

	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	[✓]	[ ]	[ ]

ACTION: If no, write in the Contract - Problem/Non - Compliance section of "Data Assessment Narrative".

A.1.9.7.4 Aqueous

Are any spike recoveries:

(a) less than 30%?	[ ]	[✓]	[ ]
(b) between 30-74%?	[ ]	[✓]	[ ]
(c) between 126-150%?	[ ]	[✓]	[ ]
(d) greater than 150%?	[ ]	[✓]	[ ]

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 126-150%, flag as estimated (J) all associated aqueous data not flagged with a "U"; if greater than 150%, reject (red-line) all associated aqueous data not flagged with a "U".

NOTE: If pre-digestion spike result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, disregard spike recovery on Form V. Flag the associated data as estimated(J).

A.1.9.7.5 Soil/Sediment

Are any spike recoveries:

(a) less than 10%?	[ ]	[ ]	[✓]
(b) between 10-74%?	[ ]	[ ]	[✓]
(c) between 126-200%?	[ ]	[ ]	[✓]
(d) greater than 200%?	[ ]	[ ]	[✓]

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 126-200%, flag as estimated all associated data was not flagged with a "U"; if greater than 200%, reject all associated data not flagged with a "U".

		YES	NO	N/A
A.1.9.8	Form VI (Lab Duplicates)			
A.1.9.8.1	Present and complete for: each 20 samples?	[✓]	___	___
	each matrix type?	[✓]	___	___
	each concentration range (i.e. low, med., high)?	[✓]	___	___
	both AA and ICP when both are used for same analyte?	[✓]	___	___

ACTION: If no for any the above, flag as estimated (J) all data >CRDL* for which duplicate sample was not analyzed.

Note: 1. If one duplicate sample was analyzed for more than 20 samples, then first 20 samples do not have to be flagged as estimated.
2. If percent solids for soil sample and its duplicate differ by more than 1%, prepare a Form VI for each duplicate pair, report concentrations in Hg/L on wet weight basis and calculate RPD or Difference for each analyte.

A.1.9.8.2	Was field blank used for duplicate analysis?	___	[✓]	___

ACTION: If yes, flag all data >CRDL* as estimated (J) for which field blank was used as duplicate.

NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.

A.1.9.8.3	Are all values within control limits (RPD 20% or difference < ±CRDL)?	[✓]	___	___
	If no, are all results outside the control limits flagged with an * on Form I's and VI?	[✓]	___	___

ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".

NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than IDL.

* Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/A
	2. If lab duplicate result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, do not apply precision criteria.			
A.1.9.8.4	Is any value for sample duplicate pair less than CRDL* and other value greater than or equal to 10 x *CRDL?	___	[✓]	___
	ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5	Aqueous Circle all values on Data Summary Sheet that are: RPD > 50%, or Difference > ± CRDL*			
	Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	___	[✓]	___
	Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[✓]	___
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.8.6	Soil/Sediment Circle all values on Data Summary Sheet that are: RPD > 100%, or Difference > 2 x CRDL*			
	Is any RPD (where sample and duplicate are both greater than or equal to 5 times *CRDL) : > 100%?	___	[___]	✓
	Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) : > 2x*CRDL?	___	[___]	✓

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
ACTION: If yes, flag the associated data as estimated.			
A.1.9.9 Field Duplicates			
A.1.9.9.1 Were field duplicates analyzed?	[ ]	✓	
ACTION: If yes, prepare a Form VI for each aqueous field duplicate pair. Prepare a Form VI for each soil duplicate pair, if percent solids for sample and its duplicate differ by more than 1%; report concentrations of soils in ug/l on wet weight basis and calculate RPDs or Difference for each analyte.			
NOTE: 1. Do not calculate RPD when both values are less than IDL. 2. Flag all associated data only for field duplicate pair.			
A.1.9.9.2 Is any value for sample duplicate pair less than *CRDL and other value greater than or equal to 10 x *CRDL?		[✓]	
ACTION: If yes, flag the associated data as estimated.			
A.1.9.9.3 Aqueous			
Circle all values on Form VI for field duplicates that are: RPD > 50%, or Difference > ± CRDL*			
Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?		[✓]	
Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?		[✓]	
ACTION: If yes, flag the associated data as estimated.			

* Substitute IDL for CRDL when IDL > CRDL.

** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.9.4 Soil/Sediment			
Circle all values on Form VI for field duplicates that are: RPD >100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than 5 times *CRDL) : >100%?	___	[✓]	___
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x *CRDL): >2x *CRDL?	___	[✓]	___

ACTION: If yes, flag the associated data as estimated.

1.9.10 Form VII (Laboratory Control Sample) (Note: LCS - not required for aqueous Hg and cyanide analyses.)

	YES	NO	N/A
A.1.9.10.1 Was one LCS prepared and analyzed for: every 20 water samples?	[✓]	___	___
every 20 solid samples?	[___]	___	✓
both AA and ICP when both are used for same analyte?	[✓]	___	___

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory for submittal of results of LCS. Flag as estimated (J) all data for which LCS was not analyzed.

NOTE: If only one LCS was analyzed for more than 20 samples, then first 20 samples close to LCS do not have to be flagged as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

**Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.10.2 Aqueous LCS			
Circle all LCS values outside control limits (80 - 120%- except aqueous Ag and Sb).			
Is any LCS recovery: less than 50%?	___	[✓]	___
between 50% and 79%?	___	[✓]	___
between 121% and 150%?	___	[✓]	___
greater than 150%?	___	[✓]	___

ACTION: Less than 50%, reject (red-line) all data; between 50% and 79%, flag all associated data as estimated (J); between 121% and 150%, flag all positive (not flagged with a "U") results as estimated; greater than 150%, reject all positive results.

A.1.9.10.3 Solid LCS

NOTE: 1. If "Found" value of LCS is rejectable due to duplicate injections or analytical spike recovery criteria, regardless of LCS recovery, flag the associated data as estimated (J).
2. If IDL of an analyte is equal to or greater than true value of LCS, disregard the "Action" below even though LCS is out of control limits.

Is LCS "Found" value higher than the control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated positive data as estimated.

Is LCS "Found" value lower than the Control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated data as estimated.

		YES	NO	N/A
A.1.9.11	**Form IX (ICP Serial Dilution) -**			
	NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IDL.			
A.1.9.11.1	Was Serial Dilution analysis performed for: each 20 samples?	[✓]		
	each matrix type?	[✓]		
	each concentration range (i.e. low, med.)?	[✓]		
	ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIDLs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DPO report.			
A.1.9.11.2	Was field blank(s) used for Serial Dilution Analysis?		[✓]	
	ACTION: If yes, flag all associated data ≥ 10 x IDL as estimated (J).			
	NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.11.3	Are results outside control limit flagged with an "E" on Form I's and Form IX when initial concentration on Form IX is equal to 50 times IDL or greater.	[✓]		
	ACTION: If no, write in the contract-problem/non-compliance section of the "Data Assessment Narrative".			
A.1.9.11.4	Circle all values on Data Summary Sheet that are outside control limit for initial concentrations equal to or greater than 10 x IDLs only. Are any % difference values: > 10%?		[✓]	
	≥ 100%?		[✓]	

		YES	NO	N/A
	ACTION: Flag as estimated (J) all associated equal to or greater than 10xIDLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xIDLs for which PD is greater than or equal to 100%.			
A.1.9.12	Furnace Atomic Absorption (AA) QC Analysis			
A.1.9.12.1	Are duplicate injections present in furnace raw data (except during full Method of Standard Addition) for each sample analyzed by GFAA?	[✓]	__	__
	ACTION: If no, reject the data on Form I's for which duplicate injections were not performed.			
A.1.9.12.2	Do the duplicate injection readings agree within 20% Relative Standard Deviation (RSD) or Coefficient of Variation (CV) for concentration greater than CRDL?	[✓]	__	__
	Was a dilution analyzed for sample with post digestion spike recovery less than 40%?	[✓]	__	__
	ACTION: If no for any of the above, flag all the associated data as estimated (J).			
A.1.9.12.3	Is *post digestion spike recovery less than 10% or greater than 150% for any result?	__	[✓]	__
	ACTION: If yes, reject (red-line) the affected data if recovery is <10%; reject data not flagged with "U" if spike recovery is >150%.			
	NOTE: Reject the data only if the affected sample was not subsequently analyzed by Method of Standard Addition.			

* Post digestion spike is not required on the pre-digestion spiked sample when predigestion spike recovery is within control limits of 75-125% or when SR>4xSA.

		YES	NO	N/A
A.1.9.13	Form VIII (Method of Standard Addition Results)			
A.1.9.13.1	Present?	[✓]		
	If no, is any Form I result coded with "S" or a "+"?		[✓]	
	ACTION: If yes, write request on Telephone Record Log and contact laboratory for submittal of Form VIII.			
A.1.9.13.2	Is coefficient of correlation for MSA less than 0.990 for any sample?		[✓]	
	ACTION: If yes, reject (red-line) affected data.			
A.1.9.13.3	Was *MSA required for any sample but not performed?		[✓]	
	Is coefficient of correlation for MSA less than 0.995?		[✓]	
	Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?		[✓]	
	ACTION: If yes for any of the above, flag all the associated data as estimated (J).			
A.1.9.13.4	Was proper quantitation procedure followed correctly as outlined in the SOW on page E-16 through E-17?	[✓]		
	ACTION: If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14	Dissolved/Total or Inorganic/Total Analytes -			
A.1.9.14.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)..		[✓]	
	Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?		[✓]	

* MSA is not required on LCS and prep. blank.

	YES	NO	N/A
NOTE: 1. If yes, prepare a list comparing differences between all dissolved (or inorganic) and total analytes. Compute the differences as a percent of the total analyte only when dissolved concentration is greater than CRDL as well as total concentration. 2. Apply the following questions only if inorganic (or dissolved) results are (i) above CRDL, and (ii) greater than total constituents. 3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.			
A.1.9.14.2 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 10%?	___	[✓]	___
A.1.9.14.3 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%?	___	[✓]	___

ACTION: If more than 10%, flag both dissolved (or inorganic) and total values as estimated (J); if more than 50%, reject (red-line) the data for both values.

A.1.9.15 Form I to IX

A.1.9.15.1 Are all the Form I through Form IX labeled with:

	YES	NO	N/A
Laboratory name?	[✓]	___	___
Case/SAS number?	[✓]	___	___
EPA sample No.?	[✓]	___	___
SDG No.?	[✓]	___	___
Contract No.?	[✓]	___	___
Correct units?	[✓]	___	___
Matrix?	[✓]	___	___

ACTION: If no for any of the above, note under contract problem/non-compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.15.2 Do any computation/transcription errors exceed 10% of reported values on Forms I-IX for:			
(NOTE: Check all forms against raw data.)			
(a) all analytes analyzed by ICP?	___	[✓]	___
(b) all analytes analyzed by GFAA?	___	[✓]	___
(c) all analytes analyzed by AA Flame?	___	[ ]	✓
(d) Mercury?	___	[✓]	___
(e) Cyanide?	___	[ ]	✓

ACTION: If yes, prepare Telephone Log, contact laboratory for corrected data and correct errors with red pencil and initial.

A.1.9.16 Form I (Field Blank) -

Circle all field blank values on Data Summary Sheet that are greater than CRDL, 2 x IDL when IDL > CRDL.

Do concentrations of field blank(s) fall below CRDL (or 2 x IDL when IDL > CRDL) for all parameters of associated aqueous and soil samples?	[✓]	___	___
If no, was field blank value already rejected due to other QC criteria?	[✓]	___	___

ACTION: If no, reject (except field blank results) all associated positive sample data less than or equal to five times the field blank value.

	YES	NO	N/A
A.1.9.17 Form X, XI, XII (Verification of Instrumental Parameters).			
A.1.9.17.1 Is verification report present for:			
Instrument Detection Limits (quarterly)?	[✓]		
ICP Interelement Correction Factors (annually)?	[✓]		
ICP Linear Ranges (quarterly)?	[✓]		
ACTION: If no, contact DPO of the lab.			
A.1.9.17.2 Form X (Instrument Detection Limits) - (Note: IDL is not required for Cyanide.)			
Are IDLs present for: all the analytes?	[✓]		
all the instruments used?	[✓]		
For both AA and ICP when both are used for same analyte?	[✓]		
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
Is IDL greater than CRDL for any analyte?		[✓]	
If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?	[✓]		
ACTION: If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.			

	YES	NO	N/A
A.1.9.17.3 Form XI (Linear Ranges)			
Was any sample result higher than high linear range of ICP.	___	[✓]	___
Was any sample result higher than the highest calibration standard for non-ICP parameters?	___	[✓]	___
If yes for any of the above, was the sample diluted to obtain the result on Form I?	[✓]	___	___
ACTION: If no, flag the result reported on Form I as estimated(J).			
A.1.9.18 Percent Solids of Sediments			
Is soil content in sediment(s) less than 50%?	___	[___]	[✓]
ACTION: If yes, qualify as estimated all data not previously rejected or flagged due to other QC criteria.			

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Feb. 1990
Number: HW-2
Revision: 10

Case#	NWS	Site	Naval Weapons Station	Matrix: Soil	
SDG#	CLP 181	Lab	Roy F. Weston	Water	✓
Contractor	Roy F. Weston	Reviewer	Heartland ESI	Other	

A.2.1 The case description and exceptions, if any, are noted below with reason(s) for rejection or qualification as estimated value(s) J.

1. CRDLs for Arsenic, Cadmium, Lead and Selenium were below 50%. All data estimated.
2. CRDLs for Chromium, Copper, Manganese and Silver were below control limit. All data estimated.

PBH 2/28/92

PBH 2/28/92

2.2 Contract-Problems/Non-Compliance

Forms 5, 6 and 9 were not submitted with data package.

PBH 2/28/92

MB Reviewer: _____ Date: _____
Signature

Contractor Reviewer: Paul B. Hively Date: 2/28/92
Signature

Verified by: Christopher D. Lapollin Date: 3/2/92

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 18

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 1-M002, 2-M002, 3-M002, 3-M202, 4-M002, M-M102, 5-M002

Field Blank

FIELD DUP. #'S: LAB DUP. #'S: 2-M202 MATRIX SPIKE #: 2-M202

SERIAL DILUTION SAMPLE NO. 2-M202 COMPLETION DATE: 2/28/92 REVIEWERS INITIALS: PBH

	X		I	IIA				IIB		III				IV		V	VI	VII	IX	
Parameter	Detection Limits UG/L CRDL	IDL	Field Blank	Calib. Ver. %R Init	Continued 1	2	3	CRDL Std Ver. % R Init	Fin	Calibration Blanks Init	Continued 1	2	3	PBL PREP	PBL ANA	ICP ICS % R Init	Fin	MS Matrix	Lab Dup RPD Diff	LCS % R	Ser Dil % D	Meth
Al	200		NA																			
Sb	60																					
As	10	2		103	102	102	96	5		U	U	U	U	U			78		86			F
Ba	200	16		100	101	100	102			U	U	U	U	U		85	84	101		96		P
Be	5																					
Cd	5	2		95	96	97	103	29	15	U	U	U	U	U		94	96	99		91		P
Ca	5000																					
Cr	10	4		98	98	97	99	51	60	U	U	U	U	U		95	94	97		91		P
Co	50																	PBH				
Cu	25	6		101	101	99	102	66	71	U	U	U	U	U		95	95	95 ~~200~~	20	92	100	P
Fe	100	46		99	101	98	101			U	U	U	U	U		91	94	94	20	94	100	P
Pb	3	3		103	102	103	105	0		U	U	U	U	U				104		98		F
Mg	5000																					
Mn	15	2		98	98	97	100	50	51	U	U	U	U	U		92	88	99		93		P
Hg	0.2			101	102	101	101			U	U	U	U	U						95		CV
Ni	40																					
K	5000																					
Se	5	2		102	102	100	100	4		U	U	U	U	U				105		90		F
Ag	10	3		103	105	104	107	50	57	U	U	U	U	U		98	99	100		96		P
Na	5000	10		101	101	99	98			U	U	U	U	U						95		P
Tl	10																					
V	50																					
Zn	20	6		99	99	97	99	97	101	U	U	U	U	U		88	87	97	200	94	170	P
CN	10																					

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 181

SITE/STUDY DESCRIPTION: _____ SAMPLE NOS: _____

Field Blank _____

FIELD DUP. #'S: _____ LAB DUP. #'S: _____ MATRIX SPIKE #: _____

SERIAL DILUTION SAMPLE NO. _____ COMPLETION DATE: 2/28/92 REVIEWERS INITIALS: PBH

Parameter	X Detection Limits UG/L CRDL	IDL	I Field Blank	IIA Calib. Ver. %R Init	1	2	3	IIB CRDL Std Ver. % R Init	Fin	III Calibration Blanks Init	1	2	3	PREP	BLANK	IV ICP ICS % R Init	Fin	V Matrix Spike	VI Lab Dup RPD/Diff	VII LCS % R	IX Ser Dil % D	Method
Al	200		NA																			
Sb	60																					
As	10	2			99	103	103				U	U	U									F
Ba	200	16			99						U											P
Be	5																					
Cd	5	2			104						U											P
Ca	5000																					
Cr	10	4			97						U											P
Co	50																					
Cu	25	6			101						U											P
Fe	100	46			99						U											P
Pb	3	3																				
Mg	5000																					
Mn	15	2			99						U											P
Hg	0.2				101	101					U	U		U								CV
Ni	40																					
K	5000																					
Se	5	2			101	100	104				U	U	U									F
Ag	10	3			106						U											P
Na	5000	10			98						U											P
Tl	10																					
V	50																					
Zn	20	6			99						U											P
CN	10																					

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited Scope) Date: 2/28/92 Case #: NWS

Site: Naval Weapons Station Lab Name: Roy F. Weston

Reviewer's Initials: PBH Number of Samples: 2

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Inter-ferences	Spike Recovery	Duplicates Lab	Duplicates Field	Detection Limits	LCS	Serial Dilution	MSA	Total Analytes	Rejection
ICP		1											1	
Flame AA														
Furnace AA		3											3	
Mercury														
Total		4											4	
Other														

Analytes Flagged as Estimated (J) Due to Exceeding Criteria For:*

ICP		4											4	
Flame AA														
Furnace AA														
Mercury														
Total		4											4	
Other														

Note:
Asterisk (*) Indicates additional exceedances of review criteria.

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.7: CLP Data Assessment Checklist
Inorganic Analysis

Date: Feb. 1990
Number: HW-2
Revision: 10

INORGANIC REGIONAL DATA ASSESSMENT

Region II

CASE NO. NWS

SITE Naval Weapons Station

LABORATORY Roy F. Weston

NO. OF SAMPLES/ MATRIX 7 waters

SDG# CLP 181

REVIEWER (IF NOT ESD) Heartland EST

SCW# 390

REVIEWER'S NAME Paul B. Humbry

DPO: ACTION _____ FYI _____

COMPLETION DATE 2/28/92

DATA ASSESSMENT SUMMARY

		ICP	AA	Hg	CYANIDE
1.	HOLDING TIMES	O	O	O	NA
2.	CALIBRATIONS	Z	Z		
3.	BLANKS	O	O		
4.	ICS				
5.	LCS				
6.	DUPLICATE ANALYSIS				
7.	MATRIX SPIKE				
8.	MSA				
9.	SERIAL DILUTION				
10.	SAMPLE VERIFICATION				
11.	OTHER QC				
12.	OVERALL ASSESSMENT				

O = Data has no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS: _____

AREAS OF CONCERN: _____

NOTABLE PERFORMANCE: _____

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Eight (8) water sample and one (1) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
1-M002	911019101
1-M002MS	911019101MS
1-M002D	911019101D
1-M202	911019102
2-M002	911019104
3-M002	911019105
4-M002	911019106
5-M002	911019107
6-M002	911019108
7-M002	911019109

Heartland ESI has reviewed the data for the samples listed above TAL Metals (under the limited scope requirements) using Region II Data Validation Protocol, February 1990 revision. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

TAl Metals reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110191**, the analysis of eight (8) field water sample and one (1) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The USEPA CLP analytical protocol was followed as required.

Specific QA/QC deficiency **Findings** are listed numerically in the following categories:

Holding Times

The holding times were met as specified in Region II Protocol.

Calibration

1. The CRDL Standard for Lead was below 50%. All positive and non-detect results are rejected if within the concentration range as applied by the Region II Protocol.

2. The CRDL Standard for Cadmium was above 150%. All positive results are rejected if within the concentration range as applied by the Region II Protocol.

3. The CRDL Standards for Selenium and Manganese were below the lower control limit. All positive and non-detect results are qualified if within the concentration range as applied by the Region II Protocol.

Preparation and Field Blanks

No deficiencies in this section.

Interferences

No significant interferences were observed.

Metals Data Assessment Narrative (continued - Page 2)

Interferences

No significant interferences were observed.

Spike Recovery

4. The Matrix Spike recoveries for Arsenic and Lead were below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

5. The Matrix Spike recovery for Iron was above 150%. All positive results are rejected.

Duplicate

6. The Duplicate analysis for Zinc was outside the control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

LCS

No deficiencies in this section.

Serial Dilution

7. The Serial dilution for Iron was outside the control limit. All positive results are qualified as estimated,"J".

MSA

8. The following analytes exhibited low recovery during the GFAA spiking procedures. All data is qualified as estimated, "J" or "UJ".

Analyte	Samples
Lead	1-M002,3-M002,4-M002,5-M002 AND 6-M002.
Selenium	1-M202,6-M002 AND 7-M002.

HEARTLAND ENVIRONMENTAL SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	Pb	+/U	R	1
All Water Samples	Cd	+	R	2
All Water Samples	Mn and Se	+/U	J/UJ	3
All Water Samples	As and Pb	+/U	J/UJ	4
All Water Samples	Fe	+	R	5
All Water Samples	Zn	+/U	J/UJ	6
All Water Samples	Fe	+	J	7
1-M002,3-M002,4-M002, 5-M002 AND 6-M002. 1-M202,6-M002 AND 7-M002.	Pb Se	+/U	J/UJ	8

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

1-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP191

Matrix (soil/water): WATER Lab Sample ID: 911019101

Level (low/med): LOW Date Received: 10/29/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U	N	F	UJ4
7440-39-3	Barium	16.90	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	23.40			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	~~2230.00~~		~~N~~	~~P~~	R5
7439-92-1	Lead	~~2.00~~	~~U~~	~~NW~~	~~F~~	R1
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	14.80	B		P	J3
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	2.00	U		F	
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	3130.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	50.00		*	P	J6
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

1-M202

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP191

Matrix (soil/water): WATER Lab Sample ID: 911019102

Level (low/med): LOW Date Received: 10/29/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U	N	F	UJ4
7440-39-3	Barium	16.00	U		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	46.00	U	N	P	
7439-92-1	Lead	~~2.00~~	~~U~~	~~N~~	~~F~~	R1
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	2.00	U		P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	2.00	U	W	F	UJ8
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	184.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	6.00	U	*	P	J6
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

2-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP191

Matrix (soil/water): WATER Lab Sample ID: 911019104

Level (low/med): LOW Date Received: 10/29/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U	N	F	UJ4
7440-39-3	Barium	44.70	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	432.00			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	~~52600.00~~		~~N~~	~~P~~	RJ
7439-92-1	Lead	7.00		N	F	J4
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	61.90			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	2.00	U		F	
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	3710.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	91.30		*	P	J6
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP191

Matrix (soil/water): WATER Lab Sample ID: 911019105

Level (low/med): LOW Date Received: 10/29/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U	N	F	UJ4
7440-39-3	Barium	18.20	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	32.70			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	~~4860.00~~		~~N~~	~~P~~	R5
7439-92-1	Lead	~~2.00~~	~~U~~	~~NW~~	~~F~~	R1
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	30.70			P	J3
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	2.00	U		F	
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	2710.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	52.50		*	P	J6
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

4-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP191

Matrix (soil/water): WATER Lab Sample ID: 911019106

Level (low/med): LOW Date Received: 10/29/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U	N	F	UJ4
7440-39-3	Barium	20.80	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	~~3.50~~	~~B~~		~~P~~	R2
7440-70-2	Calcium				NR	
7440-47-3	Chromium	400.00			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	~~62200.00~~		~~N~~	~~P~~	R5
7439-92-1	Lead	6.20		NW	F	J4,8
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	45.50			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	2.00	U		F	
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	3590.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	82.80		*	P	J6
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

5-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP191

Matrix (soil/water): WATER Lab Sample ID: 911019107

Level (low/med): LOW Date Received: 10/29/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U	N	F	UJ4
7440-39-3	Barium	22.10	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	108.00			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	~~14800.00~~		~~N~~	~~P~~	R5
7439-92-1	Lead	~~3.00~~		~~NW~~	~~F~~	R1
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	27.80			P	J3
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	2.00	U		F	
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	3780.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	29.60		*	P	J6
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

6-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP191

Matrix (soil/water): WATER Lab Sample ID: 911019108

Level (low/med): LOW Date Received: 10/29/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U	N	F	UJ4
7440-39-3	Barium	54.10	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	310.00			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.40	B		P	
7439-89-6	Iron	~~42000.00~~		~~N~~	~~P~~	RJ
7439-92-1	Lead	6.70		NW	F	J4
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	328.00			P	
7439-97-6	Mercury	1.06			CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	2.00	U	W	F	UJ8
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	2810.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	74.20		*	P	J6
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

7-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP191

Matrix (soil/water): WATER Lab Sample ID: 911019109

Level (low/med): LOW Date Received: 10/29/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	5.50	B	N	F	J4
7440-39-3	Barium	292.00			P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	~~5.00~~			~~P~~	R 2
7440-70-2	Calcium				NR	
7440-47-3	Chromium	2360.00			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	54.40			P	
7439-89-6	Iron	~~316000.00~~		~~N~~	~~P~~	R5
7439-92-1	Lead	190.00		N	F	J4
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	819.00			P	
7439-97-6	Mercury	.39			CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	2.00	U	W	F	UJ8
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	12500.00			P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	817.00		*	P	J6
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report (CCS) - Present?	[ ]		✓
ACTION: If no, contact RSCC.			
A.1.2 Record of Communication (from RSCC) - Present?	[ ]		✓
ACTION: If no, request from RSCC.			
A.1.3 Trip Report - Present and complete?	[ ]		✓
ACTION: If no, contact RSCC for trip report.			
A.1.4 Sample Traffic Report - Present or on file?	[ ]		✓
Legible?	[ ]		✓
ACTION: If no, request from Regional Sample Control Center (RSCC).			
A.1.5 Cover Page - Present?	[✓]		
Is cover page properly filled in and signed by the lab manager or the manager's designee?	[✓]		
ACTION: If no, prepare Telephone Record Log, and contact laboratory.			
Do numbers of samples correspond to numbers on Record of Communication?	[ ]		✓
Do sample numbers on cover page agree with sample numbers on:			
(a) Traffic Report Sheet?	[ ]		✓
(b) Form I's?	[✓]		
ACTION: If no for any of the above, contact RSCC for clarification.			

	YES	NO	N/A
A.1.6 Form I (Final Data) - Are all Form I's present and complete?	[✓]	__	__
ACTION: If no, prepare telephone record log and contact laboratory for submittal.			
Are correct units (ug/l for waters and mg/kg for soils) indicated on Form I's?	[✓]	__	__
Are soil sample results for each parameter corrected for percent solids?	[✓]	__	__
Are EPA sample # s and corresponding laboratory sample ID # s the same as on the Cover Page, Form I's and in the raw data?	[✓]	__	__
Are computation/transcription errors less than 10% of reported values?	[✓]	__	__
Are all "less than IDL" values properly coded with "U"?	[✓]	__	__
Was a brief physical description of samples given on Form I's?	[✓]	__	__
Were the result qualifiers used correctly with final data?	[✓]	__	__
ACTION: If no for any of the above, prepare Telephone Record Log, and contract laboratory for corrected data.			
Were any samples diluted beyond requirements of contract?	__	[✓]	__
If yes, were dilutions noted on Form I's?	[✓]	__	__
ACTION: If no, note under Contract-Problem/Non-Compliance of the "Data Assessment Narrative".			
A.1.7 Holding Times - (aqueous and soil samples)			
(Examine sample traffic reports and digestion/distillation logs.)			
Mercury analysis (28 days). . . . . exceeded?	__	[✓]	__
Cyanide distillation (14 days). . . . . exceeded?	__	[__]	✓

	YES	NO	N/A
Other Metals analysis (6 months). . . . exceeded?	___	[✓]	___

NOTE: Prepare a list of all samples and analytes for which holding times have been exceeded. Specify the number of days from date of collection to the date of preparation (from raw data). Attach to checklist.

ACTION: If yes, reject (red-line) values less than Instrument Detection Limit (IDL) and flag as estimated (J) the values above IDL even though sample(s) was preserved properly.

