



April 26, 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 samples and one (1) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

<u>Navy No.</u>	<u>RFW No.</u>
4-M003	911154801
5-M003	911154802
5-M203	911154803
3-M003	911154804

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 Form 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

000001

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# 9111548, the analysis of four (4) field water sample and one (1) matrix spike and duplicate pair. Overall, the inorganic data quality was fair.

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 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 Standard for Zinc was above the upper control limit. All positive results are qualified as estimated, "J" 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.

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Spike Recovery

3. The Matrix Spike recovery for Silver was below 30%. All positive and non-detect results are rejected.
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".

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".

<u>Analyte</u>	<u>Samples</u>
Arsenic	4-M003.
Lead	4-M003.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
All water samples	Pb and Se	+/U	R	1
All water samples	Zn	+	J	2
All water samples	Ag	+/U	R	3
All water samples	As and Pb	+/U	J/UJ	4
4-M003 4-M003	As Pb	+/U	J/UJ	5

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

3-M003

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP548

Matrix (soil/water): WATER

Lab Sample ID: 911154801

Level (low/med): LOW

Date Received: 11/26/91

% 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		N	F J4
7440-39-3	Barium	52.00	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	427.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	18.30	B		P
7439-89-6	Iron	63400.00			P
7439-92-1	Lead	36.40		N*	F J4
7439-95-4	Magnesium				NR
7439-96-5	Manganese	53.60			P
7439-97-6	Mercury	.27			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 N		P R3
7440-23-5	Sodium	3150.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	89.30			P
	Cyanide				NR

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Clarity After: CLEAR

Artifacts:

Comments:

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U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

4-M003

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP548

Matrix (soil/water): WATER Lab Sample ID: 911154802

Level (low/med): LOW Date Received: 11/26/91

% 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
7440-39-3	Barium	42.60	B		F
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		F
7440-70-2	Calcium				NR
7440-47-3	Chromium	36.80			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		F
7439-89-6	Iron	5130.00			F
7439-92-1	Lead	2.80	B	*NW	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	15.70			F
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	N	F
7440-23-5	Sodium	7200.00			F
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	23.80			F
	Cyanide				NR

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Color After: COLORLESS Clarity After: CLEAR Artifacts:
Comments:

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U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

5-M003

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP548

Matrix (soil/water): WATER Lab Sample ID: 911154803

Level (low/med): LOW Date Received: 11/26/91

% 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 034
7440-39-3	Barium	38.20	B		F
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	64.70			F
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	10000.00			P
7439-92-1	Lead	3.80		*N	F R1
7439-95-4	Magnesium				NR
7439-96-5	Manganese	24.50			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 R1
7440-22-4	Silver	10.00	U	N	F R3
7440-23-5	Sodium	2550.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	24.00			P J2
	Cyanide				NR

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Comments:

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U.S. EPA - CLP

SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

5-M203

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP548

Matrix (soil/water): WATER Lab Sample ID: 911154804

Level (low/med): LOW Date Received: 11/26/91

% 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
7440-39-3	Barium	16.00	U		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		F
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	65.10	B		P
7439-92-1	Lead	2.00	U	*N	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
7440-22-4	Silver	10.00	U	N	F
7440-23-5	Sodium	857.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	6.00	U		P
	Cyanide				NR

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FORM I - IN

03/90

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STANDARD OPERATING PROCEDURE

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
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	YES	NO	N/A
A.1.1 <u>Contract Compliance Screening Report (CCS)</u> - Present? ACTION: If no, contact RSOC.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.2 <u>Record of Communication (from RSOC)</u> - Present? ACTION: If no, request from RSOC.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.3 <u>Trip Report</u> - Present and complete? ACTION: If no, contact RSOC for trip report.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.4 <u>Sample Traffic Report</u> - Present or on file? Legible? ACTION: If no, request from Regional Sample Control Center (RSOC).	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
A.1.5 <u>Cover Page</u> - 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?	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
ACTION: If no for any of the above, contact RSOC for clarification.			

Title: Evaluation of Metals Data for the
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	YES	NO	N/A
A.1.6 <u>Form I (Final Data)</u> - Are all Form I's present and complete? <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	__	__
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?	<input checked="" type="checkbox"/>	__	__
Are soil sample results for each parameter corrected for percent solids?	<input type="checkbox"/>	__	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	__	__
Are computation/transcription errors less than 10% of reported values?	<input checked="" type="checkbox"/>	__	__
Are all "less than MCL" values properly coded with "U"?	<input checked="" type="checkbox"/>	__	__
Was a brief physical description of samples given on Form I's?	<input checked="" type="checkbox"/>	__	__
Were the result qualifiers used correctly with final data?	<input checked="" type="checkbox"/>	__	__
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?	__	<input checked="" type="checkbox"/>	__
If yes, were dilutions noted on Form I's?	<input checked="" type="checkbox"/>	__	__
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?	__	<input checked="" type="checkbox"/>	__
Cyanide distillation (14 days) exceeded?	__	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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	YES	NO	N/A
Other Metals analysis (6 months) exceeded?	—	<input checked="" type="checkbox"/>	—

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

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	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	<input checked="" type="checkbox"/>	---	---
Legible?	<input checked="" type="checkbox"/>	---	---
Properly Labeled?	<input checked="" type="checkbox"/>	---	---

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?	<input checked="" type="checkbox"/>	---	---
Is record of 5 point calibration present for Hg analysis?	<input checked="" type="checkbox"/>	---	---

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?	<input type="checkbox"/>	---	<input checked="" type="checkbox"/>
Furnace AA?	<input checked="" type="checkbox"/>	---	---
Cyanides?	<input type="checkbox"/>	---	<input checked="" type="checkbox"/>

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 $\pm 10\%$ of true value.
 2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRCL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

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YES NO N/A

ACTION: Flag associated data as estimated if standards are not within $\pm 10\%$ 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.

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.

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ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with \bar{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 (U), if the ICV or CCV \bar{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.

YES NO N/A

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 $2 \times CRDL$ (or $2 \times IDL$ 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 $\pm CRDL$
- ICP Analysis - **True Value $\pm 2CRDL$
- CN Analysis - **True Value $\pm 0.5 \times$ 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 $IDL > CRDL$.

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	YES	NO	N/A
A.1.9.3.2 Was CRU analyzed after ICV/ICB and before the final CCV/CCB, and for every four hours of ICP run?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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 CRU standards within control limits:
 Metals 80 - 120%R? PBH 4/23/92

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.

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	YES	NO	N/A
ACTION: If yes, reject (red-line) all associated data greater than CREL 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 IEL when IEL is greater than CREL?	<input checked="" type="checkbox"/>		
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 CREL?		<input checked="" type="checkbox"/>	
ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCREL.			
A.1.9.6 <u>Form IV (ICP Interference Check Sample)</u>			
A.1.9.6.1 Present and complete?	<input checked="" type="checkbox"/>		
(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)?	<input checked="" type="checkbox"/>		
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%)?	<input checked="" type="checkbox"/>		
If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	<input checked="" type="checkbox"/>		
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").			

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	YES	NO	N/A
<hr/>			
A.1.9.7 <u>Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)-</u> (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?	<input checked="" type="checkbox"/>	___	___
each matrix type?	<input checked="" type="checkbox"/>	___	___
each conc. range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	___	___
For both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	___	<input checked="" type="checkbox"/>
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?	___	<input checked="" type="checkbox"/>	___
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	___
If no, is sample concentration greater than or equal to four times spike concentration?	<input checked="" type="checkbox"/>	___	___
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.			

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	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) between 30-74%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) between 126-150%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(d) greater than 150%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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 MS_R,
 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%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) between 10-74%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) between 126-200%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) greater than 200%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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".

Topic: Evaluation of Metals Data for the
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	YES	NO	N/A
A.1.9.8 Form VI (Lab Duplicates)			
A.1.9.8.1 Present and complete for: each 20 samples?	<input checked="" type="checkbox"/>	—	—
each matrix type?	<input checked="" type="checkbox"/>	—	—
each concentration range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	—	—
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>

ACTION: If no for any the above, flag as estimated (J) all data >CRIL* 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 mg/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 >CRIL* 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 < ±CRIL)?

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 CRIL when IDL > CRIL.

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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 $10 \times CRDL^*$ YES NO N/A

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
 $Difference > \pm CRDL^*$

Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times $CRDL^*$ YES NO N/A

Is any **difference between sample and duplicate greater than $CRDL^*$ where sample and/or duplicate is less than 5 times $CRDL^*$ YES NO N/A

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
 $Difference > 2 \times CRDL^*$

Is any RPD (where sample and duplicate are both greater than or equal to 5 times $CRDL^*$) :

$> 100\%$ YES NO N/A

Is any **difference between sample and duplicate (where sample and/or duplicate is less than $5 \times CRDL^*$) :

$> 2 \times CRDL^*$ YES NO N/A

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

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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 ILL.
 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 ILL for CRDL when ILL > CRDL

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

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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 CRIL*

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

>100%?

— []

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

>2x *CRIL?

— []

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 IRL for CRIL when IRL > CRIL.

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

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	YES	NO	N/A
A.1.9.11 <u>FORM IX (ICP Serial Dilution) -</u>			
NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IIL.			
A.1.9.11.1 Was Serial Dilution analysis performed for:			
each 20 samples?	<input checked="" type="checkbox"/>	___	___
each matrix type?	<input checked="" type="checkbox"/>	___	___
each concentration range (i.e. low, med.)?	<input checked="" type="checkbox"/>	___	___
ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIILs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DPO report.			
.1.9.11.2 Was field blank(s) used for Serial Dilution Analysis?	___	<input checked="" type="checkbox"/>	___
ACTION: If yes, flag all associated data $\geq 10 \times$ IIL 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 IIL or greater.	<input checked="" type="checkbox"/>	___	___
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 IILs only. Are any % difference values:			
> 10%?	___	<input checked="" type="checkbox"/>	___
> 100%?	___	<input checked="" type="checkbox"/>	___

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YES NO NA

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 (FAA) OC 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 FAA?

[✓] -- --

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 pre-digestion spike recovery is within control limits of 75-125% or when SP4XSA.

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	YES	NO	N/A
A.1.9.13 <u>Form VIII (Method of Standard Addition Results)</u>			
A.1.9.13.1 Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is any Form I result coded with "S" or a "+"?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If yes, reject (red-line) affected data.			
A.1.9.13.3 Was *MSA required for any sample but not performed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is coefficient of correlation for MSA less than 0.995?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14 <u>Dissolved/Total or Inorganic/Total Analytes -</u>			
A.1.9.14.1 Were any analyses performed for dissolved as well as total analytes on the same sample(s)..	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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

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- 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 CREL as well as total concentration.
 2. Apply the following questions only if inorganic (or dissolved) results are (i) above CREL, and (ii) greater than total constituents.
 3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.

YES NO N/A

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".

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Compliance (Total Review - Inorganics)

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	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?	___	[<input checked="" type="checkbox"/>]	___
(b) all analytes analyzed by GFAA?	___	[<input checked="" type="checkbox"/>]	___
(c) all analytes analyzed by AA Flame?	___	[<input type="checkbox"/>]	[<input checked="" type="checkbox"/>]
(d) Mercury?	___	[<input checked="" type="checkbox"/>]	___
(e) Cyanide?	___	[<input type="checkbox"/>]	[<input checked="" type="checkbox"/>]

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 $CRDL$, $2 \times IDL$ when $IDL > CRDL$.

Do concentrations of field blank(s) fall below $CRDL$ (or $2 \times IDL$ 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.

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 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

Date: Feb. 1990
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	YES	NO	N/A
<u>A.1.9.17.3 Form XI (Linear Ranges)</u>			
Was any sample result higher than high linear range of ICP.	—	[<input checked="" type="checkbox"/>]	—
Was any sample result higher than the highest calibration standard for non-ICP parameters?	—	[<input checked="" type="checkbox"/>]	—
If yes for any of the above, was the sample diluted to obtain the result on Form I?	[<input checked="" type="checkbox"/>]	—	—
<u>ACTION:</u> 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%?	—	[<input type="checkbox"/>]	[<input checked="" type="checkbox"/>]
<u>ACTION:</u> If yes, qualify as estimated all data not previously rejected or flagged due to other QC criteria.			

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Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Feb. 1990
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Case#	<u>NWS</u>	Site	<u>Naval Weapons Station</u>	Matrix: Soil	<u> </u>
SG#	<u>CLP 54P</u>	Lab	<u>Roy F. Weston</u>	Water	<u>✓</u>
Contractor	<u>Roy F. Weston</u>	Reviewer	<u>Heartland ESI</u>	Other	<u> </u>

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. The CRDL Standards for Lead and Selenium were below 50%. All data is rejected.
2. The CRDL Standard for Zinc was above the upper control limit. All positive results are qualified as estimated.
3. The Matrix Spike recovery for Silver was below 30%. All data rejected.
4. The Matrix Spike recoveries for Arsenic and Lead were below the lower control limit. All data qualified as estimated.

PBH 4/23/92

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Date: Feb. 1990
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PBH 4/23/92

...2.2 Contract-Problems/Non-Compliance

PBH 4/23/92

M-S Reviewer:

Signature

Date:

Contractor Reviewer:

Signature

Date:

Verified by:

Signature

Date:

LABORATORY: Roy F. Weston CASE NO. NWS SW NO. 390 SAMPLE TYPE/SDG: CLP 588

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 3-M003, 4-M003, 5-M003

5-M203

FIELD DUP. #'S: _____ LAB DUP. #'S: 3-M003 Field Blank _____ MATRIX SPIKE #: 3-M003

SERIAL DILUTION SAMPLE NO. 3-M003 COMPLETION DATE: 4/23/92 REVIEWERS INITIALS: PBH

Parameter	Detection Limits UG/L		Field Blank	Calib. Ver. XR			CRDL Std Ver. X R		Calibration Blanks			P B R L E A P N	ICP ICS I R		M S t p r i x k	Lab Dup RPD Diff.	LCS X R	Ser Dil X D	Meth		
	CRDL	IDL		Continued			Init	Fin	Continued				Init	Fin						x	k
				1	2	3			1	2	3										
Al	200	91	NA																		
Bb	60	20																			
Ba	10	2		98	96	94	97	120		U	U	U	U	U		(39)	200	95	F		
Ba	200	16		96	98	97	97			U	U	U	U	U	84	85	86	3.1	98	100	P
Be	5	1																			
Cc	5	2		101	100	106	107	88	109	U	U	U	U	U	95	98	84	⁰ 7.9	109		P
Ca	3000	47																			
	10	4		98	100	99	99	100	101	U	U	U	U	U	96	97	84	1.9	98	0.3	P
Cd	50	11																			
Cd	25	6		101	102	102	103	102	113	U	U	U	U	U	98	99	85	14.7	100	100	P
Fe	100	46		99	101	100	100								93	94	760	2.4	101	0.8	P
Pb	3	2		104	106	105	103	(0)		U	U	U	U	U		(44)	(21)		109		F
Mn	5000	29																			
Mn	15	2		98	100	100	100	97	100	U	U	U	U	U	88	89	85	2.4	100	2.6	P
Ni	0.2	0.04		102	102	101	102			U	U	U	U	U			102		99		CU
Ni	40	11																			
K	5000	694																			
Se	5	2		99	96	100	99	(0)		U	U	U	U	U			94		111		F
Ag	10	3		106	108	108	109	100	07	U	U	U	U	U	97	99	(0)	4.8	97	500	P
	5000	110		96	99	95	96			U	U	U	U	U					99	5.7	P
Il	10																				
V	50	8																			000034
Zn	20	6		98	99	99	99	111	(121)	U	U	U	U	U	90	92	85	.6	101	12.5	P

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.6: CLP Data Assessment
 Summary Form (Inorganics)

Date: Feb. 1990
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CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited scope) Date: 4/27/92 Case #: NWS
 Site: Naval Weapons Station Lab Name: Roy Weston
 Reviewer's Initials: PBJH Number of Samples: 4

Analytes Rejected Due to Exceeding Review Criteria:*

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

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

ICP		1										1	
Flame AA													
Furnace AA						2						2	
Mercury													
Total		1				2						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 4 waters

SDG# CLP 548

REVIEWER (IF NOT ESD) Heathley EST

SG# 390

REVIEWER'S NAME Paul B. Humby

DPC: ACTION FYI

COMPLETION DATE 4/27/92

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	Z	↓	↓
8. MSA	O	O	↓	↓
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.

P.O. BOX 163 ST. PETERS MO 63376

(314) 278-8232

April 26, 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 samples and one (1) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

<u>Navy No.</u>	<u>RFW No.</u>
261M03	911148001
261M13	911148002
262M03	911148003
263M03	911148004
264M03	911148005
264M23	911148006

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.

000001

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# 9111480, the analysis of six (6) field water sample and one (1) matrix spike and duplicate pair. Overall, the inorganic data quality was fair.

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, Silver and Zinc were above 150%. All positive results are rejected if within the concentration range as applied by the Region II Protocol.
2. The CRDL Standard for Chromium was 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 Copper was above the upper control limit. All positive results are qualified as estimated, "J" 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.

000002

Metals Data Assessment Narrative (continued - Page 2)

Interferences

No significant interferences were observed.

Spike Recovery

4. The Matrix Spike recovery for Silver was below 30%. All positive and non-detect results are rejected.
5. 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".

Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

Serial Dilution

6. The Serial dilution for Iron was outside the control limit. All positive results are qualified as estimated, "J".

MSA

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

<u>Analyte</u>	<u>Samples</u>
Lead	261M03, 261M13, 262M03 and 263M03.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
All water samples	As, Cd, Ag and Zn.	+	R	1
All water samples	Cr	+/U	J/UJ	2
All water samples	Cu	+	J	3
All water samples	Ag	+/U	R	4
All water samples	As and Se	+/U	J/UJ	5
All water samples	Fe	+	J	6
261M03, 261M13, 262M03 and 263M03.	Pb	+/U	J/UJ	7

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

QL - denotes data validation qualifier

000004

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U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

261M03

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP480

Matrix (soil/water): WATER Lab Sample ID: 911148001

Level (low/med): LOW Date Received: 11/20/91

% 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
7440-39-3	Barium	43.00	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.10	B		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	6.40	B		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	36.80			P
7439-89-6	Iron	6020.00		E	P
7439-92-1	Lead	3.80		W	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	88.80			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	N	F
7440-22-4	Silver	10.00	U	N	P
7440-23-5	Sodium	2320.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	118.00			P
	Cyanide				NR

UJ5

R1

J2

J3

J6

J7

UJ5

R4

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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U.S. EPA - CLP

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

261M13

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP480

Matrix (soil/water): WATER

Lab Sample ID: 911148002

Level (low/med): LOW

Date Received: 11/20/91

% 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 055
7440-39-3	Barium	26.20	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 072
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	7940.00		E	P 56
7439-92-1	Lead	2.00	U	W	F 057
7439-95-4	Magnesium				NR
7439-96-5	Manganese	88.50			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	N	F 055
7440-22-4	Silver	10.00	U	N	P R4
7440-23-5	Sodium	2060.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	28.50			P R1
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

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U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

262M03

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP480

Matrix (soil/water): WATER Lab Sample ID: 911148003

Level (low/med): LOW Date Received: 11/20/91

% 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 055
7440-39-3	Barium	34.90	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	16.00			P J2
7440-48-4	Cobalt				NR
7440-50-8	Copper	17.80	B		P J3
7439-89-6	Iron	21500.00		E	P J6
7439-92-1	Lead	2.00	U	W	F 057
7439-95-4	Magnesium				NR
7439-96-5	Manganese	38.50			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	N	F 055
7440-22-4	Silver	10.00	U	N	P 24
7440-23-5	Sodium	5230.00			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	81.70			P
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

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U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

263M03

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP480

Matrix (soil/water): WATER Lab Sample ID: 911148004

Level (low/med): LOW Date Received: 11/20/91

% 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 U55
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	6.00	U		P U52
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	3270.00		E	P J6
7439-92-1	Lead	2.00	U	W	F U57
7439-95-4	Magnesium				NR
7439-96-5	Manganese	8.00	B		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	N	F U55
7440-22-4	Silver	10.00	U	N	P R4
7440-23-5	Sodium	3580.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	43.40			P R1
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

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EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

264M03

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP480

Matrix (soil/water): WATER Lab Sample ID: 911148005

Level (low/med): LOW Date Received: 11/20/91

% 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	N		F R1
7440-39-3	Barium	65.70	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	5.60			P R1
7440-70-2	Calcium				NR
7440-47-3	Chromium	41.20			P J2
7440-48-4	Cobalt				NR
7440-50-8	Copper	29.10			P J3
7439-89-6	Iron	50500.00	E		P J6
7439-92-1	Lead	12.30	S		F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	99.30			P
7439-97-6	Mercury	.28			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.00	U	N	F OJ5
7440-22-4	Silver	24.40	N		P R1,4
7440-23-5	Sodium	2770.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	97.40			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

264M23

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP480

Matrix (soil/water): WATER Lab Sample ID: 911148006

Level (low/med): LOW Date Received: 11/20/91

% 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 035
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	48.80	B	E	P 36
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	N	F 035
7440-22-4	Silver	10.00	U	N	P R4
7440-23-5	Sodium	110.00	U		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	6.40	B		P R1
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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000010

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

Date: Feb. 1990
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	YES	NO	N/A
A.1.6 <u>Form I (Final Data)</u> - Are all Form I's present and complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are soil sample results for each parameter corrected for percent solids?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are computation/transcription errors less than 10% of reported values?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are all "less than IDL" values properly coded with "U"?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was a brief physical description of samples given on Form I's?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were the result qualifiers used correctly with final data?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If yes, were dilutions noted on Form I's?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Cyanide distillation (14 days) exceeded?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Title: Evaluation of Metals for the Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)

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	YES	NO	NG
Other Metals analysis (6 months) exceeded?	—	<input checked="" type="checkbox"/>	—

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

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
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	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Legible?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Properly Labeled?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>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.</p>			
A.1.9 <u>Data Validation and Verification</u>			
A.1.9.1 <u>Calibration</u>			
A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is record of 5 point calibration present for Hg analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".</p>			
A.1.9.1.2 Is record of 4 point calibration present for:			
Flame AA?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Furnace AA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cyanides?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<p>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 $\pm 10\%$ of true value. 2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CROL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".</p>			

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

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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?	___	[<input checked="" type="checkbox"/>]	___
Cyanide Analysis?	___	[<input type="checkbox"/>]	[<input checked="" type="checkbox"/>]
Atomic Absorption Analysis?	___	[<input checked="" type="checkbox"/>]	___

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?	[<input checked="" type="checkbox"/>]	___	___
Present and complete for AA and ICP when both are used for same analyte?	[<input checked="" type="checkbox"/>]	___	___

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%	[<input checked="" type="checkbox"/>]	___	___
Hg - 80-120%	[<input checked="" type="checkbox"/>]	___	___
Cyanides 85-115%	[<input type="checkbox"/>]	___	[<input checked="" type="checkbox"/>]

The reviewer will calculate correlation coefficient.

STANDARD OPERATING PROCEDURE

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
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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 (U), 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?

YES NO N/A

ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).

Was ICV for cyanides distilled?

YES NO N/A
 PBH
 4/23/92

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)?

YES NO N/A

*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?

YES NO N/A

Was a $2 \times CRDL$ (or $2 \times IDL$ when $IDL > CRDL$) analyzed (CRI) for each ICP run?

YES NO N/A

(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 \pm CRDL
- ICP Analysis - **True Value \pm $2 \times CRDL$
- CN Analysis - **True Value \pm $0.5 \times$ 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 $IDL > CRDL$.

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
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	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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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.

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
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	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)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are all calibration blanks less than two times Instrument Detection Limit (when IDL > CRDL)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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 <u>FORM III (Preparation Blank)</u> -			
(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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
both AA and ICP when both are used for same analyte?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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	YES	NO	N/A
ACTION: If yes, reject (red-line) all associated data greater than CRCL 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 IEL when IEL is greater than CRCL?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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 CRCL?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRCL.			
A.1.9.6 <u>Form IV (ICP Interference Check Sample)</u>			
A.1.9.6.1 Present and complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(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)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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%)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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").			

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	YES	NO	N/A
A.1.9.7 <u>Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)-</u> (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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each conc. range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If no, is sample concentration greater than or equal to four times spike concentration?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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.			

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	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) between 30-74%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) between 126-150%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(d) greater than 150%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) between 10-74%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) between 126-200%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) greater than 200%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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".

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	YES	NO	N/A
A.1.9.8 Form VI (Lab Duplicates)			
A.1.9.8.1 Present and complete for: each 20 samples?	<input checked="" type="checkbox"/>	—	—
each matrix type?	<input checked="" type="checkbox"/>	—	—
each concentration range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	—	—
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>

ACTION: If no for any the above, flag as estimated (J) all data \times CRIL* 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 \times CRIL* 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 $< \pm$ CRIL)?

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 ILL.

* Substitute ILL for CRIL when ILL $>$ CRIL.

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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?

[] [X] []

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?

[] [X] []

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

[] [X] []

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%? [] [] [X]

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

> 2x*CRDL? [] [] [X]

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

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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 ILL.
 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 ILL for CRDL when ILL > CRDL.

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

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	YES	NO	NA
A.1.9.9.4 Soil/Sediment			

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

Difference > 2 x CRIL*

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

>100%?

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

>2x *CRIL?

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 CRIL when IDL > CRIL.

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

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	YES	NO	NA
A.1.9.11 <u>Form IX (ICP Serial Dilution) -</u>			
NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IIL.			
A.1.9.11.1 Was Serial Dilution analysis performed for:			
each 20 samples?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each concentration range (i.e. low, med.)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIILs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DPO report.			
1.9.11.2 Was field blank(s) used for Serial Dilution Analysis?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ACTION: If yes, flag all associated data $\geq 10 \times$ IIL 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 IIL or greater.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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 IILs only. Are any % difference values:			
> 10%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 100%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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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) CC 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?

YES NO N/A

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 CREL?

YES NO N/A

Was a dilution analyzed for sample with post digestion spike recovery less than 40%?

YES NO N/A

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?

YES NO N/A

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 pre-digestion spike recovery is within control limits of 75-125% or when SD < 5%.

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	YES	NO	N/A
A.1.9.13 <u>Form VIII (Method of Standard Addition Results)</u>			
A.1.9.13.1 Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is any Form I result coded with "S" or a "+"?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If yes, reject (red-line) affected data.			
A.1.9.13.3 Was *MSA required for any sample but not performed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is coefficient of correlation for MSA less than 0.995?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If no, note exception under contract problem/non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14 <u>Dissolved/Total or Inorganic/Total Analytes -</u>			
A.1.9.14.1 Were any analyses performed for dissolved as well as total analytes on the same sample(s)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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

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	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%?		<input checked="" type="checkbox"/>	
A.1.9.14.3 Is the concentration of any dissolved (or inorganic) analyte greater than its total concentration by more than 50%?		<input checked="" type="checkbox"/>	
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 <u>Form I to IX</u>			
A.1.9.15.1 Are all the Form I through Form IX labeled with:			
Laboratory name?	<input checked="" type="checkbox"/>		
Case/SAS number?	<input checked="" type="checkbox"/>		
EPA sample No.?	<input checked="" type="checkbox"/>		
SDG No.?	<input checked="" type="checkbox"/>		
Contract No.?	<input checked="" type="checkbox"/>		
Correct units?	<input checked="" type="checkbox"/>		
Matrix?	<input checked="" type="checkbox"/>		

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

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	YES	NO	NA
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?	___	[<u>Y</u>]	___
(b) all analytes analyzed by GFAA?	___	[<u>Y</u>]	___
(c) all analytes analyzed by AA Flame?	___	[]	[<u>✓</u>]
(d) Mercury?	___	[<u>Y</u>]	___
(e) Cyanide?	___	[]	[<u>✓</u>]

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 CRIL, 2 x IIL when IIL > CRIL.

Do concentrations of field blank(s) fall below CRIL (or 2 x IIL when IIL > CRIL) 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.

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----- 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)?

YES NO N/A

ICP Interelement Correction Factors (annually)?

YES NO N/A

ICP Linear Ranges (quarterly)?

YES NO N/A

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?

YES NO N/A

all the instruments used?

YES NO N/A

For both AA and ICP when both are used for same analyte?

YES NO N/A

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

Is IDL greater than CRDL for any analyte?

YES NO N/A

If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?

YES NO N/A

ACTION: If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.

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A.1.9.17.3 Form XI (Linear Ranges)

Was any sample result higher than high linear range
 of ICP. YES NO N/A
 _____ [] _____

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.

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Case#	<u>NWS</u>	Site	<u>Naval Weapon Station</u>	Matrix: Soil	<u> </u>
SDG#	<u>CLP 480</u>	Lab	<u>Roy F. Weston</u>	Water	<u>✓</u>
Contractor	<u>Roy F. Weston</u>	Reviewer	<u>Heartland EST</u>	Other	<u> </u>

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. The CRDL Standards for Arsenic, Cadmium, Silver and Zinc were above 150%. All positive results are rejected.
2. The CRDL Standard for Chromium was below the lower control limit. All data qualified as estimated.
3. The CRDL Standard for Copper was above the upper control limit. All positive results are qualified as estimated.
4. The Matrix Spike recovery for Silver was below 20%. All data rejected.
5. The Matrix spike recoveries for Arsenic and Selenium were below the lower control limit. All data qualified as estimated.
6. The Serial Dilution for Iron was outside the control limit. All positive results are qualified as estimated.

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2.2 Contract-Problems/Non-Compliance

PBH 4/23/92

MS Reviewer:

Signature

Date:

Contractor Reviewer:

Signature

Date:

Verified by:

Signature

Date:

Paul B. Handy

4/23/92

William D. Jupp

4/28/92

LABORATORY: Boy F. Weston CASE NO. NWS SQ# NO. 390 SAMPLE TYPE/SDG: CLP 480

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 261M03, 262M03, 265M03

264M03 and 264M23

Field Blank

FIELD DUP. #'S: _____ LAB DUP. #'S: 262M03 MATRIX SPIKE #: 262M03

SERIAL DILUTION SAMPLE NO. 262M03 COMPLETION DATE: 4/23/92 REVIEWERS INITIALS: PBH

Parameter	Detection Limits UG/L		Field Blank	Calib. Ver. XR			CRDL Std Ver. I R		Calibration Blanks			P B ICP ICS		M S t p r i x	Lab Dup RPD	LCS I R	Ser Dil I D	M e t h				
	CRDL	IDL		Continued			Init	Fin	Continued			E A	I C S									
				Init	1	2	3	Init	Fin	Init	1	2	3						P N	Init	Fin	
Al	200	91	NA	99	97	100																
As	10	2		99	97	100	100	(157)		U	U	U	U	U		(49)	95		F			
Ba	200	16		101	100	100	100		21	U	U	U	U	U	90	89	91	13.1	99	100	P	
Be	5	1																				
Cd	5	2		105	102	94	94	(259)	102	U	U	U	U	U	99	99	102	0.6	112		P	
Cu	3000	47																				
Co	10	4		99	98	100	99	(72)	(123)	U	U	U	U	U	98	99	91	0.6	98	100	P	
Cs	50	11																				
Ce	25	6		101	102	103	102	(126)	116	U	U	U	U	U	102	101	91	13.8	99	100	P	
Fe	100	46		99	100	101	100			U	U	U	U	100	103	104	770	6.1	97	(15.4)	P	
Pb	3	2		101	101	101	102	117		U	U	U	U	U		85	200	92			F	
Mn	5000	29																				
Mn	15	2		99	99	101	101	96	104	4	U	U	U	U	114	116	91	8.9	100	27.9	P	
Hg	0.2	0.04		100	100	100	100			U	U	U	U	U		118	18.5	99			CV	
Ni	40	11																				
K	5000	694																				
Se	5	2		104	99	97	97	88		U	U	U	U	U		(69)	89				F	
Ag	10	3		104	105	106	100	(165)	100	U	U	U	U	U	107	107	(10)		94		P	
Mo	5000	110		100	100	100	100			U	U	U	U	140			.2	97	13.3		P	
Pt	10																					
V	50	8																			000035	
Zn	20	6		99	99	100	99	(172)	(126)	U	U	U	U	U	6.6	94	94	94	.9	100	17.5	P

STANDARD OPERATING PROCEDURE

Title: Evaluation of Metals Data for the
Contract Laboratory Program
Appendix A.6: CLP Data Assessment
Summary Form (Inorganics)

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

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited scope) Date: 4/25/92 Case #: NWS
Site: Naval Weapons Station Lab Name: Roy Weston
Reviewer's Initials: PBL Number of Samples: _____

Analytes Selected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Interferences	Spike Recovery	Duplicates Lab/Field	Detection Limits	LCS	Serial Dilution	MSA	Total Analytes	Rejection
ICP		3				1						4	
Flame AA													
Furnace AA		1										1	
Mercury													
Total		4				1						5	
Other													

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

ICP		2										2	
Flame AA													
Furnace AA						2						2	
Mercury													
Total		2				2						4	
Other													

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

000036
000040

STANDARD OPERATING PROCEDURE

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
LABORATORY Roy F. Weston
SIG# CLP 480
SO# 390

SITE Naval Weapon Station
NO. OF SAMPLES/
MATRIX 6 waters
REVIEWER (IF NOT ESD) Heartland EST
REVIEWER'S NAME Paul B. Humby
COMPLETION DATE 4/27/92

INFO. ACTION: FYI

DATA ASSESSMENT SUMMARY

	ICP	AA	Hg	CYANIDE
1. HOLDING TIMES	<u>0</u>	<u>0</u>	<u>0</u>	<u>NA</u>
2. CALIBRATIONS	<u>Z</u>	<u>Z</u>		
3. BLANKS	<u>0</u>	<u>0</u>		
4. ICS	<u>0</u>			
5. LCS	<u>0</u>			
6. DUPLICATE ANALYSIS	<u>0</u>			
7. MATRIX SPIKE	<u>Z</u>			
8. MSA	<u>0</u>			
9. SERIAL DILUTION				
10. SAMPLE VERIFICATION				
11. OTHER QC				
12. OVERALL ASSESSMENT	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>

0 = 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: _____

000037
000041

HEARTLAND ENVIRONMENTAL
SERVICES, INC.



April 26, 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.

<u>Navy No.</u>	<u>RFW No.</u>
01-M03	911262301
02-M03	911262302
03-M03	911262303
07-M03	911262306
04-M23	911262305
04-M03	911262304
07-M13	911262307

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.

000001

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# 9112623, the analysis of seven (7) field water sample and one (1) matrix spike and duplicate pair. Overall, the inorganic data quality was fair.

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 Lead was below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ" if within the concentration range as applied by the Region II Protocol.
2. The CRDL Standard for Cadmium was above the upper control limit. All positive results are qualified as estimated, "J" 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.

000002

Spike Recovery

3. The Matrix Spike recovery for Silver was below 30%. All positive and non-detect results are rejected.
4. The Matrix Spike recoveries for Arsenic, Lead and Selenium were 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

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".

<u>Analyte</u>	<u>Samples</u>
Arsenic	01-M03
Lead	02-M03 and 04-M03.
Selenium	01-M03, 02-M03, 03-M03, 07-M03, 04-M23, 04-M03 and 07-M13.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
All water samples	Pb	+ /U	J /UJ	1
All water samples	Cd	+	J	2
All water samples	Ag	+ /U	R	3
All water samples	As, Pb, Se.	+ /U	J /UJ	4
01-M03 02-M03 and 04-M03. 01-M03, 02-M03, 03-M03, 07-M03, 04-M23, 04-M03 and 07-M13.	As Pb Se	+ /U	J /UJ	5

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

QL - denotes data validation qualifier

000004

0000020

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

01-M03

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

Lab Code: WESTON Case No.: MWS SAS No.: SDG No.: CLP623

Matrix (soil/water): WATER Lab Sample ID: 911262301

Level (low/med): LOW Date Received: 12/05/91

% 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	3.10	B	NW	F J4,5
7440-39-3	Barium	79.70	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	151.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	21800.00			P
7439-92-1	Lead	10.50		NS	F J4
7439-95-4	Magnesium				NR
7439-96-5	Manganese	220.00			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	NW	F UJ4,5
7440-22-4	Silver	10.00	U	N	P R3
7440-23-5	Sodium	21500.00			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	238.00			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

0000021

U.S. EPA - CLP

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

02-M03

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

Lab Code: WESTON Case No.: MWS SAS No.: SDG No.: CLP623

Matrix (soil/water): WATER Lab Sample ID: 911262302

Level (low/med): LOW Date Received: 12/05/91

% 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
7440-39-3	Barium	57.00	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	34.70			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	15.40	B		P
7439-89-6	Iron	2650.00			P
7439-92-1	Lead	2.40	B	NW	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	26.10			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	NW	F
7440-22-4	Silver	10.00	U	N	P
7440-23-5	Sodium	2540.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	285.00			P
	Cyanide				NR

UJ4

J1,4,5

UJ4,5
R3

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

0000022

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

03-M03

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

Lab Code: WESTON Case No.: MWS SAS No.: SDG No.: CLP623

Matrix (soil/water): WATER Lab Sample ID: 911262303

Level (low/med): LOW Date Received: 12/05/91

% 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
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	21.30			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	4490.00			P
7439-92-1	Lead	14.00		NS	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	5.50	B		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	NW	F
7440-22-4	Silver	10.00	U	N	P
7440-23-5	Sodium	6740.00			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	17.40	B		P
	Cyanide				NR

UJ4

J4

UJ4/R3

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

0000025

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

07-M03

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

Lab Code: WESTON Case No.: MWS SAS No.: SDG No.: CLP623

Matrix (soil/water): WATER Lab Sample ID: 911262306

Level (low/med): LOW Date Received: 12/05/91

% 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	9.40	B	N	F 34
7440-39-3	Barium	122.00	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	41.30			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	25800.00			P
7439-92-1	Lead	11.30		NS	F 34
7439-95-4	Magnesium				NR
7439-96-5	Manganese	135.00			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	NW	F 054,5
7440-22-4	Silver	10.00	U	N	P R3
7440-23-5	Sodium	5040.00			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	144.00			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:
Comments:

0900024

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

04-M23

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

Lab Code: WESTON Case No.: MWS SAS No.: SDG No.: CLP623

Matrix (soil/water): WATER Lab Sample ID: 911262305

Level (low/med): LOW Date Received: 12/05/91

% 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
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	10.80		NS	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	NW	F
7440-22-4	Silver	10.00	U	N	P
7440-23-5	Sodium	262.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	32.60			P
	Cyanide				NR

0J4

J4

0J4, 5
R3

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:
Comments:

0000023

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

04-M03

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

Lab Code: WESTON Case No.: MWS SAS No.: SDG No.: CLP623

Matrix (soil/water): WATER Lab Sample ID: 911262304

Level (low/med): LOW Date Received: 12/05/91

% 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	37.70		N	F J4
7440-39-3	Barium	46.10	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	1130.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	25.20			P
7439-89-6	Iron	147000.00			P
7439-92-1	Lead	56.00		NW	F J4,5
7439-95-4	Magnesium				NR
7439-96-5	Manganese	170.00			P
7439-97-6	Mercury	.12	B		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.00	U	NW	F J4,5
7440-22-4	Silver	10.00	U	N	P R3
7440-23-5	Sodium	4460.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	228.00			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:
Comments:

1
INORGANIC ANALYSIS DATA SHEET

07-M13

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

Lab Code: WESTON Case No.: MWS SAS No.: SDG No.: CLP623

Matrix (soil/water): WATER Lab Sample ID: 911262307

Level (low/med): LOW Date Received: 12/05/91

% 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	9.70	B	N	F 54
7440-39-3	Barium	128.00	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.60	B		P 52
7440-70-2	Calcium				NR
7440-47-3	Chromium	48.20			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	28200.00			P
7439-92-1	Lead	11.20		NS	F 54
7439-95-4	Magnesium				NR
7439-96-5	Manganese	143.00			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	NW	F 054, 5
7440-22-4	Silver	10.00	U	N	P 54
7440-23-5	Sodium	5240.00			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	108.00			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:
 Color After: COLORLESS Clarity After: CLEAR Artifacts:
 Comments:

STANDARD OPERATING PROCEDURE

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

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.1.6 <u>Form I (Final Data)</u> - Are all Form I's present and complete?	<input checked="" type="checkbox"/>	—	—
<u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	—	—
Are soil sample results for each parameter corrected for percent solids?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	—	—
Are computation/transcription errors less than 10% of reported values?	<input checked="" type="checkbox"/>	—	—
Are all "less than MDL" values properly coded with "U"?	<input checked="" type="checkbox"/>	—	—
Was a brief physical description of samples given on Form I's?	<input checked="" type="checkbox"/>	—	—
Were the result qualifiers used correctly with final data?	<input checked="" type="checkbox"/>	—	—
<u>ACTION:</u> 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?	—	<input checked="" type="checkbox"/>	—
If yes, were dilutions noted on Form I's?	<input checked="" type="checkbox"/>	—	—
<u>ACTION:</u> 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?	—	<input checked="" type="checkbox"/>	—
Cyanide distillation (14 days) exceeded?	—	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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	YES	NO	N/A
Other Metals analysis (6 months) exceeded?	—	<input checked="" type="checkbox"/>	—

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

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A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Legible?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Properly Labeled?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>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.</p>			
A.1.9 <u>Data Validation and Verification</u>			
1.9.1 <u>Calibration</u>			
A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is record of 5 point calibration present for Hg analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>ACTION: If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".</p>			
A.1.9.1.2 Is record of 4 point calibration present for:			
Flame AA?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Furnace AA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cyanides?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<p>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 $\pm 10\%$ of true value.</p> <p>2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".</p>			

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YES NO N/A

ACTION: Flag associated data as estimated if standards are not within $\pm 10\%$ of true values (except CRL 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.