A.1.8 Raw Data

		YES	NO	N/A
A.1.8.1	Digestion Log* for flame AA/ICP (Form XIII) present?	[✓]	___	___
	Digestion Log for furnace AA Form XIII present?	[✓]	___	___
	Distillation Log for mercury Form XIII present?	[✓]	___	___
	Distillation Log for cyanides Form XIII present?	[___]	___	✓
	Are pH values (pH<2 for all metals, pH>12 for cyanide) present?	[✓]	___	___
	*Weights, dilutions and volumes used to obtain values.			
	Percent solids calculation present for soils/sediments?	[___]	___	✓
	Are preparation dates present on Digestion Log?	[✓]	___	___
A.1.8.2	Measurement read out record present? ICP	[✓]	___	___
	Flame AA	[___]	___	✓
	Furnace AA	[✓]	___	___
	Mercury	[✓]	___	___
	Cyanides	[___]	___	✓

		YES	NO	N/A
A.1.8.3	Are all raw data to support all sample analyses and QC operations present?	[✓]	__	__
	Legible?	[✓]	__	__
	Properly Labeled?	[✓]	__	__

ACTION: If no for any of the above, write Telephone Record Log and contact laboratory. Flag metal data as estimated if pH of sample is greater than 2. Flag cyanide data as estimated if pH sample is less than 12.

A.1.9 Data Validation and Verification

1.9.1 Calibration

A.1.9.1.1	Is record of at least 2 point calibration present for ICP analysis?	[✓]	__	__
	Is record of 5 point calibration present for Hg analysis?	[✓]	__	__

ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".

A.1.9.1.2	Is record of 4 point calibration present for:			
	Flame AA?	[__]	__	✓
	Furnace AA?	[✓]	__	__
	Cyanides?	[__]	__	✓

NOTE:
1. If less than 4 standards are measured in absorbance mode, then the remaining standards in concentration mode must be run immediately after calibration and be within ±10% of true value.
2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRDL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
ACTION: Flag associated data as estimated if standards are not within ±10% of true values (except CRDL calibration standard). Do not flag the data as estimated in linear range indicated by good recovery of standard.			
A.1.9.1.3 Is correlation *coefficient less than 0.995 for:			
Mercury Analysis?	___	[✓]	___
Cyanide Analysis?	___	[___]	✓
Atomic Absorption Analysis?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.2 Form II A (Initial and Continuing Calibration Verification)-			
A.1.9.2.1 Present and complete for every metal and cyanide?	[✓]	___	___
Present and complete for AA and ICP when both are used for same analyte?	[✓]	___	___
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
A.1.9.2.2 Circle all values on data summary sheet that are outside contract windows. Are all calibration standards (initial and continuing) within control limits?			
Metals 90-110%	[✓]	___	___
Hg - 80-120%	[✓]	___	___
Cyanides 85-115%	[___]	___	✓

* The reviewer will calculate correlation coefficient.

	YES	NO	N/A
ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with %R between 75-89% (65-79% for Hg; 70-84% for CN) or 111-125% (121-135% for Hg; 116-130% for CN) recovery and nearest good calibration standard. Qualify results <IDL as estimated (UJ), if the ICV or CCV %R is 75-89% (CN, 70-84% ; HG, 65-79%). Reject (red-line) as unacceptable data if recovery of the ICV or CCV is outside the range 75-125% (CN, 70-130%; Hg, 65-135%). Qualify five samples on either side of verification standard out of control limits.			
Was continuing calibration performed every 10 samples or every 2 hours?	[✓]	__	__
ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).			
Was ICV for cyanides distilled?	[__]	__	✓
ACTION: If no, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".			

A.1.9.3 Form II B (CRDL Standards for AA and ICP) -

	YES	NO	N/A
A.1.9.3.1 Was a CRDL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?	[✓]	__	__
*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?	[__]	__	✓
Was a 2xCRDL (or 2xIDL when IDL>CRDL) analyzed (CRI) for each ICP run? (Note: CRI for AL,Ba,Ca,Fe,Mg,Na,or K is not required.)	[✓]	__	__

ACTION: If no for any of the above, flag as estimated all data falling within the affected ranges. The affected ranges are:
AA Analysis - **True Value ± CRDL
ICP Analysis - **True Value ± 2CRDL
CN Analysis - **True Value ± 0.5 x True Value.

* Find the results of mid-range standard in the raw data.
**True value of CRA, CRI or mid-range standard. Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/A
A.1.9.3.2	Was CRI analyzed after ICV/ICB and before the final CCV/CCB, and for every four hours of ICP run?	[✓]		
	ACTION: If no, write in Contract Problem/Non-Compliance Section of the "Data Assessment Narrative".			
A.1.9.3.3	Circle all values on summary sheet that are outside acceptance windows.			
	Are CRA and CRI standards within control limits: Metals 80 - 120%R?	[ ]	✓	
	Is mid-range standard within control limits: Cyanide 80 - 120%R?	[ ]		✓
	ACTION: Flag as estimated all data within the affected ranges if the recovery of the standard is between 50-79%; flag only positive data if the recovery is between 121-150%; reject (red line) all data if the recovery is less than 50%; reject only positive data if the recovery is greater than 150%.			
A.1.9.4	Form III (Initial and Continuing Calibration Blanks)			
A.1.9.4.1	Present and complete?	[✓]		
	For both AA and ICP when both are used for same analyte?	[✓]		
	Was an initial calibration blank analyzed?	[✓]		
	Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	[✓]		
	ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/non-compliance section of the Data Assessment Narrative.			

		YES	NO	N/A
A.1.9.4.2	Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IDL when IDL > CRDL). Are all calibration blanks (when IDL<CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	[✓]		
	Are all calibration blanks less than two times Instrument Detection Limit (when IDL>CRDL)?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all positive data less than or equal to calibration blank values analyzed between calibration blank with value over CRDL (or 2xIDL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.

A.1.9.5 FORM III (Preparation Blank) -

(Note: The preparation blank for mercury is the same as the calibration blank.)

		YES	NO	N/A
A.1.9.5.1	Was one prep. blank analyzed for: each 20 samples?	[✓]		
	each batch?	[✓]		
	each matrix type?	[✓]		
	both AA and ICP when both are used for same analyte?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all associated positive data <10 x IDLs for which prep. blank was not analyzed.

NOTE: If only one blank was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).

		YES	NO	N/A
A.1.9.5.2	Is concentration of prep. blank greater than CRDL when IDL is less than or equal to CRDL?		[✓]	
	If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?		[✓]	

		YES	NO	N/A
	ACTION: If yes, reject (red-line) all associated data greater than CRDL concentration but less than ten times the prep. blank value found in the raw data.			
A.1.9.5.3	Do concentrations of prep. blank fall below two times IDL when IDL is greater than CRDL?	[✓]		
	ACTION: If no, reject (red-line) all positive data that has a concentration less than 10 times the prep. blank value in the raw data.			
A.1.9.5.4	Is concentration of prep. blank below the negative CRDL?		[✓]	
	ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6	Form IV (ICP Interference Check Sample)			
A.1.9.6.1	Present and complete?	[✓]		
	(NOTE: Not required for furnace AA, flame AA, mercury, cyanide and Ca, Mg, K and Na.)			
	Was ICS analyzed at beginning and end of run (or at least twice every 8 hours)?	[✓]		
	ACTION: If no, flag as estimated (J) all samples for which AL, Ca, Fe, or Mg is higher than in ICS.			
A.1.8.6.2	Circle all values on Data Summary Sheet that are more than + 20% of true or established mean value. Are all Interference Check Sample results inside of control limits (+ 20%)?	[✓]		
	If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	[✓]		
	ACTION: If no, flag as estimated (J) those positive results for which ICS recovery is between 121-150%; flag all sample results as estimated if ICS recovery falls within 50-79%; reject (red-line) those sample results for which ICS recovery is less than 50%; if ICS recovery is above 150%, reject positive results only (not flagged with a "U").			

		YES	NO	N/A
A.1.9.7	Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)- (Note: Not required for Ca, Mg, K, and Na (both matrices), Al, and Fe (soil only.)			
A.1.9.7.1	Present and complete for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each conc. range (i.e. low, med., high)?	[✓]	__	__
	For both AA and ICP when both are used for same analyte?	[✓]	__	__
	ACTION: If no for any of the above, flag as estimated (J) all positive data less than four times spiking level for which spiked sample was not analyzed.			
	NOTE: If one spiked sample was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.9.7.2	Was field blank used for spiked sample?	__	[✓]	__
	ACTION: If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
	NOTE: Matrix spike analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.7.3	Circle all values on Data Summary Sheet that are outside control limits (75% to 125%). Are all recoveries within control limits?	[__]	✓	__
	If no, is sample concentration greater than or equal to four times spike concentration?	[__]	✓	__
	ACTION: If yes, disregard spike recoveries for analytes whose concentrations are greater than or equal to four times spike added. If no, circle those analytes on Form V for which sample concentration is less than four times the spike concentration.			

	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	[___]	___	___

ACTION: If no, write in the Contract - Problem/Non - Compliance section of "Data Assessment Narrative".

A.1.9.7.4 Aqueous

Are any spike recoveries:

(a) less than 30%?	___	[✓]	___
(b) between 30-74%?	✓	[___]	___
(c) between 126-150%?	___	[✓]	___
(d) greater than 150%?	✓	[___]	___

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 126-150%, flag as estimated (J) all associated aqueous data not flagged with a "U"; if greater than 150%, reject (red-line) all associated aqueous data not flagged with a "U".

NOTE: If pre-digestion spike result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, disregard spike recovery on Form V. Flag the associated data as estimated(J).

A.1.9.7.5 Soil/Sediment

Are any spike recoveries:

(a) less than 10%?	___	[___]	✓
(b) between 10-74%?	___	[___]	✓
(c) between 126-200%?	___	[___]	✓
(d) greater than 200%?	___	[___]	✓

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 126-200%, flag as estimated all associated data was not flagged with a "U"; if greater than 200%, reject all associated data not flagged with a "U".

		YES	NO	N/A
A.1.9.8	Form VI (Lab Duplicates)			
A.1.9.8.1	Present and complete for: each 20 samples?	[✓]	___	___
	each matrix type?	[✓]	___	___
	each concentration range (i.e. low, med., high)?	[✓]	___	___
	both AA and ICP when both are used for same analyte?	[✓]	___	___

ACTION: If no for any the above, flag as estimated (J) all data >CRDL* for which duplicate sample was not analyzed.

Note: 1. If one duplicate sample was analyzed for more than 20 samples, then first 20 samples do not have to be flagged as estimated.
2. If percent solids for soil sample and its duplicate differ by more than 1%, prepare a Form VI for each duplicate pair, report concentrations in Hg/L on wet weight basis and calculate RPD or Difference for each analyte.

A.1.9.8.2	Was field blank used for duplicate analysis?	___	[✓]	___

ACTION: If yes, flag all data >CRDL* as estimated (J) for which field blank was used as duplicate.

NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.

A.1.9.8.3	Are all values within control limits (RPD 20% or difference < ±CRDL)?	[___]	[✓]	___
	If no, are all results outside the control limits flagged with an * on Form I's and VI?	[✓]	___	___

ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".

NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than IDL.

* Substitute IDL for CRDL when IDL > CRDL.

	YES	NO	N/A
2. If lab duplicate result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, do not apply precision criteria.			
A.1.9.8.4 Is any value for sample duplicate pair less than CRDL* and other value greater than or equal to 10 x *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5 Aqueous Circle all values on Data Summary Sheet that are: RPD > 50%, or Difference > ± CRDL*			
Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	✓	[_ _]	_ _
Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.8.6 Soil/Sediment Circle all values on Data Summary Sheet that are: RPD > 100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than or equal to 5 times *CRDL) : > 100%?	___	[_ _]	✓
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) : > 2x*CRDL?	___	[_ _]	✓

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
ACTION: If yes, flag the associated data as estimated.			
A.1.9.9 Field Duplicates			
A.1.9.9.1 Were field duplicates analyzed?	[___]	✓	___

ACTION: If yes, prepare a Form VI for each aqueous field duplicate pair. Prepare a Form VI for each soil duplicate pair, if percent solids for sample and its duplicate differ by more than 1%; report concentrations of soils in ug/l on wet weight basis and calculate RPDs or Difference for each analyte.

NOTE:
1. Do not calculate RPD when both values are less than IDL.
2. Flag all associated data only for field duplicate pair.

A.1.9.9.2 Is any value for sample duplicate pair less than *CRDL and other value greater than or equal to 10 x *CRDL?	___	[✓]	___

ACTION: If yes, flag the associated data as estimated.

A.1.9.9.3 Aqueous

Circle all values on Form VI for field duplicates that are:
RPD > 50%, or
Difference > ± CRDL*

Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	___	[✓]	___
Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[✓]	___

ACTION: If yes, flag the associated data as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A

A.1.9.9.4 Soil/Sediment

Circle all values on Form VI for field duplicates that are:
RPD >100%, or

Difference > 2 x CRDL*

Is any RPD (where sample and duplicate are both greater than 5 times *CRDL) :

>100%? ___ [✓] ___

Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x *CRDL):

>2x *CRDL? ___ [✓] ___

ACTION: If yes, flag the associated data as estimated.

A.1.9.10 Form VII (Laboratory Control Sample) (Note: LCS - not required for aqueous Hg and cyanide analyses.)

A.1.9.10.1 Was one LCS prepared and analyzed for:

every 20 water samples? [✓] ___ ___

every 20 solid samples? [___] ___ ✓

both AA and ICP when both are used for same analyte? [✓] ___ ___

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory for submittal of results of LCS. Flag as estimated (J) all data for which LCS was not analyzed.

NOTE: If only one LCS was analyzed for more than 20 samples, then first 20 samples close to LCS do not have to be flagged as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

**Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.10.2 Aqueous LCS			
Circle all LCS values outside control limits (80 - 120%- except aqueous Ag and Sb).			
Is any LCS recovery: less than 50%?	___	[✓]	___
between 50% and 79%?	___	[✓]	___
between 121% and 150%?	___	[✓]	___
greater than 150%?	___	[✓]	___

ACTION: Less than 50%, reject (red-line) all data; between 50% and 79%, flag all associated data as estimated (J); between 121% and 150%, flag all positive (not flagged with a "U") results as estimated; greater than 150%, reject all positive results.

A.1.9.10.3 Solid LCS

NOTE: 1. If "Found" value of LCS is rejectable due to duplicate injections or analytical spike recovery criteria, regardless of LCS recovery, flag the associated data as estimated (J).
2. If IDL of an analyte is equal to or greater than true value of LCS, disregard the "Action" below even though LCS is out of control limits.

Is LCS "Found" value higher than the control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated positive data as estimated.

Is LCS "Found" value lower than the Control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated data as estimated.

		YES	NO	N/A
A.1.9.11	Form IX (ICP Serial Dilution) -			
	NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IDL.			
A.1.9.11.1	Was Serial Dilution analysis performed for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each concentration range (i.e. low, med.)?	[✓]	__	__
	ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIDLs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DPO report.			
A.1.9.11.2	Was field blank(s) used for Serial Dilution Analysis?	__	[✓]	__
	ACTION: If yes, flag all associated data ≥ 10 x IDL as estimated (J).			
	NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.11.3	Are results outside control limit flagged with an "E" on Form I's and Form IX when initial concentration on Form IX is equal to 50 times IDL or greater.	[✓]	__	__
	ACTION: If no, write in the contract-problem/non-compliance section of the "Data Assessment Narrative".			
A.1.9.11.4	Circle all values on Data Summary Sheet that are outside control limit for initial concentrations equal to or greater than 10 x IDLs only. Are any % difference values: > 10%?	✓	[__]	__
	≥ 100%?	__	[✓]	__

		YES	NO	N/A
	ACTION: Flag as estimated (J) all associated equal to or greater than 10xIDLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xIDLs for which PD is greater than or equal to 100%.			
A.1.9.12	Furnace Atomic Absorbtion (AA) QC Analysis			
A.1.9.12.1	Are duplicate injections present in furnace raw data (except during full Method of Standard Addition) for each sample analyzed by GFAA?	[✓]	__	__
	ACTION: If no, reject the data on Form I's for which duplicate injections were not performed.			
A.1.9.12.2	Do the duplicate injection readings agree within 20% Relative Standard Deviation (RSD) or Coefficient of Variation (CV) for concentration greater than CRDL?	[✓]	__	__
	Was a dilution analyzed for sample with post digestion spike recovery less than 40%?	[✓]	__	__
	ACTION: If no for any of the above, flag all the associated data as estimated (J).			
A.1.9.12.3	Is *post digestion spike recovery less than 10% or greater than 150% for any result?	__	[✓]	__
	ACTION: If yes, reject (red-line) the affected data if recovery is <10%; reject data not flagged with "U" if spike recovery is >150%.			
	NOTE: Reject the data only if the affected sample was not subsequently analyzed by Method of Standard Addition.			

* Post digestion spike is not required on the pre-digestion spiked sample when predigestion spike recovery is within control limits of 75-125% or when SR>4xSA.

		YES	NO	N/A
A.1.9.13	Form VIII (Method of Standard Addition Results)			
A.1.9.13.1	Present?	[✓]		
	If no, is any Form I result coded with "S" or a "+"?		[✓]	
	ACTION: If yes, write request on Telephone Record Log and contact laboratory for submittal of Form VIII.			
A.1.9.13.2	Is coefficient of correlation for MSA less than 0.990 for any sample?		[✓]	
	ACTION: If yes, reject (red-line) affected data.			
A.1.9.13.3	Was *MSA required for any sample but not performed?		[✓]	
	Is coefficient of correlation for MSA less than 0.995?		[✓]	
	Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?		[✓]	
	ACTION: If yes for any of the above, flag all the associated data as estimated (J).			
A.1.9.13.4	Was proper quantitation procedure followed correctly as outlined in the SOW on page E-16 through E-17?	[ ]	[✓]	
	ACTION: If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14	Dissolved/Total or Inorganic/Total Analytes -			
A.1.9.14.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)..		[✓]	
	Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?		[✓]	

* MSA is not required on LCS and prep. blank.

	YES	NO	N/A

NOTE: 1. If yes, prepare a list comparing differences between all dissolved (or inorganic) and total analytes. Compute the differences as a percent of the total analyte only when dissolved concentration is greater than CRDL as well as total concentration.
2. Apply the following questions only if inorganic (or dissolved) results are (i) above CRDL, and (ii) greater than total constituents.
3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.

A.1.9.14.2 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 10%? ___ [✓] ___

A.1.9.14.3 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%? ___ [✓] ___

ACTION: If more than 10%, flag both dissolved (or inorganic) and total values as estimated (J); if more than 50%, reject (red-line) the data for both values.

A.1.9.15 Form I to IX

A.1.9.15.1 Are all the Form I through Form IX labeled with:

Laboratory name?	[✓]	___	___
Case/SAS number?	[✓]	___	___
EPA sample No.?	[✓]	___	___
SDG No.?	[✓]	___	___
Contract No.?	[✓]	___	___
Correct units?	[✓]	___	___
Matrix?	[✓]	___	___

ACTION: If no for any of the above, note under contract problem/non-compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.15.2 Do any computation/transcription errors exceed 10% of reported values on Forms I-IX for:			
(NOTE: Check all forms against raw data.)			
(a) all analytes analyzed by ICP?	___	[✓]	___
(b) all analytes analyzed by GFAA?	___	[✓]	___
(c) all analytes analyzed by AA Flame?	___	[ ]	✓
(d) Mercury?	___	[✓]	___
(e) Cyanide?	___	[ ]	✓

ACTION: If yes, prepare Telephone Log, contact laboratory for corrected data and correct errors with red pencil and initial.

A.1.9.16 Form I (Field Blank) -

Circle all field blank values on Data Summary Sheet that are greater than CRDL, 2 x IDL when IDL > CRDL.

Do concentrations of field blank(s) fall below CRDL (or 2 x IDL when IDL > CRDL) for all parameters of associated aqueous and soil samples?	[✓]	___	___
If no, was field blank value already rejected due to other QC criteria?	[✓]	___	___

ACTION: If no, reject (except field blank results) all associated positive sample data less than or equal to five times the field blank value.

	YES	NO	N/A
A.1.9.17 Form X, XI, XII (Verification of Instrumental Parameters).			
A.1.9.17.1 Is verification report present for:			
Instrument Detection Limits (quarterly)?	[✓]		
ICP Interelement Correction Factors (annually)?	[✓]		
ICP Linear Ranges (quarterly)?	[✓]		
ACTION: If no, contact DPO of the lab.			
A.1.9.17.2 Form X (Instrument Detection Limits) - (Note: IDL is not required for Cyanide.)			
Are IDLs present for: all the analytes?	[✓]		
all the instruments used?	[✓]		
For both AA and ICP when both are used for same analyte?	[✓]		
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
Is IDL greater than CRDL for any analyte?		[✓]	
If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?	[✓]		
ACTION: If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.			

	YES	NO	N/A
A.1.9.17.3 Form XI (Linear Ranges)			
Was any sample result higher than high linear range of ICP.	___	[✓]	___
Was any sample result higher than the highest calibration standard for non-ICP parameters?	___	[✓]	___
If yes for any of the above, was the sample diluted to obtain the result on Form I?	[✓]	___	___
ACTION: If no, flag the result reported on Form I as estimated(J).			
A.1.9.18 Percent Solids of Sediments			
Is soil content in sediment(s) less than 50%?	___	[___]	✓
ACTION: If yes, qualify as estimated all data not previously rejected or flagged due to other QC criteria.			

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Feb. 1990
Number: HW-2
Revision: 10

Case#	NWS	Site	Naval Weapons Station	Matrix: Soil	
SDG#	CLP 191	Lab	Roy F. Weston	Water	✓
Contractor	Roy F. Weston	Reviewer	Heartland Est	Other	

A.2.1 The case description and exceptions, if any, are noted below with reason(s) for rejection or qualification as estimated value(s) J.

1. Lead CRDL was <50%. All data rejected.
2. Cadmium CRDL was >150% All positive results are rejected.
3. Manganese and Selenium CRDLs were high. All positive results are estimated.
4. Matrix Spike Recoveries of Arsenic and Lead were below the control limits. All data qualified as estimated.
5. Matrix Spike Recovery for Cadmium was >150%. All positive results are rejected.
6. Duplicate analysis for Zinc was outside control limits. All data is qualified as estimated.
7. The Serial dilution for Iron was outside the control limits. All positive results are estimated.
8. The analytical spike recoveries for Lead

A.2.1 (continuation)

(1-M002) 3-M002, 4-M002, 5-M002 and 6-M002) and Selenium (1-M202, 6-M002 and 7-M002.)

PBH 2/27/92

PBH 2/27/92

2.2 Contract-Problems/Non-Compliance

PBH 2/27/92

M&B Reviewer: _____ Date: _____
Signature

Contractor Reviewer: Paul B. Hanly Date: 2/27/92
Signature

Verified by: Christopher D. Scarpellino Date: 3/2/92

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 191

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 1-M002, 1-M202, 2-M002, 3-M002, 4-M002, 5-M002, 6-M002, 7-M002

FIELD DUP. #'S: _____ LAB DUP. #'S: 1-M002 Field Blank _____ MATRIX SPIKE #: 1-M002

SERIAL DILUTION SAMPLE NO. 1-M002 COMPLETION DATE: 2/27/92 REVIEWERS INITIALS: PBH

Parameter	X Detection Limits UG/L CRDL	IDL	I Field Blank	IIA Calib. Ver. %R Init	Continued 1	2	3	IIB CRDL Std Ver. % R Init	Fin	III Calibration Blanks Init	Continued 1	2	3	PBL PREP	PBL ANA	IV ICP ICS % R Init	Fin	V Matrix Spike	VI Lab Dup RPD Diff	LCS % R	IX Ser Dil % D	Method
Al	200		NA																			
Sb	60																					
As	10	2		100	96	98	97	119		U	U	U	U	U			62		80			F
Ba	200	16		99	99	95	94			U	U	U	U	U	84	80	89	200	96	100		P
Be	5																					
Cd	5	2		97	101	99	98	112	151	U	U	U	U	U	97	97	94	~~11.3~~ PBH	98			P
Ca	5000																					
Cr	10	4		99	101	100	101	97	100	U	U	U	U	U	96	97	95	~~6.9~~ 11.3 PBH	97	100		P
Co	50																					
Cu	25	6		102	103	100	99	102	100	U	U	U	U	U	100	95	90		97			P
Fe	100	46		100	102	100	101			U	U	U	U	U	93	93	175	69	98	16.6		P
Pb	3	3		96	95	91	98	0		U	U	U	U	U			71		84			F
Mg	5000																					
Mn	15	2		99	101	99	99	123	129	U	U	U	U	U	104	101	90	2.0	98			P
Hg	0.2			102	103	102	102			U	U	U	U	U					98			CV
Ni	40																					
K	5000																					
Se	5	2		96	95	96	95	148		U	U	U	U	U			88		86			F
Ag	10	3		103	102	101	101	97	103	U	U	U	U	U	99	96	88		97			P
Na	5000	110		99	99	97	97			U	113	186	234	U				4.5	96	2.7		P
Tl	10																					
V	50																					
Zn	20	6		100	103	103	104	99	101	U	U	U	U	U	92	93	89	112.5	101	15.0		P
CN	10																					

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APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 191

SITE/STUDY DESCRIPTION: _____ SAMPLE NOS: _____

Field Blank _____

FIELD DUP. #'S: _____ LAB DUP. #'S: _____ MATRIX SPIKE #: _____

SERIAL DILUTION SAMPLE NO. _____ COMPLETION DATE: 2/27/92 REVIEWERS INITIALS: PBH

	X		I	IIA				IIB		III				IV		V		VI	VII	IX	
Parameter	Detection Limits UG/L		Field Blank	Calib. Ver. %R				CRDL Std Ver. % R		Calibration Blanks				PBL EAN	ICP ICS % R		MS Matrix	Lab Dup RPD/Diff	LCS	Ser Dil	Meth
	CRDL	IDL		Init	Continued 1	2	3	Init	Fin	Init	Continued 1	2	3	P N	Init	Fin			% R	% D	
Al	200		NA																		
Sb	60																				
As	10	2			100						U										F
Ba	200																				
Be	5																				
Cd	5																				
Ca	5000																				
[illegible]	10																				
Co	50																				
Cu	25																				
Fe	100																				
Pb	3	3			99	97	98				U	U	U								F
Mg	5000																				
Mn	15																				
Hg	0.2				102	102					U	U		U							CV
Ni	40																				
K	5000																				
Se	5	3			94						U										F
Ag	10																				
Na	5000																				
[illegible]	10																				
V	50																				
Zn	20																				
CN	10		N																		

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: _____ Date: _____ Case #: _____

Site: _____ Lab Name: _____

Reviewer's Initials: _____ Number of Samples: _____

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Inter-ferences	Spike Recovery	Duplicates Lab	Duplicates Field	Detection Limits	LCS	Serial Dilution	MSA	Total Analytes	Rejection
ICP		1				1							2	
Flame AA														
Furnace AA		1											1	
Mercury														
Total		2				1							3	
Other														

Analytes Flagged as Estimated (J) Due to Exceeding Criteria For:*

ICP		1					1				1		3	
Flame AA														
Furnace AA		1				2						2	5	
Mercury														
Total		2				2	1				1	2	8	
Other														

Note:
Asterisk (*) Indicates additional exceedances of review criteria.

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.7: CLP Data Assessment Checklist
Inorganic Analysis

Date: Feb. 1990
Number: HW-2
Revision: 10

INORGANIC REGIONAL DATA ASSESSMENT

Region II

CASE NO. NWS

SITE Naval Weapons Station

LABORATORY Roy F. Weston

NO. OF SAMPLES/ MATRIX 8

SDG# CLP 191

REVIEWER (IF NOT ESD) Heartland ESI

SOW# 390

REVIEWER'S NAME Paul B. Humby

DPO: ACTION _____ FYI _____

COMPLETION DATE 2/27/92

DATA ASSESSMENT SUMMARY

		ICP	AA	Hg	CYANIDE
1.	HOLDING TIMES	O	O	O	NA
2.	CALIBRATIONS		Z		
3.	BLANKS		O		
4.	ICS				
5.	LCS				
6.	DUPLICATE ANALYSIS				
7.	MATRIX SPIKE	Z			
8.	MSA				
9.	SERIAL DILUTION	O			
10.	SAMPLE VERIFICATION				
11.	OTHER QC				
12.	OVERALL ASSESSMENT				

O = Data has no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS:

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Eight (8) water sample and no (0) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
1-M002	911021101
2-M002	911021102
3-M002	911021103
4-M002	911021104
5-M002	911021105
7-M002	911021106
8-M002	911021107
8-M202	911021108

Heartland ESI has reviewed the data for the samples listed above TAL Metals (under the limited scope requirements) using Region II Data Validation Protocol, February 1990 revision. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

TAl Metals reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110211**, the analysis of eight (8) field water sample and no (0) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The USEPA CLP analytical protocol was followed as required with the exception that the laboratory failed to submit forms 5,6 and 9. The QC data for this package can be found in SDG #235.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in Region II Protocol.

Calibration

1. The CRDL Standard for Selenium was above 150%. All positive results are rejected if within the concentration range as applied by the Region II Protocol.

2. The CRDL Standards for Arsenic and Lead were below the lower control limit. All positive and non-detect results are qualified if within the concentration range as applied by the Region II Protocol.

Preparation and Field Blanks

No deficiencies in this section.

Interferences

No significant interferences were observed.

Interferences

No significant interferences were observed.

Metals Data Assessment Narrative (continued - Page 2)

Spike Recovery

3. The Matrix Spike recoveries for Arsenic and Selenium were below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

4. The Matrix Spike recovery for Lead was below 30%. All positive and non-detect results are rejected.

Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

Serial Dilution

No deficiencies in this section.

MSA

5. The following analytes exhibited low recovery during the GFAA spiking procedures. All data is qualified as estimated, "J" or "UJ".

Analyte	Samples
Lead	1-M002,3-M002,8-M002 and 8-M202.
Selenium	3-M002,3-M002,4-M002,5-M002,7-M002 and 8-M202.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	Se	+	R	1
All Wtaer Samples	As and Pb	+/U	J/UJ	2
All Water Samples	As and Se	+/U	J/UJ	3
All Water Samples	Pb	+/U	R	4
1-M002,3-M002,8-M002, and 8-M202.	Pb	+/U	J/UJ	5
2-M002,3-M002,4-M002, 5-M002,7-M002 and 8-M202.	Se			

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

U.S. EPA - CLP

000021

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

1-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP211

Matrix (soil/water): WATER Lab Sample ID: 911021101

Level (low/med): LOW Date Received: 10/30/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U		F	UJ2,3
7440-39-3	Barium	50.90	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	362.00			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	56700.00			P	
7439-92-1	Lead	~~5.60~~		~~W~~	~~F~~	~~J2R4~~
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	53.40			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	2.00	U		F	UJ3
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	4410.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	70.80			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

000022

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

2-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP211

Matrix (soil/water): WATER Lab Sample ID: 911021102

Level (low/med): LOW Date Received: 10/30/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U		F	UJ2,3
7440-39-3	Barium	54.30	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	789.00			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.40	B		P	
7439-89-6	Iron	110000.00			P	
7439-92-1	Lead	~~12.10~~			~~F~~	R4
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	134.00			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	2.00	U	W	F	UJ3,5
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	4270.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	95.10			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP211

Matrix (soil/water): WATER Lab Sample ID: 911021103

Level (low/med): LOW Date Received: 10/30/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U		F	UJ2,3
7440-39-3	Barium	38.70	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	4.10	B		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	27.70			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	2800.00			P	
7439-92-1	Lead	~~2.50~~	~~B~~	~~W~~	~~F~~	~~J2R4~~
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	67.60			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	2.00	U	W	F	UJ3,5
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	4310.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	88.10			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

4-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP211

Matrix (soil/water): WATER Lab Sample ID: 911021104

Level (low/med): LOW Date Received: 10/30/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U		F	UJ2,3
7440-39-3	Barium	22.40	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	403.00			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	58900.00			P	
7439-92-1	Lead	~~15.00~~		~~S~~	~~F~~	R4
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	102.00			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	2.00	U	W	F	UJ3,5
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	5960.00			P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	78.40			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

000025
EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

5-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP211

Matrix (soil/water): WATER Lab Sample ID: 911021105

Level (low/med): LOW Date Received: 10/30/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U		F	UJ2,3
7440-39-3	Barium	153.00	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	5.30			P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	650.00			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	14.40	B		P	
7439-89-6	Iron	102000.00			P	
7439-92-1	Lead	~~26.30~~		~~S~~	~~F~~	R4
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	322.00			P	
7439-97-6	Mercury	.17	B		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	2.00	U	W	F	UJ3,5
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	4580.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	193.00			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

7-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP211

Matrix (soil/water): WATER Lab Sample ID: 911021106

Level (low/med): LOW Date Received: 10/30/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U		F	UJ2,3
7440-39-3	Barium	135.00	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	25.10			P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	2800.00			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	35.30			P	
7439-89-6	Iron	497000.00			P	
7439-92-1	Lead	~~64.80~~		~~S~~	~~F~~	R4
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	591.00			P	
7439-97-6	Mercury	.14	B		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	2.00	U	W	F	UJ3,5
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	7880.00			P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	916.00			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

8-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP211

Matrix (soil/water): WATER Lab Sample ID: 911021107

Level (low/med): LOW Date Received: 10/30/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U		F	UJ2,3
7440-39-3	Barium	32.60	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	155.00			P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	21600.00			P	
7439-92-1	Lead	~~2.00~~	~~U~~	~~W~~	~~F~~	~~UJ2~~ R4
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	51.20			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	2.00	U		F	UJ3
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	4370.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	47.90			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

8-M202

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP211

Matrix (soil/water): WATER Lab Sample ID: 911021108

Level (low/med): LOW Date Received: 10/30/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U		F	UJ2,3
7440-39-3	Barium	16.00	U		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	46.00	U		P	
7439-92-1	Lead	~~2.00~~	~~U~~	~~W~~	~~F~~	~~UJ2~~ R4
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	2.00	U		P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	2.00	U	W	F	UJ3,5
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	427.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	7.50	B		P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report (CCS) - Present?	[ ]		✓
ACTION: If no, contact RSCC.			
A.1.2 Record of Communication (from RSCC) - Present?	[ ]		✓
ACTION: If no, request from RSCC.			
A.1.3 Trip Report - Present and complete?	[ ]		✓
ACTION: If no, contact RSCC for trip report.			
A.1.4 Sample Traffic Report - Present or on file?	[ ]		✓
Legible?	[ ]		✓
ACTION: If no, request from Regional Sample Control Center (RSCC).			
A.1.5 Cover Page - Present?	[✓]		
Is cover page properly filled in and signed by the lab manager or the manager's designee?	[✓]		
ACTION: If no, prepare Telephone Record Log, and contact laboratory.			
Do numbers of samples correspond to numbers on Record of Communication?	[ ]		✓
Do sample numbers on cover page agree with sample numbers on:			
(a) Traffic Report Sheet?	[ ]		✓
(b) Form I's?	[✓]		
ACTION: If no for any of the above, contact RSCC for clarification.			

	YES	NO	N/A
A.1.6 Form I (Final Data) - Are all Form I's present and complete?	[✓]	__	__
ACTION: If no, prepare telephone record log and contact laboratory for submittal.			
Are correct units (ug/l for waters and mg/kg for soils) indicated on Form I's?	[✓]	__	__
Are soil sample results for each parameter corrected for percent solids?	[__]	__	✓
Are EPA sample # s and corresponding laboratory sample ID # s the same as on the Cover Page, Form I's and in the raw data?	[✓]	__	__
Are computation/transcription errors less than 10% of reported values?	[✓]	__	__
Are all "less than IDL" values properly coded with "U"?	[✓]	__	__
Was a brief physical description of samples given on Form I's?	[✓]	__	__
Were the result qualifiers used correctly with final data?	[__]	__	✓
ACTION: If no for any of the above, prepare Telephone Record Log, and contract laboratory for corrected data.			
Were any samples diluted beyond requirements of contract?	__	[✓]	__
If yes, were dilutions noted on Form I's?	[✓]	__	__
ACTION: If no, note under Contract-Problem/Non-Compliance of the "Data Assessment Narrative".			

A.1.7 Holding Times - (aqueous and soil samples)

(Examine sample traffic reports and digestion/distillation logs.)

Mercury analysis (28 days). . . . . exceeded?	__	[✓]	__
Cyanide distillation (14 days). . . . . exceeded?	__	[__]	✓

	YES	NO	N/A
Other Metals analysis (6 months). . . . exceeded?	___	[✓]	___

NOTE: Prepare a list of all samples and analytes for which holding times have been exceeded. Specify the number of days from date of collection to the date of preparation (from raw data). Attach to checklist.

ACTION: If yes, reject (red-line) values less than Instrument Detection Limit (IDL) and flag as estimated (J) the values above IDL even though sample(s) was preserved properly.

A.1.8 Raw Data

		YES	NO	N/A
A.1.8.1	Digestion Log* for flame AA/ICP (Form XIII) present?	[✓]	___	___
	Digestion Log for furnace AA Form XIII present?	[✓]	___	___
	Distillation Log for mercury Form XIII present?	[✓]	___	___
	Distillation Log for cyanides Form XIII present?	[___]	___	✓
	Are pH values (pH<2 for all metals, pH>12 for cyanide) present?	[✓]	___	___
	*Weights, dilutions and volumes used to obtain values.			
	Percent solids calculation present for soils/sediments?	[___]	___	✓
	Are preparation dates present on Digestion Log?	[✓]	___	___
A.1.8.2	Measurement read out record present? ICP	[✓]	___	___
	Flame AA	[___]	___	✓
	Furnace AA	[✓]	___	___
	Mercury	[✓]	___	___
	Cyanides	[___]	___	✓

	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	[✓]		
Legible?	[✓]		
Properly Labeled?	[✓]		

ACTION: If no for any of the above, write Telephone Record Log and contact laboratory. Flag metal data as estimated if pH of sample is greater than 2. Flag cyanide data as estimated if pH sample is less than 12.

A.1.9 Data Validation and Verification

1.9.1 Calibration

	YES	NO	N/A
A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	[✓]		
Is record of 5 point calibration present for Hg analysis?	[✓]		

ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.1.2 Is record of 4 point calibration present for:			
Flame AA?	[ ]		✓
Furnace AA?	[✓]		
Cyanides?	[ ]		✓

NOTE:
1. If less than 4 standards are measured in absorbance mode, then the remaining standards in concentration mode must be run immediately after calibration and be within ±10% of true value.
2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRDL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
ACTION: Flag associated data as estimated if standards are not within ±10% of true values (except CRDL calibration standard). Do not flag the data as estimated in linear range indicated by good recovery of standard.			
A.1.9.1.3 Is correlation *coefficient less than 0.995 for:			
Mercury Analysis?	___	[✓]	___
Cyanide Analysis?	___	[___]	✓
Atomic Absorption Analysis?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.2 Form II A (Initial and Continuing Calibration Verification)-			
A.1.9.2.1 Present and complete for every metal and cyanide?	[✓]	___	___
Present and complete for AA and ICP when both are used for same analyte?	[✓]	___	___
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
A.1.9.2.2 Circle all values on data summary sheet that are outside contract windows. Are all calibration standards (initial and continuing) within control limits?			
Metals 90-110%	[✓]	___	___
Hg - 80-120%	[✓]	___	___
Cyanides 85-115%	[✓]	___	___

* The reviewer will calculate correlation coefficient.

	YES	NO	N/A
ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with %R between 75-89% (65-79% for Hg; 70-84% for CN) or 111-125% (121-135% for Hg; 116-130% for CN) recovery and nearest good calibration standard. Qualify results <IDL as estimated (UJ), if the ICV or CCV %R is 75-89% (CN, 70-84% ; HG, 65-79%). Reject (red-line) as unacceptable data if recovery of the ICV or CCV is outside the range 75-125% (CN, 70-130%; Hg, 65-135%). Qualify five samples on either side of verification standard out of control limits.			
Was continuing calibration performed every 10 samples or every 2 hours?	[✓]	__	__
ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).			
Was ICV for cyanides distilled?	[__]	__	✓
ACTION: If no, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".			

A.1.9.3 Form II B (CRDL Standards for AA and ICP) -

A.1.9.3.1 Was a CRDL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?	[✓]	__	__
*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?	[__]	__	✓
Was a 2xCRDL (or 2xIDL when IDL>CRDL) analyzed (CRI) for each ICP run? (Note: CRI for AL,Ba,Ca,Fe,Mg,Na,or K is not required.)	[✓]	__	__

ACTION: If no for any of the above, flag as estimated all data falling within the affected ranges. The affected ranges are:

AA Analysis - **True Value ± CRDL
ICP Analysis - **True Value ± 2CRDL
CN Analysis - **True Value ± 0.5 x True Value.

* Find the results of mid-range standard in the raw data.
**True value of CRA, CRI or mid-range standard. Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/A
A.1.9.3.2	Was CRI analyzed after ICV/ICB and before the final CCV/CCB, and for every four hours of ICP run?	[✓]		

ACTION: If no, write in Contract Problem/Non-Compliance Section of the "Data Assessment Narrative".

A.1.9.3.3 Circle all values on summary sheet that are outside acceptance windows.

Are CRA and CRI standards within control limits: Metals 80 - 120%R?	[ ]		✓	
Is mid-range standard within control limits: Cyanide 80 - 120%R?	[ ]			✓

ACTION: Flag as estimated all data within the affected ranges if the recovery of the standard is between 50-79%; flag only positive data if the recovery is between 121-150%; reject (red line) all data if the recovery is less than 50%; reject only positive data if the recovery is greater than 150%.

A.1.9.4 Form III (Initial and Continuing Calibration Blanks)

A.1.9.4.1	Present and complete?	[✓]		
	For both AA and ICP when both are used for same analyte?	[✓]		
	Was an initial calibration blank analyzed?	[✓]		
	Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	[✓]		

ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/non-compliance section of the Data Assessment Narrative.

		YES	NO	N/A
A.1.9.4.2	Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IDL when IDL > CRDL). Are all calibration blanks (when IDL<CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	[✓]		
	Are all calibration blanks less than two times Instrument Detection Limit (when IDL>CRDL)?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all positive data less than or equal to calibration blank values analyzed between calibration blank with value over CRDL (or 2xIDL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.

A.1.9.5 FORM III (Preparation Blank) -

(Note: The preparation blank for mercury is the same as the calibration blank.)

A.1.9.5.1	Was one prep. blank analyzed for: each 20 samples?	[✓]		
	each batch?	[✓]		
	each matrix type?	[✓]		
	both AA and ICP when both are used for same analyte?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all associated positive data <10 x IDLs for which prep. blank was not analyzed.

NOTE: If only one blank was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).

A.1.9.5.2	Is concentration of prep. blank greater than CRDL when IDL is less than or equal to CRDL?		[✓]	
	If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?		[✓]	

		YES	NO	N/A
	ACTION: If yes, reject (red-line) all associated data greater than CRDL concentration but less than ten times the prep. blank value found in the raw data.			
A.1.9.5.3	Do concentrations of prep. blank fall below two times IDL when IDL is greater than CRDL?	[✓]	___	___
	ACTION: If no, reject (red-line) all positive data that has a concentration less than 10 times the prep. blank value in the raw data.			
A.1.9.5.4	Is concentration of prep. blank below the negative CRDL?	___	[✓]	___
	ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6	Form IV (ICP Interference Check Sample)			
A.1.9.6.1	Present and complete?	[✓]	___	___
	(NOTE: Not required for furnace AA, flame AA, mercury, cyanide and Ca, Mg, K and Na.)			
	Was ICS analyzed at beginning and end of run (or at least twice every 8 hours)?	[✓]	___	___
	ACTION: If no, flag as estimated (J) all samples for which AL, Ca, Fe, or Mg is higher than in ICS.			
A.1.8.6.2	Circle all values on Data Summary Sheet that are more than + 20% of true or established mean value. Are all Interference Check Sample results inside of control limits (+ 20%)?	[✓]	___	___
	If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	[✓]	___	___
	ACTION: If no, flag as estimated (J) those positive results for which ICS recovery is between 121-150%; flag all sample results as estimated if ICS recovery falls within 50-79%; reject (red-line) those sample results for which ICS recovery is less than 50%; if ICS recovery is above 150%, reject positive results only (not flagged with a "U").			

		YES	NO	N/A
A.1.9.7	Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)- (Note: Not required for Ca, Mg, K, and Na (both matrices), Al, and Fe (soil only.)			
A.1.9.7.1	Present and complete for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each conc. range (i.e. low, med., high)?	[✓]	__	__
	For both AA and ICP when both are used for same analyte?	[__]	__	✓

ACTION: If no for any of the above, flag as estimated (J) all positive data less than four times spiking level for which spiked sample was not analyzed.

NOTE: If one spiked sample was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).

A.1.9.7.2	Was field blank used for spiked sample?	__	[✓]	__

ACTION: If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.

NOTE: Matrix spike analysis should be performed on a field blank when it is the only aqueous sample in SDG.

A.1.9.7.3	Circle all values on Data Summary Sheet that are outside control limits (75% to 125%). Are all recoveries within control limits?	[__]	✓	__
	If no, is sample concentration greater than or equal to four times spike concentration?	[__]	✓	__

ACTION: If yes, disregard spike recoveries for analytes whose concentrations are greater than or equal to four times spike added. If no, circle those analytes on Form V for which sample concentration is less than four times the spike concentration.

	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	[ ]	✓	

ACTION: If no, write in the Contract - Problem/Non - Compliance section of "Data Assessment Narrative".

A.1.9.7.4 Aqueous

Are any spike recoveries:

	YES	NO	N/A
(a) less than 30%?	✓	[ ]	
(b) between 30-74%?	✓	[ ]	
(c) between 126-150%?		[✓]	
(d) greater than 150%?		[✓]	

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 126-150%, flag as estimated (J) all associated aqueous data not flagged with a "U"; if greater than 150%, reject (red-line) all associated aqueous data not flagged with a "U".

NOTE: If pre-digestion spike result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, disregard spike recovery on Form V. Flag the associated data as estimated(J).

A.1.9.7.5 Soil/Sediment

Are any spike recoveries:

	YES	NO	N/A
(a) less than 10%?		[ ]	✓
(b) between 10-74%?		[ ]	✓
(c) between 126-200%?		[ ]	✓
(d) greater than 200%?		[ ]	✓

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 126-200%, flag as estimated all associated data was not flagged with a "U"; if greater than 200%, reject all associated data not flagged with a "U".

		YES	NO	N/A
A.1.9.8	Form VI (Lab Duplicates)			
A.1.9.8.1	Present and complete for: each 20 samples?	[✓]	___	___
	each matrix type?	[✓]	___	___
	each concentration range (i.e. low, med., high)?	[✓]	___	___
	both AA and ICP when both are used for same analyte?	[✓]	___	___

ACTION: If no for any the above, flag as estimated (J) all data >CRDL* for which duplicate sample was not analyzed.

Note: 1. If one duplicate sample was analyzed for more than 20 samples, then first 20 samples do not have to be flagged as estimated.
2. If percent solids for soil sample and its duplicate differ by more than 1%, prepare a Form VI for each duplicate pair, report concentrations in Hg/L on wet weight basis and calculate RPD or Difference for each analyte.

A.1.9.8.2	Was field blank used for duplicate analysis?	___	[✓]	___

ACTION: If yes, flag all data >CRDL* as estimated (J) for which field blank was used as duplicate.

NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.

A.1.9.8.3	Are all values within control limits (RPD 20% or difference < ±CRDL)?	[✓]	___	___
	If no, are all results outside the control limits flagged with an * on Form I's and VI?	[✓]	___	___

ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".

NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than IDL.

* Substitute IDL for CRDL when IDL > CRDL.

	YES	NO	N/A
2. If lab duplicate result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, do not apply precision criteria.			
A.1.9.8.4 Is any value for sample duplicate pair less than CRDL* and other value greater than or equal to 10 x *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5 Aqueous Circle all values on Data Summary Sheet that are: RPD > 50%, or Difference > ± CRDL*			
Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	___	[✓]	___
Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.8.6 Soil/Sediment Circle all values on Data Summary Sheet that are: RPD > 100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than or equal to 5 times *CRDL) : > 100%?	___	[___]	✓
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) : > 2x*CRDL?	___	[___]	✓

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

		YES	NO	N/A
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9	Field Duplicates			
A.1.9.9.1	Were field duplicates analyzed?	[___]	[✓]	___
	ACTION: If yes, prepare a Form VI for each aqueous field duplicate pair. Prepare a Form VI for each soil duplicate pair, if percent solids for sample and its duplicate differ by more than 1%; report concentrations of soils in ug/l on wet weight basis and calculate RPDs or Difference for each analyte.			
	NOTE: 1. Do not calculate RPD when both values are less than IDL. 2. Flag all associated data only for field duplicate pair.			
A.1.9.9.2	Is any value for sample duplicate pair less than *CRDL and other value greater than or equal to 10 x *CRDL?	___	[✓]	___
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9.3	Aqueous			
	Circle all values on Form VI for field duplicates that are: RPD > 50%, or Difference > ± CRDL*			
	Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	___	[✓]	___
	Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[✓]	___
	ACTION: If yes, flag the associated data as estimated.			

* Substitute IDL for CRDL when IDL > CRDL.

** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.9.4 Soil/Sediment			
Circle all values on Form VI for field duplicates that are: RPD >100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than 5 times *CRDL) : >100%?	___	[ ]	✓
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x *CRDL): >2x *CRDL?	___	[ ]	✓

ACTION: If yes, flag the associated data as estimated.

A.1.9.10 Form VII (Laboratory Control Sample) (Note: LCS - not required for aqueous Hg and cyanide analyses.)

	YES	NO	N/A
A.1.9.10.1 Was one LCS prepared and analyzed for: every 20 water samples?	[✓]		
every 20' solid samples?	[ ]		✓
both AA and ICP when both are used for same analyte?	[✓]		

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory for submittal of results of LCS. Flag as estimated (J) all data for which LCS was not analyzed.

NOTE: If only one LCS was analyzed for more than 20 samples, then first 20 samples close to LCS do not have to be flagged as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

**Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.10.2 Aqueous LCS			
Circle all LCS values outside control limits (80 - 120%- except aqueous Ag and Sb).			
Is any LCS recovery: less than 50%?	___	[✓]	___
between 50% and 79%?	___	[✓]	___
between 121% and 150%?	___	[✓]	___
greater than 150%?	___	[✓]	___

ACTION: Less than 50%, reject (red-line) all data; between 50% and 79%, flag all associated data as estimated (J); between 121% and 150%, flag all positive (not flagged with a "U") results as estimated; greater than 150%, reject all positive results.

A.1.9.10.3 Solid LCS

NOTE: 1. If "Found" value of LCS is rejectable due to duplicate injections or analytical spike recovery criteria, regardless of LCS recovery, flag the associated data as estimated (J).
2. If IDL of an analyte is equal to or greater than true value of LCS, disregard the "Action" below even though LCS is out of control limits.

Is LCS "Found" value higher than the control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated positive data as estimated.

Is LCS "Found" value lower than the Control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated data as estimated.

		YES	NO	N/A
A.1.9.11	Form IX (ICP Serial Dilution) -			
	NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IDL.			
A.1.9.11.1	Was Serial Dilution analysis performed for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each concentration range (i.e. low, med.)?	[✓]	__	__
	ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIDLs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DFO report.			
A.1.9.11.2	Was field blank(s) used for Serial Dilution Analysis?	__	[✓]	__
	ACTION: If yes, flag all associated data ≥ 10 x IDL as estimated (J).			
	NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.11.3	Are results outside control limit flagged with an "E" on Form I's and Form IX when initial concentration on Form IX is equal to 50 times IDL or greater.	[✓]	__	__
	ACTION: If no, write in the contract-problem/non-compliance section of the "Data Assessment Narrative".			
A.1.9.11.4	Circle all values on Data Summary Sheet that are outside control limit for initial concentrations equal to or greater than 10 x IDLs only. Are any % difference values: > 10%?	__	[✓]	__
	≥ 100%?	__	[✓]	__

	YES	NO	N/A
ACTION: Flag as estimated (J) all associated equal to or greater than 10xIDLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xIDLs for which PD is greater than or equal to 100%.			
A.1.9.12 Furnace Atomic Absorbtion (AA) QC Analysis			
A.1.9.12.1 Are duplicate injections present in furnace raw data (except during full Method of Standard Addition) for each sample analyzed by GFAA?	[✓]	__	__
ACTION: If no, reject the data on Form I's for which duplicate injections were not performed.			
.1.9.12.2 Do the duplicate injection readings agree within 20% Relative Standard Deviation (RSD) or Coefficient of Variation (CV) for concentration greater than CRDL?	[✓]	__	__
Was a dilution analyzed for sample with post digestion spike recovery less than 40%?	[✓]	__	__
ACTION: If no for any of the above, flag all the associated data as estimated (J).			
A.1.9.12.3 Is *post digestion spike recovery less than 10% or greater than 150% for any result?	__	[✓]	__
ACTION: If yes, reject (red-line) the affected data if recovery is <10%; reject data not flagged with "U" if spike recovery is >150%.			
NOTE: Reject the data only if the affected sample was not subsequently analyzed by Method of Standard Addition.			

* Post digestion spike is not required on the pre-digestion spiked sample when predigestion spike recovery is within control limits of 75-125% or when SR>4xSA.

		YES	NO	N/A
A.1.9.13	Form VIII (Method of Standard Addition Results)			
A.1.9.13.1	Present?	[✓]		
	If no, is any Form I result coded with "S" or a "+"?		[✓]	
	ACTION: If yes, write request on Telephone Record Log and contact laboratory for submittal of Form VIII.			
A.1.9.13.2	Is coefficient of correlation for MSA less than 0.990 for any sample?		[✓]	
	ACTION: If yes, reject (red-line) affected data.			
A.1.9.13.3	Was *MSA required for any sample but not performed?		[✓]	
	Is coefficient of correlation for MSA less than 0.995?		[✓]	
	Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?		[✓]	
	ACTION: If yes for any of the above, flag all the associated data as estimated (J).			
A.1.9.13.4	Was proper quantitation procedure followed correctly as outlined in the SOW on page E-16 through E-17?	[✓]		
	ACTION: If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14	Dissolved/Total or Inorganic/Total Analytes -			
A.1.9.14.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)..		[✓]	
	Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?		[✓]	

* MSA is not required on LCS and prep. blank.

	YES	NO	N/A

NOTE: 1. If yes, prepare a list comparing differences between all dissolved (or inorganic) and total analytes. Compute the differences as a percent of the total analyte only when dissolved concentration is greater than CRDL as well as total concentration.
2. Apply the following questions only if inorganic (or dissolved) results are (i) above CRDL, and (ii) greater than total constituents.
3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.

A.1.9.14.2 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 10%? ___ [✓] ___

A.1.9.14.3 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%? ___ [✓] ___

ACTION: If more than 10%, flag both dissolved (or inorganic) and total values as estimated (J); if more than 50%, reject (red-line) the data for both values.

A.1.9.15 Form I to IX

A.1.9.15.1 Are all the Form I through Form IX labeled with:

	YES	NO	N/A
Laboratory name?	[✓]	___	___
Case/SAS number?	[✓]	___	___
EPA sample No.?	[✓]	___	___
SDG No.?	[✓]	___	___
Contract No.?	[✓]	___	___
Correct units?	[✓]	___	___
Matrix?	[✓]	___	___

ACTION: If no for any of the above, note under contract problem/non-compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.15.2 Do any computation/transcription errors exceed 10% of reported values on Forms I-IX for:			
(NOTE: Check all forms against raw data.)			
(a) all analytes analyzed by ICP?	___	[✓]	___
(b) all analytes analyzed by GFAA?	___	[✓]	___
(c) all analytes analyzed by AA Flame?	___	[ ]	✓
(d) Mercury?	___	[✓]	___
(e) Cyanide?	___	[ ]	✓

ACTION: If yes, prepare Telephone Log, contact laboratory for corrected data and correct errors with red pencil and initial.

A.1.9.16 Form I (Field Blank) -

Circle all field blank values on Data Summary Sheet that are greater than CRDL, 2 x IDL when IDL > CRDL.

Do concentrations of field blank(s) fall below CRDL (or 2 x IDL when IDL > CRDL) for all parameters of associated aqueous and soil samples?	[___]	___	✓
If no, was field blank value already rejected due to other QC criteria?	[___]	___	✓

ACTION: If no, reject (except field blank results) all associated positive sample data less than or equal to five times the field blank value.

	YES	NO	N/A
A.1.9.17 Form X, XI, XII (Verification of Instrumental Parameters).			
A.1.9.17.1 Is verification report present for:			
Instrument Detection Limits (quarterly)?	[✓]		
ICP Interelement Correction Factors (annually)?	[✓]		
ICP Linear Ranges (quarterly)?	[✓]		
ACTION: If no, contact DPO of the lab.			
A.1.9.17.2 Form X (Instrument Detection Limits) - (Note: IDL is not required for Cyanide.)			
Are IDLs present for: all the analytes?	[✓]		
all the instruments used?	[✓]		
For both AA and ICP when both are used for same analyte?	[✓]		
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
Is IDL greater than CRDL for any analyte?		[✓]	
If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?	[✓]		
ACTION: If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.			