STANDARD OPERATING PROCEDURE

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YES NO N/A

ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with \bar{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 (U), if the ICV or CCV \bar{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 \pm CRDL

ICP Analysis - **True Value \pm 2CRDL

CN Analysis - **True Value \pm 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.

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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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is mid-range standard within control limits: Cyanide 80 - 120%R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For both AA and ICP when both are used for same analyte?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was an initial calibration blank analyzed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/non-compliance section of the Data Assessment Narrative.			

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	YES	NO	NA
ACTION: If yes, reject (red-line) all associated data greater than CRCL 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 IEL when IEL is greater than CRCL?	[X]		
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 CRCL?		[X]	
ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRCL.			
A.1.9.6 <u>Form IV (ICP Interference Check Sample)</u>			
A.1.9.6.1 Present and complete?	[X]		
(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)?	[X]		
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%)?	[X]		
If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	[X]		
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").			

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	YES	NO	N/A
A.1.9.7 <u>Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)-</u> (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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each conc. range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If no, is sample concentration greater than or equal to four times spike concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.			

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	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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%	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) between 30-74%	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) between 125-150%	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(d) greater than 150%	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

ACTION: If less than 30%, reject all associated aqueous
 data; if between 30-74%, flag all associated
 aqueous data as estimated (J); if between
 125-150%, 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%	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) between 10-74%	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) between 125-200%	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) greater than 200%	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

ACTION: If less than 10%, reject all associated data; if
 between 10-74%, flag all associated data as estimated;
 if between 125-200%, 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".

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	YES	NO	N/A
A.1.9.8 Form VI (Lab Duplicates)			
A.1.9.8.1 Present and complete for: each 20 samples?	<input checked="" type="checkbox"/>	—	—
each matrix type?	<input checked="" type="checkbox"/>	—	—
each concentration range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	—	—
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>

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 Mg/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 SOG.

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.

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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?

___ [X] ___

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?

___ [X] ___

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

___ [X] ___

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%?

___ [] [X]

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

> 2x*CRDL?

___ [] [X]

* Substitute IDL for CRDL when IDL > CRDL.

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

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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.

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	YES	NO	N/A
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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.

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	YES	NO	N/A
A.1.9.11 <u>Form IX (ICP Serial Dilution) -</u>			
<u>NOTE:</u> Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IIL.			
A.1.9.11.1 Was Serial Dilution analysis performed for:			
each 20 samples?	<input checked="" type="checkbox"/>	---	---
each matrix type?	<input checked="" type="checkbox"/>	---	---
each concentration range (i.e. low, med.)?	<input checked="" type="checkbox"/>	---	---
<u>ACTION:</u> If no for any of the above, flag all positive data greater than or equal to 10xIILs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DPO report.			
1.9.11.2 Was field blank(s) used for Serial Dilution Analysis?	---	<input checked="" type="checkbox"/>	---
<u>ACTION:</u> If yes, flag all associated data \geq 10 x IIL as estimated (J).			
<u>NOTE:</u> 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 IIL or greater.	<input checked="" type="checkbox"/>	---	---
<u>ACTION:</u> 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 IILs only. Are any % difference values:			
> 10%?	---	<input checked="" type="checkbox"/>	---
\geq 100%?	---	<input checked="" type="checkbox"/>	---

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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) CC 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 CRIL?

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 pre-digestion spike recovery is within control limits of 75-125% or when $SR > 4 \times SA$.

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	YES	NO	N/A
A.1.9.13 <u>Form VIII (Method of Standard Addition Results)</u>			
A.1.9.13.1 Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is any Form I result coded with "S" or a "+"?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If yes, reject (red-line) affected data.			
A.1.9.13.3 Was *MSA required for any sample but not performed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is coefficient of correlation for MSA less than 0.995?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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 SCW on page E-16 through E-17?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If no, note exception under contract problem/non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14 <u>Dissolved/Total or Inorganic/Total Analytes -</u>			
A.1.9.14.1 Were any analyses performed for dissolved as well as total analytes on the same sample(s)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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

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- 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 CREL as well as total concentration.
 2. Apply the following questions only if inorganic (or dissolved) results are (i) above CREL, and (ii) greater than total constituents.
 3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.

YES NO N/A

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".

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	NA
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?	___	<input checked="" type="checkbox"/>	___
(b) all analytes analyzed by GFAA?	___	<input checked="" type="checkbox"/>	___
(c) all analytes analyzed by AA Flame?	___	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) Mercury?	___	<input checked="" type="checkbox"/>	___
(e) Cyanide?	___	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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.

Title: Evaluation of Metals Data for the
Contract Laboratory Program
Appendix A.1: Data Assessment - Contract
Compliance (Total Review - Inorganics)

Date: Feb. 1996
Number: HW-2
Revision: 10

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# GLP 623 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. The CRDL Standard for Lead was below the lower control limit. All data estimated.
2. The CRDL Standard for Cadmium was above the upper control limit. All positive results are qualified as estimated.
3. The Matrix Spike Recovery for Silver was below 30%. All data rejected.
4. The Matrix Spike Recoveries for Arsenic, Lead and Selenium was below the lower control limit. All data qualified as estimated.

~~PBH 4/23/92~~

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 4/23/92

...2.2 Contract-Problems/Non-Compliance

PBH 4/23/92

MS Reviewer:

Signature

Date:

Contractor Reviewer:

Signature

Date:

Verified By:

Elizabeth D. Scaydler

Date:

LABORATORY: Roy F. Weston CASE NO. NWS SOLV NO. 390 SAMPLE TYPE/SDG: CLP 623

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 01-M03, 02-M03, 03-M03, 04-M03, 04M23, 7-M03 and 7-M13

FIELD DUP. #'S: _____ LAB DUP. #'S: 01-M03 Field Blank MATRIX SPIKE #: 01-M03

SERIAL DILUTION SAMPLE NO. 01-M03 COMPLETION DATE: 4/23/92 REVIEWERS INITIALS: PBH

Parameter	I		IIA			IIB		III			IV		V		VI		VII		IX		
	Detection Limits		Field Blank	Calib. Ver. XR			CRDL Std Ver. XR		Calibration Blanks			P B R L	ICP ICS	M S	Lab Dup	LCS	Ser Dil	M e t h			
	UG/L			Continued					Continued			E A	I R	t p	r i						
	CRDL	IDL		Init	1	2	3	Init	Fin	Init	1	2	3	P N	Init	Fin	x k	Dif	I R	I D	h
Al	200	91	NA	97	101	100	100														
As	10	2		97	101	100	101	111		U	U	U	U	U							
Ba	200	16		101	101	101	101			U	U	U	U	U	86	86	93	3.4	100	P	
Be	5	1																			
Cd	5	2		97	98	94	95	(124)	119	U	U	U	U	U	95	94	89	200	98	P	
Cu	5000	47																			
Fe	10	4		99	100	100	100	100	99	U	U	U	U	U	96	97	112	1.3	99	14.4	P
Mn	50	11																			
Co	25	6		103	103	103	103	609	105	U	U	U	U	U	98	98	91	2.0	101	P	
Pb	100	46		101	102	102	102			U	U	U	U	56	91	92	489	2.7	102	7.6	P
Bi	3	2		95	98	100	100	(77)		U	U	U	U	U							
Mo	5000	29																			
Mg	15	2		100	101	101	102	100	100	U	U	U	U	U	93	91	93	2.0	101	9.7	P
Hg	0.2	0.04		102	104	99	103			U	U	U	U	U			101		102	CU	
Ni	40	11																			
K	5000	694																			
Se	5	2		102	105	105	104	100		U	U	U	U	U							
Ag	10	3		98	99	97	96	87	83	U	U	U	U	U	94	93	(22)	3.2	103	6.3	P
Zn	5000	110		101	100	101	102			U	U	U	U	224					100	P	
Tl	10																				
V	50	8																			
In	20	6	✓	100	101	100	101	112	102	U	U	U	U	14	91	91	79	13.1	103	3.0	P

000037

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.6: CLP Data Assessment
 Summary Form (Inorganics)

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

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited scope) Date: _____ Case #: NWS
 Site: Naval Weapons Station Lab Name: Roy Westley
 Reviewer's Initials: PBL Number of Samples: _____

Analytes Selected Due to Exceeding Review Criteria:*

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

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

ICP		1												1	
Flame AA															
Furnace AA			1					2						3	
Mercury															
Total			2					2						4	
Other															

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

000038 /
 000040

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
 LABORATORY Roy F. Weston
 SDG# CLP
 SQ# 390
 IFO: ACTION: FYI

SITE Naval Weapon Station
 NO. OF SAMPLES/
 MATRIX _____
 REVIEWER (IF NOT ESD) Heartland ESI
 REVIEWER'S NAME Paul B. Humby
 COMPLETION DATE _____

DATA ASSESSMENT SUMMARY

	ICP	AA	Hg	CYANIDE
1. HOLDING TIMES	O	O	O	NA
2. CALIBRATIONS	↓	↓	↓	↓
3. BLANKS	↓	↓	↓	↓
4. ICS	↓	↓	↓	↓
5. LCS	↓	↓	↓	↓
6. DUPLICATE ANALYSIS	↓	↓	↓	↓
7. MATRIX SPIKE	Z	↓	↓	↓
MSA	O	↓	↓	↓
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: _____

April 26, 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 samples and one (1) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

<u>Navy No.</u>	<u>RFW No.</u>
02-M03	911260601
03-M03	911260602
04-M03	911260603
04-M23	911260604
05-M03	911260605
07-M03	911260606

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.

000001

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# 9112606, the analysis of Six (6) field water sample and one (1) matrix spike and duplicate pair. Overall, the inorganic data quality was fair.

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 Lead and Selenium were below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ" if within the concentration range as applied by the Region II Protocol.
2. The CRDL Standard for Zinc was above the upper control limit. All positive results are qualified as estimated, "J" 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.

Spike Recovery

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

5. The Serial Dilution for Iron was outside the control limit. All positive results are qualified as estimated, "J".

MSA

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

<u>Analyte</u>	<u>Samples</u>
Lead	02-M03, 03-M03, 04-M03, 04-M23 and 05-M03.
Selenium	02-M03, 03-M03, 04-M03, 04-M23, 05-M03 and 07-M03.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
All water samples	Pb and Se	+/U	J/UJ	1
All water samples	Zn	+	J	2
All water samples	Ag	+/U	R	3
All water samples	As	+/U	J/UJ	4
All water samples	Fe	+	J	5
02-M03, 03-M03, 04-M03, 04-M23 and 05-M03. 02-M03, 03-M03, 04-M03, 04-M23, 05-M03 and 07-M03.	Pb Se	+/U	J/UJ	6

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

QL - denotes data validation qualifier

0000020

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

02-M03

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

Lab Code: WESTON Case No.: N.W. SAS No.: SDG No.: CLP606

Matrix (soil/water): WATER Lab Sample ID: 911260601

Level (low/med): LOW Date Received: 12/04/91

% 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	N	F
7440-39-3	Barium	40.70	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	78.90			P
7440-48-4	Cobalt				NR
7440-50-3	Copper	12.70	B		P
7439-89-6	Iron	9770.00		E	P
7439-92-1	Lead	2.20	B	W	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	41.20			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	W	F
7440-22-4	Silver	10.00	U	N	P
7440-23-5	Sodium	3690.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	85.00			P
	Cyanide				NR

UT4

J5
J1J1
R3

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:
Comments:

FORM I - IN

03/90

000005

1
INORGANIC ANALYSIS DATA SHEET

03-M03

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

Lab Code: WESTON Case No.: N.W. SAS No.: SDG No.: CLP606

Matrix (soil/water): WATER Lab Sample ID: 911260602

Level (low/med): LOW Date Received: 12/04/91

% 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	N	F <i>UJ4</i>
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	26.60			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	3670.00		E	P <i>J5</i>
7439-92-1	Lead	2.50	B	W	F <i>J1</i>
7439-95-4	Magnesium				NR
7439-96-5	Manganese	17.40			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	F <i>UJ1</i>
7440-22-4	Silver	10.00	U	N	P <i>R3</i>
7440-23-5	Sodium	3160.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	44.50			P <i>J2</i>
	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

04-M03

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

Lab Code: WESTON Case No.: N.W. SAS No.: SDG No.: CLP606

Matrix (soil/water): WATER Lab Sample ID: 911260603

Level (low/med): LOW Date Received: 12/04/91

% 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	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	350.00		E	P J5
7439-92-1	Lead	5.90		W	F J1
7439-95-4	Magnesium				NR
7439-96-5	Manganese	9.50	B		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 UJ1
7440-22-4	Silver	10.00	U	N	P R3
7440-23-5	Sodium	3590.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	41.60			P J2
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FORM I - IN

03/90

000007

0000023

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

04-M23

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

Lab Code: WESTON Case No.: N.W. SAS No.: SDG No.: CLP606

Matrix (soil/water): WATER Lab Sample ID: 911260604

Level (low/med): LOW Date Received: 12/04/91

% 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	N	F
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	E	P
7439-92-1	Lead	2.00	U	W	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	6.70	B		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
7440-22-4	Silver	10.00	U	N	P
7440-23-5	Sodium	285.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	24.90			P
	Cyanide				NR

UT4
UT1

PBH 4/23/92

UT1
R3
T2

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

05-M03

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

Lab Code: WESTON Case No.: N.W. SAS No.: SDG No.: CLP606

Matrix (soil/water): WATER Lab Sample ID: 911260605

Level (low/med): LOW Date Received: 12/04/91

% 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	N	F
7440-39-3	Barium	18.80	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	82.60			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	11100.00		E	P
7439-92-1	Lead	2.50	B	W	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	22.80			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
7440-22-4	Silver	10.00	U	N	P
7440-23-5	Sodium	3880.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	49.50			P
	Cyanide				NR

UJ4

J5
J1

UJ1
R3

J2

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

0000025

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

07-M03

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

Lab Code: WESTON Case No.: N.W. SAS No.: SDG No.: CLP606

Matrix (soil/water): WATER Lab Sample ID: 911260606

Level (low/med): LOW Date Received: 12/04/91

% 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	4.10	B	N	F J4
7440-39-3	Barium	228.00			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	2370.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	62.60			P
7439-89-6	Iron	273000.00		E	P J5
7439-92-1	Lead	130.00			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	496.00			P
7439-97-6	Mercury	.30			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.00	U	W	F UJI
7440-22-4	Silver	10.00	U	N	P R3
7440-23-5	Sodium	14900.00			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	657.00			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:
 Color After: COLORLESS Clarity After: CLEAR Artifacts:
 Comments:

FORM I - IN

03/90

000010

STANDARD OPERATING PROCEDURE

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

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	YES	NO	N/A
A.1.6 <u>Form I (Final Data)</u> - Are all Form I's present and complete? <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are soil sample results for each parameter corrected for percent solids?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are computation/transcription errors less than 10% of reported values?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are all "less than MDL" values properly coded with "U"?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was a brief physical description of samples given on Form I's?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were the result qualifiers used correctly with final data?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If yes, were dilutions noted on Form I's?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Cyanide distillation (14 days) exceeded?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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	YES	NO	N/A
Other Metals analysis (6 months) . . . exceeded?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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?

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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

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	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	<input checked="" type="checkbox"/>	__	__
Legible?	<input checked="" type="checkbox"/>	__	__
Properly Labeled?	<input checked="" type="checkbox"/>	__	__
<u>ACTION:</u> 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

A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	<input checked="" type="checkbox"/>	__	__
Is record of 5 point calibration present for Hg analysis?	<input checked="" type="checkbox"/>	__	__

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?	<input type="checkbox"/>	__	<input checked="" type="checkbox"/>
Furnace AA?	<input checked="" type="checkbox"/>	__	__
Cyanides?	<input type="checkbox"/>	__	<input checked="" type="checkbox"/>

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 $\pm 10\%$ of true value.
 2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CROL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

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YES NO N/A

ACTION: Flag associated data as estimated if standards are not within $\pm 10\%$ 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.

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YES NO NA

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 (U), 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 (CRIL Standards for AA and ICP) -

A.1.9.3.1 Was a CRIL 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 2xCRIL (or 2xIDL when IDL > CRIL) 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 ± CRIL
- ICP Analysis - **True Value ± 2xCRIL
- 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 CRIL when IDL > CRIL.

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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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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.

10 - 1001 1001
 1001 1001

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	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)?	<input checked="" type="checkbox"/>	___	___
Are all calibration blanks less than two times Instrument Detection Limit (when IDL > CRDL)?	<input checked="" type="checkbox"/>	___	___
<p>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.</p>			
<p>A.1.9.5 <u>FORM III (Preparation Blank)</u> -</p> <p>(Note: The preparation blank for mercury is the same as the calibration blank.)</p>			
A.1.9.5.1 Was one prep. blank analyzed for: each 20 samples?	<input checked="" type="checkbox"/>	___	___
each batch?	<input checked="" type="checkbox"/>	___	___
each matrix type?	<input checked="" type="checkbox"/>	___	___
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	___	<input checked="" type="checkbox"/>
<p>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.</p> <p>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).</p>			
A.1.9.5.2 Is concentration of prep. blank greater than CRDL when IDL is less than or equal to CRDL?	___	<input checked="" type="checkbox"/>	___
If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?	___	<input checked="" type="checkbox"/>	___

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	YES	NO	N/A
ACTION: If yes, reject (red-line) all associated data greater than CRCL 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 <u>TEL</u> when <u>TEL</u> is greater than CRCL?	<input checked="" type="checkbox"/>		
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 CRCL?		<input checked="" type="checkbox"/>	
ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRCL.			
A.1.9.6 <u>Form IV (ICP Interference Check Sample)</u>			
A.1.9.6.1 Present and complete?	<input checked="" type="checkbox"/>		
(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)?	<input checked="" type="checkbox"/>		
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%)?	<input checked="" type="checkbox"/>		
If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	<input checked="" type="checkbox"/>		
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").			