	YES	NO	N/A
A.1.9.17.3 Form XI (Linear Ranges)			
Was any sample result higher than high linear range of ICP.	___	[✓]	___
Was any sample result higher than the highest calibration standard for non-ICP parameters?	___	[✓]	___
If yes for any of the above, was the sample diluted to obtain the result on Form I?	[✓]	___	___
ACTION: If no, flag the result reported on Form I as estimated(J).			
A.1.9.18 Percent Solids of Sediments			
Is soil content in sediment(s) less than 50%?	___	[___]	✓
ACTION: If yes, qualify as estimated all data not previously rejected or flagged due to other QC criteria.			

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Feb. 1990
Number: HW-2
Revision: 10

Case#	NWS	Site	Naval Weapons Station	Matrix: Soil	
SDG#	CLP 211	Lab	Roy F. Weston	Water	✓
Contractor	Roy F. Weston	Reviewer	Heartland ESI	Other	

A.2.1 The case description and exceptions, if any, are noted below with reason(s) for rejection or qualification as estimated value(s) J.

1. Selenium CRDL high all positive results are rejected.
2. Arsenic and Lead CRDL low recovery. All data is estimated.
3. The Matrix Spike Recovery for Arsenic and Selenium had low recovery. All data estimated.
4. The Matrix spike Recovery for Lead was below 30%. All data rejected.
5. The Analytical spike for Lead (1-M002, 3-M002) 8-M002 and 8M202) and Selenium (2-M002, 3-M002, 4-M002, 5-M002, 7-M002 and 8-M202.

PBH 2/27/91

PBH 2/27/92

2.2 Contract-Problems/Non-Compliance

Forms 5, 6 and 9 were in another data package. Samples were not qualified as required

PBH 2/27/92

MS Reviewer: _____ Date: _____
Signature

Contractor Reviewer: Paul B. Hinly Date: 2/27/92
Signature

Verified by: Stephen D. Lapellin Date: 3/2/92

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 211

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 1-M002, 2-M002, 3-M002, 4-M002, 5-M002, 7-M002, 8-M002 and 8-M202

FIELD DUP. #'S: _____ LAB DUP. #'S: Field Blank 6-M002 MATRIX SPIKE #: 6-M002

SERIAL DILUTION SAMPLE NO. 6-M002 COMPLETION DATE: 2/27/92 REVIEWERS INITIALS: PBH

	X		I	IIA				IIB		III				IV		V	VI	VII	IX	
Parameter	Detection Limits UG/L		Field Blank	Calib. Ver. %R				CRDL Std Ver. % R		Calibration Blanks				PBRL EAN	ICP ICS % R		MS Matrix	Lab Dup RPD/Diff	LCS	Ser Dil	Meth
	CRDL	IDL		Init	Continued 1	2	3	Init	Fin	Init	Continued 1	2	3		Init	Fin			% R	% D	
Al	200		NA	~~92~~ PBH																	
Sb	60																				
As	10	2		92	93	95	93	77		U	U	U	U	U			39	21	95		F
Ba	200	16		100	100	98	97			U	U	U	U	U	85	84	94	7	100	100	P
Be	5																				
Cd	5	2		98	98	94	93	117	109	U	U	U	U	U	87	97	90	0	99	100	P
Ca	5000																				
Cr	10	4		98	98	97	97	112	107	U	U	U	U	U	98	97	97	.6	99	7.9	P
Co	50																				
Cu	25	6		98	98	95	95	111	108	U	U	U	U	U	97	96	91	.4	98	7.9	P
Fe	100	46		99	100	98	98			U	U	U	U	U	94	94	260	.5	100	7.3	P
Pb	3	3		105	103	103	109	56		U	U	U	U	U			.8	18	84		F
Mg	5000																				
Mn	15	2		99	98	97	97	97	97	U	U	U	U	U	87	92	92	.9	99	4.6	P
Hg	0.2			102	103	101	101			U	U	U	U	U			97	2.1	95		CV
Ni	40																				
K	5000																				
Se	5	2		100	97	97	95	170		U	U	U	U	U			70	11	83		F
Ag	10	3		98	99	96	96	114	111	U	U	U	U	U	99	98	94		PBH 98	~~5.2~~	P
Na	5000	110		100	100	99	98			U	U	U	U	U				3	101	5.7	P
Tl	10																				
V	50																				
Zn	20	6		101	101	99	98	112	113	U	U	U	U	U	94	94	96	2	103	9.5	P
CN	10																				

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 211

SITE/STUDY DESCRIPTION: _____ SAMPLE NOS: _____

Field Blank _____

FIELD DUP. #'S: _____ LAB DUP. #'S: _____ MATRIX SPIKE #: _____

SERIAL DILUTION SAMPLE NO. _____ COMPLETION DATE: 2/27/92 REVIEWERS INITIALS: PBH

	X		I	IIA				IIB		III				IV		V		VI	VII	IX	
Parameter	Detection Limits UG/L		Field Blank	Calib. Ver. %R				CRDL Std Ver. % R		Calibration Blanks				PBL EAN	ICP ICS % R		MS Matrix	Lab Dup RPD/Diff	LCS	Ser Dil	Meth
	CRDL	IDL		Init	Continued 1	2	3	Init	Fin	Init	Continued 1	2	3		Init	Fin			% R	% D	
Al	200		NA																		
Sb	60																				
As	10	2			93	94					U	U									F
Ba	200	16			97						U										P
Be	5																				
Cd	5	2			95						U										P
Ca	5000																				
Cr	10	4			96						U										P
Co	50																				
Cu	25	6			95						U										P
Fe	100	46			98						U										P
Pb	3	3		101	97	98	101	60		U	U	U	U								F
Mg	5000				97																
Mn	15	2			99						U										P
Hg	0.2										U										CU
Ni	40																				
K	5000																				
Se	5	2			94	96	96	24			U	U	U								F
Ag	10	3			97						U										P
Na	5000	110			98						U										P
Tl	10																				
V	50																				
Zn	20	6			99						U										P
CN	10																				

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited scope) Date: 2/27/92 Case #: NWS

Site: Naval Weapons Station Lab Name: Roy F. Weston

Reviewer's Initials: PBH Number of Samples: 8

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Inter-ferences	Spike Recovery	Duplicates Lab	Duplicates Field	Detection Limits	LCS	Serial Dilution	MSA	Total Analytes	Rejection
ICP														
Flame AA														
Furnace AA		1				1							2	
Mercury														
Total		1				1							2	
Other														

Analytes Flagged as Estimated (J) Due to Exceeding Criteria For:*

ICP														
Flame AA														
Furnace AA		2				2						2	6	
Mercury														
Total		2				2						2	6	
Other														

Note:
Asterisk (*) Indicates additional exceedances of review criteria.

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.7: CLP Data Assessment Checklist
Inorganic Analysis

Date: Feb. 1990
Number: HW-2
Revision: 10

INORGANIC REGIONAL DATA ASSESSMENT

Region II

CASE NO. NWS

SITE Naval Weapons Station

LABORATORY Roy F. Weston

NO. OF SAMPLES/ MATRIX 8 Waters

SDG# CLP 211

REVIEWER (IF NOT ESD) Heartland ESI

SOW# 390

REVIEWER'S NAME Paul B. Humphry

DPO: ACTION _____ FYI _____

COMPLETION DATE 2/27/91

DATA ASSESSMENT SUMMARY

		ICP	AA	Hg	CYANIDE
1.	HOLDING TIMES	O	O	O	NA
2.	CALIBRATIONS		2		
3.	BLANKS		O		
4.	ICS				
5.	LCS				
6.	DUPLICATE ANALYSIS				
7.	MATRIX SPIKE				
8.	MSA				
9.	SERIAL DILUTION				
10.	SAMPLE VERIFICATION				
11.	OTHER QC				
12.	OVERALL ASSESSMENT	O	O	O	O

O = Data has no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS:

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Four (4) water sample and one (1) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
1-M002	911026301
1-M002MS	911026301MS
1-M002D	911026301D
1-M202	911026302
3-M002	911026303
5-M002	911026304

Heartland ESI has reviewed the data for the samples listed above TAL Metals (under the limited scope requirements) using Region II Data Validation Protocol, February 1990 revision. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

TAl Metals reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110263**, the analysis of four (4) field water sample and one (1) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The USEPA CLP analytical protocol was followed as required.

Specific QA/QC deficiency **Findings** are listed numerically in the following categories:

Holding Times

The holding times were met as specified in Region II Protocol.

Calibration

1. The CRDL Standards for Selenium and Lead were below 50%. All positive and non-detect results are rejected if within the concentration range as applied by the Region II Protocol.

Preparation and Field Blanks

No deficiencies in this section.

Interferences

No significant interferences were observed.

Interferences

No significant interferences were observed.

Metals Data Assessment Narrative (continued - Page 2)

Spike Recovery

2. The Matrix Spike recovery for Arsenic was below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

Serial Dilution

3. The Serial Dilution for Chromium was outside the control limit. All positive results are qualified as estimated, "J".

MSA

4. The following analytes exhibited low recovery during the GFAA spiking procedures. All data is qualified as estimated, "J" or "UJ".

Analyte	Samples
Arsenic	1-M002.
Selenium	1-M002 and 1-M202.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	Pb and Se	+/U	R	1
All Water Samples	As	+/U	J/UJ	2
All Water Samples	Cr	+	J	3
1-M002. 1-M002 and 1-M202.	As Se	+/U	J/UJ	4

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

1-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP263

Matrix (soil/water): WATER Lab Sample ID: 911126301

Level (low/med): LOW Date Received: 11/01/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00		WN	F	J2,4
7440-39-3	Barium	28.30	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	61.00			P	J3
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	7520.00			P	
7439-92-1	Lead	~~9.10~~			~~F~~	R1
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	52.60			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~20.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	4980.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	23.50			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

1-M202

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP263

Matrix (soil/water): WATER Lab Sample ID: 911126302

Level (low/med): LOW Date Received: 11/01/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U	N	F	UJ2
7440-39-3	Barium	58.90	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.30	B		P	J3
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	284.00			P	
7439-92-1	Lead	~~2.00~~	~~U~~		~~F~~	R1
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	15.60			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	1050.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	22.30			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP263

Matrix (soil/water): WATER Lab Sample ID: 911126303

Level (low/med): LOW Date Received: 11/01/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	12.80		N	F	J2
7440-39-3	Barium	50.30	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	12.20			P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	536.00			P	J3
7440-48-4	Cobalt				NR	
7440-50-8	Copper	24.00	B		P	
7439-89-6	Iron	70900.00			P	
7439-92-1	Lead	39.70			F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	96.90			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~4.30~~	~~B~~	~~S~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	3920.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	194.00			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

5-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP263

Matrix (soil/water): WATER Lab Sample ID: 911126304

Level (low/med): LOW Date Received: 11/01/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	13.70		N	F	J2
7440-39-3	Barium	95.60	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	20.10			P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	1180.00			P	J3
7440-48-4	Cobalt				NR	
7440-50-8	Copper	80.10			P	
7439-89-6	Iron	129000.00			P	
7439-92-1	Lead	88.00			F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	318.00			P	
7439-97-6	Mercury	.58			CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~4.00~~	~~B~~	~~S~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	4380.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	140.00			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report (CCS) - Present?	[ ]		✓
ACTION: If no, contact RSCC.			
A.1.2 Record of Communication (from RSCC) - Present?	[ ]		✓
ACTION: If no, request from RSCC.			
A.1.3 Trip Report - Present and complete?	[ ]		✓
ACTION: If no, contact RSCC for trip report.			
A.1.4 Sample Traffic Report - Present or on file?	[ ]		✓
Legible?	[ ]		✓
ACTION: If no, request from Regional Sample Control Center (RSCC).			
A.1.5 Cover Page - Present?	[✓]		
Is cover page properly filled in and signed by the lab manager or the manager's designee?	[✓]		
ACTION: If no, prepare Telephone Record Log, and contact laboratory.			
Do numbers of samples correspond to numbers on Record of Communication?	[ ]		✓
Do sample numbers on cover page agree with sample numbers on:			
(a) Traffic Report Sheet?	[ ]		✓
(b) Form I's?	[✓]		
ACTION: If no for any of the above, contact RSCC for clarification.			

	YES	NO	N/A
A.1.6 Form I (Final Data) - Are all Form I's present and complete?	[✓]	__	__
ACTION: If no, prepare telephone record log and contact laboratory for submittal.			
Are correct units (ug/l for waters and mg/kg for soils) indicated on Form I's?	[✓]	__	__
Are soil sample results for each parameter corrected for percent solids?	[__]	__	✓
Are EPA sample # s and corresponding laboratory sample ID # s the same as on the Cover Page, Form I's and in the raw data?	[✓]	__	__
Are computation/transcription errors less than 10% of reported values?	[✓]	__	__
Are all "less than IDL" values properly coded with "U"?	[✓]	__	__
Was a brief physical description of samples given on Form I's?	[✓]	__	__
Were the result qualifiers used correctly with final data?	[✓]	__	__
ACTION: If no for any of the above, prepare Telephone Record Log, and contract laboratory for corrected data.			
Were any samples diluted beyond requirements of contract?	__	[✓]	__
If yes, were dilutions noted on Form I's?	[__]	__	✓
ACTION: If no, note under Contract-Problem/Non-Compliance of the "Data Assessment Narrative".			

A.1.7 Holding Times - (aqueous and soil samples)

(Examine sample traffic reports and digestion/distillation logs.)

Mercury analysis (28 days). . . . . exceeded?	__	[✓]	__
Cyanide distillation (14 days). . . . . exceeded?	__	[__]	✓

	YES	NO	N/A
Other Metals analysis (6 months). . . . exceeded?	___	[✓]	___

NOTE: Prepare a list of all samples and analytes for which holding times have been exceeded. Specify the number of days from date of collection to the date of preparation (from raw data). Attach to checklist.

ACTION: If yes, reject (red-line) values less than Instrument Detection Limit (IDL) and flag as estimated (J) the values above IDL even though sample(s) was preserved properly.

A.1.8 Raw Data

		YES	NO	N/A
A.1.8.1	Digestion Log* for flame AA/ICP (Form XIII) present?	[✓]	___	___
	Digestion Log for furnace AA Form XIII present?	[✓]	___	___
	Distillation Log for mercury Form XIII present?	[✓]	___	___
	Distillation Log for cyanides Form XIII present?	[___]	___	✓
	Are pH values (pH<2 for all metals, pH>12 for cyanide) present?	[✓]	___	___
	*Weights, dilutions and volumes used to obtain values.			
	Percent solids calculation present for soils/sediments?	[___]	___	✓
	Are preparation dates present on Digestion Log?	[✓]	___	___
A.1.8.2	Measurement read out record present? ICP	[✓]	___	___
	Flame AA	[___]	___	✓
	Furnace AA	[✓]	___	___
	Mercury	[✓]	___	✓ PBH 2/27/92
	Cyanides	[___]	___	✓

	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	[✓]	__	__
Legible?	[✓]	__	__
Properly Labeled?	[✓]	__	__

ACTION: If no for any of the above, write Telephone Record Log and contact laboratory. Flag metal data as estimated if pH of sample is greater than 2. Flag cyanide data as estimated if pH sample is less than 12.

A.1.9 Data Validation and Verification

.1.9.1 Calibration

	YES	NO	N/A
A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	[✓]	__	__
Is record of 5 point calibration present for Hg analysis?	[✓]	__	__

ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.1.2 Is record of 4 point calibration present for:			
Flame AA?	[__]	__	✓
Furnace AA?	[✓]	__	__
Cyanides?	[__]	__	✓

NOTE:
1. If less than 4 standards are measured in absorbance mode, then the remaining standards in concentration mode must be run immediately after calibration and be within ±10% of true value.
2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRDL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
ACTION: Flag associated data as estimated if standards are not within ±10% of true values (except CRDL calibration standard). Do not flag the data as estimated in linear range indicated by good recovery of standard.			
A.1.9.1.3 Is correlation *coefficient less than 0.995 for:			
Mercury Analysis?	___	[✓]	___
Cyanide Analysis?	___	[___]	✓
Atomic Absorption Analysis?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.2 Form II A (Initial and Continuing Calibration Verification)-			
A.1.9.2.1 Present and complete for every metal and cyanide?	[✓]	___	___
Present and complete for AA and ICP when both are used for same analyte?	[✓]	___	___
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
A.1.9.2.2 Circle all values on data summary sheet that are outside contract windows. Are all calibration standards (initial and continuing) within control limits?			
Metals 90-110%	[✓]	___	___
Hg - 80-120%	[✓]	___	___
Cyanides 85-115%	[___]	___	✓

* The reviewer will calculate correlation coefficient.

	YES	NO	N/A
ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with %R between 75-89% (65-79% for Hg; 70-84% for CN) or 111-125% (121-135% for Hg; 116-130% for CN) recovery and nearest good calibration standard. Qualify results <IDL as estimated (UJ), if the ICV or CCV %R is 75-89% (CN, 70-84% ; HG, 65-79%). Reject (red-line) as unacceptable data if recovery of the ICV or CCV is outside the range 75-125% (CN, 70-130%; Hg, 65-135%). Qualify five samples on either side of verification standard out of control limits.			
Was continuing calibration performed every 10 samples or every 2 hours?	[✓]	__	__
ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).			
Was ICV for cyanides distilled?	[__]	__	✓
ACTION: If no, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".			

A.1.9.3 Form II B (CRDL Standards for AA and ICP) -

	YES	NO	N/A
A.1.9.3.1 Was a CRDL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?	[✓]	__	__
*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?	[__]	__	✓
Was a 2xCRDL (or 2xIDL when IDL>CRDL) analyzed (CRI) for each ICP run? (Note: CRI for AL,Ba,Ca,Fe,Mg,Na,or K is not required.)	[✓]	__	__

ACTION: If no for any of the above, flag as estimated all data falling within the affected ranges. The affected ranges are:

AA Analysis - **True Value ± CRDL
ICP Analysis - **True Value ± 2CRDL
CN Analysis - **True Value ± 0.5 x True Value.

* Find the results of mid-range standard in the raw data.
**True value of CRA, CRI or mid-range standard. Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/A
A.1.9.3.2	Was CRI analyzed after ICV/ICB and before the final CCV/CCB, and for every four hours of ICP run?	[✓]		

ACTION: If no, write in Contract Problem/Non-Compliance Section of the "Data Assessment Narrative".

A.1.9.3.3 Circle all values on summary sheet that are outside acceptance windows.

Are CRA and CRI standards within control limits: Metals 80 - 120%R?	[ ]		✓	
Is mid-range standard within control limits: Cyanide 80 - 120%R?	[ ]			✓

ACTION: Flag as estimated all data within the affected ranges if the recovery of the standard is between 50-79%; flag only positive data if the recovery is between 121-150%; reject (red line) all data if the recovery is less than 50%; reject only positive data if the recovery is greater than 150%.

A.1.9.4 Form III (Initial and Continuing Calibration Blanks)

A.1.9.4.1	Present and complete?	[✓]		
	For both AA and ICP when both are used for same analyte?	[✓]		
	Was an initial calibration blank analyzed?	[✓]		
	Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	[✓]		

ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/non-compliance section of the Data Assessment Narrative.

		YES	NO	N/A
A.1.9.4.2	Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IDL when IDL > CRDL). Are all calibration blanks (when IDL<CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	[✓]		
	Are all calibration blanks less than two times Instrument Detection Limit (when IDL>CRDL)?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all positive data less than or equal to calibration blank values analyzed between calibration blank with value over CRDL (or 2xIDL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.

A.1.9.5 FORM III (Preparation Blank) -

(Note: The preparation blank for mercury is the same as the calibration blank.)

		YES	NO	N/A
A.1.9.5.1	Was one prep. blank analyzed for: each 20 samples?	[✓]		
	each batch?	[✓]		
	each matrix type?	[✓]		
	both AA and ICP when both are used for same analyte?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all associated positive data <10 x IDLs for which prep. blank was not analyzed.

NOTE: If only one blank was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).

		YES	NO	N/A
A.1.9.5.2	Is concentration of prep. blank greater than CRDL when IDL is less than or equal to CRDL?		[✓]	
	If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?		[✓]	

		YES	NO	N/A
	ACTION: If yes, reject (red-line) all associated data greater than CRDL concentration but less than ten times the prep. blank value found in the raw data.			
A.1.9.5.3	Do concentrations of prep. blank fall below two times IDL when IDL is greater than CRDL?	[✓]		
	ACTION: If no, reject (red-line) all positive data that has a concentration less than 10 times the prep. blank value in the raw data.			
A.1.9.5.4	Is concentration of prep. blank below the negative CRDL?		[✓]	
	ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6	Form IV (ICP Interference Check Sample)			
A.1.9.6.1	Present and complete?	[✓]		
	(NOTE: Not required for furnace AA, flame AA, mercury, cyanide and Ca, Mg, K and Na.)			
	Was ICS analyzed at beginning and end of run (or at least twice every 8 hours)?	[✓]		
	ACTION: If no, flag as estimated (J) all samples for which AL, Ca, Fe, or Mg is higher than in ICS.			
A.1.8.6.2	Circle all values on Data Summary Sheet that are more than + 20% of true or established mean value. Are all Interference Check Sample results inside of control limits (+ 20%)?	[✓]		
	If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	[✓]		
	ACTION: If no, flag as estimated (J) those positive results for which ICS recovery is between 121-150%; flag all sample results as estimated if ICS recovery falls within 50-79%; reject (red-line) those sample results for which ICS recovery is less than 50%; if ICS recovery is above 150%, reject positive results only (not flagged with a "U").			

		YES	NO	N/A
A.1.9.7	Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)- (Note: Not required for Ca, Mg, K, and Na (both matrices), Al, and Fe (soil only.)			
A.1.9.7.1	Present and complete for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each conc. range (i.e. low, med., high)?	[✓]	__	__
	For both AA and ICP when both are used for same analyte?	[✓]	__	__
	ACTION: If no for any of the above, flag as estimated (J) all positive data less than four times spiking level for which spiked sample was not analyzed.			
	NOTE: If one spiked sample was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.9.7.2	Was field blank used for spiked sample?	__	[✓]	__
	ACTION: If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
	NOTE: Matrix spike analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.7.3	Circle all values on Data Summary Sheet that are outside control limits (75% to 125%). Are all recoveries within control limits?	[✗]	✓	__
	If no, is sample concentration greater than or equal to four times spike concentration?	[__]	✓	__
	ACTION: If yes, disregard spike recoveries for analytes whose concentrations are greater than or equal to four times spike added. If no, circle those analytes on Form V for which sample concentration is less than four times the spike concentration.			

PBH 2/27/92

	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	[✓]	[ ]	[ ]

ACTION: If no, write in the Contract - Problem/Non - Compliance section of "Data Assessment Narrative".

A.1.9.7.4 Aqueous

Are any spike recoveries:

	YES	NO	N/A
(a) less than 30%?	[ ]	[✓]	[ ]
(b) between 30-74%?	[✓]	[ ]	[ ]
(c) between 126-150%?	[ ]	[✓]	[ ]
(d) greater than 150%?	[ ]	[✓]	[ ]

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 126-150%, flag as estimated (J) all associated aqueous data not flagged with a "U"; if greater than 150%, reject (red-line) all associated aqueous data not flagged with a "U".

NOTE: If pre-digestion spike result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, disregard spike recovery on Form V. Flag the associated data as estimated(J).

A.1.9.7.5 Soil/Sediment

Are any spike recoveries:

	YES	NO	N/A
(a) less than 10%?	[ ]	[ ]	[✓]
(b) between 10-74%?	[ ]	[ ]	[✓]
(c) between 126-200%?	[ ]	[ ]	[✓]
(d) greater than 200%?	[ ]	[ ]	[✓]

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 126-200%, flag as estimated all associated data was not flagged with a "U"; if greater than 200%, reject all associated data not flagged with a "U".

		YES	NO	N/A
A.1.9.8	Form VI (Lab Duplicates)			
A.1.9.8.1	Present and complete for: each 20 samples?	[✓]	___	___
	each matrix type?	[✓]	___	___
	each concentration range (i.e. low, med., high)?	[✓]	___	___
	both AA and ICP when both are used for same analyte?	[✓]	___	___

ACTION: If no for any the above, flag as estimated (J) all data >CRDL* for which duplicate sample was not analyzed.

Note: 1. If one duplicate sample was analyzed for more than 20 samples, then first 20 samples do not have to be flagged as estimated.
2. If percent solids for soil sample and its duplicate differ by more than 1%, prepare a Form VI for each duplicate pair, report concentrations in µg/L on wet weight basis and calculate RPD or Difference for each analyte.

A.1.9.8.2	Was field blank used for duplicate analysis?	___	[✓]	___

ACTION: If yes, flag all data >CRDL* as estimated (J) for which field blank was used as duplicate.

NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.

A.1.9.8.3	Are all values within control limits (RPD 20% or difference < ±CRDL)?	[✓]	___	___
	If no, are all results outside the control limits flagged with an * on Form I's and VI?	[✓]	___	___

ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".

NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than IDL.

* Substitute IDL for CRDL when IDL > CRDL.

	YES	NO	N/A
2. If lab duplicate result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, do not apply precision criteria.			
A.1.9.8.4 Is any value for sample duplicate pair less than CRDL* and other value greater than or equal to 10 x *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5 Aqueous Circle all values on Data Summary Sheet that are: RPD > 50%, or Difference > ± CRDL*			
Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	___	[✓]	___
Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.8.6 Soil/Sediment Circle all values on Data Summary Sheet that are: RPD > 100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than or equal to 5 times *CRDL) : > 100%?	___	[___]	✓
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) : > 2x*CRDL?	___	[___]	✓

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

		YES	NO	N/A
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9	Field Duplicates			
A.1.9.9.1	Were field duplicates analyzed?	[___]	_ _	✓
	ACTION: If yes, prepare a Form VI for each aqueous field duplicate pair. Prepare a Form VI for each soil duplicate pair, if percent solids for sample and its duplicate differ by more than 1%; report concentrations of soils in ug/l on wet weight basis and calculate RPDs or Difference for each analyte.			
	NOTE: 1. Do not calculate RPD when both values are less than IDL. 2. Flag all associated data only for field duplicate pair.			
A.1.9.9.2	Is any value for sample duplicate pair less than *CRDL and other value greater than or equal to 10 x *CRDL?	___	[_ _]	✓
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9.3	Aqueous			
	Circle all values on Form VI for field duplicates that are: RPD > 50%, or Difference > ± CRDL*			
	Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	___	[_ _]	✓
	Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[_ _]	✓
	ACTION: If yes, flag the associated data as estimated.			

* Substitute IDL for CRDL when IDL > CRDL.

** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.9.4 Soil/Sediment			
Circle all values on Form VI for field duplicates that are: RPD >100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than 5 times *CRDL) : >100%?	___	[ ]	✓
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x *CRDL): >2x *CRDL?	___	[ ]	✓

ACTION: If yes, flag the associated data as estimated.

A.1.9.10 Form VII (Laboratory Control Sample) (Note: LCS - not required for aqueous Hg and cyanide analyses.)

A.1.9.10.1 Was one LCS prepared and analyzed for: every 20 water samples?	[✓]	___	___
every 20 solid samples?	[___]	___	✓
both AA and ICP when both are used for same analyte?	[✓]	___	___

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory for submittal of results of LCS. Flag as estimated (J) all data for which LCS was not analyzed.

NOTE: If only one LCS was analyzed for more than 20 samples, then first 20 samples close to LCS do not have to be flagged as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

**Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.10.2 Aqueous LCS			
Circle all LCS values outside control limits (80 - 120%- except aqueous Ag and Sb).			
Is any LCS recovery: less than 50%?	___	[✓]	___
between 50% and 79%?	___	[✓]	___
between 121% and 150%?	___	[✓]	___
greater than 150%?	___	[✓]	___

ACTION: Less than 50%, reject (red-line) all data; between 50% and 79%, flag all associated data as estimated (J); between 121% and 150%, flag all positive (not flagged with a "U") results as estimated; greater than 150%, reject all positive results.

A.1.9.10.3 Solid LCS

NOTE: 1. If "Found" value of LCS is rejectable due to duplicate injections or analytical spike recovery criteria, regardless of LCS recovery, flag the associated data as estimated (J).
2. If IDL of an analyte is equal to or greater than true value of LCS, disregard the "Action" below even though LCS is out of control limits.

Is LCS "Found" value higher than the control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated positive data as estimated.

Is LCS "Found" value lower than the Control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated data as estimated.