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	YES	NO	N/A
<hr/>			
A.1.9.7 <u>Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)-</u> (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?	<input checked="" type="checkbox"/>	---	---
each matrix type?	<input checked="" type="checkbox"/>	---	<input checked="" type="checkbox"/> PBH 4/23/92
each conc. range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	---	---
For both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	---	<input checked="" type="checkbox"/>
<u>ACTION:</u> 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.			
<u>NOTE:</u> 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?	---	<input checked="" type="checkbox"/>	---
<u>ACTION:</u> If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
<u>NOTE:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	---
If no, is sample concentration greater than or equal to four times spike concentration?	<input checked="" type="checkbox"/>	---	---
<u>ACTION:</u> 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.			

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	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) between 30-74%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) between 126-150%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(d) greater than 150%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) between 10-74%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) between 126-200%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) greater than 200%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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".

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	YES	NO	N/A
A.1.9.8 Form VI (Lab Duplicates)			
A.1.9.8.1 Present and complete for: each 20 samples?	<input checked="" type="checkbox"/>	—	—
each matrix type?	<input checked="" type="checkbox"/>	—	—
each concentration range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	—	—
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>

ACTION: If no for any the above, flag as estimated (J) all data >CRIL* 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 >CRIL* 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 < ±CRIL)? — —

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 CRIL when IDL > CRIL.

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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 $10 \times CRDL^*$?

___ [] ___

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 > $\pm CRDL^*$

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 > $2 \times CRDL^*$

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 $5 \times CRDL$) :

> $2 \times CRDL^*$?

___ []

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

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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.

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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%?

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

>2x *CRDL?

[X] ✓
 PBH 4/23/02

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 IRL for CRDL when IRL > CRDL.

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

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	YES	NO	N/A
A.1.9.11 <u>FORM IX (ICP Serial Dilution) -</u>			
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each concentration range (i.e. low, med.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ACTION: If yes, flag all associated data \geq 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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
\geq 100%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Title: Evaluation of Metals Data for the
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YES NO NA

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 (FAA) OC 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 CREL?

[✓] _ _

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 pre-digestion spike recovery is within control limits of 75-125% or when SD > 4xSA.

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	YES	NO	NA
A.1.9.13 <u>Form VIII (Method of Standard Addition Results)</u>			
A.1.9.13.1 Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is any Form I result coded with "S" or a "+"?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If yes, reject (red-line) affected data.			
A.1.9.13.3 Was *MSA required for any sample but not performed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is coefficient of correlation for MSA less than 0.995?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14 <u>Dissolved/Total or Inorganic/Total Analytes -</u>			
A.1.9.14.1 Were any analyses performed for dissolved as well as total analytes on the same sample(s)..	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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

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- 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.

YES NO N/A

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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Case/SAS number?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EPA sample No.?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SDG No.?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contract No.?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Correct units?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Matrix?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

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	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?	___	[<input checked="" type="checkbox"/>]	___
(b) all analytes analyzed by GFAAS?	___	[<input checked="" type="checkbox"/>]	___
(c) all analytes analyzed by AA Flame?	___	[<input type="checkbox"/>]	[<input checked="" type="checkbox"/>]
(d) Mercury?	___	[<input checked="" type="checkbox"/>]	___
(e) Cyanide?	___	[<input type="checkbox"/>]	[<input checked="" type="checkbox"/>]

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 $CRDL$, $2 \times IDL$ when $IDL > CRDL$.

Do concentrations of field blank(s) fall below $CRDL$ (or $2 \times IDL$ 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.

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 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

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	YES	NO	N/A
<u>A.1.9.17.3 Form XI (Linear Ranges)</u>			
Was any sample result higher than high linear range of ICP.	—	<input checked="" type="checkbox"/>	—
Was any sample result higher than the highest calibration standard for non-ICP parameters?	—	<input checked="" type="checkbox"/>	—
If yes for any of the above, was the sample diluted to obtain the result on Form I?	<input checked="" type="checkbox"/>	—	—
<u>ACTION:</u> If no, flag the result reported on Form I as estimated(J).			

<u>A.1.9.18 Percent Solids of Sediments</u>			
Is soil content in sediment(s) less than 50%?	—	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<u>ACTION:</u> 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
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Case#	<u>NWS</u>	Site	<u>Naval Weapons Station</u>	Matrix:	Soil <u> </u>
SDG#	<u>CLP 606</u>	Lab	<u>Roy F. Weston</u>	Water	<input checked="" type="checkbox"/>
Contractor	<u>Roy F. Weston</u>	Reviewer	<u>Paul B. Humberg</u>	Other	<u> </u>

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 Standards for Lead and Selenium were below control limit. All data qualified as estimated.
2. CRDL Standard for Zinc was above the upper control limit. All positive results are qualified as estimated.
3. The Matrix Spike Recovery for Silver was below 30%. All data rejected.
4. The Matrix Spike Recovery for Arsenic was below the control limit. All data qualified as estimated.
5. The Serial dilution for Iron was outside the control limit. All positive results are qualified as estimated.

PAH 4/23/90

000034

LABORATORY: Roy F. Weston CASE NO. NWS SC# NO. 390 SAMPLE TYPE/SDG: CLP 606

SITE/STUDY DESCRIPTION: _____ SAMPLE NOS: 02-M03, 03-M03, 04-M03,
04-M23, 05-M03 and 07-M03.

FIELD DUP. #'S: _____ LAB DUP. #'S: 02-M03 MATRIX SPIKE #: 02-M03

SERIAL DILUTION SAMPLE NO. 02-M03 COMPLETION DATE: 4/27/92 REVIEWERS INITIALS: PPH

Element	Detection Limits		Field Blank	Calib. Ver. XR			CEDL Std Ver. XR		Calibration Blanks			P B R L E A P N	ICP ICS XR		M S t p r i RPD x k	Lab Dup RPD	LCS XR	Ser Dil X D	M e t h			
	CRDL	IDL		Continued			Init	Fin	Continued				Init	Fin								
				1	2	3			1	2	3											
Al	200	91	NA																			
B	80	20																				
Ba	10	2		101	100	98	99	96								60	101		F			
Ba	200	16		100	100	99	102								84	88	94	5	99	100	P	
Be	5	1																				
Cd	5	2		100	100	101	102	98	90							97	100	94	0	101		P
Ca	3000	47																				
	10	4		100	101	101	104	110	112							96	101	97	13	99	.8	P
Cd	50	11																				
Co	25	6		104	104	103	106	115	112							97	101	91	200	100	100	P
Fe	100	46		101	101	101	104								95	100	64	.17	100	100	P	
Pb	3	2		103	104	102	106	70								46	5	95				F
Mn	5000	29																				
Mn	15	2		100	103	102	104	118	104							93	97	94	1	101	59	P
Hg	0.2	0.04		103	103	102	100									101	0	101				F
Ni	40	11																				
K	5000	694																				
Se	5	2		99	99	100	96	74								88	0	96				F
Ag	10	3		103	104	104	105	102	105							93	96	0	0	100	0	P
	5000	110		100	100	99	103										1.8	99	6			P
Li	10																					
V	50	8																				000036
Zn	20	6		101	102	102	105	124	114							42	96	94	120	104	376	P

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.6: CLP Data Assessment
 Summary Form (Inorganics)

Date: Feb. 1990
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CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited scope) Date: 4/27/92 Case #: NWS
 Site: Naval Weapons Station Lab Name: Roy Weston
 Reviewer's Initials: PBL Number of Samples: 6

Analytes Rejected Due to Exceeding Review Criteria:*

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

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

ICP		1											1	
Flame AA														
Furnace AA		2				1							3	
Mercury														
Total		3				1							4	
Other														

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

000037 /
 000040

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
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INORGANIC REGIONAL DATA ASSESSMENT

Region II

CASE NO. NWS

SITE Naval Weapons Station
NO. OF SAMPLES/
MATRIX _____

LABORATORY Roy F. Weston

SDG# CLP

REVIEWER (IF NOT ESD) Howtley EST

SO# 390

REVIEWER'S NAME Paul B. Humby

DPO: ACTION: FYI

COMPLETION DATE _____

DATA ASSESSMENT SUMMARY

	ICP	AA	Hg	CYANIDE
1. HOLDING TIMES	O	O	O	NA
2. CALIBRATIONS				
3. BLANKS				
4. ICS				
5. LCS				
6. DUPLICATE ANALYSIS				
7. MATRIX SPIKE	Z			
8. MSA	O			
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: _____

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HEARTLAND ENVIRONMENTAL
SERVICES, INC.



April 26, 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 no (0) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

<u>Navy No.</u>	<u>RFW No.</u>
05-007	911260701
05-008	911260702

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 Form 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

000001

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# 9112607, the analysis of two (2) field water sample and no (0) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The Qa samples for this data package were found in SDG 606.

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 Lead and Selenium were below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ" if within the concentration range as applied by the Region II Protocol.
2. The CRDL Standard for Zinc was above the upper control limit. All positive results are qualified as estimated, "J" 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.

000002

Metals Data Assessment Narrative (continued - Page 2)

Spike Recovery

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

5. The Serial Dilution for Iron was outside the control limit. All positive results are qualified as estimated, "J".

MSA

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

<u>Analyte</u>	<u>Samples</u>
Arsenic	05-007-
Lead	05-007- and 05-008-.
Selenium	05-007-.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
All water samples	Pb and Se	+ /U	J/UJ	1
All water samples	Zn	+	J	2
All water samples	Ag	+ /U	R	3
All water samples	As	+ /U	J/UJ	4
All water samples	Fe	+	J	5
05-007- 05-007- and 05-008- 05-007-	As Pb Se	+ /U	J/UJ	6

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

QL - denotes data validation qualifier

000004

0000014

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

05-007-

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

Lab Code: WESTON Case No.: N.W. SAS No.: SDG No.: CLP607

Matrix (soil/water): WATER Lab Sample ID: 911260701

Level (low/med): LOW Date Received: 12/04/91

% 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
7440-39-3	Barium	39.50	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	120.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	15500.00			P
7439-92-1	Lead	5.40		W	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	84.10			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
7440-22-4	Silver	10.00	U		P
7440-23-5	Sodium	7240.00			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	127.00			P
	Cyanide				NR

034

JT
J1

031
R3

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

0000015

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

05-008-

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

Lab Code: WESTON Case No.: N.W. SAS No.: SDG No.: CLP607

Matrix (soil/water): WATER Lab Sample ID: 911260702

Level (low/med): LOW Date Received: 12/04/91

% 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
7440-39-3	Barium	30.10	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	104.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	13300.00			P
7439-92-1	Lead	4.20		W	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	37.50			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	4110.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	45.40			P
	Cyanide				NR

0J4

JJ
JI

0J1
R3

J2

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:
Comments:

Title: Evaluation of Metals Data for the
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 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

Date: Feb. 1990
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	YES	NO	N/A
A.1.6 <u>Form I (Final Data)</u> - Are all Form I's present and complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are soil sample results for each parameter corrected for percent solids?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are computation/transcription errors less than 10% of reported values?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are all "less than MDL" values properly coded with "U"?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was a brief physical description of samples given on Form I's?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were the result qualifiers used correctly with final data?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If yes, were dilutions noted on Form I's?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Cyanide distillation (14 days) exceeded?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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	YES	NO	N/A
Other Metals analysis (6 months) exceeded?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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

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	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	<input checked="" type="checkbox"/>	__	__
Legible?	<input checked="" type="checkbox"/>	__	__
Properly Labeled?	<input checked="" type="checkbox"/>	__	__
<p><u>ACTION:</u> 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.</p>			
A.1.9 <u>Data Validation and Verification</u>			
1.9.1 <u>Calibration</u>			
A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	<input checked="" type="checkbox"/>	__	__
Is record of 5 point calibration present for Hg analysis?	<input checked="" type="checkbox"/>	__	__
<p><u>ACTION:</u> If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".</p>			
A.1.9.1.2 Is record of 4 point calibration present for:			
Flame AA?	<input type="checkbox"/>	__	<input checked="" type="checkbox"/>
Furnace AA?	<input checked="" type="checkbox"/>	__	__
Cyanides?	<input type="checkbox"/>	__	<input checked="" type="checkbox"/>
<p><u>NOTE:</u> 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 $\pm 10\%$ of true value. 2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRIL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".</p>			

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YES NO NA

ACTION: Flag associated data as estimated if standards are not within $\pm 10\%$ 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.

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.

STANDARD OPERATING PROCEDURE

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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 <u>III</u> as estimated (U), 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 (CRL Standards for AA and ICP) -

A.1.9.3.1 Was a CRL 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 2xCRL (or 2xIDL when $IDL > CRL$) 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 \pm CRL
 ICP Analysis - **True Value \pm 2CRL
 CN Analysis - **True Value \pm 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 CRL when $IDL > CRL$.

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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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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.

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	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 IIL when IIL > CRDL). Are all calibration blanks (when IIL < CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are all calibration blanks less than two times Instrument Detection Limit (when IIL > CRDL)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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 2xIIL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.			
A.1.9.5 <u>FORM III (Preparation Blank) -</u>			
(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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<u>ACTION:</u> If no for any of the above, flag as estimated (J) all associated positive data <10 x IILs for which prep. blank was not analyzed.			
<u>NOTE:</u> 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 IIL is less than or equal to CRDL?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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	YES	NO	NA
ACTION: If yes, reject (red-line) all associated data greater than CRCL 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 IEL when IEL is greater than CRCL?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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 CRCL?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRCL.			
A.1.9.6 <u>Form IV (ICP Interference Check Sample)</u>			
A.1.9.6.1 Present and complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(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)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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%)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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").			

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	YES	NO	N/A
A.1.9.7 <u>Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)-</u> (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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each conc. range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If no, is sample concentration greater than or equal to four times spike concentration?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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.			

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Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) between 30-74%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) between 126-150%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(d) greater than 150%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) between 10-74%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) between 126-200%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) greater than 200%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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".

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	YES	NO	N/A
A.1.9.8 <u>Form VI (Lab Duplicates)</u>			
A.1.9.8.1 Present and complete for: each 20 samples?	<input checked="" type="checkbox"/>	—	—
each matrix type?	<input checked="" type="checkbox"/>	—	—
each concentration range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	—	—
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
<p>ACTION: If no for any the above, flag as estimated (J) all data \timesCRIL* for which duplicate sample was not analyzed.</p> <p>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.</p>			
A.1.9.8.2 Was field blank used for duplicate analysis?	—	<input checked="" type="checkbox"/>	—
<p>ACTION: If yes, flag all data \timesCRIL* as estimated (J) for which field blank was used as duplicate.</p> <p>NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.</p>			
A.1.9.8.3 Are all values within control limits (RPD 20% or difference $< \pm$ CRIL)?	<input checked="" type="checkbox"/>	—	—
If no, are all results outside the control limits flagged with an * on Form I's and VI?	<input checked="" type="checkbox"/>	—	—
<p>ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".</p> <p>NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than IRL.</p>			

* Substitute IRL for CRIL when IRL $>$ CRIL.

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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?

YES NO N/A

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?

YES NO N/A

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

YES NO N/A

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%? YES NO N/A

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

> 2x*CRDL? YES NO N/A

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

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YES NO NA

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 ILL.
 2. Flag all associated data only for field duplicate pair.

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

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 > ± CRIL*

Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRIL?

Is any **difference between sample and duplicate greater than *CRIL where sample and/or duplicate is less than 5 times *CRIL?

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

* Substitute ILL for CRIL when ILL > CRIL.

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

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	YES	NO	N/A
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A.1.9.9.4 Soil/Sediment

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

Difference > 2 x CRIL*

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

>100%?

_ [] ✓

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

>2x *CRIL?

_ [] ✓

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 IRL for CRIL when IRL > CRIL.

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

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	YES	NO	N/A
A.1.9.11 <u>Form IX (ICP Serial Dilution) -</u>			
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each concentration range (i.e. low, med.)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ACTION: If yes, flag all associated data \geq 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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
\geq 100%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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YES NO N/A

ACTION: Flag as estimated (J) all associated equal to or greater than 10XRLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10XRLs for which PD is greater than or equal to 100%.

A.1.9.12 Furnace Atomic Absorption (AA) CC 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 CRL?

[✓] -- --

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 $SR > 4 \times SA$.

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	YES	NO	N/A
A.1.9.13 <u>Form VIII (Method of Standard Addition Results)</u>			
A.1.9.13.1 Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is any Form I result coded with "S" or a "+"?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If yes, reject (red-line) affected data.			
A.1.9.13.3 Was *MSA required for any sample but not performed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is coefficient of correlation for MSA less than 0.995?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14 <u>Dissolved/Total or Inorganic/Total Analytes -</u>			
A.1.9.14.1 Were any analyses performed for dissolved as well as total analytes on the same sample(s)..	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

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- 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 CPDL as well as total concentration.
 2. Apply the following questions only if inorganic (or dissolved) results are (i) above CPDL, and (ii) greater than total constituents.
 3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.

	YES	NO	N/A
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".

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

Date: Feb. 1990
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	YES	NO	NA
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?	___	[<input checked="" type="checkbox"/>]	___
(b) all analytes analyzed by GFAA?	___	[<input checked="" type="checkbox"/>]	___
(c) all analytes analyzed by AA Flame?	___	[<input type="checkbox"/>]	[<input checked="" type="checkbox"/>]
(d) Mercury?	___	[<input checked="" type="checkbox"/>]	___
(e) Cyanide?	___	[<input type="checkbox"/>]	[<input checked="" type="checkbox"/>]

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 $CRIL$, $2 \times IEL$ when $IEL > CRIL$.

Do concentrations of field blank(s) fall below $CRIL$ (or $2 \times IEL$ when $IEL > CRIL$) 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.

Title: Evaluation of Metals Data for the
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_____ 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)?

YES NO N/A

ICP Interelement Correction Factors (annually)?

YES NO N/A

ICP Linear Ranges (quarterly)?

YES NO N/A

ACTION: If no, contact IPO 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?

YES NO N/A

all the instruments used?

YES NO N/A

For both AA and ICP when both are used for same analyte?

YES NO N/A

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

Is IDL greater than CRDL for any analyte?

YES NO N/A

If yes, is the concentration on Form I of the sample analyzed on the instrument whose IDL exceeds CRDL, greater than 5 x IDL?

YES NO N/A

ACTION: If no, flag as estimated all values less than five times IDL of the instrument whose IDL exceeds CRDL.

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

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

Date: Feb. 1990
Number: HW-2
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Case# NWS Site Naval Weapons Station Matrix: Soil
SDG# CLP 607 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. The CRDL standards for lead and Selenium were below the lower control limit. All data qualified as estimated.
2. The CRDL standard for Zinc was above the upper control limit. All positive results are qualified as estimated.
3. The Matrix Spike recovery for Silver was below 30%. All data rejected.
4. The Matrix Spike recovery for Arsenic was below the lower control limit. All data is qualified as estimated.
5. The Serial dilution was ^{PBH 4/23/92} ~~above~~ outside the control limit. All positive results are qualified as estimated.

PBH 4/23/92

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

Date: Feb. 1990
Number: HW-2
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PBH 4/23/92

2.2 Contract-Problems/Non-Compliance

PBH 4/23/92

MS Reviewer: _____ Date: _____

Signature

Contractor Reviewer: Paul B. Humby Date: 4/23/92

Signature

Verified by: Christopher D. Scarpellito Date: 4/28/92

000031

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.6: CLP Data Assessment
 Summary Form (Inorganics)

Date: Feb. 1990
 Number: HW-2
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CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (Limits) Scope Date: _____ Case #: NWS
 Site: Naval Weapons Station Lab Name: Roy Weston
 Reviewer's Initials: PBL Number of Samples: _____

Analytes Rejected Due to Exceeding Review Criteria:*

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

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

ICP		1										1	
Flame AA													
Furnace AA		2				1						3	
Mercury													
Total		3				1						4	
Other													

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

000033 /
 000040

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
 NO. OF SAMPLES/
 MATRIX 2 waters

LABORATORY Roy F. Weston

SDG# CLP 607

REVIEWER (IF NOT ESD) Heathley EST

SCW# 390

REVIEWER'S NAME Paul B. Humby

IFO: ACTION FYI

COMPLETION DATE 4/27/92

DATA ASSESSMENT SUMMARY

	ICP	AA	Hg	CYANIDE
1. HOLDING TIMES	O	O	O	NA
2. CALIBRATIONS	↓	↓	↓	↓
3. BLANKS	↓	↓	↓	↓
4. ICS	↓	↓	↓	↓
5. LCS	↓	↓	↓	↓
6. DUPLICATE ANALYSIS	↓	↓	↓	↓
7. MATRIX SPIKE	Z	↓	↓	↓
MSA	↓	↓	↓	↓
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.



April 26, 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 no (0) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

<u>Navy No.</u>	<u>RFW No.</u>
05-M03	911260801
07-M03	911260804

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.

000001

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# 9112608, the analysis of two (2) field water sample and no (0) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The Qa samples for this data package were found in SDG 606.

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 Lead and Selenium were below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ" if within the concentration range as applied by the Region II Protocol.
2. The CRDL Standard for Zinc was above the upper control limit. All positive results are qualified as estimated, "J" 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 recovery for Silver was below 30%. All positive and non-detect results are rejected.
4. 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

5. The Serial Dilution for Iron was outside the control limit. All positive results are qualified as estimated, "J".

MSA

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

<u>Analyte</u>	<u>Samples</u>
Arsenic	05-M03 and 07-M03.
Selenium	05-M03.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
All water samples	Pb and Se	+/U	J/UJ	1
All water samples	Zn	+	J	2
All water samples	Ag	+/U	R	3
All water samples	As	+/U	J/UJ	4
All water samples	Fe	+	J	5
05-M03 and 07-M03. 05-M03.	As Se	+/U	J/UJ	6

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

QL - denotes data validation qualifier

0000014

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

05-M03

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

Lab Code: WESTON Case No.: N.W. SAS No.:

SDG No.: CLP608

Matrix (soil/water): WATER

Lab Sample ID: 911260801

Level (low/med): LOW

Date Received: 12/04/91

% 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
7440-39-3	Barium	189.00	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	34.70			P
7440-70-2	Calcium				NR
7440-47-3	Chromium	157.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	71.30			P
7439-89-6	Iron	524000.00			P
7439-92-1	Lead	157.00			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	1730.00			P
7439-97-6	Mercury	.50			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.00	U	W	F
7440-22-4	Silver	15.20			P
7440-23-5	Sodium	3430.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	699.00			P
	Cyanide				NR

UJ4,6

J5

UJ1,6
R3

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

000005

0000015

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

07-M03

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

Lab Code: WESTON

Case No.: N.W.

SAS No.:

SDG No.: CLP608

Matrix (soil/water): WATER

Lab Sample ID: 911260804

Level (low/med): LOW

Date Received: 12/04/91

% 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	3.50	B	W	F
7440-39-3	Barium	97.90	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	33.60			P
7440-70-2	Calcium				NR
7440-47-3	Chromium	86.10			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	42.90			P
7439-89-6	Iron	19000.00			P
7439-92-1	Lead	42.50		S	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	590.00			P
7439-97-6	Mercury	.23			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	20.00	U		F
7440-22-4	Silver	10.00	U		P
7440-23-5	Sodium	3460.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	592.00			P
	Cyanide				NR

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J5

UJ1
R3

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FORM I - IN

03/90

000006

STANDARD OPERATING PROCEDURE

Title: Evaluation of Metals Data for the
Contract Laboratory Program
Appendix A.1: Data Assessment - Contract
Compliance (Total Review - Inorganics)

Date: Feb. 1990
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	YES	NO	N/A
A.1.1 <u>Contract Compliance Screening Report (CCS)</u> - Present? <u>ACTION:</u> If no, contact RSCC.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.2 <u>Record of Communication (from RSCC)</u> - Present? <u>ACTION:</u> If no, request from RSCC.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.3 <u>Trip Report</u> - Present and complete? <u>ACTION:</u> If no, contact RSCC for trip report.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.4 <u>Sample Traffic Report</u> - Present or on file? Legible?	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
<u>ACTION:</u> If no, request from Regional Sample Control Center (RSCC).			
A.1.5 <u>Cover Page</u> - Present? Is cover page properly filled in and signed by the lab manager or the manager's designee? <u>ACTION:</u> 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?	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<u>ACTION:</u> If no for any of the above, contact RSCC for clarification.			

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
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Date: Feb. 1990
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	YES	NO	N/A
A.1.6 <u>Form I (Final Data)</u> - Are all Form I's present and complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are soil sample results for each parameter corrected for percent solids?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are computation/transcription errors less than 10% of reported values?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are all "less than MDL" values properly coded with "U"?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was a brief physical description of samples given on Form I's?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were the result qualifiers used correctly with final data?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If yes, were dilutions noted on Form I's?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Cyanide distillation (14 days) exceeded?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

STANDARD OPERATING PROCEDURE

Title: Evaluation of Metals for the Contract
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 Compliance (Total Review - Inorganics)

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	YES	NO	N/A
Other Metals analysis (6 months) exceeded?	—	<input checked="" type="checkbox"/>	—

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?	<input checked="" type="checkbox"/>	—	—
Digestion Log for furnace AA Form XIII present?	<input checked="" type="checkbox"/>	—	—
Distillation Log for mercury Form XIII present?	<input checked="" type="checkbox"/>	—	—
Distillation Log for cyanides Form XIII present?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
Are pH values (pH < 2 for all metals, pH > 12 for cyanide) present?	<input checked="" type="checkbox"/>	—	—
*weights, dilutions and volumes used to obtain values.			
Percent solids calculation present for soils/sediments?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
Are preparation dates present on Digestion Log?	<input checked="" type="checkbox"/>	—	—
A.1.8.2 Measurement read out record present?			
ICP	<input checked="" type="checkbox"/>	—	—
Flame AA	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
Furnace AA	<input checked="" type="checkbox"/>	—	—
Mercury	<input checked="" type="checkbox"/>	—	—
Cyanides	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>

STANDARD OPERATING PROCEDURE

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

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	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	<input checked="" type="checkbox"/>	---	---
Legible?	<input checked="" type="checkbox"/>	---	---
Properly Labeled?	<input checked="" type="checkbox"/>	---	---

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

A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	<input checked="" type="checkbox"/>	---	---
Is record of 5 point calibration present for Hg analysis?	<input checked="" type="checkbox"/>	---	---

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?	<input type="checkbox"/>	---	<input checked="" type="checkbox"/>
Furnace AA?	<input checked="" type="checkbox"/>	---	---
Cyanides?	<input type="checkbox"/>	---	<input checked="" type="checkbox"/>

- 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 $\pm 10\%$ of true value.
 2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CCL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

STANDARD OPERATING PROCEDURE

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

Date: Feb. 1990
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YES NO N/A

ACTION: Flag associated data as estimated if standards are not within $\pm 10\%$ 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.

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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 (U), 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 (CRL Standards for AA and ICP) -

A.1.9.3.1 Was a CRL 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 $2 \times CRL$ (or $2 \times IDL$ when $IDL > CRL$) 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 \pm CRL
- ICP Analysis - **True Value \pm $2 \times CRL$
- CN Analysis - **True Value \pm $0.5 \times$ 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 CRL when $IDL > CRL$.

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	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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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 CPA 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.

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	YES	NO	N/A
A.1.9.4.2 Circle all calibration blank values on Data Summary Sheet that are above CREL (or 2 x ILL when ILL > CREL). Are all calibration blanks (when ILL < CREL) less than or equal to Contract Required Detection Limits (CREL)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are all calibration blanks less than two times Instrument Detection Limit (when ILL > CREL)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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 CREL (or 2xILL) 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

ACTION: If no for any of the above, flag as estimated (J) all associated positive data < 10 x ILLs 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 CREL when ILL is less than or equal to CREL?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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	YES	NO	NA
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 <u>ML</u> when <u>ML</u> is greater than CRDL?	<input checked="" type="checkbox"/>		
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?		<input checked="" type="checkbox"/>	
ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6 <u>Form IV (ICP Interference Check Sample)</u>			
A.1.9.6.1 Present and complete?	<input checked="" type="checkbox"/>		
(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)?	<input checked="" type="checkbox"/>		
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%)?	<input checked="" type="checkbox"/>		
If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	<input checked="" type="checkbox"/>		
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").			

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	YES	NO	N/A
A.1.9.7 <u>Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)-</u> (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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each conc. range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<u>ACTION:</u> 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.			
<u>NOTE:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
<u>NOTE:</u> Matrix spike analysis should be performed on a field blank when it is the only aqueous sample in SEQ.			
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If no, is sample concentration greater than or equal to four times spike concentration?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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.			

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	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) between 30-74%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) between 125-150%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(d) greater than 150%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 125-150%, 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%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) between 10-74%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) between 125-200%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) greater than 200%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 125-200%, 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".

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	YES	NO	N/A
A.1.9.8 <u>Form VI (Lab Duplicates)</u>			
A.1.9.8.1 Present and complete for: each 20 samples?	<input checked="" type="checkbox"/>	—	—
each matrix type?	<input checked="" type="checkbox"/>	—	—
each concentration range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	—	—
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>

ACTION: If no for any the above, flag as estimated (J) all data ~~>CREL~~* 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 ~~>CREL~~* 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 < \pm CREL)? — —

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 \pm less than ILL.

* Substitute ILL for CREL when ILL > CREL.

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	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 $10 \times CRDL^*$?		<input checked="" type="checkbox"/>	
ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5 General Circle all values on Data Summary Sheet that are: $RPD > 50\%$, or $Difference > \pm CRDL^*$			
Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times $CRDL^*$?		<input checked="" type="checkbox"/>	
Is any **difference between sample and duplicate greater than $CRDL$ where sample and/or duplicate is less than 5 times $CRDL$?		<input checked="" type="checkbox"/>	
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 $Difference > 2 \times CRDL^*$			
Is any RPD (where sample and duplicate are both greater than or equal to 5 times $CRDL$) :			
$> 100\%$?		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Is any **difference between sample and duplicate (where sample and/or duplicate is less than $5 \times CRDL$) :			
$> 2 \times CRDL$?		<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

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_____ YES NO NA

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 ILL.
 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 ILL for CRDL when ILL > CRDL.

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

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	YES	NO	N/A
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A.1.9.9.4 Soil/Sediment

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

Difference > 2 x CRIL*

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

>100%?

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

>2x *CRIL?

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 MLL for CRIL when MLL > CRIL.

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

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YES NO NA

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%?	___	(<u> </u>)	___
	between 50% and 79%?	___	(<u> </u>)	___
	between 121% and 150%?	___	(<u> </u>)	___
	greater than 150%?	___	(<u> </u>)	___

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 IRL 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?	___	(<u> </u>)	___	✓
---	-----	---------------	-----	---

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

Is LCS "Found" value lower than the Control limits on Form VII?	___	(<u> </u>)	___	✓
--	-----	---------------	-----	---

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

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	YES	NO	N/A
A.1.9.11 <u>FORM IX (ICP Serial Dilution) -</u>			
NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x ILL.			
A.1.9.11.1 Was Serial Dilution analysis performed for:			
each 20 samples?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each concentration range (i.e. low, med.)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ACTION: If no for any of the above, flag all positive data greater than or equal to 10xILLs 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ACTION: If yes, flag all associated data $\geq 10 \times \text{ILL}$ as estimated (J).			
NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SOG.			
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 ILL or greater.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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 ILLs only. Are any % difference values:			
> 10%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
$\geq 100\%$?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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YES NO N/A

ACTION: Flag as estimated (J) all associated equal to or greater than 10xMUs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xMUs for which PD is greater than or equal to 100%.

A.1.9.12 Furnace Atomic Absorption (FAA) OC 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 FAA?

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 CML?

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 pre-digestion spike recovery is within control limits of 75-125% or when SD < 4SA.

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YES NO N/A

VIII (Method of Standard Addition Results)

ent? YES NO N/A

o, is any Form I result coded with "S" or a "+"? YES NO N/A

If yes, write request on Telephone Record Log and contact laboratory for submittal of Form VIII.

efficient of correlation for MSA less than 0.990 for sample? YES NO N/A

If yes, reject (red-line) affected data.

SA required for any sample but not performed? YES NO N/A

efficient of correlation for MSA less than 0.995? YES NO N/A

A calibration outside the linear range of the standard curve generated at the beginning of the analytical run? YES NO N/A

If yes for any of the above, flag all the associated data as estimated (J).

proper quantitation procedure followed correctly as outlined in the SOW on page E-16 through E-17? YES NO N/A

If no, note exception under contract problem/non-compliance of data assessment narrative, or prepare a separate list.

Method of Total or Inorganic/Total Analytes -

any analyses performed for dissolved as well as total analytes on the same sample(s)? YES NO N/A

any analyses performed for inorganic as well as total (dissolved + inorganic) analytes on the same sample(s)? YES NO N/A

equipped on LCS and prep. blank.

YES NO N/A

YES NO N/A

YES NO N/A

YES NO N/A

YES NO N/A

YES NO N/A

YES NO N/A

YES NO N/A

YES NO N/A

YES NO N/A

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	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?	___	[<input checked="" type="checkbox"/>]	___
(b) all analytes analyzed by GFAA?	___	[<input checked="" type="checkbox"/>]	___
(c) all analytes analyzed by AA Flame?	___	[<input type="checkbox"/>]	[<input checked="" type="checkbox"/>]
(d) Mercury?	___	[<input checked="" type="checkbox"/>]	___
(e) Cyanide?	___	[<input type="checkbox"/>]	[<input checked="" type="checkbox"/>]

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 $CRIL$, $2 \times IIL$ when $IIL > CRIL$.

Do concentrations of field blank(s) fall below $CRIL$ (or $2 \times IIL$ when $IIL > CRIL$) 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.

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 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)?	<input checked="" type="checkbox"/>	___	___
ICP Interelement Correction Factors (annually)?	<input checked="" type="checkbox"/>	___	___
ICP Linear Ranges (quarterly)?	<input checked="" type="checkbox"/>	___	___

ACTION: If no, contact IPO of the lab.

A.1.9.17.2 Form X (Instrument Detection Limits) - (Note: IDL is not required for Cyanide.)

Are <u>IDLs</u> present for:	all the analytes?	<input checked="" type="checkbox"/>	___	___
	all the instruments used?	<input checked="" type="checkbox"/>	___	___
For both AA and ICP when both are used for same analyte?		<input checked="" type="checkbox"/>	___	___

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.

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	YES	NO	N/A
17.3 <u>Form XI (Linear Ranges)</u>			
Was any sample result higher than high linear range of ICP.	___	[<input checked="" type="checkbox"/>]	___
Was any sample result higher than the highest calibration standard for non-ICP parameters?	___	[<input checked="" type="checkbox"/>]	___
If yes for any of the above, was the sample diluted to obtain the result on Form I?	[<input checked="" type="checkbox"/>]	___	___
<u>ACTION:</u> If no, flag the result reported on Form I as estimated(J).			

18 <u>Percent Solids of Sediments</u>			
Is soil content in sediment(s) less than 50%?	___	[<input type="checkbox"/>]	[<input checked="" type="checkbox"/>]
<u>ACTION:</u> If yes, qualify as estimated all data not previously rejected or flagged due to other QC criteria.			

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 608

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 03-005-M003

07-M003

Field Blank

FIELD DUP. #'S: _____ LAB DUP. #'S: 02-M03 MATRIX SPIKE #: 02-M03

SERIAL DILUTION SAMPLE NO. 02-M03 COMPLETION DATE: 4/27/92 REVIEWERS INITIALS: PB4

Parameter	Detection Limits		Field Blank	Calib. Var. XR			CRDL Std Ver. XR		Calibration Blanks			P B R L E A P N	ICP ICS XR		M S t p r i x k	Lab Dup RPD	LCS XR	Ser Dil XR	M e t h			
	UG/L	IDL		Continued			Continued		Continued				Init	Fin						Init	Fin	
	CRDL	IDL		Init	1	2	3	Init	Fin	Init	1											2
Al	200	91	NA																			
As	80	20																				
As	10	2		101	100	98	99	96	U	U	U	U	U			(60)		101		F		
Ba	200	66		100	100	99	102	98	98	U	U	U	U	U	84	88	94	5	99	100	P	
Be	5	1																				
Cd	5	2		100	100	101	102	98	90	U	U	U	U	U	97	100	94	0	101		P	
Cu	5000	47																				
Cu	10	4		100	101	101	104	111	112	U	U	U	U	U	96	101	97	13	99	0.8	P	
Cu	50	11																				
Cu	25	6		104	104	103	106	115	112	U	U	U	U	U	97	101	91	200	100	100	P	
Fe	100	46		101	101	101	104			U	U	U	U	U	95	100	64	17	101	(10.2)	P	
Pb	3	2		103	104	107	106	(70)			U	U	U	U	U			96	5	95		F
Mn	5000	29																				
Mn	15	2		101	101	101	104	118	104	U	U	6.7	U	U	93	97	94	1	101	59	P	
Hg	0.2	0.04		103	103	102	100			U	U	U	U	U			101	0	101		CV	
Hf	40	11																				
K	5000	694																				
Se	5	2		99	99	100	96	(74)			U	U	U	U	U			88	0	96		F
Ag	10	3		103	104	104	105	102	105	U	U	U	U	U	93	96	(6)	0	100	0	P	
Ag	5000	110		100	100	99	103			U	U	U	U	U					99	6	P	
Fl	10																					
V	50	8																				
Zn	20	6		101	102	102	105	(124)	114	U	U	U	U	U	92	96	94	12	104	37.6	P	

000032

Title: Evaluation of Metals Data for the
Contract Laboratory Program
Appendix A.6: CLP Data Assessment
Summary Form (Inorganics)

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

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited scope) Date: _____ Case #: NWS
 Site: Naval Weapons Station Lab Name: Roy Weston
 Reviewer's Initials: PBL Number of Samples: _____

Analytes Rejected Due to Exceeding Review Criteria:*

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

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

ICP		1										1	
Flame AA													
Furnace AA		2				1						3	
Mercury													
Total		3				1						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 2 water

SDG# CLP 608

REVIEWER (IF NOT ESD) Heartland EST

SQL# 390

REVIEWER'S NAME Pamela B. Humby

IPC: ACTION: FYI

COMPLETION DATE 4/27/92

DATA ASSESSMENT SUMMARY

	ICP	AA	Hg	CYANIDE
1. HOLDING TIMES	O	O	O	NA
2. CALIBRATIONS	↓	↓	↓	↓
3. BLANKS	↓	↓	↓	↓
4. ICS	↓	↓	↓	↓
5. LCS	↓	↓	↓	↓
6. DUPLICATE ANALYSIS	↓	↓	↓	↓
7. MATRIX SPIKE	Z	↓	↓	↓
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.



April 26, 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 no (0) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

<u>Navy No.</u>	<u>RFW No.</u>
01-M03	911262401
02-M03	911262402
03-M03	911262403
04-M03	911262404
05-M03	911262405
06-M03	911262406
06-M13	911262407

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.

000001

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# 9112624, the analysis of seven (7) field water sample and no (0) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The Qa samples for this data package were found in SDG 606.

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 the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ" if within the concentration range as applied by the Region II Protocol.
2. The CRDL Standard for Cadmium was above the upper control limit. All positive results are qualified as estimated, "J" 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.