		YES	NO	N/A
A.1.9.11	Form IX (ICP Serial Dilution) -			
	NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IDL.			
A.1.9.11.1	Was Serial Dilution analysis performed for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each concentration range (i.e. low, med.)?	[✓]	__	__
	ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIDLs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DPO report.			
A.1.9.11.2	Was field blank(s) used for Serial Dilution Analysis?	__	[✓]	__
	ACTION: If yes, flag all associated data ≥ 10 x IDL as estimated (J).			
	NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.11.3	Are results outside control limit flagged with an "E" on Form I's and Form IX when initial concentration on Form IX is equal to 50 times IDL or greater.	[✓]	__	__
	ACTION: If no, write in the contract-problem/non-compliance section of the "Data Assessment Narrative".			
A.1.9.11.4	Circle all values on Data Summary Sheet that are outside control limit for initial concentrations equal to or greater than 10 x IDLs only. Are any % difference values: > 10%?	✓	[__]	__
	≥ 100%?	__	[✓]	__

	YES	NO	N/A
ACTION: Flag as estimated (J) all associated equal to or greater than 10xIDLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xIDLs for which PD is greater than or equal to 100%.			
A.1.9.12 Furnace Atomic Absorbtion (AA) QC Analysis			
A.1.9.12.1 Are duplicate injections present in furnace raw data (except during full Method of Standard Addition) for each sample analyzed by GFAA?	[✓]	__	__
ACTION: If no, reject the data on Form I's for which duplicate injections were not performed.			
A.1.9.12.2 Do the duplicate injection readings agree within 20% Relative Standard Deviation (RSD) or Coefficient of Variation (CV) for concentration greater than CRDL?	[✓]	__	__
Was a dilution analyzed for sample with post digestion spike recovery less than 40%?	[✓]	__	__
ACTION: If no for any of the above, flag all the associated data as estimated (J).			
A.1.9.12.3 Is *post digestion spike recovery less than 10% or greater than 150% for any result?	__	[✓]	__
ACTION: If yes, reject (red-line) the affected data if recovery is <10%; reject data not flagged with "U" if spike recovery is >150%.			
NOTE: Reject the data only if the affected sample was not subsequently analyzed by Method of Standard Addition.			

* Post digestion spike is not required on the pre-digestion spiked sample when predigestion spike recovery is within control limits of 75-125% or when SR>4xSA.

		YES	NO	N/A
A.1.9.13	Form VIII (Method of Standard Addition Results)			
A.1.9.13.1	Present?	[✓]		
	If no, is any Form I result coded with "S" or a "+"?		[✓]	
	ACTION: If yes, write request on Telephone Record Log and contact laboratory for submittal of Form VIII.			
A.1.9.13.2	Is coefficient of correlation for MSA less than 0.990 for any sample?		[✓]	
	ACTION: If yes, reject (red-line) affected data.			
A.1.9.13.3	Was *MSA required for any sample but not performed?		[✓]	
	Is coefficient of correlation for MSA less than 0.995?		[✓]	
	Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?		[✓]	
	ACTION: If yes for any of the above, flag all the associated data as estimated (J).			
A.1.9.13.4	Was proper quantitation procedure followed correctly as outlined in the SOW on page E-16 through E-17?	[✓]		
	ACTION: If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14	Dissolved/Total or Inorganic/Total Analytes -			
A.1.9.14.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)..		[✓]	
	Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?		[✓]	

* MSA is not required on LCS and prep. blank.

	YES	NO	N/A

NOTE: 1. If yes, prepare a list comparing differences between all dissolved (or inorganic) and total analytes. Compute the differences as a percent of the total analyte only when dissolved concentration is greater than CRDL as well as total concentration.
2. Apply the following questions only if inorganic (or dissolved) results are (i) above CRDL, and (ii) greater than total constituents.
3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.

A.1.9.14.2 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 10%? ___ [✓] ___

A.1.9.14.3 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%? ___ [✓] ___

ACTION: If more than 10%, flag both dissolved (or inorganic) and total values as estimated (J); if more than 50%, reject (red-line) the data for both values.

A.1.9.15 Form I to IX

A.1.9.15.1 Are all the Form I through Form IX labeled with:

	YES	NO	N/A
Laboratory name?	[✓]	___	___
Case/SAS number?	[✓]	___	___
EPA sample No.?	[✓]	___	___
SDG No.?	[✓]	___	___
Contract No.?	[✓]	___	___
Correct units?	[✓]	___	___
Matrix?	[✓]	___	___

ACTION: If no for any of the above, note under contract problem/non-compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.15.2 Do any computation/transcription errors exceed 10% of reported values on Forms I-IX for:			
(NOTE: Check all forms against raw data.)			
(a) all analytes analyzed by ICP?	___	[✓]	___
(b) all analytes analyzed by GFAA?	___	[✓]	___
(c) all analytes analyzed by AA Flame?	___	[ ]	✓
(d) Mercury?	___	[✓]	___
(e) Cyanide?	___	[ ]	✓

ACTION: If yes, prepare Telephone Log, contact laboratory for corrected data and correct errors with red pencil and initial.

A.1.9.16 Form I (Field Blank) -

Circle all field blank values on Data Summary Sheet that are greater than CRDL, 2 x IDL when IDL > CRDL.

Do concentrations of field blank(s) fall below CRDL (or 2 x IDL when IDL > CRDL) for all parameters of associated aqueous and soil samples?	[___]	___	✓
If no, was field blank value already rejected due to other QC criteria?	[___]	___	✓

ACTION: If no, reject (except field blank results) all associated positive sample data less than or equal to five times the field blank value.

	YES	NO	N/A
A.1.9.17 Form X, XI, XII (Verification of Instrumental Parameters).			
A.1.9.17.1 Is verification report present for:			
Instrument Detection Limits (quarterly)?	[✓]		
ICP Interelement Correction Factors (annually)?	[✓]		
ICP Linear Ranges (quarterly)?	[✓]		
ACTION: If no, contact DPO of the lab.			
A.1.9.17.2 Form X (Instrument Detection Limits) - (Note: IDL is not required for Cyanide.)			
Are IDLs present for: all the analytes?	[✓]		
all the instruments used?	[✓]		
For both AA and ICP when both are used for same analyte?	[✓]		
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
Is IDL greater than CRDL for any analyte?		[✓]	
If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?	[✓]		
ACTION: If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.			

	YES	NO	N/A
A.1.9.17.3 Form XI (Linear Ranges)			
Was any sample result higher than high linear range of ICP.	___	[✓]	___
Was any sample result higher than the highest calibration standard for non-ICP parameters?	___	[✓]	___
If yes for any of the above, was the sample diluted to obtain the result on Form I?	[✓]	___	___
ACTION: If no, flag the result reported on Form I as estimated(J).			
A.1.9.18 Percent Solids of Sediments			
Is soil content in sediment(s) less than 50%?	___	[___]	✓
ACTION: If yes, qualify as estimated all data not previously rejected or flagged due to other QC criteria.			

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Feb. 1990
Number: HW-2
Revision: 10

Case#	NWS	Site	Naval Weapons Station	Matrix: Soil	
SDG#	CLP 263	Lab	Roy F. Weston	Water	4
Contractor	Roy F. Weston	Reviewer	Paul B. Humby	Other	

A.2.1 The case description and exceptions, if any, are noted below with reason(s) for rejection or qualification as estimated value(s) J.

1. All Selenium and Lead results are rejected for Low recovery of CRDL.
2. Matrix Spike Recovery for Arsenic is low. All data estimated.
3. Serial dilution out for Chromium. All positive results are estimated.
4. Post-digestion analytical spike for Arsenic (1-M002) and Selenium (1-M002 and 1M202) are qualified as estimated.

PBH 2/27/91

PBH 2/27/92

2.2 Contract-Problems/Non-Compliance

PBH 2/27/92

M&S Reviewer: _____ Date: _____
Signature

Contractor Reviewer: Paul B. Hively Date: 2/27/92
Signature

Verified By: Matthew D. Scayellin Date: 3/2/92

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 263

SITE/STUDY DESCRIPTION: Naval Weapon Station SAMPLE NOS: 1-M002, 1-M201, 3-M002 and 5-M002

FIELD DUP. #'S: _____ Field Blank _____ LAB DUP. #'S: 1-M002 MATRIX SPIKE #: 1-M002

SERIAL DILUTION SAMPLE NO. 1-M002 COMPLETION DATE: 2/27/92 REVIEWERS INITIALS: PBH

Parameter	X Detection Limits UG/L CRDL	IDL	I Field Blank	IIA Calib. Ver. %R Init	Continued 1	2	3	IIB CRDL Std Ver. % R Init	Fin	III Calibration Blanks Init	Continued 1	2	3	PBL PREP	PBL ANN	IV ICP ICS % R Init	Fin	V MS Spik	VI Lab Dup RPD/Diff	VII LCS % R	IX Ser Dil % D	Meth
Al	200		NA																			
Sb	60																					
As	10	2		98	98	93	93	81		U	U	U	U	U		PBH ~~81~~		72	200	95		F
Ba	200	16		102	100	99	103			U	U	U	U	U		85	84	98	2.5	101	100	P
Be	5																					
Cd	5	2		104	106	103	107	101	105	U	U	U	U	U		95	96	103	.6	104		P
Ca	5000																					
Cr	10	4		99	97	98	100	105	107	U	U	U	U	U		96	97	98	1.5	94	10.7	P
Co	50																					
Cu	25	6		103	102	100	104	104	112	U	U	U	U	U		98	97	95	16.2	95		P
Fe	100	46		101	99	100	103			U	U	U	U	U		93	93	136	1.5	97	3.4	P
Pb	3	3		102	97	105	101	27		U	U	U	U	U				86	12.2	110		F
Mg	5000																					
Mn	15	2		100	98	98	101	97	98	U	U	U	U	U		87	83	97	1.4	95	3.0	P
Hg	0.2			103	104	105	103			U	U	U	U	U				90	51	96		CV
Ni	40																					
K	5000																					
Se	5	2		103	102	97	97	0	U	U	U	U	U	U				83		94		F
Ag	10	3		104	102	101	103	109	115	U	U	U	U	U		98	97	93		99		P
Na	5000	110		107	107	108	104			U	U	U	U	U						102	1.6	P
Tl	10																					
V	50																					
Zn	20	6	U	100	100	99	104	106	115	U	U	U	U	U		92	94	99	1.4	98	100	P
CN	10																					

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. CLP263 SOW NO. 390 SAMPLE TYPE/SDG: CLP 263

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS:

Field Blank

FIELD DUP. #'S: LAB DUP. #'S: MATRIX SPIKE #:

SERIAL DILUTION SAMPLE NO. COMPLETION DATE: 2/27/92 REVIEWERS INITIALS: PBH

Parameter	X Detection Limits UG/L CRDL	IDL	I Field Blank	IIA Calib. Ver. %R Init	Continued 1	2	3	IIB CRDL Std Ver. % R Init	Fin	III Calibration Blanks Init	Continued 1	2	3	PBL PBN	IV ICP ICS % R Init	Fin	V MS Matrix	Lab Dup RPD Diff	VI LCS % R	VII Ser Dil % D	IX Meth
Al	200		NA																		
Sb	60																				
As	10	2			92	94	102				U	U	U								F
Ba	200	16			101						U										P
Be	5																				
Cd	5	2			104						U										P
Ca	5000																				
[illegible]	10	4			100						U										P
Co	50																				
Cu	25	6			104						U										P
Fe	100	46			102						48.2										P
Pb	3	2		107	105	107		73		U	U	U	U								F
Mg	5000																				
Mn	15	2		100	100			~~100~~	PBH		U										P
Hg	0.2			105	106	106		105	~~106~~	U 106	U	U	U								CV
Ni	40																				
K	5000																				
Se	5	2		99	93	102		158	252		U	U	U								F
Ag	10	3			104						U										P
Na	5000	110			104						178										P
[illegible]	10																				
V	50																				
Zn	20	6			105						U										P
CN	10																				

000035

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited scope) Date: 2/22/90 Case #: NMUS

Site: Naval Weapons Station Lab Name: Roy F. Weston

Reviewer's Initials: PBH Number of Samples: 4

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Inter-ferences	Spike Recovery	Duplicates Lab	Duplicates Field	Detection Limits	LCS	Serial Dilution	MSA	Total Analytes	Rejection
ICP														
Flame AA														
Furnace AA		2											2	
Mercury														
Total		2											2	
Other														

Analytes Flagged as Estimated (J) Due to Exceeding Criteria For:*

ICP											1		1	
Flame AA														
Furnace AA		~~1~~ PBH				1						2	3	
Mercury														
Total						1					1	2	4	
Other														

Note:
Asterisk (*) Indicates additional exceedances of review criteria.

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.7: CLP Data Assessment Checklist
Inorganic Analysis

Date: Feb. 1990
Number: HW-2
Revision: 10

INORGANIC REGIONAL DATA ASSESSMENT

Region II

CASE NO. NWS

SITE Naval Weapons Station

LABORATORY Roy F. Weston

NO. OF SAMPLES/ MATRIX 4 waters

SDG# CLP 263

REVIEWER (IF NOT ESD) Heartland ESI

SOW# 390

REVIEWER'S NAME Paul B. Hunbury

DPO: ACTION _____ FYI _____

COMPLETION DATE 2/27/92

DATA ASSESSMENT SUMMARY

		ICP	AA	Hg	CYANIDE
1.	HOLDING TIMES	O	O	O	NA
2.	CALIBRATIONS		Z		
3.	BLANKS		O		
4.	ICS				
5.	LCS				
6.	DUPLICATE ANALYSIS				
7.	MATRIX SPIKE				
8.	MSA				
9.	SERIAL DILUTION				
10.	SAMPLE VERIFICATION				
11.	OTHER QC				
12.	OVERALL ASSESSMENT				

O = Data has no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS:

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Two (2) water sample and no (0) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
2-M002	911127901
6-M002	911127902

Heartland ESI has reviewed the data for the samples listed above TAL Metals (under the limited scope requirements) using Region II Data Validation Protocol, February 1990 revision. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

TAl Metals reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110279**, the analysis of two (2) field water sample and no (0) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The USEPA CLP analytical protocol was followed as required with the exception that the laboratory failed to submit Forms 5,6 and 9. The QC data for this package can be found in SDG #263.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in Region II Protocol.

Calibration

1. The CRDL Standards for Selenium and Lead were below 50%. All positive and non-detect results are rejected if within the concentration range as applied by the Region II Protocol.

Preparation and Field Blanks

No deficiencies in this section.

Interferences

No significant interferences were observed.

Interferences

No significant interferences were observed.

Metals Data Assessment Narrative (continued - Page 2)

Spike Recovery

2. The Matrix Spike recovery for Arsenic was below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

Serial Dilution

3. The Serial Dilution for Chromium was outside the control limit. All positive results are qualified as estimated, "J".

MSA

4. The following analytes exhibited low recovery during the GFAA spiking procedures. All data is qualified as estimated, "J" or "UJ".

Analyte	Samples
Arsenic	2-M002.
Selenium	2-M002 and 6-M002.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	Pb and Se	+/U	R	1
All Water Samples	As	+/U	J/UJ	2
All Water Samples	Cr	+	J	3
2-M002. 2-M002 and 6-M002.	As Se	+/U	J/UJ	4

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

2-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP279

Matrix (soil/water): WATER Lab Sample ID: 911127901

Level (low/med): LOW Date Received: 11/04/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.30	B	W	F	J2,4
7440-39-3	Barium	35.50	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.30	B		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	139.00			P	J3
7440-48-4	Cobalt				NR	
7440-50-8	Copper	12.30	B		P	
7439-89-6	Iron	26700.00			P	
7439-92-1	Lead	11.20		S	F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	29.50			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	2310.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440=66-6	Zinc	94.00			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

6-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP279

Matrix (soil/water): WATER Lab Sample ID: 911127902

Level (low/med): LOW Date Received: 11/04/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	80.80		S	F	J2
7440-39-3	Barium	237.00			P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	48.20			P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	4540.00			P	J3
7440-48-4	Cobalt				NR	
7440-50-8	Copper	140.00			P	
7439-89-6	Iron	534000.00			P	
7439-92-1	Lead	282.00		S	F	
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	1170.00			P	
7439-97-6	Mercury	.45			CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~20.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	2550.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	1190.00			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)

Date: Feb. 1990
Number: HW-2
Revision: 10

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report (CCS) - Present?	[ ]		✓
ACTION: If no, contact RSCC.			
A.1.2 Record of Communication (from RSCC) - Present?	[ ]		✓
ACTION: If no, request from RSCC.			
A.1.3 Trip Report - Present and complete?	[ ]		✓
ACTION: If no, contact RSCC for trip report.			
A.1.4 Sample Traffic Report - Present or on file?	[ ]		✓
Legible?	[ ]		✓
ACTION: If no, request from Regional Sample Control Center (RSCC).			
A.1.5 Cover Page - Present?	[✓]		
Is cover page properly filled in and signed by the lab manager or the manager's designee?	[✓]		
ACTION: If no, prepare Telephone Record Log, and contact laboratory.			
Do numbers of samples correspond to numbers on Record of Communication?	[ ]		✓
Do sample numbers on cover page agree with sample numbers on:			
(a) Traffic Report Sheet?	[ ]		✓
(b) Form I's?	[✓]		
ACTION: If no for any of the above, contact RSCC for clarification.			

	YES	NO	N/A
A.1.6 Form I (Final Data) - Are all Form I's present and complete?	[✓]	__	__
ACTION: If no, prepare telephone record log and contact laboratory for submittal.			
Are correct units (ug/l for waters and mg/kg for soils) indicated on Form I's?	[✓]	__	__
Are soil sample results for each parameter corrected for percent solids?	[__]	__	✓
Are EPA sample # s and corresponding laboratory sample ID # s the same as on the Cover Page, Form I's and in the raw data?	[✓]	__	__
Are computation/transcription errors less than 10% of reported values?	[✓]	__	__
Are all "less than IDL" values properly coded with "U"?	[✓]	__	__
Was a brief physical description of samples given on Form I's?	[✓]	__	__
Were the result qualifiers used correctly with final data?	[✓]	__	__
ACTION: If no for any of the above, prepare Telephone Record Log, and contract laboratory for corrected data.			
Were any samples diluted beyond requirements of contract?	__	[✓]	__
If yes, were dilutions noted on Form I's?	[✓]	__	__
ACTION: If no, note under Contract-Problem/Non-Compliance of the "Data Assessment Narrative".			

A.1.7 Holding Times - (aqueous and soil samples)

(Examine sample traffic reports and digestion/distillation logs.)

Mercury analysis (28 days). . . . . exceeded?	__	[✓]	__
Cyanide distillation (14 days). . . . . exceeded?	__	[__]	✓

	YES	NO	N/A
Other Metals analysis (6 months). . . . exceeded?	___	[✓]	___

NOTE: Prepare a list of all samples and analytes for which holding times have been exceeded. Specify the number of days from date of collection to the date of preparation (from raw data). Attach to checklist.

ACTION: If yes, reject (red-line) values less than Instrument Detection Limit (IDL) and flag as estimated (J) the values above IDL even though sample(s) was preserved properly.

A.1.8 Raw Data

		YES	NO	N/A
A.1.8.1	Digestion Log* for flame AA/ICP (Form XIII) present?	[✓]	___	___
	Digestion Log for furnace AA Form XIII present?	[✓]	___	___
	Distillation Log for mercury Form XIII present?	[✓]	___	___
	Distillation Log for cyanides Form XIII present?	[___]	___	✓
	Are pH values (pH<2 for all metals, pH>12 for cyanide) present?	[✓]	___	___
	*Weights, dilutions and volumes used to obtain values.			
	Percent solids calculation present for soils/sediments?	[___]	___	✓
	Are preparation dates present on Digestion Log?	[✓]	___	___
A.1.8.2	Measurement read out record present? ICP	[✓]	___	___
	Flame AA	[___]	___	✓
	Furnace AA	[✓]	___	___
	Mercury	[✓]	___	___
	Cyanides	[___]	___	✓

	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	[✓]	__	__
Legible?	[✓]	__	__
Properly Labeled?	[✓]	__	__

ACTION: If no for any of the above, write Telephone Record Log and contact laboratory. Flag metal data as estimated if pH of sample is greater than 2. Flag cyanide data as estimated if pH sample is less than 12.

A.1.9 Data Validation and Verification

1.9.1 Calibration

	YES	NO	N/A
A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	[✓]	__	__
Is record of 5 point calibration present for Hg analysis?	[✓]	__	__

ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.1.2 Is record of 4 point calibration present for:			
Flame AA?	[__]	__	✓
Furnace AA?	[✓]	__	__
Cyanides?	[__]	__	✓

NOTE: 1. If less than 4 standards are measured in absorbance mode, then the remaining standards in concentration mode must be run immediately after calibration and be within ±10% of true value.
2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRDL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
ACTION: Flag associated data as estimated if standards are not within ±10% of true values (except CRQL calibration standard). Do not flag the data as estimated in linear range indicated by good recovery of standard.			
A.1.9.1.3 Is correlation *coefficient less than 0.995 for:			
Mercury Analysis?	___	[✓]	___
Cyanide Analysis?	___	[ ]	✓
Atomic Absorption Analysis?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.2 Form II A (Initial and Continuing Calibration Verification)-			
A.1.9.2.1 Present and complete for every metal and cyanide?	[✓]	___	___
Present and complete for AA and ICP when both are used for same analyte?	[✓]	___	___
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
A.1.9.2.2 Circle all values on data summary sheet that are outside contract windows. Are all calibration standards (initial and continuing) within control limits?			
Metals 90-110%	[✓]	___	___
Hg - 80-120%	[✓]	___	___
Cyanides 85-115%	[___]	___	✓

* The reviewer will calculate correlation coefficient.

	YES	NO	N/A
ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with %R between 75-89% (65-79% for Hg; 70-84% for CN) or 111-125% (121-135% for Hg; 116-130% for CN) recovery and nearest good calibration standard. Qualify results <IDL as estimated (UJ), if the ICV or CCV %R is 75-89% (CN, 70-84% ; HG, 65-79%). Reject (red-line) as unacceptable data if recovery of the ICV or CCV is outside the range 75-125% (CN, 70-130%; Hg, 65-135%). Qualify five samples on either side of verification standard out of control limits.			
Was continuing calibration performed every 10 samples or every 2 hours?	[✓]	__	__
ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).			
Was ICV for cyanides distilled?	[__]	__	✓
ACTION: If no, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".			

A.1.9.3 Form II B (CRDL Standards for AA and ICP) -

	YES	NO	N/A
A.1.9.3.1 Was a CRDL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?	[✓]	__	__
*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?	[__]	__	✓
Was a 2xCRDL (or 2xIDL when IDL>CRDL) analyzed (CRI) for each ICP run? (Note: CRI for AL,Ba,Ca,Fe,Mg,Na,or K is not required.)	[✓]	__	__

ACTION: If no for any of the above, flag as estimated all data falling within the affected ranges. The affected ranges are:

AA Analysis - **True Value ± CRDL
ICP Analysis - **True Value ± 2CRDL
CN Analysis - **True Value ± 0.5 x True Value.

* Find the results of mid-range standard in the raw data.
**True value of CRA, CRI or mid-range standard. Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/A
A.1.9.3.2	Was CRI analyzed after ICV/ICB and before the final CCV/CCB, and for every four hours of ICP run?	[✓]		

ACTION: If no, write in Contract Problem/Non-Compliance Section of the "Data Assessment Narrative".

A.1.9.3.3 Circle all values on summary sheet that are outside acceptance windows.

Are CRA and CRI standards within control limits: Metals 80 - 120%R?	[ ]		✓	
Is mid-range standard within control limits: Cyanide 80 - 120%R?	[ ]			✓

ACTION: Flag as estimated all data within the affected ranges if the recovery of the standard is between 50-79%; flag only positive data if the recovery is between 121-150%; reject (red line) all data if the recovery is less than 50%; reject only positive data if the recovery is greater than 150%.

A.1.9.4 Form III (Initial and Continuing Calibration Blanks)

A.1.9.4.1	Present and complete?	[✓]		
	For both AA and ICP when both are used for same analyte?	[✓]		
	Was an initial calibration blank analyzed?	[✓]		
	Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	[✓]		

ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/non-compliance section of the Data Assessment Narrative.

		YES	NO	N/A
A.1.9.4.2	Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IDL when IDL > CRDL). Are all calibration blanks (when IDL<CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	[✓]		
	Are all calibration blanks less than two times Instrument Detection Limit (when IDL>CRDL)?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all positive data less than or equal to calibration blank values analyzed between calibration blank with value over CRDL (or 2xIDL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.

A.1.9.5 FORM III (Preparation Blank) -

(Note: The preparation blank for mercury is the same as the calibration blank.)

A.1.9.5.1	Was one prep. blank analyzed for: each 20 samples?	[✓]		
	each batch?	[✓]		
	each matrix type?	[✓]		
	both AA and ICP when both are used for same analyte?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all associated positive data <10 x IDLs for which prep. blank was not analyzed.

NOTE: If only one blank was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).

A.1.9.5.2	Is concentration of prep. blank greater than CRDL when IDL is less than or equal to CRDL?		[✓]	
	If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?		[✓]	

		YES	NO	N/A
	ACTION: If yes, reject (red-line) all associated data greater than CRDL concentration but less than ten times the prep. blank value found in the raw data.			
A.1.9.5.3	Do concentrations of prep. blank fall below two times IDL when IDL is greater than CRDL?	[✓]		
	ACTION: If no, reject (red-line) all positive data that has a concentration less than 10 times the prep. blank value in the raw data.			
A.1.9.5.4	Is concentration of prep. blank below the negative CRDL?		[✓]	
	ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6	Form IV (ICP Interference Check Sample)			
A.1.9.6.1	Present and complete?	[✓]		
	(NOTE: Not required for furnace AA, flame AA, mercury, cyanide and Ca, Mg, K and Na.)			
	Was ICS analyzed at beginning and end of run (or at least twice every 8 hours)?	[✓]		
	ACTION: If no, flag as estimated (J) all samples for which AL, Ca, Fe, or Mg is higher than in ICS.			
A.1.8.6.2	Circle all values on Data Summary Sheet that are more than + 20% of true or established mean value. Are all Interference Check Sample results inside of control limits (+ 20%)?	[✓]		
	If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	[✓]		
	ACTION: If no, flag as estimated (J) those positive results for which ICS recovery is between 121-150%; flag all sample results as estimated if ICS recovery falls within 50-79%; reject (red-line) those sample results for which ICS recovery is less than 50%; if ICS recovery is above 150%, reject positive results only (not flagged with a "U").			

		YES	NO	N/A
A.1.9.7	Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)- (Note: Not required for Ca, Mg, K, and Na (both matrices), Al, and Fe (soil only.)			
A.1.9.7.1	Present and complete for: each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each conc. range (i.e. low, med., high)?	[✓]	__	__
	For both AA and ICP when both are used for same analyte?	[✓]	__	__
	ACTION: If no for any of the above, flag as estimated (J) all positive data less than four times spiking level for which spiked sample was not analyzed.			
	NOTE: If one spiked sample was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.9.7.2	Was field blank used for spiked sample?	__	[✓]	__
	ACTION: If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
	NOTE: Matrix spike analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.7.3	Circle all values on Data Summary Sheet that are outside control limits (75% to 125%). Are all recoveries within control limits?	[__]	✓	__
	If no, is sample concentration greater than or equal to four times spike concentration?	[__]	✓	__
	ACTION: If yes, disregard spike recoveries for analytes whose concentrations are greater than or equal to four times spike added. If no, circle those analytes on Form V for which sample concentration is less than four times the spike concentration.			

	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	[✓]	__	__

ACTION: If no, write in the Contract - Problem/Non - Compliance section of "Data Assessment Narrative".

A.1.9.7.4 Aqueous

Are any spike recoveries:

	YES	NO	N/A
(a) less than 30%?	__	[✓]	__
(b) between 30-74%?	✓	[__]	__
(c) between 126-150%?	__	[✓]	__
(d) greater than 150%?	__	[✓]	__

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 126-150%, flag as estimated (J) all associated aqueous data not flagged with a "U"; if greater than 150%, reject (red-line) all associated aqueous data not flagged with a "U".

NOTE: If pre-digestion spike result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, disregard spike recovery on Form V. Flag the associated data as estimated(J).

A.1.9.7.5 Soil/Sediment

Are any spike recoveries:

	YES	NO	N/A
(a) less than 10%?	__	[__]	✓
(b) between 10-74%?	__	[__]	✓
(c) between 126-200%?	__	[__]	✓
(d) greater than 200%?	__	[__]	✓

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 126-200%, flag as estimated all associated data was not flagged with a "U"; if greater than 200%, reject all associated data not flagged with a "U".

		YES	NO	N/A
A.1.9.8	Form VI (Lab Duplicates)			
A.1.9.8.1	Present and complete for: each 20 samples?	[✓]	___	___
	each matrix type?	[✓]	___	___
	each concentration range (i.e. low, med., high)?	[✓]	___	___
	both AA and ICP when both are used for same analyte?	[✓]	___	___

ACTION: If no for any the above, flag as estimated (J) all data >CRDL* for which duplicate sample was not analyzed.