000002

Metals Data Assessment Narrative (continued - Page 2)

Spike Recovery

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

5. The Serial Dilution for Iron was outside the control limit. All positive results are qualified as estimated, "J".

MSA

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

<u>Analyte</u>	<u>Samples</u>
Lead	01-M03 and 02-M03.
Selenium	all samples

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
All water samples	Pb	+/U	J/UJ	1
All water samples	Cd	+	J	2
All water samples	Ag	+/U	R	3
All water samples	As	+/U	J/UJ	4
All water samples	Fe	+	J	5
01-M03 and 02-M03. all samples	Pb Se	+/U	J/UJ	6

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

QL - denotes data validation qualifier

000004

0000016

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

01-M03

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

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP624

Matrix (soil/water): WATER Lab Sample ID: 911262401

Level (low/med): LOW Date Received: 12/05/91

% 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 UJ4
7440-39-3	Barium	47.90	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	150.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	20900.00			P J5
7439-92-1	Lead	3.60		W	F J1,6
7439-95-4	Magnesium				NR
7439-96-5	Manganese	30.00			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 UJ6
7440-22-4	Silver	10.00	U		P R3
7440-23-5	Sodium	5000.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	56.70			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:
 Color After: COLORLESS Clarity After: CLEAR Artifacts:
 Comments:

FORM I - IN

03/90

000005

0000017

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

02-M03

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

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

SDG No.: CLP624

Matrix (soil/water): WATER

Lab Sample ID: 911262402

Level (low/med): LOW

Date Received: 12/05/91

% 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 UJ4
7440-39-3	Barium	37.30	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	41.60			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	4870.00			P J5
7439-92-1	Lead	3.10		W	F 346
7439-95-4	Magnesium				NR
7439-96-5	Manganese	69.60			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 UJ6
7440-22-4	Silver	10.00	U		P R3
7440-23-5	Sodium	4110.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	76.30			P
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FORM I - IN

03/90

000006

0000018

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

03-M03

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

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP624

Matrix (soil/water): WATER Lab Sample ID: 911262403

Level (low/med): LOW Date Received: 12/05/91

% 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
7440-39-3	Barium	30.80	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	51.30			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	6200.00			P
7439-92-1	Lead	15.30		S	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	42.40			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	F
7440-22-4	Silver	10.00	U		P
7440-23-5	Sodium	4610.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	97.90			P
	Cyanide				NR

UJ4

JJ
ST

PBH
4/24/92

UJ6
R3

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:
Comments:

0000019

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

04-M03

WEEDON, INC - L372 Contract: 1771-15-03

Case No.: NAVAL SAS No.: SDG No.: CLP624

(P): WATER Lab Sample ID: 911262404

LOW Date Received: 12/05/91

0.0

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

AS No.	Analyte	Concentration	C	Q	M
0-90-5	Aluminum				NR
0-36-0	Antimony				NR
0-38-2	Arsenic	2.00	U		F UJ4
0-39-3	Barium	23.90	B		P
0-41-7	Beryllium				NR
0-43-9	Cadmium	3.00	U		P
0-70-2	Calcium				NR
0-47-3	Chromium	273.00			P
0-48-4	Cobalt				NR
0-50-8	Copper	10.00	U		P
0-89-6	Iron	38000.00			P J5
0-92-1	Lead	15.70		S	F J1 PBH 4/24/92
0-85-4	Magnesium				NR
0-85-5	Manganese	80.80			P
0-97-6	Mercury	.10	U		CV
0-02-0	Nickel				NR
0-09-7	Potassium				NR
2-49-2	Selenium	2.00	U W		F UJ6
0-22-4	Silver	10.00	U		P R3
0-23-5	Sodium	5600.00			P
0-28-0	Thallium				NR
0-62-2	Vanadium				NR
0-66-6	Zinc	101.00			P
	Cyanide				NR

COLORLESS Clarity Before: CLEAR

Texture:

COLORLESS Clarity After: CLEAR

Artifacts:

0000020

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

05-M03

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

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP624

Matrix (soil/water): WATER

Lab Sample ID: 911262405

Level (low/med): LOW

Date Received: 12/05/91

% 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 UJ4
7440-39-3	Barium	165.00	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	5.70			P J2
7440-70-2	Calcium				NR
7440-47-3	Chromium	614.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	21.20	B		P
7439-89-6	Iron	65900.00			P JS
7439-92-1	Lead	30.90		S	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	280.00			P
7439-97-6	Mercury	.28			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.00	U	W	F UJ6
7440-22-4	Silver	10.00	U		P R3
7440-23-5	Sodium	5820.00			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	222.00			P
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FORM I - IN

03/90

000009

0000027

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

06-M03

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

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP624

Matrix (soil/water): WATER Lab Sample ID: 911262406

Level (low/med): LOW Date Received: 12/05/91

% 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 UJ4
7440-39-3	Barium	41.10	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.60	B		P J2
7440-70-2	Calcium				NR
7440-47-3	Chromium	416.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	81500.00			P J5
7439-92-1	Lead	23.40		S	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	640.00			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 UJ6
7440-22-4	Silver	10.00	U		P R3
7440-23-5	Sodium	35100.00			P
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:

0000022

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

06-M13

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

Lab Code: WESTON Case No.: NAVAL SAS No.: SDG No.: CLP624

Matrix (soil/water): WATER Lab Sample ID: 911262407

Level (low/med): LOW Date Received: 12/05/91

% 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 UJ4
7440-39-3	Barium	42.60	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.90	B		P J2
7440-70-2	Calcium				NR
7440-47-3	Chromium	247.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	52900.00			P J5
7439-92-1	Lead	15.20		S	F J4 PB4
7439-95-4	Magnesium				NR
7439-96-5	Manganese	615.00			P 4/24/92
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 UJ6
7440-22-4	Silver	40.00	U		P R3
7440-23-5	Sodium	34900.00			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	308.00			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.1.6 <u>Form I (Final Data)</u> - Are all Form I's present and complete?	<input checked="" type="checkbox"/>	—	—
<u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	—	—
Are soil sample results for each parameter corrected for percent solids?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	—	—
Are computation/transcription errors less than 10% of reported values?	<input checked="" type="checkbox"/>	—	—
Are all "less than IDL" values properly coded with "U"?	<input checked="" type="checkbox"/>	—	—
Was a brief physical description of samples given on Form I's?	<input checked="" type="checkbox"/>	—	—
Were the result qualifiers used correctly with final data?	<input checked="" type="checkbox"/>	—	—
<u>ACTION:</u> 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?	—	<input checked="" type="checkbox"/>	—
If yes, were dilutions noted on Form I's?	<input checked="" type="checkbox"/>	—	—
<u>ACTION:</u> 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?	—	<input checked="" type="checkbox"/>	—
Cyanide distillation (14 days) exceeded?	—	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Title: Evaluation of Metals for the Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)

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

	YES	NO	N/A
Other Metals analysis (6 months) . . . exceeded?	—	<input checked="" type="checkbox"/>	—

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?	<input checked="" type="checkbox"/>	—	—
Digestion Log for furnace AA Form XIII present?	<input checked="" type="checkbox"/>	—	—
Distillation Log for mercury Form XIII present?	<input checked="" type="checkbox"/>	—	—
Distillation Log for cyanides Form XIII present?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
Are pH values (pH < 2 for all metals, pH > 12 for cyanide) present?	<input checked="" type="checkbox"/>	—	—
*weights, dilutions and volumes used to obtain values.			
Percent solids calculation present for soils/sediments?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
Are preparation dates present on Digestion Log?	<input checked="" type="checkbox"/>	—	—
A.1.8.2 Measurement read out record present?			
ICP	<input checked="" type="checkbox"/>	—	—
Flame AA	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
Furnace AA	<input checked="" type="checkbox"/>	—	—
Mercury	<input checked="" type="checkbox"/>	—	—
Cyanides	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>

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	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	<input checked="" type="checkbox"/>	___	___
Legible?	<input checked="" type="checkbox"/>	___	___
Properly Labeled?	<input checked="" type="checkbox"/>	___	___
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 <u>Data Validation and Verification</u>			
1.9.1 <u>Calibration</u>			
A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	<input checked="" type="checkbox"/>	___	___
Is record of 5 point calibration present for Hg analysis?	<input checked="" type="checkbox"/>	___	___
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?	<input type="checkbox"/>	___	<input checked="" type="checkbox"/>
Furnace AA?	<input checked="" type="checkbox"/>	___	___
Cyanides?	<input type="checkbox"/>	___	<input checked="" type="checkbox"/>

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 $\pm 10\%$ of true value.
 2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

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YES NO N/A

ACTION: Flag associated data as estimated if standards are not within $\pm 10\%$ of true values (except CROL 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.

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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 (U), 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? YES NO N/A

ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).

Was ICV for cyanides distilled? YES NO N/A

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

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

A.1.9.3.1 Was a CRL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)? YES NO N/A

*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis? YES NO N/A

Was a $2 \times CRL$ (or $2 \times IDL$ when $IDL > CRL$) analyzed (CRI) for each ICP run?
 (Note: CRI for AL, Ba, Ca, Fe, Mg, Na, or K is not required.) YES NO N/A

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 \pm CRL
- ICP Analysis - **True Value \pm $2 \times CRL$
- CN Analysis - **True Value \pm 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 CRL when $IDL > CRL$.

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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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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 CPA 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.

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	YES	NO	N/A
ACTION: If yes, reject (red-line) all associated data greater than CRCL 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 IEL when IEL is greater than CRCL?	<input checked="" type="checkbox"/>		
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 CRCL?		<input checked="" type="checkbox"/>	
ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRCL.			
A.1.9.6 <u>Form IV (ICP Interference Check Sample)</u>			
A.1.9.6.1 Present and complete?	<input checked="" type="checkbox"/>		
(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)?	<input checked="" type="checkbox"/>		
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%)?	<input checked="" type="checkbox"/>		
If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	<input checked="" type="checkbox"/>		
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").			

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	YES	NO	N/A
A.1.9.7 <u>Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)-</u> (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?	<input checked="" type="checkbox"/>	__	__
each matrix type?	<input checked="" type="checkbox"/>	__	__
each conc. range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	__	__
For both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	__	<input checked="" type="checkbox"/>
<u>ACTION:</u> 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.			
<u>NOTE:</u> 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?	__	<input checked="" type="checkbox"/>	__
<u>ACTION:</u> If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
<u>NOTE:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	__
If no, is sample concentration greater than or equal to four times spike concentration?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	__
<u>ACTION:</u> 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.			

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	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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:

- | | | | |
|------------------------|-------------------------------------|-------------------------------------|--------------------------|
| (a) less than 30%? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) between 30-74%? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) between 125-150%? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| (d) greater than 150%? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

ACTION: If less than 30%, reject all associated aqueous
 data; if between 30-74%, flag all associated
 aqueous data as estimated (J); if between
 125-150%, 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%? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| (b) between 10-74%? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| (c) between 125-200%? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| (d) greater than 200%? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTION: If less than 10%, reject all associated data; if
 between 10-74%, flag all associated data as estimated;
 if between 125-200%, 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".

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	YES	NO	N/A
A.1.9.8 Form VI (Lab Duplicates)			
A.1.9.8.1 Present and complete for: each 20 samples?	<input checked="" type="checkbox"/>	—	—
each matrix type?	<input checked="" type="checkbox"/>	—	—
each concentration range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	—	—
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>

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.

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	YES	NO	N/A
<u>ACTION:</u> If yes, flag the associated data as estimated.			
A.1.9.9 Field Duplicates			
A.1.9.9.1 Were field duplicates analyzed?	[]	[]	[] ✓
<u>ACTION:</u> 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.			
<u>NOTE:</u> 1. Do not calculate RPD when both values are less than IHL. 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?	[]	[]	[] ✓
<u>ACTION:</u> 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?	[]	[]	[] ✓
<u>ACTION:</u> If yes, flag the associated data as estimated.			

* Substitute IHL for CRDL when IHL > CRDL.

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

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	YES	NO	N/A
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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.

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	YES	NO	N/A
A.1.9.11 <u>Form IX (ICP Serial Dilution) -</u>			
NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x ILL.			
A.1.9.11.1 Was Serial Dilution analysis performed for:			
each 20 samples?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each concentration range (i.e. low, med.)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ACTION: If no for any of the above, flag all positive data greater than or equal to 10x ILLs as estimated (J) for which Serial Dilution Analysis was not performed, and summarize the deficiency on the DFO report.			
.1.9.11.2 Was field blank(s) used for Serial Dilution Analysis?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ACTION: If yes, flag all associated data $\geq 10 \times$ ILL 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 ILL or greater.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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 ILLs only. Are any % difference values:			
> 10%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
$\geq 100\%$?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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YES NO N/A

ACTION: Flag as estimated (J) all associated equal to or greater than 10xMLLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xMLLs for which PD is greater than or equal to 100%.

A.1.9.12 Furnace Atomic Absorption (AA) CC 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 CML?

[✓] _ _

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.

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	YES	NO	N/A
A.1.9.13 <u>Form VIII (Method of Standard Addition Results)</u>			
A.1.9.13.1 Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is any Form I result coded with "S" or a "+"?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If yes, reject (red-line) affected data.			
A.1.9.13.3 Was *MSA required for any sample but not performed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is coefficient of correlation for MSA less than 0.995?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If no, note exception under contract problem/non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14 <u>Dissolved/Total or Inorganic/Total Analytes -</u>			
A.1.9.14.1 Were any analyses performed for dissolved as well as total analytes on the same sample(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

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- 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.

YES NO N/A

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".

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	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?	___	<input checked="" type="checkbox"/>	___
(b) all analytes analyzed by GFAA?	___	<input checked="" type="checkbox"/>	___
(c) all analytes analyzed by AA Flame?	___	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) Mercury?	___	<input checked="" type="checkbox"/>	___
(e) Cyanide?	___	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<u>ACTION:</u> 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 $CFDL$, $2 \times IDL$ when $IDL > CFDL$.

Do concentrations of field blank(s) fall below $CFDL$ (or $2 \times IDL$ when $IDL > CFDL$) 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.

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 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

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

	YES	NO	N/A
A.1.9.17 <u>Form X, XI, XII (Verification of Instrumental Parameters).</u>			

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.

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.1.9.17.3 Form XI (Linear Ranges)			
Was any sample result higher than high linear range of ICP.	—	<input checked="" type="checkbox"/>	—
Was any sample result higher than the highest calibration standard for non-ICP parameters?	—	<input checked="" type="checkbox"/>	—
If yes for any of the above, was the sample diluted to obtain the result on Form I?	<input checked="" type="checkbox"/>	—	—
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%?	—	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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#	<u>NWS</u>	Site	<u>Naval Weapons Station</u>	Matrix:	<u>Soil</u>
SDG#	<u>CLP 624</u>	Lab	<u>Roy F. Weston</u>	Water	<u>✓</u>
Contractor	<u>Roy F. Weston</u>	Reviewer	<u>Heartland EST</u>	Other	<u>_____</u>

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. The CRDL Standard for Lead was below the lower control limit. All data is qualified as estimated.
2. The CRDL Standard for Cadmium was above the upper control limit. All positive data is qualified as estimated.
3. The Matrix Spike recovery for Silver was below 30%. All data rejected.
4. The Matrix Spike recovery for Arsenic was below the lower control limit. All data is qualified as estimated.
5. The Serial Dilution for Iron was outside the control limit. All positive results are qualified as estimated.

~~PBH 4/23/92~~

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

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

~~PBT 4/24/92~~

...2.2 Contract-Problems/Non-Compliance

~~PBT 4/24/92~~

MS Reviewer: _____ Date: _____

Signature

Contractor Reviewer: Paul B. Hruby Date: 4/24/92

Signature

Verified by: Christopher D. Scapellato Date: 4/28/92

LABORATORY: Roy F. Weston CASE NO. NWS SOLV NO. 390 SAMPLE TYPE/SDG: CLP 624

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 01-M03, 02-M03, 03-M03, 04-M03, 05-M03, 06-M03 and 06-M13.

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

SERIAL DILUTION SAMPLE NO. _____ COMPLETION DATE: 4/23/92 REVIEWERS INITIALS: PBH

Parameter	Detection Limits		Field Blank	Calib. Ver. XR			CRDL Std Ver. XR		Calibration Blanks			P B R L E A P N	ICP ICS XR		M S t p r 1 x k	Lab Dup RPD Diff	LCS XR	Ser Dil ID	M e t h		
	UG/L	IDL		Continued			Init	Fin	Continued				Init	Fin							
	CRDL	IDL		Init	1	2			3	Init	1									2	3
Al	200	91	NA																		
Bb	80	20																			
Ba	10	2		97	100	100	101	111			U	U	U	U	U			97	100	F	
Ba	200	16		101	101	101	101			U	U	U	U	U	86	86	94	5	100	P	
Be	5	1																			
Cd	5	2		97	98	94	95	124	119	U	U	U	U	U	95	94	94	0	98	P	
Cn	5000	47																			
Cd	10	4		99	100	100	100	106	99	U	U	U	U	U	96	97	97	13	99	0.8 P	
Cd	50	11																			
Cd	25	6		103	103	103	103	109	105	U	U	U	U	U	98	98	97	200	101	100 P	
Fa	100	46		101	102	102	102			U	U	U	U	557	91	92	64	17	102	10.2 P	
Pb	3	2		95	98	100	100	76			U	U	U	U	U			96	5	102	F
Mg	5000	29																			
Mn	15	2		100	101	101	100	100	100	U	U	U	U	U	93	91	94	1	101	54 P	
Hg	0.2	0.04		102	104	99	103			U	U	U	U	U			101	0	102	CV	
Ni	40	11																			
K	5000	694																			
Se	5	2		102	105	105	104	100			U	U	U	U	U			88	0	101	F
Ag	10	3		98	99	97	96	87	83	U	U	U	U	U	94	93	0	0	103	0 P	
Na	5000	110		101	100	101	102			U	U	U	U	224				100	6	P	
Tl	10																				
P	50	8																			
Zn	20	6		100	101	100	101	113	102	U	U	U	U	14	91	91	44	12	103	37.4 P	

000037

Title: Evaluation of Metals Data for the
Contract Laboratory Program
Appendix A.6: CLP Data Assessment
Summary Form (Inorganics)

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

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited scope) Date: _____ Case #: NWS
Site: Naval Weapons Station Lab Name: Roy Weston
Reviewer's Initials: PBL Number of Samples: _____

Analytes Rejected Due to Exceeding Review Criteria:*

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

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

ICP		1										1	
Flame AA													
Furnace AA		1				1						2	
Mercury													
Total		2				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
 LABORATORY Roy F. Weston
 SDG# CLP 624
 SO# 390
 DPO: ACTION FYI

SITE Naval Weapons Station
 NO. OF SAMPLES/
 MATRIX 7 waters
 REVIEWER (IF NOT ESD) Heathley EST
 REVIEWER'S NAME Paul B. Humby
 COMPLETION DATE 4/27/92

DATA ASSESSMENT SUMMARY

	ICP	AA	Hg	CYANIDE
1. HOLDING TIMES	O	O	O	NA
2. CALIBRATIONS	↓	↓	↓	↓
3. BLANKS	↓	↓	↓	↓
4. ICS	↓	↓	↓	↓
5. LCS	↓	↓	↓	↓
6. DUPLICATE ANALYSIS	↓	↓	↓	↓
7. MATRIX SPIKE	Z	↓	↓	↓
MSA	O	↓	↓	↓
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: _____

000039
 000041



April 26, 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 samples and one (1) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

<u>Navy No.</u>	<u>RFW No.</u>
1-M003	911150401
2-M003	911150402
3-M003	911150403
2-M103	911150404
4-M003	911150405
4-M203	911150406
5-M003	911150407
6-M003	911150408

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.

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# 9112504**, the analysis of Eight (8) field water sample and one (1) matrix spike and duplicate pair. Overall, the inorganic data quality was fair.

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 Chromium was below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ" if within the concentration range as applied by the Region II Protocol.
2. The CRDL Standard for Copper was above the upper control limit. All positive results are qualified as estimated, "J" if within the concentration range as applied by the Region II Protocol.
3. The CRDL Standards for Arsenic, Cadmium, Silver and Zinc were above 150%. All positive results are rejected if within the concentration range applied by the Region II Protocol.

Preparation and Field Blanks

No deficiencies in this section.

Interferences

No significant interferences were observed.

000002

Metals Data Assessment Narrative (continued - Page 2)

Spike Recovery

- 4. The Matrix Spike recoveries for Arsenic and Silver 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 Analyses for Iron and Lead were 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

No deficiencies in this section.

MSA

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

<u>Analyte</u>	<u>Samples</u>
Lead	1-M003, 2-M003, 3-M003, 2-M103 and 6-M003.
Selenium	4-M003 and 6-M003.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
All water samples	Cr	+/U	J/UJ	1
All water samples	Cu	+	J	2
All water samples	As, Cd, Ag and Zn.	+	R	3
All water samples	As and Ag	+/U	R	4
All water samples	Se	+/U	J/UJ	5
All water samples	Fe and Pb	+/U	J/UJ	6
1-M003, 2-M003, 3-M003, 2-M103 and 6-M003. 4-M003 and 6-M003.	Pb Se	+/U	J/UJ	7

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

QL - denotes data validation qualifier

000004

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

1-M003

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP504

Matrix (soil/water): WATER Lab Sample ID: 911150401

Level (low/med): LOW Date Received: 11/22/91

% 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	52.30	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 JS1
7440-48-4	Cobalt				NR
7440-50-8	Copper	12.00	B		P J2
7439-89-6	Iron	1960.00		*	P J6
7439-92-1	Lead	3.40		W*	F J6,7
7439-95-4	Magnesium				NR
7439-96-5	Manganese	23.60			P
7439-97-6	Mercury	.15	B		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.00	U N		F JS
7440-22-4	Silver	10.00	U N		P R4
7440-23-5	Sodium	2700.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	57.90			P R3
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:
 Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

1
INORGANIC ANALYSIS DATA SHEET

2-M003

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP504

Matrix (soil/water): WATER Lab Sample ID: 911150402

Level (low/med): LOW Date Received: 11/22/91

% 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	20.90	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	6.00	U *		P UJ1
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	31000.00		*	P JG
7439-92-1	Lead	2.00	U	W*	F UJ6, 7
7439-95-4	Magnesium				NR
7439-96-5	Manganese	278.00			P
7439-97-6	Mercury	.12	B		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.00	U N		F UJ5
7440-22-4	Silver	10.00	U N		P R4
7440-23-5	Sodium	4930.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	38.70			P R3
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:
 Color After: COLORLESS Clarity After: CLEAR Artifacts:
 Comments:

0000020

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

3-M003

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP504

Matrix (soil/water): WATER Lab Sample ID: 911150403

Level (low/med): LOW Date Received: 11/22/91

% 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	21.50	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 UJ1
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	5720.00	U *		F J6
7439-92-1	Lead	2.00	U W*		F UJ6,7
7439-95-4	Magnesium				NR
7439-96-5	Manganese	23.40			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 N		F UJ5
7440-22-4	Silver	10.00	U N		P R4
7440-23-5	Sodium	2220.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	42.30			P R3
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FORM I - IN

03/90

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0000021

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

2-M103

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP504

Matrix (soil/water): WATER Lab Sample ID: 911150404

Level (low/med): LOW Date Received: 11/22/91

% 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	21.50	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 UJ1
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	35300.00		*	P J6
7439-92-1	Lead	2.00	U	W*	F UJ6,7
7439-95-4	Magnesium				NR
7439-96-5	Manganese	294.00			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	N	F UJ5
7440-22-4	Silver	10.00	U	N	P R4
7440-23-5	Sodium	4900.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	39.60			P R3
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

000008

0000022

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

4-M003

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

Lab Code: WESTON

Case No.: NWS

SAS No.:

SDG No.: CLP504

Matrix (soil/water): WATER

Lab Sample ID: 911150405

Level (low/med): LOW

Date Received: 11/22/91

% 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	84.10	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	24.30	*		P J1
7440-48-4	Cobalt				NR
7440-50-8	Copper	24.00	B		P J2
7439-59-6	Iron	17400.00	*		P J6
7439-92-1	Lead	17.30	S*		F J6
7439-95-4	Magnesium				NR
7439-96-5	Manganese	306.00			P
7439-97-6	Mercury	.34			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.00	U NW		F U55, 7
7440-22-4	Silver	~10.00	U N		P R4
7440-23-5	Sodium	2500.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	156.00			P
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FORM I - IN

03/90

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0000023

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

4-M203

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

Lab Code: WESTON

Case No.: NWS

SAS No.:

SDG No.: CLP504

Matrix (soil/water): WATER

Lab Sample ID: 911150406

Level (low/med): LOW

Date Received: 11/22/91

% 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 UJ1
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	46.00	U	*	P UJ6
7439-92-1	Lead	2.30	B	*	F J6
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	N	F UJ5
7440-22-4	Silver	10.00	U	N	P R4
7440-23-5	Sodium	110.00	U		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	7.00	B		P R3
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FORM I, - IN

03/90

000010

0000024

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

5-M003

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP504

Matrix (soil/water): WATER Lab Sample ID: 911150407

Level (low/med): LOW Date Received: 11/22/91

% 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	47.10	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	25.00	*		P J1
7440-48-4	Cobalt				NR
7440-50-8	Copper	13.60	B		P J2
7439-89-6	Iron	21000.00	*		F J6
7439-92-1	Lead	14.30	S*		F J6
7439-95-4	Magnesium				NR
7439-96-5	Manganese	183.00			P
7439-97-6	Mercury	.32			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.00	U N		F UJ5
7440-22-4	Silver	10.00	U N		P R4
7440-23-5	Sodium	2680.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	62.80			P R3
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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0000025

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

6-M003

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

Lab Code: WESTON

Case No.: NWS

SAS No.:

SDG No.: CLP504

Matrix (soil/water): WATER

Lab Sample ID: 911150408

Level (low/med): LOW

Date Received: 11/22/91

% 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	31.40	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	6.00	U	*	P UJ1
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7429-89-6	Iron	1890.00		*	P J6
7439-92-1	Lead	2.00	U	W*	F UJ6,7
7439-95-4	Magnesium				NR
7439-96-5	Manganese	33.20			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	NW	F UJ5,7
7440-22-4	Silver	10.00	U	N	P R4
7440-23-5	Sodium	2560.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	47.90			P R3
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

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	YES	NO	N/A
A.1.6 <u>Form I (Final Data)</u> - Are all Form I's present and complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are soil sample results for each parameter corrected for percent solids?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are computation/transcription errors less than 10% of reported values?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are all "less than MDL" values properly coded with "U"?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was a brief physical description of samples given on Form I's?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were the result qualifiers used correctly with final data?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If yes, were dilutions noted on Form I's?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If no, note under Contract-Problem/Non-Compliance of the "Data Assessment Narrative".			

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

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

Mercury analysis (28 days) exceeded?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Cyanide distillation (14 days) exceeded?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

STANDARD OPERATING PROCEDURE

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	YES	NO	N/A
Other Metals analysis (6 months) exceeded?	—	<input checked="" type="checkbox"/>	—

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?	<input checked="" type="checkbox"/>	—	—
Digestion Log for furnace AA Form XIII present?	<input checked="" type="checkbox"/>	—	—
Distillation Log for mercury Form XIII present?	<input checked="" type="checkbox"/>	—	—
Distillation Log for cyanides Form XIII present?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
Are pH values (pH < 2 for all metals, pH > 12 for cyanide) present?	<input checked="" type="checkbox"/>	—	—
*weights, dilutions and volumes used to obtain values.			
Percent solids calculation present for soils/sediments?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
Are preparation dates present on Digestion Log?	<input checked="" type="checkbox"/>	—	—
A.1.8.2 Measurement read out record present?			
ICP	<input checked="" type="checkbox"/>	—	—
Flame AA	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
Furnace AA	<input checked="" type="checkbox"/>	—	—
Mercury	<input checked="" type="checkbox"/>	—	—
Cyanides	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>

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	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Legible?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Properly Labeled?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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

A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is record of 5 point calibration present for Hg analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Furnace AA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cyanides?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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 CREL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

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YES NO N/A

ACTION: Flag associated data as estimated if standards are not within $\pm 10\%$ 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? YES NO N/A

Cyanide Analysis? YES NO N/A

Atomic Absorption Analysis? YES NO N/A

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? YES NO N/A

Present and complete for AA and ICP when both are used for same analyte? YES NO N/A

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% YES NO N/A

Hg - 80-120% YES NO N/A

Cyanides 85-115% YES NO N/A

* The reviewer will calculate correlation coefficient.

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YES NO N/A

ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with IR 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 (U), if the ICV or CCV IR 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?

YES NO N/A

ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).

Was ICV for cyanides distilled?

YES NO N/A

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)?

YES NO N/A

*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?

YES NO N/A

Was a 2xCRDL (or 2xIDL when IDL > CRDL) analyzed (CRI) for each ICP run?

YES NO N/A

(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 \pm CRDL
- ICP Analysis - **True Value \pm 2CRDL
- CN Analysis - **True Value \pm 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.

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	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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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 CPA 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.

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	YES	NO	N/A
ACTION: If yes, reject (red-line) all associated data greater than CRIL 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 IEL when IEL is greater than CRIL?	<input checked="" type="checkbox"/>		
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 CRIL?		<input checked="" type="checkbox"/>	
ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRIL.			
A.1.9.6 <u>Form IV (ICP Interference Check Sample)</u>			
A.1.9.6.1 Present and complete?	<input checked="" type="checkbox"/>		
(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)?	<input checked="" type="checkbox"/>		
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%)?	<input checked="" type="checkbox"/>		
If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	<input checked="" type="checkbox"/>		
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").			

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YES NO N/A

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 SOG.

- 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.

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	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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%	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) between 30-74%	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) between 125-150%	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(d) greater than 150%	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 125-150%, 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%	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) between 10-74%	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) between 125-200%	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) greater than 200%	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 125-200%, 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".

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	YES	NO	N/A
A.1.9.8 Form VI (Lab Duplicates)	<input checked="" type="checkbox"/>	—	—
A.1.9.8.1 Present and complete for: each 20 samples?	<input checked="" type="checkbox"/>	—	—
each matrix type?	<input checked="" type="checkbox"/>	—	—
each concentration range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	—	—
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>

ACTION: If no for any the above, flag as estimated (J) all data >CREL* 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 >CREL* 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 < ±CREL)?

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 CREL when IDL > CREL.

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YES NO N/A

2. If lab duplicate result is rejectable due to coefficient of correlation of PSA, 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 $10 \times CRDL^*$? YES NO N/A

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 > $\pm CRDL^*$

Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times $CRDL^*$? YES NO N/A

Is any **difference between sample and duplicate greater than $CRDL^*$ where sample and/or duplicate is less than 5 times $CRDL^*$? YES NO N/A

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 > $2 \times CRDL^*$

Is any RPD (where sample and duplicate are both greater than or equal to 5 times $CRDL^*$) :

> 100%? YES NO N/A

Is any **difference between sample and duplicate (where sample and/or duplicate is less than $5 \times CRDL^*$) :

> $2 \times CRDL^*$? YES NO N/A

* Substitute IDL for CRDL when $IDL > CRDL$.

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

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	YES	NO	N/A
<u>ACTION:</u> If yes, flag the associated data as estimated.			
A.1.9.9 <u>Field Duplicates</u>			
A.1.9.9.1 Were field duplicates analyzed?	[]	[]	[] ✓
<u>ACTION:</u> 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.			
<u>NOTE:</u> 1. Do not calculate RPD when both values are less than ILL. 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?	[]	[]	[] ✓
<u>ACTION:</u> If yes, flag the associated data as estimated.			
A.1.9.9.3 <u>AQUEOUS</u>			
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?	[]	[]	[] ✓
<u>ACTION:</u> If yes, flag the associated data as estimated.			

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

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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%?	___	[<input checked="" type="checkbox"/>]	___
	between 50% and 79%?	___	[<input checked="" type="checkbox"/>]	___
	between 121% and 150%?	___	[<input checked="" type="checkbox"/>]	___
	greater than 150%?	___	[<input checked="" type="checkbox"/>]	___

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 IRL 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?	___	[<input type="checkbox"/>]	___ <input checked="" type="checkbox"/>
--	-----	------------------------------	---

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

Is LCS "Found" value lower than the Control limits on Form VII?	___	[<input type="checkbox"/>]	___ <input checked="" type="checkbox"/>
---	-----	------------------------------	---

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

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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 ILL.

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 10x ILLs 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 $\geq 10 \times \text{ILL}$ 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 ILL 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 ILLs only. Are any % difference values:
 > 10%?

> 100%?

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

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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) OC 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 CROL?

[✓] _ _

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 SP > 4SA.

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	YES	NO	NA
A.1.9.13 <u>Form VIII (Method of Standard Addition Results)</u>			
A.1.9.13.1 Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is any Form I result coded with "S" or a "+"?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION</u> : 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION</u> : If yes, reject (red-line) affected data.			
A.1.9.13.3 Was *MSA required for any sample but not performed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is coefficient of correlation for MSA less than 0.995?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION</u> : 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION</u> : If no, note exception under contract problem/non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14 <u>Dissolved/Total or Inorganic/Total Analytes -</u>			
A.1.9.14.1 Were any analyses performed for dissolved as well as total analytes on the same sample(s)..	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

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Title: Evaluation of Metals Data for the
 Contract Laboratory Program
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- | | 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 CREL as well as total concentration. | | | |
| 2. Apply the following questions only if inorganic (or dissolved) results are (i) above CREL, 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.?	[✓]	—	—
SOG 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".

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	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?	—	<input checked="" type="checkbox"/>	—
(b) all analytes analyzed by GFAA?	—	<input checked="" type="checkbox"/>	—
(c) all analytes analyzed by AA Flame?	—	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) Mercury?	—	<input checked="" type="checkbox"/>	—
(e) Cyanide?	—	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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 $CRLL$, $2 \times ILL$ when $ILL > CRLL$.

Do concentrations of field blank(s) fall below $CRLL$ (or $2 \times ILL$ when $ILL > CRLL$) 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.

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

Date: Feb. 1990
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	YES	NO	N/A
A.1.9.17 <u>Form X, XI, XII (Verification of Instrumental Parameters)</u>			
A.1.9.17.1 Is verification report present for:			
Instrument Detection Limits (quarterly)?	<input checked="" type="checkbox"/>	—	—
ICP Interelement Correction Factors (annually)?	<input checked="" type="checkbox"/>	—	—
ICP Linear Ranges (quarterly)?	<input checked="" type="checkbox"/>	—	—
<u>ACTION:</u> If no, contact DPO of the lab.			
A.1.9.17.2 <u>Form X (Instrument Detection Limits)</u> - (Note: IIL is not required for Cyanide.)			
Are IILs present for:			
all the analytes?	<input checked="" type="checkbox"/>	—	—
all the instruments used?	<input checked="" type="checkbox"/>	—	—
For both AA and ICP when both are used for same analyte?	<input checked="" type="checkbox"/>	—	—
<u>ACTION:</u> If no for any of the above, prepare Telephone Record Log and contact laboratory.			
Is IIL greater than CRDL for any analyte?	—	<input checked="" type="checkbox"/>	—
If yes, is the concentration on Form I of the sample analyzed on the instrument whose IIL exceeds CRDL, greater than 5 x IIL?	<input checked="" type="checkbox"/>	—	—
<u>ACTION:</u> If no, flag as estimated all values less than five times IIL of the instrument whose IIL exceeds CRDL.			

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
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	YES	NO	N/A
<u>A.1.9.17.3 Form XI (Linear Ranges)</u>			
Was any sample result higher than high linear range of ICP.	—	<input checked="" type="checkbox"/>	—
Was any sample result higher than the highest calibration standard for non-ICP parameters?	—	<input checked="" type="checkbox"/>	—
If yes for any of the above, was the sample diluted to obtain the result on Form I?	<input checked="" type="checkbox"/>	—	—
<u>ACTION:</u> If no, flag the result reported on Form I as estimated(J).			
<u>A.1.9.18 Percent Solids of Sediments</u>			
Is soil content in sediment(s) less than 50%?	—	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<u>ACTION:</u> 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
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Case# NW5 Site Naval Weapon Station Matrix: Soil
SDG# CLP 504 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. The CRDL Standard for Chromium was below the lower control limit. All data qualified as estimated.

2. The CRDL Standard for Copper was above the upper control limit. All positive data is qualified as estimated.

3. The CRDL Standards for Arsenic, Cadmium, Silver and Zinc were above 150%. All positive results are rejected.

4. The Matrix Spike recoveries for Arsenic and Silver were below 30%. All data is rejected.

5. The Matrix Spike recovery for Selenium was below the lower control limit. All data is qualified as estimated.

6. The Duplicate analyses for Iron and Lead were outside the control limit. All data qualified as estimated.

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

Date: Feb. 1990
Number: HW-2
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PBH 4/23/92

...2.2 Contract-Problems/Non-Compliance

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~~_____~~
PBH 4/23/92

MS Reviewer: _____

Signature

Date: _____

Contractor Reviewer: _____

Signature

Paul B. Hummel

Date: _____

4/23/92

Verified by: _____

[Signature]

Date: _____

4/28/92

LABORATORY: Roy F. Weston CASE NO. NWS SOLV NO. 390 SAMPLE TYPE/SDC: CLP 504

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 1-M003, 2-M003, 3-M003, 2-M103, 4-M003, 4-M203, 5-M003 and 6-M003

FIELD DUP. #'S: _____ LAB DUP. #'S: 4-M003 ^{Field Blank} MATRIX SPIKE #: 4-M003

SERIAL DILUTION SAMPLE NO. 4-M003 COMPLETION DATE: 4/23/92 REVIEWERS INITIALS: PB#

Parameter	Detection Limits		Field Blank	Calib. Ver. XR			CRDL Std Ver. XR		Calibration Blanks			P B R L E A P N	ICP ICS XR		M S t p r i x k	Lab Dup RPD Diff	LCS I R	Ser Dil I D	M e t h
	UG/L	IDL		Continued			Init	Fin	Continued				Init	Fin					
	CRDL	IDL		1	2	3			1	2	3								
Al	200	91	NA																
As	10	2		99	97	100	100	(157)		U	U	U	U	U		(13)	95		F
Ba	200	16		101	100	100	100		27	U	U	U	U	90	89	91	11.4	99	36 P
Be	5	1																	
Cd	5	2		105	108	94	94	(259)	102	U	U	U	U	49	99	93	(35)	112	P
Cu	3000	47																	
	10	4		99	98	100	99	(72)	(123)	U	U	U	U	98	99	103	(35)	48	100 P
Cu	50	11																	
Cu	25	6		101	102	103	102	(126)	116	U	U	U	U	102	101	95	19	99	100 P
Fa	100	46		99	100	101	100			U	U	U	U	100	103	104	144	(53)	99 3.1 P
Pb	3	2		101	101	101	102	117		U	U	U	U			108	(52)	92	F
Mg	5000	29																	
Mn	15	2		99	99	101	101	96	104	3.9	U	U	U	U	114	116	119	15	100, 3 P
Pz	0.2	0.04		102	102	101	102			U	U	U	U			101	13	99	CV
Ni	40	11																	
K	5000	694																	
Se	5	2		104	99	97	97	88		U	U	U	U			(40)	89	100	F
Ag	10	3		104	105	106	105	(165)	100	U	U	U	U	107	107	(0)	94	100	P
	5000	110		100	100	100	100			114	U	U	U	140			.4	97	7.5 P
Tl	10																		
V	50	8																	000033
Zn	20	6		99	99	100	99	(172)	(126)	U	U	U	U	6.6	94	94	98	2.1	100 1.7 P

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.6: CLP Data Assessment
 Summary Form (Inorganics)

Date: Feb. 1990
 Number: HW-2
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CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited scope) Date: 4/27/92 Case #: NWS
 Site: Naval Weapons Station Lab Name: Roy Weston
 Reviewer's Initials: PBL Number of Samples: 8

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Inter-ferences	Spike Recovery	Duplicates Lab/Field	Detection Limits	Serial LCS Dilution	Total MSA Analytes	Rejection
ICP		3				1				4	
Flame AA											
Furnace AA		1				1				2	
Mercury											
Total		4				2				6	
Other											

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

ICP		2					1				3
Flame AA											
Furnace AA						1	1				2
Mercury											
Total		2				1	2				5
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 Weapon Station

LABORATORY Roy F. Weston

NO. OF SAMPLES/
 MATRIX 8 waters

SG# CLP 504

REVIEWER (IF NOT ESD) Heartland EST

SG# 390

REVIEWER'S NAME Paul B. Humby

IPC: ACTION: FYI

COMPLETION DATE _____

DATA ASSESSMENT SUMMARY

	ICP	AA	Hg	CYANIDE
1. HOLDING TIMES	<u>0</u>	<u>0</u>	<u>0</u>	<u>NA</u>
2. CALIBRATIONS	<u>Z</u>	<u>Z</u>		
3. BLANKS	<u>0</u>	<u>0</u>		
4. ICS	<u>↓</u>	<u>↓</u>		
5. LCS	<u>↓</u>	<u>↓</u>		
6. DUPLICATE ANALYSIS	<u>Z</u>	<u>Z</u>		
7. MATRIX SPIKE	<u>Z</u>	<u>Z</u>		
8. MSA	<u>0</u>	<u>0</u>		
9. SERIAL DILUTION	<u>↓</u>	<u>↓</u>		
10. SAMPLE VERIFICATION	<u>↓</u>	<u>↓</u>		
11. OTHER QC	<u>↓</u>	<u>↓</u>		
12. OVERALL ASSESSMENT	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>

- 0 = 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: _____

000040
 000041

HEARTLAND ENVIRONMENTAL
SERVICES, INC.