Note: 1. If one duplicate sample was analyzed for more than 20 samples, then first 20 samples do not have to be flagged as estimated.
2. If percent solids for soil sample and its duplicate differ by more than 1%, prepare a Form VI for each duplicate pair, report concentrations in Hg/L on wet weight basis and calculate RPD or Difference for each analyte.

A.1.9.8.2	Was field blank used for duplicate analysis?	___	[✓]	___

ACTION: If yes, flag all data >CRDL* as estimated (J) for which field blank was used as duplicate.

NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.

A.1.9.8.3	Are all values within control limits (RPD 20% or difference < ±CRDL)?	[✓]	___	___
	If no, are all results outside the control limits flagged with an * on Form I's and VI?	[✓]	___	___

ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".

NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than IDL.

* Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/A
	2. If lab duplicate result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, do not apply precision criteria.			
A.1.9.8.4	Is any value for sample duplicate pair less than CRDL* and other value greater than or equal to 10 x *CRDL?	___	[✓]	___
	ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5	Aqueous Circle all values on Data Summary Sheet that are: RPD > 50%, or Difference > ± CRDL*.			
	Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	___	[✓]	___
	Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[✓]	___
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.8.6	Soil/Sediment Circle all values on Data Summary Sheet that are: RPD > 100%, or Difference > 2 x CRDL*			
	Is any RPD (where sample and duplicate are both greater than or equal to 5 times *CRDL) : > 100%?	___	[___]	✓
	Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) : > 2x*CRDL?	___	[___]	✓

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

		YES	NO	N/A
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9	Field Duplicates			
A.1.9.9.1	Were field duplicates analyzed?	[ ]	[✓]	
	ACTION: If yes, prepare a Form VI for each aqueous field duplicate pair. Prepare a Form VI for each soil duplicate pair, if percent solids for sample and its duplicate differ by more than 1%; report concentrations of soils in ug/l on wet weight basis and calculate RPDs or Difference for each analyte.			
	NOTE: 1. Do not calculate RPD when both values are less than IDL. 2. Flag all associated data only for field duplicate pair.			
A.1.9.9.2	Is any value for sample duplicate pair less than *CRDL and other value greater than or equal to 10 x *CRDL?		[✓]	
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9.3	Aqueous			
	Circle all values on Form VI for field duplicates that are: RPD > 50%, or Difference > ± CRDL*			
	Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?		[✓]	
	Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?		[✓]	
	ACTION: If yes, flag the associated data as estimated.			

* Substitute IDL for CRDL when IDL > CRDL.

** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.9.4 Soil/Sediment			
Circle all values on Form VI for field duplicates that are: RPD >100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than 5 times *CRDL) : >100%?	___	[✓]	___
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x *CRDL): >2x *CRDL?	___	[✓]	___

ACTION: If yes, flag the associated data as estimated.

A.1.9.10 Form VII (Laboratory Control Sample) (Note: LCS - not required for aqueous Hg and cyanide analyses.)

	YES	NO	N/A
A.1.9.10.1 Was one LCS prepared and analyzed for: every 20 water samples?	[✓]	___	___
every 20 solid samples?	[___]	___	✓
both AA and ICP when both are used for same analyte?	[✓]	___	___

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory for submittal of results of LCS. Flag as estimated (J) all data for which LCS was not analyzed.

NOTE: If only one LCS was analyzed for more than 20 samples, then first 20 samples close to LCS do not have to be flagged as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

**Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.10.2 Aqueous LCS			
Circle all LCS values outside control limits (80 - 120%- except aqueous Ag and Sb).			
Is any LCS recovery: less than 50%?	___	[✓]	___
between 50% and 79%?	___	[✓]	___
between 121% and 150%?	___	[✓]	___
greater than 150%?	___	[✓]	___

ACTION: Less than 50%, reject (red-line) all data; between 50% and 79%, flag all associated data as estimated (J); between 121% and 150%, flag all positive (not flagged with a "U") results as estimated; greater than 150%, reject all positive results.

A.1.9.10.3 Solid LCS

NOTE: 1. If "Found" value of LCS is rejectable due to duplicate injections or analytical spike recovery criteria, regardless of LCS recovery, flag the associated data as estimated (J).
2. If IDL of an analyte is equal to or greater than true value of LCS, disregard the "Action" below even though LCS is out of control limits.

Is LCS "Found" value higher than the control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated positive data as estimated.

Is LCS "Found" value lower than the Control limits on Form VII?	___	[ ]	✓

ACTION: If yes, qualify all associated data as estimated.

		YES	NO	N/A
A.1.9.11	Form IX (ICP Serial Dilution) -			
	NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IDL.			
A.1.9.11.1	Was Serial Dilution analysis performed for:			
	each 20 samples?	[✓]	__	__
	each matrix type?	[✓]	__	__
	each concentration range (i.e. low, med.)?	[✓]	__	__
	ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIDLs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DFO report.			
A.1.9.11.2	Was field blank(s) used for Serial Dilution Analysis?	__	[✓]	__
	ACTION: If yes, flag all associated data ≥ 10 x IDL as estimated (J).			
	NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.11.3	Are results outside control limit flagged with an "E" on Form I's and Form IX when initial concentration on Form IX is equal to 50 times IDL or greater.	[✓]	__	__
	ACTION: If no, write in the contract-problem/non-compliance section of the "Data Assessment Narrative".			
A.1.9.11.4	Circle all values on Data Summary Sheet that are outside control limit for initial concentrations equal to or greater than 10 x IDLs only. Are any % difference values:			
	> 10%?	✓	[__]	__
	≥ 100%?	__	[✓]	__

	YES	NO	N/A
ACTION: Flag as estimated (J) all associated equal to or greater than 10xIDLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xIDLs for which PD is greater than or equal to 100%.			
A.1.9.12 Furnace Atomic Absorbtion (AA) QC Analysis			
A.1.9.12.1 Are duplicate injections present in furnace raw data (except during full Method of Standard Addition) for each sample analyzed by GFAA?	[✓]	__	__
ACTION: If no, reject the data on Form I's for which duplicate injections were not performed.			
A.1.9.12.2 Do the duplicate injection readings agree within 20% Relative Standard Deviation (RSD) or Coefficient of Variation (CV) for concentration greater than CRDL?	[✓]	__	__
Was a dilution analyzed for sample with post digestion spike recovery less than 40%?	[✓]	__	__
ACTION: If no for any of the above, flag all the associated data as estimated (J).			
A.1.9.12.3 Is *post digestion spike recovery less than 10% or greater than 150% for any result?	__	[✓]	__
ACTION: If yes, reject (red-line) the affected data if recovery is <10%; reject data not flagged with "U" if spike recovery is >150%.			
NOTE: Reject the data only if the affected sample was not subsequently analyzed by Method of Standard Addition.			

* Post digestion spike is not required on the pre-digestion spiked sample when predigestion spike recovery is within control limits of 75-125% or when SR>4xSA.

		YES	NO	N/A
A.1.9.13	Form VIII (Method of Standard Addition Results)			
A.1.9.13.1	Present?	[✓]		
	If no, is any Form I result coded with "S" or a "+"?		[✓]	
	ACTION: If yes, write request on Telephone Record Log and contact laboratory for submittal of Form VIII.			
A.1.9.13.2	Is coefficient of correlation for MSA less than 0.990 for any sample?		[✓]	
	ACTION: If yes, reject (red-line) affected data.			
A.1.9.13.3	Was *MSA required for any sample but not performed?		[✓]	
	Is coefficient of correlation for MSA less than 0.995?		[✓]	
	Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?		[✓]	
	ACTION: If yes for any of the above, flag all the associated data as estimated (J).			
A.1.9.13.4	Was proper quantitation procedure followed correctly as outlined in the SOW on page E-16 through E-17?	[✓]		
	ACTION: If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14	Dissolved/Total or Inorganic/Total Analytes -			
A.1.9.14.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)..		[✓]	
	Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?		[✓]	

* MSA is not required on LCS and prep. blank.

	YES	NO	N/A

NOTE: 1. If yes, prepare a list comparing differences between all dissolved (or inorganic) and total analytes. Compute the differences as a percent of the total analyte only when dissolved concentration is greater than CRDL as well as total concentration.
2. Apply the following questions only if inorganic (or dissolved) results are (i) above CRDL, and (ii) greater than total constituents.
3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.

A.1.9.14.2 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 10%? ___ [✓] ___

A.1.9.14.3 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%? ___ [✓] ___

ACTION: If more than 10%, flag both dissolved (or inorganic) and total values as estimated (J); if more than 50%, reject (red-line) the data for both values.

A.1.9.15 Form I to IX

A.1.9.15.1 Are all the Form I through Form IX labeled with:

	YES	NO	N/A
Laboratory name?	[✓]	___	___
Case/SAS number?	[✓]	___	___
EPA sample No.?	[✓]	___	___
SDG No.?	[✓]	___	___
Contract No.?	[✓]	___	___
Correct units?	[✓]	___	___
Matrix?	[✓]	___	___

ACTION: If no for any of the above, note under contract problem/non-compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.15.2 Do any computation/transcription errors exceed 10% of reported values on Forms I-IX for:			
(NOTE: Check all forms against raw data.)			
(a) all analytes analyzed by ICP?	___	[✓]	___
(b) all analytes analyzed by GFAA?	___	[✓]	___
(c) all analytes analyzed by AA Flame?	___	[ ]	✓
(d) Mercury?	___	[✓]	___
(e) Cyanide?	___	[ ]	✓

ACTION: If yes, prepare Telephone Log, contact laboratory for corrected data and correct errors with red pencil and initial.

A.1.9.16 Form I (Field Blank) -

Circle all field blank values on Data Summary Sheet that are greater than CRDL, 2 x IDL when IDL > CRDL.

Do concentrations of field blank(s) fall below CRDL (or 2 x IDL when IDL > CRDL) for all parameters of associated aqueous and soil samples?	[___]	___	✓
If no, was field blank value already rejected due to other QC criteria?	[___]	___	✓

ACTION: If no, reject (except field blank results) all associated positive sample data less than or equal to five times the field blank value.

	YES	NO	N/A
A.1.9.17 Form X, XI, XII (Verification of Instrumental Parameters).			
A.1.9.17.1 Is verification report present for:			
Instrument Detection Limits (quarterly)?	[✓]		
ICP Interelement Correction Factors (annually)?	[✓]		
ICP Linear Ranges (quarterly)?	[✓]		
ACTION: If no, contact DPO of the lab.			
A.1.9.17.2 Form X (Instrument Detection Limits) - (Note: IDL is not required for Cyanide.)			
Are IDLs present for: all the analytes?	[✓]		
all the instruments used?	[✓]		
For both AA and ICP when both are used for same analyte?	[✓]		
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
Is IDL greater than CRDL for any analyte?		[✓]	
If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?	[✓]		
ACTION: If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.			

	YES	NO	N/A
A.1.9.17.3 Form XI (Linear Ranges)			
Was any sample result higher than high linear range of ICP.	___	[✓]	___
Was any sample result higher than the highest calibration standard for non-ICP parameters?	___	[✓]	___
If yes for any of the above, was the sample diluted to obtain the result on Form I?	[✓]	___	___
ACTION: If no, flag the result reported on Form I as estimated(J).			
A.1.9.18 Percent Solids of Sediments			
Is soil content in sediment(s) less than 50%?	___	[___]	✓
ACTION: If yes, qualify as estimated all data not previously rejected or flagged due to other QC criteria.			

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Feb. 1990
Number: HW-2
Revision: 10

Case#	NWS	Site	Naval Weapons Station	Matrix:	Soil ____
SDG#	CLP 279	Lab	Roy F. Weston		Water ✓
Contractor	Roy Weston	Reviewer	Heartland ESI		Other ____

A.2.1 The case description and exceptions, if any, are noted below with reason(s) for rejection or qualification as estimated value(s) J.

1. All Lead and Selenium results in affected area are rejected for CRDL recovery.
2. The Matrix Spike Recovery for Arsenic was low. All data estimated.
3. The Serial Dilution for Chromium was outside the control limits. All positive results are estimated.
4. The analytical spike for Arsenic (2-M002) and Selenium (2-M002 and 6-M002) were out of control and are flagged accordingly.

PBH 2/27/92

PBH 2/27/92

2.2 Contract-Problems/Non-Compliance

Forms 5, 6 and 9 were not in this data package. Forms for this group were in CLP 263. All data packages should stand alone. The laboratory should submitt new packages with forms.

MB Reviewer: _____ Date: _____
Signature

Contractor Reviewer: Paul B. Hurley Date: 2/27/92
Signature

Verified by: Ralph D. Scapellin Date: 3/2/92

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 279

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 2-M002, 6-M002

FIELD DUP. #'S: LAB DUP. #'S: 1-M002 Field Blank MATRIX SPIKE #: 1-M002

SERIAL DILUTION SAMPLE NO. 1-M002 COMPLETION DATE: 2/27/92 REVIEWERS INITIALS: PBH

Parameter	X Detection Limits UG/L CRDL	IDL	I Field Blank	IIA Calib. Ver. %R Init	Continued 1	2	3	IIB CRDL Std Ver. % R Init	Fin	III Calibration Blanks Init	Continued 1	2	3	PBL PBN	IV ICP ICS % R Init	Fin	V Matrix Spike	VI Lab Dup RPD/Diff	VII LCS % R	IX Ser Dil % D	Method
Al	200		NA																		
Sb	60																				
As	10	2		98	98	93	93	81		U	U	U	U	U	PBH 81		72	200	95		F
Ba	200	16		102	100	99	103			U	U	U	U	U	85	84	98	2.5	101	10.0	P
Be	5																				
Cd	5	2		104	106	103	103	101	105	U	U	U	U	U	95	96	103	0.6	104		P
Ca	5000																				
Cr	10	4		99	97	98	100	105	107	U	U	U	U	U	96	97	98	1.5	94	10.7	P
Co	50																				
Cu	25	6		103	102	100	104	104	112	U	U	U	U	U	98	97	95	11.2	95		P
Fe	100	46		101	99	100	103			U	U	U	U	U	93	93	136	1.5	97	34	P
Pb	3	3		102	97	105	101	27		U	U	U	U	U			86	16.2	110		F
Mg	5000																				
Mn	15	2		100	98	98	101	97	98	U	U	U	U	U	87	83	97	1.5	95	30	P
Hg	0.2			103	104	105	103			U	U	U	U	U			70	.51	96		CV
Ni	40																				
K	5000																				
Se	5	2		103	102	97	92	0		U	U	U	U	U			83		94		F
Ag	10	3		104	102	101	103	107	115	U	U	U	U	U	98	97	93		99		P
Na	5000	110		107	107	108	104			U	U	U	U	U					102	1.6	P
Tl	10																				
V	50																				
Zn	20	6		100	100	99	104	106	115	U	U	U	U	U	92	94	99	1.4	98	100	P
CN	10																				

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APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 277

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS:

Field Blank

FIELD DUP. #'S: LAB DUP. #'S: MATRIX SPIKE #:

SERIAL DILUTION SAMPLE NO. COMPLETION DATE: 2/27/92 REVIEWERS INITIALS: PBK

Parameter	X Detection Limits UG/L CRDL	IDL	I Field Blank	IIA Calib. Ver. %R Init	Continued 1	2	3	IIB CRDL Std Ver. % R Init	Fin	III Calibration Blanks Init	Continued 1	2	3	PBL PREP	ICP ICS % R PAN Init	Fin	V MS Matrix	VI Lab Dup RPD Diff	VII LCS % R	IX Ser Dil % D	Method
Al	200		NA																		
Sb	60																				
As	10	2			92	94	107				U	U	U								F
Ba	200	16			101						U										P
Be	5																				
Cd	5	2			104						U										P
Ca	5000																				
[illegible]	10	4			100						U										P
Co	50																				
Cu	25	6			104						U										P
Fe	100	46			102						48.2										P
Pb	3	2		107	105	107		73		U	U	U	U								F
Mg	5000																				
Mn	15	2			100						U										P
Hg	0.2			105	106	106				U	U	U	U								CV
Ni	40																				
K	5000																				
Se	5	2		99	93	102		158		U	U	U									F
Ag	10	3			104						U										P
Na	5000	110			104						178										P
[illegible]	10																				
V	50																				
Zn	20	6			105						U										P
CN	10																				

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CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited Scope) Date: 2/27/92 Case #: NWS

Site: Naval Weapons Station Lab Name: Roy F Weston

Reviewer's Initials: PBII Number of Samples: 2

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Inter-ferences	Spike Recovery	Duplicates Lab	Duplicates Field	Detection Limits	LCS	Serial Dilution	MSA	Total Analytes	Rejection
ICP														
Flame AA														
Furnace AA		2											2	
Mercury														
Total		2											2	
Other														

Analytes Flagged as Estimated (J) Due to Exceeding Criteria For:*

ICP											1		1	
Flame AA														
Furnace AA						1						1	2	
Mercury														
Total						1					1	1	3	
Other														

Note:
Asterisk (*) Indicates additional exceedances of review criteria.

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.7: CLP Data Assessment Checklist
Inorganic Analysis

Date: Feb. 1990
Number: HW-2
Revision: 10

INORGANIC REGIONAL DATA ASSESSMENT

Region II

CASE NO. NWS

SITE Naval Weapons Station

LABORATORY Roy F. Weston

NO. OF SAMPLES/ MATRIX 2

SDG# CLP 279

REVIEWER (IF NOT ESD) Heartland ESI

SOW# 390

REVIEWER'S NAME Paul B Humby

DPO: ACTION _____ FYI _____

COMPLETION DATE 2/22/92

DATA ASSESSMENT SUMMARY

		ICP	AA	Hg	CYANIDE
1.	HOLDING TIMES	O	O	O	NA
2.	CALIBRATIONS	↓	Z	↓	↓
3.	BLANKS	↓	O	↓	↓
4.	ICS	↓	↓	↓	↓
5.	LCS	↓	↓	↓	↓
6.	DUPLICATE ANALYSIS	↓	↓	↓	↓
7.	MATRIX SPIKE	↓	↓	↓	↓
8.	MSA	↓	↓	↓	↓
9.	SERIAL DILUTION	↓	↓	↓	↓
10.	SAMPLE VERIFICATION	↓	↓	↓	↓
11.	OTHER QC	↓	↓	↓	↓
12.	OVERALL ASSESSMENT	✓	✓	✓	✓

O = Data has no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS:

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Six (6) water sample and no (0) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
1-M002	911128001
7-M002	911128002
7-M102	911128003
6-M002	911128004
6-M102	911128005
6-M202	911128006

Heartland ESI has reviewed the data for the samples listed above TAL Metals (under the limited scope requirements) using Region II Data Validation Protocol, February 1990 revision. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

TAl Metals reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110280**, the analysis of six (6) field water sample and no (0) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The USEPA CLP analytical protocol was followed as required with the exception that the laboratory failed to submit Forms 5,6 and 9. The QC data for this data package can be found in SDG #263.

Specific QA/QC deficiency **Findings** are listed numerically in the following categories:

Holding Times

The holding times were met as specified in Region II Protocol.

Calibration

1. The CRDL Standards for Selenium and Lead were below 50%. All positive and non-detect results are rejected if within the concentration range as applied by the Region II Protocol.

Preparation and Field Blanks

No deficiencies in this section.

Interferences

No significant interferences were observed.

Interferences

No significant interferences were observed.

Metals Data Assessment Narrative (continued - Page 2)

Spike Recovery

2. The Matrix Spike recovery for Arsenic was below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

Serial Dilution

3. The Serial Dilution for Chromium was outside the control limit. All positive results are qualified as estimated, "J".

MSA

No deficiencies in this section.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	Pb and Se	+/U	R	1
All Water Samples	As	+/U	J/UJ	2
All Water Samples	Cr	+	J	3

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

03-001-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP280

Matrix (soil/water): WATER Lab Sample ID: 911128001

Level (low/med): LOW Date Received: 11/04/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	3500.00		S	F	J2
7440-39-3	Barium	151.00	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	49.20			P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	641.00			P	J3
7440-48-4	Cobalt				NR	
7440-50-8	Copper	500.00	U		P	
7439-89-6	Iron	1244200.00			P	
7439-92-1	Lead	147.00			F	~~J1~~ PBH 2/27/92
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	894.00			P	
7439-97-6	Mercury	1.63			CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~20.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	200.00	U		P	
7440-23-5	Sodium	4280.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	308.00	B		P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

7-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP280

Matrix (soil/water): WATER Lab Sample ID: 911128002

Level (low/med): LOW Date Received: 11/04/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	16.00		S	F	J2
7440-39-3	Barium	130.00	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	19.00			P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	227.00			P	J3
7440-48-4	Cobalt				NR	
7440-50-8	Copper	51.40			P	
7439-89-6	Iron	111000.00			P	
7439-92-1	Lead	59.70		S	F	~~J1~~ PBH 2/27/92
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	606.00			P	
7439-97-6	Mercury	2.00			CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~20.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	2910.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	288.00			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

7-M102

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP280

Matrix (soil/water): WATER Lab Sample ID: 911128003

Level (low/med): LOW Date Received: 11/04/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	13.90			F	J2
7440-39-3	Barium	119.00	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	25.30			P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	159.00			P	J3
7440-48-4	Cobalt				NR	
7440-50-8	Copper	46.20			P	
7439-89-6	Iron	77400.00			P	
7439-92-1	Lead	50.00		S	F	~~J1~~ PBH 2/27/92
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	565.00			P	
7439-97-6	Mercury	.97			CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~6.00~~		S	F	~~J1~~ R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	3100.00	B		P	PBH 2/27/92
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	305.00			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

6-M002

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP280

Matrix (soil/water): WATER Lab Sample ID: 911128004

Level (low/med): LOW Date Received: 11/04/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U	W	F	UJ2
7440-39-3	Barium	195.00	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	16.60			P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6060.00			P	J3
7440-48-4	Cobalt				NR	
7440-50-8	Copper	250.00	U		P	
7439-89-6	Iron	880000.00			P	
7439-92-1	Lead	98.50		S	F	~~J1~~ PBH 2/27/92
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	1456.00			P	
7439-97-6	Mercury	.16	B		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~20.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	100.00	U		P	
7440-23-5	Sodium	29500.00			P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	1120.00			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

6-M102

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP280

Matrix (soil/water): WATER Lab Sample ID: 911128005

Level (low/med): LOW Date Received: 11/04/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.20	B		F	J2
7440-39-3	Barium	38.20	B		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	5.60			P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	430.00			P	J3
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	98500.00			P	
7439-92-1	Lead	26.90		S	F	~~J+~~ PBH 2/27/92
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	701.00			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~20.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	34800.00			P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	291.00			P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

6-M202

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-03

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP280

Matrix (soil/water): WATER Lab Sample ID: 911128006

Level (low/med): LOW Date Received: 11/04/91

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum				NR	
7440-36-0	Antimony				NR	
7440-38-2	Arsenic	2.00	U		F	UJ2
7440-39-3	Barium	16.00	U		P	
7440-41-7	Beryllium				NR	
7440-43-9	Cadmium	3.00	U		P	
7440-70-2	Calcium				NR	
7440-47-3	Chromium	6.00	U		P	
7440-48-4	Cobalt				NR	
7440-50-8	Copper	10.00	U		P	
7439-89-6	Iron	222.00			P	
7439-92-1	Lead	~~2.00~~	~~U~~	~~W~~	F	~~UJ~~ ~~UJ1~~ R1
7439-95-4	Magnesium				NR	
7439-96-5	Manganese	2.00	U		P	PBH
7439-97-6	Mercury	.10	U		CV	2/27/92
7440-02-0	Nickel				NR	
7440-09-7	Potassium				NR	
7782-49-2	Selenium	~~2.00~~	~~U~~	~~W~~	~~F~~	R1
7440-22-4	Silver	10.00	U		P	
7440-23-5	Sodium	978.00	B		P	
7440-28-0	Thallium				NR	
7440-62-2	Vanadium				NR	
7440-66-6	Zinc	6.00	U		P	
	Cyanide				NR	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

	YES	NO	N/A
A.1.1 Contract Compliance Screening Report (CCS) - Present?	[ ]		✓
ACTION: If no, contact RSCC.			
A.1.2 Record of Communication (from RSCC) - Present?	[ ]		✓
ACTION: If no, request from RSCC.			
A.1.3 Trip Report - Present and complete?	[ ]		✓
ACTION: If no, contact RSCC for trip report.			
A.1.4 Sample Traffic Report - Present or on file?	[ ]		✓
Legible?	[ ]		
ACTION: If no, request from Regional Sample Control Center (RSCC).			
A.1.5 Cover Page - Present?	[✓]		
Is cover page properly filled in and signed by the lab manager or the manager's designee?	[✓]		
ACTION: If no, prepare Telephone Record Log, and contact laboratory.			
Do numbers of samples correspond to numbers on Record of Communication?	[✓]		
Do sample numbers on cover page agree with sample numbers on:			
(a) Traffic Report Sheet?	[✓]		
(b) Form I's?	[✓]		
ACTION: If no for any of the above, contact RSCC for clarification.			

	YES	NO	N/A
A.1.6 Form I (Final Data) - Are all Form I's present and complete?	[✓]	__	__
ACTION: If no, prepare telephone record log and contact laboratory for submittal.			
Are correct units (ug/l for waters and mg/kg for soils) indicated on Form I's?	[✓]	__	__
Are soil sample results for each parameter corrected for percent solids?	[__]	__	✓
Are EPA sample # s and corresponding laboratory sample ID # s the same as on the Cover Page, Form I's and in the raw data?	[✓]	__	__
Are computation/transcription errors less than 10% of reported values?	[✓]	__	__
Are all "less than IDL" values properly coded with "U"?	[✓]	__	__
Was a brief physical description of samples given on Form I's?	[✓]	__	__
Were the result qualifiers used correctly with final data?	[✓]	__	__
ACTION: If no for any of the above, prepare Telephone Record Log, and contract laboratory for corrected data.			
Were any samples diluted beyond requirements of contract?	__	[✓]	__
If yes, were dilutions noted on Form I's?	[__]	__	✓
ACTION: If no, note under Contract-Problem/Non-Compliance of the "Data Assessment Narrative".			
A.1.7 Holding Times - (aqueous and soil samples)			
(Examine sample traffic reports and digestion/distillation logs.)			
Mercury analysis (28 days). . . . . exceeded?	__	[✓]	__
Cyanide distillation (14 days). . . . . exceeded?	__	[__]	✓

	YES	NO	N/A
Other Metals analysis (6 months). . . . exceeded?	___	[✓]	___

NOTE: Prepare a list of all samples and analytes for which holding times have been exceeded. Specify the number of days from date of collection to the date of preparation (from raw data). Attach to checklist.

ACTION: If yes, reject (red-line) values less than Instrument Detection Limit (IDL) and flag as estimated (J) the values above IDL even though sample(s) was preserved properly.

A.1.8 Raw Data

		YES	NO	N/A
A.1.8.1	Digestion Log* for flame AA/ICP (Form XIII) present?	[✓]	___	___
	Digestion Log for furnace AA Form XIII present?	[✓]	___	___
	Distillation Log for mercury Form XIII present?	[✓]	___	___
	Distillation Log for cyanides Form XIII present?	[___]	___	✓
	Are pH values (pH<2 for all metals, pH>12 for cyanide) present?	[___]	✓	___
	*Weights, dilutions and volumes used to obtain values.			
	Percent solids calculation present for soils/sediments?	[___]	___	✓
	Are preparation dates present on Digestion Log?	[✓]	___	___
A.1.8.2	Measurement read out record present? ICP	[✓]	___	___
	Flame AA	[___]	___	✓
	Furnace AA	[✓]	___	___
	Mercury	[✓]	___	___
	Cyanides	[___]	___	✓

	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	[✓]	__	__
Legible?	[✓]	__	__
Properly Labeled?	[✓]	__	__

ACTION: If no for any of the above, write Telephone Record Log and contact laboratory. Flag metal data as estimated if pH of sample is greater than 2. Flag cyanide data as estimated if pH sample is less than 12.

A.1.9 Data Validation and Verification

.1.9.1 Calibration

	YES	NO	N/A
A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	[✓]	__	__
Is record of 5 point calibration present for Hg analysis?	[✓]	__	__

ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.1.2 Is record of 4 point calibration present for:			
Flame AA?	[__]	__	✓
Furnace AA?	[✓]	__	__
Cyanides?	[__]	__	✓

NOTE:
1. If less than 4 standards are measured in absorbance mode, then the remaining standards in concentration mode must be run immediately after calibration and be within ±10% of true value.
2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRDL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
ACTION: Flag associated data as estimated if standards are not within ±10% of true values (except CRDL calibration standard). Do not flag the data as estimated in linear range indicated by good recovery of standard.			
A.1.9.1.3 Is correlation *coefficient less than 0.995 for:			
Mercury Analysis?	___	[✓]	___
Cyanide Analysis?	___	[___]	✓
Atomic Absorption Analysis?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.2 Form II A (Initial and Continuing Calibration Verification)-			
A.1.9.2.1 Present and complete for every metal and cyanide?	[✓]	___	___
Present and complete for AA and ICP when both are used for same analyte?	[✓]	___	___
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
A.1.9.2.2 Circle all values on data summary sheet that are outside contract windows. Are all calibration standards (initial and continuing) within control limits?			
Metals 90-110%	[✓]	___	___
Hg - 80-120%	[✓]	___	___
Cyanides 85-115%	[___]	___	✓

* The reviewer will calculate correlation coefficient.

	YES	NO	N/A
ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with %R between 75-89% (65-79% for Hg; 70-84% for CN) or 111-125% (121-135% for Hg; 116-130% for CN) recovery and nearest good calibration standard. Qualify results <IDL as estimated (UJ), if the ICV or CCV %R is 75-89% (CN, 70-84% ; HG, 65-79%). Reject (red-line) as unacceptable data if recovery of the ICV or CCV is outside the range 75-125% (CN, 70-130%; Hg, 65-135%). Qualify five samples on either side of verification standard out of control limits.			
Was continuing calibration performed every 10 samples or every 2 hours?	[✓]	__	__
ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).			
Was ICV for cyanides distilled?	[__]	__	✓
ACTION: If no, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".			
A.1.9.3 Form II B (CRDL Standards for AA and ICP) -			
A.1.9.3.1 Was a CRDL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?	[✓]	__	__
*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?	[__]	__	✓
Was a 2xCRDL (or 2xIDL when IDL>CRDL) analyzed (CRI) for each ICP run? (Note: CRI for AL,Ba,Ca,Fe,Mg,Na,or K is not required.)	[✓]	__	__
ACTION: If no for any of the above, flag as estimated all data falling within the affected ranges. The affected ranges are: AA Analysis - **True Value ± CRDL; ICP Analysis - **True Value ± 2CRDL; CN Analysis - **True Value ± 0.5 x True Value.			

* Find the results of mid-range standard in the raw data.
**True value of CRA, CRI or mid-range standard. Substitute IDL for CRDL when IDL > CRDL.

		YES	NO	N/A
A.1.9.3.2	Was CRI analyzed after ICV/ICB and before the final CCV/CCB, and for every four hours of ICP run?	[✓]		
	ACTION: If no, write in Contract Problem/Non-Compliance Section of the "Data Assessment Narrative".			
A.1.9.3.3	Circle all values on summary sheet that are outside acceptance windows.			
	Are CRA and CRI standards within control limits: Metals 80 - 120%R?	[ ]	✓	
	Is mid-range standard within control limits: Cyanide 80 - 120%R?	[ ]		✓
	ACTION: Flag as estimated all data within the affected ranges if the recovery of the standard is between 50-79%; flag only positive data if the recovery is between 121-150%; reject (red line) all data if the recovery is less than 50%; reject only positive data if the recovery is greater than 150%.			
A.1.9.4	Form III (Initial and Continuing Calibration Blanks)			
A.1.9.4.1	Present and complete?	[✓]		
	For both AA and ICP when both are used for same analyte?	[✓]		
	Was an initial calibration blank analyzed?	[✓]		
	Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	[✓]		
	ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/non-compliance section of the Data Assessment Narrative.			

		YES	NO	N/A
A.1.9.4.2	Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IDL when IDL > CRDL). Are all calibration blanks (when IDL<CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	[✓]		
	Are all calibration blanks less than two times Instrument Detection Limit (when IDL>CRDL)?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all positive data less than or equal to calibration blank values analyzed between calibration blank with value over CRDL (or 2xIDL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.

A.1.9.5 FORM III (Preparation Blank) -

(Note: The preparation blank for mercury is the same as the calibration blank.)

		YES	NO	N/A
A.1.9.5.1	Was one prep. blank analyzed for: each 20 samples?	[✓]		
	each batch?	[✓]		
	each matrix type?	[✓]		
	both AA and ICP when both are used for same analyte?	[✓]		

ACTION: If no for any of the above, flag as estimated (J) all associated positive data <10 x IDLs for which prep. blank was not analyzed.

NOTE: If only one blank was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).

		YES	NO	N/A
A.1.9.5.2	Is concentration of prep. blank greater than CRDL when IDL is less than or equal to CRDL?		[✓]	
	If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?		[✓]	

		YES	NO	N/A
	ACTION: If yes, reject (red-line) all associated data greater than CRDL concentration but less than ten times the prep. blank value found in the raw data.			
A.1.9.5.3	Do concentrations of prep. blank fall below two times IDL when IDL is greater than CRDL?	[✓]		
	ACTION: If no, reject (red-line) all positive data that has a concentration less than 10 times the prep. blank value in the raw data.			
A.1.9.5.4	Is concentration of prep. blank below the negative CRDL?		[✓]	
	ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6	Form IV (ICP Interference Check Sample)			
A.1.9.6.1	Present and complete?	[✓]		
	(NOTE: Not required for furnace AA, flame AA, mercury, cyanide and Ca, Mg, K and Na.)			
	Was ICS analyzed at beginning and end of run (or at least twice every 8 hours)?	[✓]		
	ACTION: If no, flag as estimated (J) all samples for which AL, Ca, Fe, or Mg is higher than in ICS.			
A.1.8.6.2	Circle all values on Data Summary Sheet that are more than + 20% of true or established mean value. Are all Interference Check Sample results inside of control limits (+ 20%)?	[✓]		
	If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	[✓]		
	ACTION: If no, flag as estimated (J) those positive results for which ICS recovery is between 121-150%; flag all sample results as estimated if ICS recovery falls within 50-79%; reject (red-line) those sample results for which ICS recovery is less than 50%; if ICS recovery is above 150%, reject positive results only (not flagged with a "U").			

		YES	NO	N/A
A.1.9.7	Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)- (Note: Not required for Ca, Mg, K, and Na (both matrices), Al, and Fe (soil only.)			
A.1.9.7.1	Present and complete for: each 20 samples?	[✓]	--	Found in
	each matrix type?	[✓]	--	Package
	each conc. range (i.e. low, med., high)?	[✓]	--	CLP 263
	For both AA and ICP when both are used for same analyte?	[✓]	--	--
	ACTION: If no for any of the above, flag as estimated (J) all positive data less than four times spiking level for which spiked sample was not analyzed.			
	NOTE: If one spiked sample was analyzed for more than 20 samples, then first 20 samples analyzed do not have to be flagged as estimated (J).			
A.1.9.7.2	Was field blank used for spiked sample?	--	[✓]	--
	ACTION: If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
	NOTE: Matrix spike analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.7.3	Circle all values on Data Summary Sheet that are outside control limits (75% to 125%). Are all recoveries within control limits?	[__]	✓	--
	If no, is sample concentration greater than or equal to four times spike concentration?	[__]	✓	--
	ACTION: If yes, disregard spike recoveries for analytes whose concentrations are greater than or equal to four times spike added. If no, circle those analytes on Form V for which sample concentration is less than four times the spike concentration.			

	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	[ ]	✓	

ACTION: If no, write in the Contract - Problem/Non - Compliance section of "Data Assessment Narrative".

A.1.9.7.4 Aqueous

Are any spike recoveries:

	YES	NO	N/A
(a) less than 30%?		[✓]	
(b) between 30-74%?	✓	[ ]	
(c) between 126-150%?		[✓]	
(d) greater than 150%?		[✓]	

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 126-150%, flag as estimated (J) all associated aqueous data not flagged with a "U"; if greater than 150%, reject (red-line) all associated aqueous data not flagged with a "U".

NOTE: If pre-digestion spike result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, disregard spike recovery on Form V. Flag the associated data as estimated(J).

A.1.9.7.5 Soil/Sediment

Are any spike recoveries:

	YES	NO	N/A
(a) less than 10%?		[✓]	
(b) between 10-74%?		[✓]	
(c) between 126-200%?		[✓]	
(d) greater than 200%?		[✓]	

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 126-200%, flag as estimated all associated data was not flagged with a "U"; if greater than 200%, reject all associated data not flagged with a "U".

		YES	NO	N/A
A.1.9.8	Form VI (Lab Duplicates)			Found in Chp. 263
A.1.9.8.1	Present and complete for: each 20 samples?	[✓]	—	
	each matrix type?	[✓]	—	—
	each concentration range (i.e. low, med., high)?	[✓]	—	—
	both AA and ICP when both are used for same analyte?	[✓]	—	—

ACTION: If no for any the above, flag as estimated (J) all data >CRDL* for which duplicate sample was not analyzed.

Note: 1. If one duplicate sample was analyzed for more than 20 samples, then first 20 samples do not have to be flagged as estimated.
2. If percent solids for soil sample and its duplicate differ by more than 1%, prepare a Form VI for each duplicate pair, report concentrations in Hg/L on wet weight basis and calculate RPD or Difference for each analyte.

A.1.9.8.2	Was field blank used for duplicate analysis?	—	[✓]	—

ACTION: If yes, flag all data >CRDL* as estimated (J) for which field blank was used as duplicate.

NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.

A.1.9.8.3	Are all values within control limits (RPD 20% or difference < ±CRDL)?	[✓]	—	—
	If no, are all results outside the control limits flagged with an * on Form I's and VI?	[✓]	—	—

ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".

NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than IDL.

* Substitute IDL for CRDL when IDL > CRDL.

	YES	NO	N/A
2. If lab duplicate result is rejectable due to coefficient of correlation of MSA, analytical spike recovery, or duplicate injections criteria, do not apply precision criteria.			
A.1.9.8.4 Is any value for sample duplicate pair less than CRDL* and other value greater than or equal to 10 x *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5 Aqueous Circle all values on Data Summary Sheet that are: RPD > 50%, or Difference > ± CRDL*			
Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?	___	[✓]	___
Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?	___	[✓]	___
ACTION: If yes, flag the associated data as estimated.			
A.1.9.8.6 Soil/Sediment Circle all values on Data Summary Sheet that are: RPD > 100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than or equal to 5 times *CRDL) : > 100%?	___	[✓]	___
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) : > 2x*CRDL?	___	[✓]	___

* Substitute IDL for CRDL when IDL > CRDL.
** Use absolute values of sample and duplicate to calculate the difference.

		YES	NO	N/A
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9	Field Duplicates			
A.1.9.9.1	Were field duplicates analyzed?	[ ]	✓	
	ACTION: If yes, prepare a Form VI for each aqueous field duplicate pair. Prepare a Form VI for each soil duplicate pair, if percent solids for sample and its duplicate differ by more than 1%; report concentrations of soils in ug/l on wet weight basis and calculate RPDs or Difference for each analyte.			
	NOTE: 1. Do not calculate RPD when both values are less than IDL. 2. Flag all associated data only for field duplicate pair.			
A.1.9.9.2	Is any value for sample duplicate pair less than *CRDL and other value greater than or equal to 10 x *CRDL?		[✓]	
	ACTION: If yes, flag the associated data as estimated.			
A.1.9.9.3	Aqueous			
	Circle all values on Form VI for field duplicates that are: RPD > 50%, or Difference > ± CRDL*			
	Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRDL?		[✓]	
	Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?		[✓]	
	ACTION: If yes, flag the associated data as estimated.			

* Substitute IDL for CRDL when IDL > CRDL.

** Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.9.4 Soil/Sediment			
Circle all values on Form VI for field duplicates that are: RPD >100%, or Difference > 2 x CRDL*			
Is any RPD (where sample and duplicate are both greater than 5 times *CRDL) : >100%?	___	[✓]	___
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x *CRDL): >2x *CRDL?	___	[✓]	___

ACTION: If yes, flag the associated data as estimated.

A.1.9.10 Form VII (Laboratory Control Sample) (Note: LCS - not required for aqueous Hg and cyanide analyses.)

	YES	NO	N/A
A.1.9.10.1 Was one LCS prepared and analyzed for: every 20 water samples?	[✓]	__	___
every 20' solid samples?	[___]	__	✓
both AA and ICP when both are used for same analyte?	[✓]	__	___

ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory for submittal of results of LCS. Flag as estimated (J) all data for which LCS was not analyzed.

NOTE: If only one LCS was analyzed for more than 20 samples, then first 20 samples close to LCS do not have to be flagged as estimated.

* Substitute IDL for CRDL when IDL > CRDL.

**Use absolute values of sample and duplicate to calculate the difference.

	YES	NO	N/A
A.1.9.10.2 Aqueous LCS			
Circle all LCS values outside control limits (80 - 120%- except aqueous Ag and Sb).			
Is any LCS recovery: less than 50%?	___	[✓]	___
between 50% and 79%?	___	[✓]	___
between 121% and 150%?	___	[✓]	___
greater than 150%?	___	[✓]	___

ACTION: Less than 50%, reject (red-line) all data; between 50% and 79%, flag all associated data as estimated (J); between 121% and 150%, flag all positive (not flagged with a "U") results as estimated; greater than 150%, reject all positive results.

A.1.9.10.3 Solid LCS

NOTE: 1. If "Found" value of LCS is rejectable due to duplicate injections or analytical spike recovery criteria, regardless of LCS recovery, flag the associated data as estimated (J).
2. If IDL of an analyte is equal to or greater than true value of LCS, disregard the "Action" below even though LCS is out of control limits.

Is LCS "Found" value higher than the control limits on Form VII?	___	[✓]	___

ACTION: If yes, qualify all associated positive data as estimated.

Is LCS "Found" value lower than the Control limits on Form VII?	___	[✓]	___

ACTION: If yes, qualify all associated data as estimated.

		YES	NO	N/A
A.1.9.11	**Form IX (ICP Serial Dilution)** -			
	NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IDL.			
A.1.9.11.1	Was Serial Dilution analysis performed for: each 20 samples?	[✓]	Found in Package 263	
	each matrix type?	[✓]	CLP	
	each concentration range (i.e. low, med.)?	[✓]		
	ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIDLs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DPO report.			
A.1.9.11.2	Was field blank(s) used for Serial Dilution Analysis?		[✓]	
	ACTION: If yes, flag all associated data ≥ 10 x IDL as estimated (J).			
	NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SDG.			
A.1.9.11.3	Are results outside control limit flagged with an "E" on Form I's and Form IX when initial concentration on Form IX is equal to 50 times IDL or greater.	[✓]		
	ACTION: If no, write in the contract-problem/non-compliance section of the "Data Assessment Narrative".			
A.1.9.11.4	Circle all values on Data Summary Sheet that are outside control limit for initial concentrations equal to or greater than 10 x IDLs only. Are any % difference values: > 10%?	✓	[ ]	
	≥ 100%?		[✓]	

	YES	NO	N/A
ACTION: Flag as estimated (J) all associated equal to or greater than 10xIDLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xIDLs for which PD is greater than or equal to 100%.			
A.1.9.12 Furnace Atomic Absorbtion (AA) QC Analysis			
A.1.9.12.1 Are duplicate injections present in furnace raw data (except during full Method of Standard Addition) for each sample analyzed by GFAA?	[✓]		
ACTION: If no, reject the data on Form I's for which duplicate injections were not performed.			
A.1.9.12.2 Do the duplicate injection readings agree within 20% Relative Standard Deviation (RSD) or Coefficient of Variation (CV) for concentration greater than CRDL?	[✓]		
Was a dilution analyzed for sample with post digestion spike recovery less than 40%?	[✓]		
ACTION: If no for any of the above, flag all the associated data as estimated (J).			
A.1.9.12.3 Is *post digestion spike recovery less than 10% or greater than 150% for any result?		[✓]	
ACTION: If yes, reject (red-line) the affected data if recovery is <10%; reject data not flagged with "U" if spike recovery is >150%.			
NOTE: Reject the data only if the affected sample was not subsequently analyzed by Method of Standard Addition.			

* Post digestion spike is not required on the pre-digestion spiked sample when predigestion spike recovery is within control limits of 75-125% or when SR>4xSA.

		YES	NO	N/A
A.1.9.13	Form VIII (Method of Standard Addition Results)			
A.1.9.13.1	Present?	[✓]	__	__
	If no, is any Form I result coded with "S" or a "+"?	__	[✓]	__
	ACTION: If yes, write request on Telephone Record Log and contact laboratory for submittal of Form VIII.			
A.1.9.13.2	Is coefficient of correlation for MSA less than 0.990 for any sample?	✓	[ ]	__
	ACTION: If yes, reject (red-line) affected data.			
A.1.9.13.3	Was *MSA required for any sample but not performed?	__	[✓]	__
	Is coefficient of correlation for MSA less than 0.995?	✓	[ ]	__
	Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	__	[✓]	__
	ACTION: If yes for any of the above, flag all the associated data as estimated (J).			
A.1.9.13.4	Was proper quantitation procedure followed correctly as outlined in the SOW on page E-16 through E-17?	[✓]	__	__
	ACTION: If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14	Dissolved/Total or Inorganic/Total Analytes -			
A.1.9.14.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)..	__	[✓]	__
	Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	__	[✓]	__

* MSA is not required on LCS and prep. blank.

	YES	NO	N/A
NOTE: 1. If yes, prepare a list comparing differences between all dissolved (or inorganic) and total analytes. Compute the differences as a percent of the total analyte only when dissolved concentration is greater than CRDL as well as total concentration. 2. Apply the following questions only if inorganic (or dissolved) results are (i) above CRDL, and (ii) greater than total constituents. 3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.			
A.1.9.14.2 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 10%?	___	[✓]	___
A.1.9.14.3 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%?	___	[✓]	___

ACTION: If more than 10%, flag both dissolved (or inorganic) and total values as estimated (J); if more than 50%, reject (red-line) the data for both values.

A.1.9.15 Form I to IX

A.1.9.15.1 Are all the Form I through Form IX labeled with:

Laboratory name?	[✓]	___	___
Case/SAS number?	[✓]	___	___
EPA sample No.?	[✓]	___	___
SDG No.?	[✓]	___	___
Contract No.?	[✓]	___	___
Correct units?	[✓]	___	___
Matrix?	[✓]	___	___

ACTION: If no for any of the above, note under contract problem/non-compliance section of the "Data Assessment Narrative".

	YES	NO	N/A
A.1.9.15.2 Do any computation/transcription errors exceed 10% of reported values on Forms I-IX for:			
(NOTE: Check all forms against raw data.)			
(a) all analytes analyzed by ICP?	___	[✓]	___
(b) all analytes analyzed by GFAA?	___	[✓]	___
(c) all analytes analyzed by AA Flame?	___	[ ]	✓
(d) Mercury?	___	[✓]	___
(e) Cyanide?	___	[ ]	✓

ACTION: If yes, prepare Telephone Log, contact laboratory for corrected data and correct errors with red pencil and initial.

A.1.9.16 Form I (Field Blank) -

Circle all field blank values on Data Summary Sheet that are greater than CRDL, 2 x IDL when IDL > CRDL.

Do concentrations of field blank(s) fall below CRDL (or 2 x IDL when IDL > CRDL) for all parameters of associated aqueous and soil samples?	[✓]	___	___
If no, was field blank value already rejected due to other QC criteria?	[✓]	___	___

ACTION: If no, reject (except field blank results) all associated positive sample data less than or equal to five times the field blank value.

	YES	NO	N/A
A.1.9.17 Form X, XI, XII (Verification of Instrumental Parameters).			
A.1.9.17.1 Is verification report present for:			
Instrument Detection Limits (quarterly)?	[✓]		
ICP Interelement Correction Factors (annually)?	[✓]		
ICP Linear Ranges (quarterly)?	[✓]		
ACTION: If no, contact DPO of the lab.			
A.1.9.17.2 Form X (Instrument Detection Limits) - (Note: IDL is not required for Cyanide.)			
Are IDLs present for: all the analytes?	[✓]		
all the instruments used?	[✓]		
For both AA and ICP when both are used for same analyte?	[✓]		
ACTION: If no for any of the above, prepare Telephone Record Log and contact laboratory.			
Is IDL greater than CRDL for any analyte?		[✓]	
If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?	[✓]		
ACTION: If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.			

	YES	NO	N/A
A.1.9.17.3 Form XI (Linear Ranges)			
Was any sample result higher than high linear range of ICP.	___	[✓]	___
Was any sample result higher than the highest calibration standard for non-ICP parameters?	___	[✓]	___
If yes for any of the above, was the sample diluted to obtain the result on Form I?	[✓]	___	___
ACTION: If no, flag the result reported on Form I as estimated(J).			
A.1.9.18 Percent Solids of Sediments			
Is soil content in sediment(s) less than 50%?	___	[___]	✓
ACTION: If yes, qualify as estimated all data not previously rejected or flagged due to other QC criteria.			

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Feb. 1990
Number: HW-2
Revision: 10

Case#	NWS	Site	Naval Weapons Station	Matrix: Soil	
SDG#	CLP 280	Lab	Roy F. Weston	Water	6
Contractor	Roy F. Weston	Reviewer	Heartland EST	Other	

A.2.1 The case description and exceptions, if any, are noted below with reason(s) for rejection or qualification as estimated value(s) J.

1. All selenium and Lead results are qualified for positives results. All Lead non-detects are rejected for CRDL recoveries.
2. Matrix Spike Recovery for Arsenic was below control limit. All data estimated.
3. Serial dilution outside control windows. All positive results are estimated.
4. The MSAs for Arsenic were below <.990 for Sample 6-M102. All data rejected.

PBH 2/27/92

PBH 2/27/92

2.2 Contract-Problems/Non-Compliance

Reviewer had to go to a different data package for MS/D and serial dilution data. Forms should have been submitted in this data package and data should have been flagged accordingly.

MB Reviewer: _____ Date: _____
Signature

Contractor Reviewer: Paul B. Hanly Date: 2/27/92
Signature

Verified by: Christopher D. Lapelkin Date: 3/2/92

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F Weston CASE NO. CLP280 SOW NO. 390 SAMPLE TYPE/SDG: CLP 280

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 1-M002, 7-M002, 7-M102, 6-M002, 6-M102 and 6M202.

Field Blank

FIELD DUP. #'S: LAB DUP. #'S: 1-M002 MATRIX SPIKE #: 1-M002

SERIAL DILUTION SAMPLE NO. ~~None~~ 1-M002 PBH COMPLETION DATE: 2/26/92 REVIEWERS INITIALS: PBH

	X		I	IIA				IIB		III				IV		V	VI	VII	IX	
Parameter	Detection Limits UG/L CRDL	IDL	Field Blank	Calib. Ver. %R Init	Continued 1	2	3	CRDL Std Ver. % R Init	Fin	Calibration Blanks Init	Continued 1	2	3	PB BLANK P	N	ICP ICS % R Init	Fin	MS Matrix	Lab Dup RPD Diff	LCS % R	Ser Dil % D	Method
Al	200		NA																			
Sb	60																					
As	10	2		98	98	93	93			U	U	U	U	U			72	200	95			F
Ba	200	16		102	100	99	103			U	U	U	U	U		85	84	98	2.5	101	100	P
Be	5																					
Cd	5	2		109	106	103	107	101	105	U	U	U	U	U		95	96	103	.6	104		P
Ca	5000																					
Cr	10	4		99	97	98	100	105	107	U	U	U	U	U		96	97	98	1.5	94	10.7	P
Co	50																					
Cu	25	6		103	102	100	104	109	112	U	U	U	U	U		98	97	95	16.2	95		P
Fe	100	46		101	99	100	103			U	U	U	U	U		93	93	136	~~16.2~~ 1.5	97	3.9	P
Pb	3	2		102	97	105	101	27		U	U	U	U	U				86	16.2	110		F
Mg	5000																					
Mn	15	2		100	98	98	101	97	98	U	U	U	U	U		87	83	97	1.4	95	3.0	P
Hg	0.2			103	104	105	103			U	U	U	U	U				90	51	96		CV
Ni	40																					
K	5000																					
Se	5	2		103	102	97	97	0		U	U	U	U	U				83		94		F
Ag	10	3		104	102	101	103	107	115	U	U	U	U	U		98	97	93		99		P
Na	5000	110		107	107	108	104			U	U	U	U	U						102	1.6	P
Tl	10																					
V	50																					
Zn	20	6		100	100	99	104	106	115	U	U	U	U	U		92	94	99	1.4	98	100	P
CN	10																					

000036

APPENDIX A.5 SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. CLP280 SOW NO. 390 SAMPLE TYPE/SDG: CLP 280

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS:

FIELD DUP. #'S: LAB DUP. #'S: Field Blank MATRIX SPIKE #:

SERIAL DILUTION SAMPLE NO. COMPLETION DATE: 2/26/92 REVIEWERS INITIALS: PBH

	X		I	IIA				IIB		III				IV		V	VI	VII	IX	
Parameter	Detection Limits UG/L CRDL	IDL	Field Blank	Calib. Ver. %R Init	Continued 1	2	3	CRDL Std Ver. %R Init	Fin	Calibration Blanks Init	Continued 1	2	3	PBL PREP	BLANK	ICP ICS %R Init	Fin	Mtrix Spik	Lab Dup RPD Diff	LCS %R	Ser Dil %D	Meth
Al	200		N/A																			
Sb	60																					
As	10	2			92	94	107				U	U	U									F
Ba	200	16			101						U											P
Be	5																					
Cd	5	2			104						U											P
Ca	5000																					
Cr	10	4			100						U											P
Co	50																					
Cu	25	6			104						U											P
Fe	100	46			102						48.2											P
Pb	3	2		107	105	103		73		U	U	U	U									F
Mg	5000																					
Mn	15	2			100						U											P
Hg	0.2				105	106	106				U	U	U	U								CV
Ni	40																					
K	5000																					
Se	5	2			99	93	102	158	252		U	U	U									F
Ag	10	3			104						U											P
Na	5000	110			104						178											P
Tl	10																					
V	50																					
Zn	20	6			105						U											P
CN	10																					

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited parameters) Date: 2/22/92 Case #: SLP 280

Site: Naval Weapons Station Lab Name: Roy F. Weston

Reviewer's Initials: PBH Number of Samples: 6 Samples

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Inter-ferences	Spike Recovery	Duplicates Lab	Duplicates Field	Detection Limits	LCS	Serial Dilution	MSA	Total Analytes	Rejection
ICP														
Flame AA														
Furnace AA		2											2	
Mercury														
Total		2											2	
Other														

Analytes Flagged as Estimated (J) Due to Exceeding Criteria For:*

ICP											1		1	
Flame AA														
Furnace AA						1						1	2	
Mercury														
Total						1					1	1	3	
Other														

Note:
Asterisk (*) Indicates additional exceedances of review criteria.

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.7: CLP Data Assessment Checklist
Inorganic Analysis

Date: Feb. 1990
Number: HW-2
Revision: 10

INORGANIC REGIONAL DATA ASSESSMENT

Region____

CASE NO.____

SITE Naval Weapons Station

LABORATORY Roy F. Weston

NO. OF SAMPLES/ MATRIX 6 waters

SDG# CLP 280

REVIEWER (IF NOT ESD) Heartland ESI

SOW# 390

REVIEWER'S NAME Paul B. Humber

DPO: ACTION____ FYI____

COMPLETION DATE 2/27/92

DATA ASSESSMENT SUMMARY

		ICP	AA	Hg	CYANIDE
1.	HOLDING TIMES	O	O	O	NA
2.	CALIBRATIONS	↓	M	↓	↓
3.	BLANKS	↓	O	↓	↓
4.	ICS	↓	↓	↓	↓
5.	LCS	↓	O	↓	↓
6.	DUPLICATE ANALYSIS	↓	O	↓	↓
7.	MATRIX SPIKE	↓	O	↓	↓
8.	MSA	↓	O	↓	↓
9.	SERIAL DILUTION	↓	O	↓	↓
10.	SAMPLE VERIFICATION	↓	O	↓	↓
11.	OTHER QC	↓	O	↓	↓
12.	OVERALL ASSESSMENT	↓	O	↓	↓

O = Data has no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.

ACTION ITEMS:

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Seven (7) water samples and one (1) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
3-M002	911009401
4-M002	911009402
1-M002	911009403
5-M002	911009404
5-M202	911009405
2-M002	911009406
6-M002	911009407

Heartland ESI has reviewed the data for the samples listed above for Ground Water parameters using good professional judgement in context with the methods from the USEPA Method for Chemical Analysis of Water and Wastes and the Standard Methods for the Examination of Water and Waterwater 16 ed. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

Ground water Parameters reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Groundwater Parameters

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110094**, the analysis of seven (7) field water samples and one (1) matrix spike and duplicate pair. Overall, the groundwater parameter data quality was good. The USEPA analytical protocol was followed as required.

Specific QA/QC deficiency **Findings** are listed numerically in the following categories:

Holding Times

The holding times were met as specified in by USEPA. Protocol.

Calibration

No deficiencies in this section.

Preparation and Field Blanks

No deficiencies in this section.

Spike Recovery

1. The Matris Spike recovery for CODs was below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

Matrix Spike Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	COD	+/U	J/UJ	1

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 11/14/91

CLIENT: NAVAL WEAPONS/COLTSNECK
WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9110L094

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS		REPORTING LIMIT
-001	10-003-M002	BOD 5 Day	1.0 u	MG/L		1.0
		Chloride	8.1	MG/L		5.0
		Chemical Oxygen Demand	5.0 u	MG/L	UJ1	5.0
		Ammonia, as N	0.10 u	MG/L		0.10
		Nitrite, as N	0.10 u	MG/L		0.10
		Nitrate, as N	0.24	MG/L		0.10
		Phosphate, as P	0.030	MG/L		0.020
		Sulfate	16.0	MG/L		5.0
		Turbidity	139	NTU		0.050
-002	10-004-M002	BOD 5 Day	2.7	MG/L		1.0
		Chloride	8.0	MG/L		5.0
		Chemical Oxygen Demand	52.9	MG/L	J1	10.0
		Ammonia, as N	0.10 u	MG/L		0.10
		Nitrite, as N	0.10 u	MG/L		0.10
		Nitrate, as N	0.22	MG/L		0.10
		Phosphate, as P	0.16	MG/L		0.040
		Sulfate	18.8	MG/L		5.0
		Turbidity	967	NTU		0.050
-003	10-001-M002	BOD 5 Day	1.0 u	MG/L		1.0
		Chloride	47.3	MG/L		5.0
		Chemical Oxygen Demand	32.7	MG/L	J1	10.0
		Ammonia, as N	0.10 u	MG/L		0.10
		Nitrite, as N	0.10 u	MG/L		0.10
		Nitrate, as N	0.26	MG/L		0.10
		Phosphate, as P	0.030	MG/L		0.020
		Sulfate	52.5	MG/L		10.0
		Turbidity	171	NTU		0.050
-004	10-005-M002	BOD 5 Day	3.2	MG/L		1.0
		Chloride	6.9	MG/L		5.0
		Chemical Oxygen Demand	81.6	MG/L	J1	10.0
		Ammonia, as N	0.38	MG/L		0.10
		Nitrite, as N	0.10 u	MG/L		0.10
		Nitrate, as N	0.20	MG/L		0.10
		Phosphate, as P	0.30	MG/L		0.040
		Sulfate	5.0 u	MG/L		5.0
		Turbidity	751	NTU		0.050

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 11/14/91

CLIENT: NAVAL WEAPONS/COLTSNECK
WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9110L094

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS		REPORTING LIMIT
-005	10-005-M202	BOD 5 Day	1.0 u	MG/L		1.0
		Chloride	5.0 u	MG/L		5.0
		Chemical Oxygen Demand	9.2	MG/L	J1	5.0
		Ammonia, as N	0.10 u	MG/L		0.10
		Nitrite, as N	0.10 u	MG/L		0.10
		Nitrate, as N	0.10	MG/L		0.10
		Phosphate, as P	0.020u	MG/L		0.020
		Sulfate	5.0 u	MG/L		5.0
		Turbidity	0.23	NTU		0.050
-006	10-002-M002	BOD 5 Day	1.0 u	MG/L		1.0
		Chloride	5.0 u	MG/L		5.0
		Chemical Oxygen Demand	5.0 u	MG/L	UJ1	5.0
		Ammonia, as N	0.10 u	MG/L		0.10
		Nitrite, as N	0.10 u	MG/L		0.10
		Nitrate, as N	0.10 u	MG/L		0.10
		Phosphate, as P	0.020u	MG/L		0.020
		Sulfate	17.2	MG/L		5.0
		Turbidity	45.0	NTU		0.050
-007	10-006-M002	BOD 5 Day	1.0 u	MG/L		1.0
		Chloride	10.8	MG/L		5.0
		Chemical Oxygen Demand	70.1	MG/L	J1	10.0
		Ammonia, as N	0.10 u	MG/L		0.10
		Nitrite, as N	0.10 u	MG/L		0.10
		Nitrate, as N	0.10 u	MG/L		0.10
		Phosphate, as P	0.062	MG/L		0.020
		Sulfate	39.1	MG/L		20.0
		Turbidity	114	NTU		0.050

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Two (2) water samples and one (1) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
7-M002	911010801
7-M102	911010802

Heartland ESI has reviewed the data for the samples listed above for Ground Water parameters using good professional judgement in context with the methods from the USEPA Method for Chemical Analysis of Water and Wastes and the Standard Methods for the Examination of Water and Waterwater 16 ed. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

Ground water Parameters reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Groundwater Parameters

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110108**, the analysis of two (2) field water samples and one (1) matrix spike and duplicate pair. Overall, the groundwater parameter data quality was good. The USEPA analytical protocol was followed as required.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in by USEPA. Protocol.

Calibration

No deficiencies in this section.

Preparation and Field Blanks

No deficiencies in this section.

Spike Recovery

No deficiencies in this section.

Matrix Spike Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING

Data stands as reported with no qualification.

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 11/14/91

CLIENT: NAVAL WEAPONS/COLTSNECK
WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9110L108

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-001	10-007-M002	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	5.9	MG/L	5.0
		Chemical Oxygen Demand	52.9	MG/L	10.0
		Ammonia, as N	0.26	MG/L	0.10
		Nitrite, as N	0.10 u	MG/L	0.10
		Nitrate, as N	0.10 u	MG/L	0.10
		Phosphate, as P	0.13	MG/L	0.020
		Sulfate	46.6	MG/L	10.0
		Turbidity	319	NTU	0.050
-002	10-007-M102	BOD 5 Day	1.7	MG/L	1.0
		Chloride	5.8	MG/L	5.0
		Chemical Oxygen Demand	32.7	MG/L	10.0
		Ammonia, as N	0.25	MG/L	0.10
		Nitrite, as N	0.10 u	MG/L	0.10
		Nitrate, as N	0.10 u	MG/L	0.10
		Phosphate, as P	0.089	MG/L	0.020
		Sulfate	24.6	MG/L	20.0
		Turbidity	177	NTU	0.050

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Eight (8) water sample and one (1) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
1-M002	911021101
2-M002	911021102
3-M002	911021103
4-M002	911021104
5-M002	911021105
7-M002	911021106
8-M002	911021107
8-M202	911021108

Heartland ESI has reviewed the data for the samples listed above for Ground Water parameters using good professional judgement in context with the methods from the USEPA Method for Chemical Analysis of Water and Wastes and the Standard Methods for the Examination of Water and Waterwater 16 ed. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

Ground water Parameters reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Groundwater Parameters

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110211**, the analysis of eight (8) field water sample and one (1) matrix spike and duplicate pair. Overall, the groundwater parameter data quality was good. The USEPA analytical protocol was followed as required.

Specific QA/QC deficiency **Findings** are listed numerically in the following categories:

Holding Times

The holding times were met as specified in by USEPA. Protocol.

Calibration

No deficiencies in this section.

Preparation and Field Blanks

1. The Preparation Blank for COD was above the IDL. All data is qualified as estimated.

Spike Recovery

No deficiencies in this section.

Matrix Spike Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	COD	+/U	J/UJ	1

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 11/27/91

CLIENT: NAVAL WEAPONS/COLTSNECK
WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9110L211

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-001	05-001-M002	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	7.6	MG/L	5.0
		Chemical Oxygen Demand	21.0	MG/L J1	0.50
		Ammonia, as N	0.10 u	MG/L	0.10
		Nitrite, as N	0.10 u	MG/L	0.10
		Nitrate, as N	0.16	MG/L	0.10
		Phosphate, as P	0.25	MG/L	0.050
		Sulfate	11.7	MG/L	5.0
		Turbidity	1710	NTU	0.050
-002	05-002-M002	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	8.9	MG/L	5.0
		Chemical Oxygen Demand	18.1	MG/L J1	0.50
		Ammonia, as N	0.10 u	MG/L	0.10
		Nitrite, as N	0.10 u	MG/L	0.10
		Nitrate, as N	0.14	MG/L	0.10
		Phosphate, as P	0.17	MG/L	0.050
		Sulfate	28.5	MG/L	5.0
		Turbidity	1530	NTU	0.050
-003	05-003-M002	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	7.2	MG/L	5.0
		Chemical Oxygen Demand	9.4	MG/L J1	0.50
		Ammonia, as N	0.10 u	MG/L	0.10
		Nitrite, as N	0.10 u	MG/L	0.10
		Nitrate, as N	0.28	MG/L	0.10
		Phosphate, as P	0.050u	MG/L	0.050
		Sulfate	89.9	MG/L	20.0
		Turbidity	53.0	NTU	0.050
-004	05-004-M002	BOD 5 Day	1.4	MG/L	1.0
		Chloride	8.3	MG/L	5.0
		Chemical Oxygen Demand	31.2	MG/L J1	0.50
		Ammonia, as N	0.10 u	MG/L	0.10
		Nitrite, as N	0.10 u	MG/L	0.10
		Nitrate, as N	0.13	MG/L	0.10
		Phosphate, as P	0.088	MG/L	0.050
		Sulfate	18.7	MG/L	5.0
		Turbidity	331	NTU	0.050

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 11/27/91

CLIENT: NAVAL WEAPONS/COLTSNECK
WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9110L211

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-005	05-005-M002	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	24.1	MG/L	5.0
		Chemical Oxygen Demand	22.5	MG/L J1	0.50
		Ammonia, as N	0.10 u	MG/L	0.10
		Nitrite, as N	0.10 u	MG/L	0.10
		Nitrate, as N	0.13	MG/L	0.10
		Phosphate, as P	0.16	MG/L	0.050
		Sulfate	43.2	MG/L	10.0
		Turbidity	211	NTU	0.050
-006	05-007-M002	BOD 5 Day	3.6	MG/L	1.0
		Chloride	11.2	MG/L	5.0
		Chemical Oxygen Demand	60.3	MG/L J1	0.50
		Ammonia, as N	0.10 u	MG/L	0.10
		Nitrite, as N	0.10 u	MG/L	0.10
		Nitrate, as N	0.63	MG/L	0.10
		Phosphate, as P	1.2	MG/L	0.10
		Sulfate	184	MG/L	50.0
		Turbidity	644	NTU	0.050
-007	05-008-M002	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	7.7	MG/L	5.0
		Chemical Oxygen Demand	21.0	MG/L J1	0.50
		Ammonia, as N	0.10 u	MG/L	0.10
		Nitrite, as N	0.10 u	MG/L	0.10
		Nitrate, as N	0.10 u	MG/L	0.10
		Phosphate, as P	0.050u	MG/L	0.050
		Sulfate	15.0	MG/L	5.0
		Turbidity	182	NTU	0.050
-008	05-008-M202	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	5.0 u	MG/L	5.0
		Chemical Oxygen Demand	7.9	MG/L J1	0.50
		Ammonia, as N	0.10 u	MG/L	0.10
		Nitrite, as N	0.10 u	MG/L	0.10
		Nitrate, as N	0.10 u	MG/L	0.10
		Phosphate, as P	0.025u	MG/L	0.025
		Sulfate	5.0 u	MG/L	5.0
		Turbidity	0.050u	NTU	0.050

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Three (3) water samples and one (1) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
6-M002	911023501
6-M202	911023502
5-M002	911023503

Heartland ESI has reviewed the data for the samples listed above for Ground Water parameters using good professional judgement in context with the methods from the USEPA Method for Chemical Analysis of Water and Wastes and the Standard Methods for the Examination of Water and Waterwater 16 ed. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

Ground water Parameters reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Groundwater Parameters

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110235**, the analysis of three (3) field water samples and one (1) matrix spike and duplicate pair. Overall, the groundwater parameter data quality was good. The USEPA analytical protocol was followed as required.

Specific QA/QC deficiency **Findings** are listed numerically in the following categories:

Holding Times

The holding times were met as specified in by USEPA. Protocol.

Calibration

No deficiencies in this section.

Preparation and Field Blanks

1. The COD Preparation Blank exhibited contamination above the IDL. All positive data is estimated.

Spike Recovery

2. The Matrix Spike recovery for Nitrite/Nitrate was below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

Matrix Spike Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	COD	+	J	1
All Water Samples	No2/No3	+/U	J/UJ	2

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 12/09/91

CLIENT: NAVAL WEAPONS/COLTSNECK
WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9110L235

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-001	03-006-M002	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	5.3	MG/L	5.0
		Chemical Oxygen Demand	96.8	MG/L J1	5.0
		Nitrate Nitrite	0.60	MG-N/L J2	0.10
		Ammonia, as N	0.10 u	MG/L	0.10
		Phosphate, as P	0.60	MG/L	0.050
		Sulfate	13.8	MG/L	5.0
		Turbidity	325	NTU	0.050
-002	03-006-M202	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	5.0 u	MG/L	5.0
		Chemical Oxygen Demand	13.8	MG/L J1	0.50
		Nitrate Nitrite	0.27	MG-N/L J2	0.10
		Ammonia, as N	0.10 u	MG/L	0.10
		Phosphate, as P	0.025u	MG/L	0.025
		Sulfate	5.0 u	MG/L	5.0
		Turbidity	0.070	NTU	0.050
-003	03-005-M002	BOD 5 Day	7.1	MG/L	1.0
		Chloride	6.2	MG/L	5.0
		Chemical Oxygen Demand	235	MG/L J1	5.0
		Nitrate Nitrite	1.9	MG-N/L J2	0.10
		Ammonia, as N	1.6	MG/L	0.10
		Phosphate, as P	0.78	MG/L	0.050
		Sulfate	64.9	MG/L	10.0
		Turbidity	341	NTU	0.050

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Six (6) water sample and one (1) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
1-M002	911028001
7-M002	911028002
7-M102	911028003
6-M002	911028004
6-M102	911028005
6-M202	911028006

Heartland ESI has reviewed the data for the samples listed above for Ground Water parameters using good professional judgement in context with the methods from the USEPA Method for Chemical Analysis of Water and Wastes and the Standard Methods for the Examination of Water and Waterwater 16 ed. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

Ground water Parameters reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Groundwater Parameters

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110280**, the analysis of six (6) field water sample and one (1) matrix spike and duplicate pair. Overall, the groundwater parameter data quality was good. The USEPA analytical protocol was followed as required.

Specific QA/QC deficiency **Findings** are listed numerically in the following categories:

Holding Times

The holding times were met as specified in by USEPA. Protocol.

Calibration

No deficiencies in this section.

Preparation and Field Blanks

No deficiencies in this section.

Spike Recovery

1. The Matrix Spike recovery for Phosphate was above the upper control limit. All positive results are qualified as estimated, "J".

2. The Matrix Spike recovery for Nitrite/Nitrate was below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

Matrix Spike Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	Phosphate	+	J	1
All Water Samples	NO2/NO3	+/U	J/UJ	2

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 12/09/91

CLIENT: NAVAL WEAPONS/COLTSNECK
WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9111L280

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-001	03-001-M002	BOD 5 Day	3.5	MG/L	1.0
		Chloride	8.8	MG/L	5.0
		Chemical Oxygen Demand	1810	MG/L	250
		Nitrate Nitrite	0.32	MG-N/L J2	0.10
		Ammonia, as N	0.31	MG/L	0.10
		Phosphate, as P	0.20	MG/L J1	0.050
		Sulfate	74.6	MG/L	10.0
		Turbidity	785	NTU	0.050
-002	03-007-M002	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	6.0	MG/L	5.0
		Chemical Oxygen Demand	106	MG/L	5.0
		Nitrate Nitrite	0.77	MG-N/L J2	0.10
		Ammonia, as N	1.9	MG/L	0.10
		Phosphate, as P	0.14	MG/L J1	0.050
		Sulfate	99.1	MG/L	20.0
		Turbidity	1240	NTU	0.050
-003	03-007-M102	BOD 5 Day	1.1	MG/L	1.0
		Chloride	5.9	MG/L	5.0
		Chemical Oxygen Demand	32.5	MG/L	5.0
		Nitrate Nitrite	0.71	MG-N/L J2	0.10
		Ammonia, as N	1.8	MG/L	0.10
		Phosphate, as P	0.11	MG/L J1	0.050
		Sulfate	87.5	MG/L	20.0
		Turbidity	463	NTU	0.050

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 12/09/91

CLIENT: NAVAL WEAPONS/COLTSNECK
WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9111L280

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-004	05-006-M002	BOD 5 Day	6.3	MG/L	1.0
		Chloride	47.2	MG/L	5.0
		Chemical Oxygen Demand	48.4	MG/L	5.0
		Nitrate Nitrite	0.23	MG-N/L J2	0.10
		Ammonia, as N	0.34	MG/L	0.10
		Phosphate, as P	0.31	MG/L J1	0.050
		Sulfate	93.3	MG/L	20.0
		Turbidity	835	NTU	0.050
-005	05-006-M102	BOD 5 Day	2.3	MG/L	1.0
		Chloride	45.0	MG/L	5.0
		Chemical Oxygen Demand	29.5	MG/L	5.0
		Nitrate Nitrite	0.18	MG-N/L J2	0.10
		Ammonia, as N	0.11	MG/L	0.10
		Phosphate, as P	0.25	MG/L J1	0.050
		Sulfate	91.7	MG/L	20.0
		Turbidity	7380	NTU	0.050
-006	05-006-M202	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	5.0 u	MG/L	5.0
		Chemical Oxygen Demand	5.0 u	MG/L	5.0
		Nitrate Nitrite	0.17	MG-N/L J2	0.10
		Ammonia, as N	0.10 u	MG/L	0.10
		Phosphate, as P	0.025u	MG/L	0.025
		Sulfate	5.0 u	MG/L	5.0
		Turbidity	0.61	NTU	0.050

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Seven (7) water samples and one (1) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
1-M002	911018101
2-M002	911018102
3-M002	911018103
3-M202	911018104
4-M002	911018105
4-M102	911018106
5-M002	911018107

Heartland ESI has reviewed the data for the samples listed above for Ground Water parameters using good professional judgement in context with the methods from the USEPA Method for Chemical Analysis of Water and Wastes and the Standard Methods for the Examination of Water and Waterwater 16 ed. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

Ground water Parameters reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Groundwater Parameters

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110181**, the analysis of seven (7) field water samples and one (1) matrix spike and duplicate pair. Overall, the groundwater parameter data quality was good. The USEPA analytical protocol was followed as required.

Specific QA/QC deficiency **Findings** are listed numerically in the following categories:

Holding Times

The holding times were met as specified in by USEPA. Protocol.

Calibration

No deficiencies in this section.

Preparation and Field Blanks

1. The COD Preparation Blank exhibited contamination above the IDL. All positive data is estimated.

Spike Recovery

2. The Matris Spike recovery for Nitrite/Nitrate was below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".

Matrix Spike Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	COD	+	J	1
All Water Samples	No2/No3	+/U	J/UJ	2

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 12/09/91

CLIENT: NAVAL WEAPONS/COLTSNECK
WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9110L181

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS		REPORTING LIMIT
-001	07-001-M002	BOD 5 Day	3.3	MG/L		1.0
		Chloride	50.0 u	MG/L		50.0
		Chemical Oxygen Demand	126	MG/L	J1	1.0
		Nitrate Nitrite	0.30	MG-N/L	J2	0.10
		Ammonia, as N	0.10 u	MG/L		0.10
		Phosphate, as P	0.15	MG/L		0.050
		Sulfate	6.7	MG/L		5.0
		Turbidity	553	NTU		0.050
-002	07-002-M002	BOD 5 Day	1.0 u	MG/L		1.0
		Chloride	27.6	MG/L		5.0
		Chemical Oxygen Demand	35.6	MG/L	J1	0.50
		Nitrate Nitrite	2.0	MG-N/L	J2	0.10
		Ammonia, as N	2.1	MG/L		0.10
		Phosphate, as P	0.052	MG/L		0.050
		Sulfate	36.4	MG/L		5.0
		Turbidity	46.6	NTU		0.050
-003	07-003-M002	BOD 5 Day	3.0	MG/L		1.0
		Chloride	8.1	MG/L		5.0
		Chemical Oxygen Demand	12.3	MG/L	J1	0.50
		Nitrate Nitrite	0.29	MG-N/L	J2	0.10
		Ammonia, as N	0.10 u	MG/L		0.10
		Phosphate, as P	0.050u	MG/L		0.050
		Sulfate	8.6	MG/L		5.0
		Turbidity	88.1	NTU		0.050
-004	07-003-M202	BOD 5 Day	1.0 u	MG/L		1.0
		Chloride	5.0 u	MG/L		5.0
		Chemical Oxygen Demand	13.8	MG/L	J1	0.50
		Nitrate Nitrite	0.24	MG-N/L	J2	0.10
		Ammonia, as N	0.10 u	MG/L		0.10
		Phosphate, as P	0.025u	MG/L		0.025
		Sulfate	5.0 u	MG/L		5.0
		Turbidity	0.11	NTU		0.050

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 12/09/91

CLIENT: NAVAL WEAPONS/COLTSNECK
WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9110L181

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS		REPORTING LIMIT
-005	07-004-M002	BOD 5 Day	4.8	MG/L		1.0
		Chloride	15.9	MG/L		5.0
		Chemical Oxygen Demand	221	MG/L	J1	2.5
		Nitrate Nitrite	0.25	MG-N/L	J2	0.10
		Ammonia, as N	0.10 u	MG/L		0.10
		Phosphate, as P	1.4	MG/L		0.10
		Sulfate	17.4	MG/L		5.0
		Turbidity	1850	NTU		0.050
-006	07-004-M102	BOD 5 Day	3.9	MG/L		1.0
		Chloride	15.2	MG/L		5.0
		Chemical Oxygen Demand	156	MG/L	J1	2.5
		Nitrate Nitrite	0.23	MG-N/L	J2	0.10
		Ammonia, as N	0.10 u	MG/L		0.10
		Phosphate, as P	0.99	MG/L		0.050
		Sulfate	18.6	MG/L		5.0
		Turbidity	2160	NTU		0.050
-007	07-005-M002	BOD 5 Day	8.6	MG/L		1.0
		Chloride	28.2	MG/L		5.0
		Chemical Oxygen Demand	323	MG/L	J1	2.5
		Nitrate Nitrite	0.18	MG-N/L	J2	0.10
		Ammonia, as N	0.10 u	MG/L		0.10
		Phosphate, as P	1.4	MG/L		0.10
		Sulfate	39.3	MG/L		5.0
		Turbidity	3580	NTU		0.050

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

February 28, 1992

TO: John Williams Jr.
Project Manager
Roy F. Weston Inc.

FROM: Paul Humburg
Project Manager
Heartland ESI.

SUBJECT: Submittal of Data Validation results for Naval Weapons Station, New Jersey. Eight (8) water sample and one (1) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

Navy No.	RFW No.
1-M002	911012601
2-M002	911012603
2-M102	911012604
3-M002	911012605
4-M002	911012606
4-M202	911012607
5-M002	911012608
6-M002	911012609

Heartland ESI has reviewed the data for the samples listed above for Ground Water parameters using good professional judgement in context with the methods from the USEPA Method for Chemical Analysis of Water and Wastes and the Standard Methods for the Examination of Water and Waterwater 16 ed. Analytical data in this report were screened to determine usability of the results and also to determine contractual compliance relative to the requirements and deliverables of the Region II Protocol. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Inorganic fraction was reviewed as follows:

Ground water Parameters reviewed by Paul B. Humburg

Please refer to the Annotated From 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

DATA ASSESSMENT NARRATIVE
Groundwater Parameters

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations and reported results are reviewed utilizing the raw instrument data. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Naval Weapons Station,N.J., SDG# 9110126**, the analysis of eight (8) field water sample and one (1) matrix spike and duplicate pair. Overall, the groundwater parameter data quality was good. The USEPA analytical protocol was followed as required.

Specific QA/QC deficiency **Findings** are listed numerically in the following categories:

Holding Times

The holding times were met as specified in by USEPA. Protocol.

Calibration

No deficiencies in this section.

Preparation and Field Blanks

No deficiencies in this section.

Spike Recovery

1. The Matrix Spike recoveries for Phosphate and Chloride were above the upper control limit. All positive results are qualified as estimated, "J".

Matrix Spike Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

HEARTLAND ENVIRONMENTAL
SERVICES, INC.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All Water Samples	Phosphate Chloride	+	J	1

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 11/26/91

CLIENT: NAVAL WEAPONS/COLTSNECK
WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9110L126

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS		REPORTING LIMIT
-001	04-001-M002	BOD 5 Day	1.0 u	MG/L		1.0
		Chloride	6.3	MG/L	J1	5.0
		Chemical Oxygen Demand	9.1	MG/L		5.0
		Ammonia, as N	0.10 u	MG/L		0.10
		Nitrite, as N	0.10 u	MG-N/L		0.10
		Nitrate, as N	0.16	MG-N/L		0.10
		Phosphate, as P	0.050u	MG/L	~~J~~ PBH	0.050
		Sulfate	23.8	MG/L		5.0
		Turbidity	0.080	NTU	2/28/92	0.050
-003	04-002-M002	BOD 5 Day	1.0 u	MG/L		1.0
		Chloride	6.5	MG/L	J1	5.0
		Chemical Oxygen Demand	39.4	MG/L		5.0
		Ammonia, as N	0.29	MG/L		0.10
		Nitrite, as N	0.10 u	MG-N/L		0.10
		Nitrate, as N	0.10 u	MG-N/L		0.10
		Phosphate, as P	0.050u	MG/L		0.050
		Sulfate	31.2	MG/L		5.0
		Turbidity	336	NTU		0.050
-004	04-002-M102	BOD 5 Day	1.4	MG/L		1.0
		Chloride	6.2	MG/L	J1	5.0
		Chemical Oxygen Demand	36.5	MG/L		5.0
		Ammonia, as N	0.29	MG/L		0.10
		Nitrite, as N	0.10 u	MG-N/L		0.10
		Nitrate, as N	0.10 u	MG-N/L		0.10
		Phosphate, as P	0.050u	MG/L		0.050
		Sulfate	30.7	MG/L		5.0
		Turbidity	314	NTU		0.050

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 11/26/91

CLIENT: NAVAL WEAPONS/COLTSNECK
WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9110L126

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-005	04-003-M002	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	5.0 u	MG/L	5.0
		Chemical Oxygen Demand	23.5	MG/L	5.0
		Ammonia, as N	0.10 u	MG/L	0.10
		Nitrite, as N	0.10 u	MG-N/L	0.10
		Nitrate, as N	0.12	MG-N/L	0.10
		Phosphate, as P	0.050u	MG/L	0.050
		Sulfate	10.5	MG/L	5.0
		Turbidity	0.070	NTU	0.050
-006	04-004-M002	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	5.0 u	MG/L	5.0
		Chemical Oxygen Demand	24.0	MG/L	10.0
		Ammonia, as N	0.10 u	MG/L	0.10
		Nitrite, as N	0.10 u	MG-N/L	0.10
		Nitrate, as N	0.13	MG-N/L	0.10
		Phosphate, as P	0.35	MG/L J1	0.050
		Sulfate	11.4	MG/L	5.0
		Turbidity	1120	NTU	0.050
-007	04-004-M202	BOD 5 Day	1.1	MG/L	1.0
		Chloride	5.0 u	MG/L	5.0
		Chemical Oxygen Demand	20.7	MG/L	5.0
		Ammonia, as N	0.10 u	MG/L	0.10
		Nitrite, as N	0.10 u	MG-N/L	0.10
		Nitrate, as N	0.10 u	MG-N/L	0.10
		Phosphate, as P	0.025u	MG/L	0.025
		Sulfate	5.0 u	MG/L	5.0
		Turbidity	0.19	NTU	0.050

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 11/26/91

CLIENT: NAVAL WEAPONS/COLTSNECK WESTON BATCH #: 9110L126
WORK ORDER: 1771-15-03-0000

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-008	04-005-M002	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	5.6	MG/L J1	5.0
		Chemical Oxygen Demand	14.9	MG/L	5.0
		Ammonia, as N	0.10 u	MG/L	0.10
		Nitrite, as N	0.10 u	MG-N/L	0.10
		Nitrate, as N	0.25	MG-N/L	0.10
		Phosphate, as P	0.050u	MG/L	0.050
		Sulfate	13.6	MG/L	5.0
		Turbidity	186	NTU	0.050
-009	04-006-M002	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	5.9	MG/L J1	5.0
		Chemical Oxygen Demand	16.3	MG/L	5.0
		Ammonia, as N	0.10 u	MG/L	0.10
		Nitrite, as N	0.10 u	MG-N/L	0.10
		Nitrate, as N	0.11	MG-N/L	0.10
		Phosphate, as P	0.025u	MG/L	0.025
		Sulfate	10.5	MG/L	5.0
		Turbidity	15.1	NTU	0.050