April 26, 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 no (0) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

<u>Navy No.</u>	<u>RFW No.</u>
07-001	911154401
07-002	911154402
07-003	911154403
07-203	911154404
07-004	911154405
07-103	911154406
07-005	911154407

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.

000001

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# 9112544, the analysis of seven (7) field water sample and one (1) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The Quality Assurance data can be found in SDG 504.

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 Standards for Arsenic, Copper and Zinc were above the upper control limit. All positive results are qualified as estimated, "J" 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.

000002

Metals Data Assessment Narrative (continued - Page 2)

Spike Recovery

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

5. The Duplicate Analyses for Iron and Lead were 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

No deficiencies in this section.

MSA

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

<u>Analyte</u>	<u>Samples</u>
Arsenic	07-002 and 07-003.
Lead	07-002 and 07-203.
Selenium	07-002, 07-003, 07-203 and 07-103

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
All water samples	Pb	+/U	R	1
All water samples	As, Cu, Zn.	+	J	2
All water samples	As and Ag.	+/U	R	3
All water samples	Se	+/U	J/UJ	4
All water samples	Fe and Pb	+/U	J/UJ	5
07-002 and 07-003. 07-002 and 07-203. 07-002, 07-003, 07-103 and 07-203.	As Pb Se	+/U	J/UJ	6

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

QL - denotes data validation qualifier

000004

0000018

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

07-001

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP544

Matrix (soil/water): WATER Lab Sample ID: 911154401

Level (low/med): LOW Date Received: 11/26/91

% 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	111.00		S	F R3
7440-39-3	Barium	289.00			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	6.90			P
7440-70-2	Calcium				NR
7440-47-3	Chromium	248.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	140.00			P
7439-89-6	Iron	353000.00			P JS
7439-92-1	Lead	156.00			F JS
7439-95-4	Magnesium				NR
7439-96-5	Manganese	619.00			P
7439-97-6	Mercury	.34			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	20.00	U		F US4
7440-22-4	Silver	10.00	U		P R3
7440-23-5	Sodium	4990.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	481.00			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:
Comments:

0000019

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

07-002

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

Lab Code: WESTON

Case No.: NWS

SAS No.:

SDG No.: CLP544

Matrix (soil/water): WATER

Lab Sample ID: 911154402

Level (low/med): LOW

Date Received: 11/26/91

% 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	5.40	B	W	F
7440-39-3	Barium	55.50	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	10.70			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	11.00	B		P
7439-89-6	Iron	14500.00			P
7439-92-1	Lead	5.20		W	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	65.50			P
7439-97-6	Mercury	.19	B		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.00	U	W	F
7440-22-4	Silver	10.00	U		P
7440-23-5	Sodium	27700.00			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	38.90			P
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FORM I - IN

03/90

000006

0000020

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

07-003-M003

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

Lab Code: WESTON

Case No.: NWS

SAS No.:

SDG No.: CLP544

Matrix (soil/water): WATER

Lab Sample ID: 911154403

Level (low/med): LOW

Date Received: 11/26/91

% 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	4.60	B	W	F R3
7440-39-3	Barium	53.80	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	30.10			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	28.50			P J2
7439-89-6	Iron	48200.00			P J5
7439-92-1	Lead	10.70	S		F R1
7439-95-4	Magnesium				NR
7439-96-5	Manganese	146.00			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 OJ4
7440-22-4	Silver	10.00	U		P R3
7440-23-5	Sodium	4730.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	58.20			P J2
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FORM I - IN

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000007

0000021

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

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

07-003-M203

Lab Code: WESTON Case No.: NWS SAS No.:

SDG No.: CLP544

Matrix (soil/water): WATER

Lab Sample ID: 911154404

Level (low/med): LOW

Date Received: 11/26/91

% 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				
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	2.00	U		F
7440-41-7	Beryllium	16.00	U		P
7440-43-9	Cadmium				NR
7440-70-2	Calcium	3.00	U		P
7440-47-3	Chromium				NR
7440-48-4	Cobalt	6.00	U		P
7440-50-8	Copper				NR
7439-89-6	Iron	10.00	U		P
7439-92-1	Lead	69.10	B		P
7439-95-4	Magnesium	2.00	U	W	P
7439-96-5	Manganese				NR
7439-97-6	Mercury	2.00	U		P
7440-02-0	Nickel	.10	U		CV
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver	2.00	U	W	F
7440-23-5	Sodium	10.00	U		P
7440-28-0	Thallium	851.00	B		P
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide	6.00	U		P

R3

J5
R1

UJ4
R3

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

0000022

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

07-004-MDD3

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

Lab Code: WESTON

Case No.: NWS

SAS No.:

SDG No.: CLP544

Matrix (soil/water): WATER

Lab Sample ID: 911154405

Level (low/med): LOW

Date Received: 11/26/91

% 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	61.10		S	F
7440-39-3	Barium	157.00	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	106.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	68.30			P
7439-89-6	Iron	110000.00			P
7439-92-1	Lead	63.00			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	306.00			P
7439-97-6	Mercury	.20	B		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	20.00	U		F
7440-22-4	Silver	10.00	U		P
7440-23-5	Sodium	6860.00			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	178.00			P
	Cyanide				NR

R3

J2

J5

J5

UJ4

R3

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

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U.S. EPA - CLP

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

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

07-004-MJ03

Lab Code: WESTON

Case No.: NWS

SAS No.:

SDG No.: CLP544

Matrix (soil/water): WATER

Lab Sample ID: 911154406

Level (low/med): LOW

Date Received: 11/26/91

% 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	25.90	S		F R3
7440-39-3	Barium	136.00	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	69.40			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	47.30			P J2
7439-89-6	Iron	66500.00			P J5
7439-92-1	Lead	53.80	S		F J5
7439-95-4	Magnesium				NR
7439-96-5	Manganese	223.00			P
7439-97-6	Mercury	.22			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.00		W	F UJ4
7440-22-4	Silver	10.00	U		P R3
7440-23-5	Sodium	6930.00			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	137.00			P
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

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0000024

U.S. EPA - CLP

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

07-005

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

Lab Code: WESTON

Case No.: NWS

SAS No.:

SDG No.: CLP544

Matrix (soil/water): WATER

Lab Sample ID: 911154407

Level (low/med): LOW

Date Received: 11/26/91

% 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	152.00		S	F R3
7440-39-3	Barium	310.00			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	4.60	B		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	176.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	118.00			P
7439-89-6	Iron	178000.00			P J5
7439-92-1	Lead	83.00			F J5
7439-95-4	Magnesium				NR
7439-96-5	Manganese	430.00			P
7439-97-6	Mercury	1.93			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	20.00	U		F UJ4
7440-22-4	Silver	10.00	U		P R3
7440-23-5	Sodium	18800.00			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	364.00			P
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

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000011

Title: Evaluation of Metals Data for the
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	YES	NO	N/A
A.1.6 <u>Form I (Final Data)</u> - Are all Form I's present and complete? <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	__	__
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?	<input checked="" type="checkbox"/>	__	__
Are soil sample results for each parameter corrected for percent solids?	<input type="checkbox"/>	__	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	__	__
Are computation/transcription errors less than 10% of reported values?	<input checked="" type="checkbox"/>	__	__
Are all "less than MDL" values properly coded with "U"?	<input checked="" type="checkbox"/>	__	__
Was a brief physical description of samples given on Form I's?	<input checked="" type="checkbox"/>	__	__
Were the result qualifiers used correctly with final data?	<input checked="" type="checkbox"/>	__	__
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?	__	<input checked="" type="checkbox"/>	__
If yes, were dilutions noted on Form I's?	<input checked="" type="checkbox"/>	__	__
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?	__	<input checked="" type="checkbox"/>	__
Cyanide distillation (14 days) exceeded?	__	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Title: Evaluation of Metals for the Contract
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 Appendix A.1: Data Assessment - Contract
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	YES	NO	NC
Other Metals analysis (6 months) . . . exceeded?	—	<input checked="" type="checkbox"/>	—

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

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	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Legible?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Properly Labeled?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is record of 5 point calibration present for Hg analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Furnace AA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cyanides?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

- 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 $\pm 10\%$ of true value.
 2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRCL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

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YES NO NA

ACTION: Flag associated data as estimated if standards are not within $\pm 10\%$ of true values (except GRIL 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? YES NO NA

Cyanide Analysis? YES NO NA

Atomic Absorption Analysis? YES NO NA

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

A.1.9.2 Form II A (Initial and Continuous Calibration Verification)-

A.1.9.2.1 Present and complete for every metal and cyanide? YES NO NA

Present and complete for AA and IC? when both are used for same analyte? YES NO NA

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% YES NO NA

Hg - 80-120% YES NO NA

Cyanides 85-115% YES NO NA

* The reviewer will calculate correlation coefficient.

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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 (W), 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?

YES NO N/A

ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).

Was ICV for cyanides distilled?

YES NO N/A

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

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

A.1.9.3.1 Was a CRL standard (CRA) analyzed after initial calibration for all AA metals (EXCEPT Hg)?

YES NO N/A

*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?

YES NO N/A

Was a $2 \times CRL$ (or $2 \times IDL$ when $IDL > CRL$) analyzed (CRI) for each ICP run?

YES NO N/A

(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 - $**True Value \pm CRL$
- ICP Analysis - $**True Value \pm 2CRL$
- CN Analysis - $**True Value \pm 0.5 \times True Value.$

* Find the results of mid-range standard in the raw data.

** True value of CRA, CRI or mid-range standard. Substitute IDL for CRL when $IDL > CRL$.

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	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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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 CPA and CRI standards within control limits:
 Metals 80 - 120%R?

4/23/92
 PBA

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.

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	YES	NO	N/A
A.1.9.4.2 Circle all calibration blank values on Data Summary Sheet that are above CREL (or 2 x IEL when IEL > CREL). Are all calibration blanks (when IEL < CREL) less than or equal to Contract Required Detection Limits (CREL)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are all calibration blanks less than two times Instrument Detection Limit (when IEL > CREL)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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 CREL (or 2xIEL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.			

A.1.9.5 FOP: 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

ACTION: If no for any of the above, flag as estimated (J) all associated positive data < 10 x IELs 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 CREL when IEL is less than or equal to CREL?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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	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 IEL when IEL is greater than CRDL?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6 <u>Form IV (ICP Interference Check Sample)</u>			
A.1.9.6.1 Present and complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(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)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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%)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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").			

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	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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%? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (b) between 30-74%? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (c) between 125-150%? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| (d) greater than 150%? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 125-150%, 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%? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| (b) between 10-74%? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| (c) between 125-200%? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| (d) greater than 200%? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 125-200%, 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".

Evaluation of Metals Data for the
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 Appendix A.1: Data Assessment - Contract
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	YES	NO	N/A
A.1.9.8 <u>Form VI (Lab Duplicates)</u>			
A.1.9.8.1 Present and complete for: each 20 samples?	<input checked="" type="checkbox"/>	—	—
each matrix type?	<input checked="" type="checkbox"/>	—	—
each concentration range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	—	—
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>

ACTION: If no for any the above, flag as estimated (J) all data $> CRIL^*$ 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 mg/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 $> CRIL^*$ 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 $< \pm CRIL$)?

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 $CRIL$ when $IDL > CRIL$.

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	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?		<input checked="" type="checkbox"/>	
ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5 <u>Aqueous</u> 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?		<input checked="" type="checkbox"/>	
ACTION: If yes, flag the associated data as estimated.			
A.1.9.8.6 <u>Soil/Sediment</u> 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%?		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) :			
> 2x*CRDL?		<input type="checkbox"/>	<input checked="" type="checkbox"/>

* Substitute IDL for CRDL when IDL > CRDL.

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

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_____ 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 ILL.
 2. Flag all associated data only for field duplicate pair.

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

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 > ± CRIL*

Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRIL?

Is any **difference between sample and duplicate greater than *CRIL where sample and/or duplicate is less than 5 times *CRIL?

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

* Substitute ILL for CRIL when ILL > CRIL.

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

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A.1.9.9.4 Soil/Sediment

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

Difference > 2 x CRCL*

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

>100%?

YES NO N/A
 — []

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

>2x *CRCL?

YES NO N/A
 — []

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 CRCL when IDL > CRCL.

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

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	YES	NO	NA
A.1.9.11 <u>FORM IX (ICP Serial Dilution) -</u>			
NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x ILL.			
A.1.9.11.1 Was Serial Dilution analysis performed for:			
each 20 samples?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each concentration range (i.e. low; med.)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ACTION: If no for any of the above, flag all positive data greater than or equal to 10xILLs 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ACTION: If yes, flag all associated data \geq 10 x ILL 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 ILL or greater.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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 ILLs only. Are any % difference values:			
> 10%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
\geq 100%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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YES NO N/A

ACTION: Flag as estimated (J) all associated equal to or greater than 10xMILs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xMILs for which PD is greater than or equal to 100%.

A.1.9.12 Furnace Atomic Absorption (AA) CC 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 SD > 4xSA.

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	YES	NO	N/A
A.1.9.13 <u>Form VIII (Method of Standard Addition Results)</u>			
A.1.9.13.1 Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is any Form I result coded with "S" or a "+"?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If yes, reject (red-line) affected data.			
A.1.9.13.3 Was *MSA required for any sample but not performed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is coefficient of correlation for MSA less than 0.995?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14 <u>Dissolved/Total or Inorganic/Total Analytes -</u>			
A.1.9.14.1 Were any analyses performed for dissolved as well as total analytes on the same sample(s)..	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

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- | | 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".

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	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?	—	<input checked="" type="checkbox"/>	—
(b) all analytes analyzed by GFAA?	—	<input checked="" type="checkbox"/>	—
(c) all analytes analyzed by AA Flame?	—	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) Mercury?	—	<input checked="" type="checkbox"/>	—
(e) Cyanide?	—	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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 $CRIL$, $2 \times IIL$ when $IIL > CRIL$.

Do concentrations of field blank(s) fall below $CRIL$ (or $2 \times IIL$ when $IIL > CRIL$) for all parameters of associated aqueous and soil samples?

YES NO N/A

If no, was field blank value already rejected due to other QC criteria?

YES NO N/A

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

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 Compliance (Total Review - Inorganics)

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

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 Contract Laboratory Program
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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.

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Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Date: Feb. 1990
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Case#	<u>NWS</u>	Site	<u>Naval Weapons Station</u>	Matrix:	Soil <u> </u>
SOG#	<u>CLP 544</u>	Lab	<u>Roy F. Weston</u>	Water	<u>✓</u>
Contractor	<u>Roy F. Weston</u>	Reviewer	<u>Heartland EST</u>	Other	<u> </u>

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. The CRDL Standard for Lead was below 50%.
All data is rejected.
2. The CRDL Standards for Arsenic, Copper and Zinc were above the upper control limit. All positive results are qualified as estimated.
3. The Matrix Spike Recoveries for Arsenic and Silver were below 30%. All data is rejected.
4. The Matrix Spike Recovery for Selenium was below the Lower Control limit. All data is qualified as estimated.
5. The Duplicate analyses for Iron and Lead were outside the control limit. All data is qualified as estimated.

~~PEH 4/27/92~~

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

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~~PBH 4/23/92~~

...2.2 Contract-Problems/Non-Compliance

~~PBH 4/23/92~~

MS Reviewer:

Signature:

Date:

Contractor Reviewer:

Signature

Date:

Verified By:

Richard D. Scarpellino

Date:

4/28/92

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 544

SITE/STUDY DESCRIPTION: Nucl Weapons Station SAMPLE NOS: 07-001, 07-002, 07-003, 07-004, 07-004-M103 and 7-005.

FIELD DUP. #'S: _____ LAB DUP. #'S: 4-M003 Field Blank _____ MATRIX SPIKE #: 4-M003

SERIAL DILUTION SAMPLE NO. 4-M003 COMPLETION DATE: 4/23/92 REVIEWERS INITIALS: PRH

Element	Detection Limits		Field Blank	Calib. Ver. XR			CRDL Std Ver. XR		Calibration Blanks			P B R L E A P N	ICP ICS XR		M S t p r i x	Lab Dup RPD Diff	LCS XR	Ser Dil XR	M e t h		
	UG/L	IDL		Continued			Init	Fin	Continued				Init	Fin							
	CRDL	IDL		1	2	3	1	2	3	1	2		3								
	CRDL	IDL		1	2	3	1	2	3	1	2		3								
Al	200	91	NA																		
B	60	20																			
Ba	10	2		98	98	98	91	(146)		U	U	U	U	U		(13)	81		F		
Ba	200	16		101	102	103	102			U	U	U	U	U	91	90	91	11.4	104	36	P
Be	5	1																			
Cd	5	2		100	103	100	95	103	100	U	U	U	U	U	102	99	93	35	108		P
Cd	5000	47																			
Cd	10	4		98	99	101	99	106	112	U	U	U	U	U	103	101	103	35	103	100	P
Cd	50	11																			
Cd	25	6		102	104	104	102	118	(123)	U	U	U	U	U	104	102	95	19.	104	100	P
Fe	100	46		99	101	102	101			U	U	U	U	U	104	102	144	(53)	105	3.1	P
Pb	3	2		104	98	101	103	(0)		U	U	U	-2.4	U			108	(52)	97		F
Hg	5000	29																			
Mn	15	2		99	100	100	98	103	103	U	U	U	U	U	88	82	(119)	15	104	0.3	P
Hg	0.2	0.04		102	102	101	102			U	U	U	U	U			101	13	99		CV
Ni	40	11																			
K	5000	694																			
Se	5	2		103	101	100	103	86		U	U	U	U	U			(40)	96			F
Ag	10	3		104	106	105	102	101	101	U	U	U	U	U	107	104	(0)	97	100		P
As	5000	110		102	104	103	103			U	U	U	U	U			.4	105	7.5		P
Pb	10																				
V	50	8																			000037
Zn	20	6		99	101	101	99	(123)	(130)	U	U	U	U	U	96	95	98	2.1	106	1.9	P

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.6: CLP Data Assessment
 Summary Form (Inorganics)

Date: Feb. 1990
 Number: HW-2
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CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited scope) Date: 4/27/92 Case #: NWS
 Site: Naval Weapons Station Lab Name: Roy Weston
 Reviewer's Initials: PBL Number of Samples: 7

Analytes Rejected Due to Exceeding Review Criteria:*

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

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

ICP		2					1					3	
Flame AA													
Furnace AA		1				1	1					3	
Mercury													
Total		3				1	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
LABORATORY Roy F. Weston
SDG# CLP 544
SOL# 390
IPO: ACTION FYI

SITE Naval Weapon Station
NO. OF SAMPLES/
MATRIX 7 waters
REVIEWER (IF NOT ESD) Heartland EST
REVIEWER'S NAME Paul B. Humby
COMPLETION DATE 4/27/92

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				
6. DUPLICATE ANALYSIS				
7. MATRIX SPIKE	Z	Z		
8. MSA	O	O		
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.



April 26, 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.

<u>Navy No.</u>	<u>RFW No.</u>
1-M003	911152201
2-M203	911152202
2-M003	911152203
3-M003	911152204
4-M003	911152205
6-M003	911152206
1-M203	911152207

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.

000001

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# 9112522**, the analysis of seven (7) field water sample and one (1) matrix spike and duplicate pair. Overall, the inorganic data quality was fair.

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 Standards for Arsenic, Copper and Zinc were above the upper control limit. All positive results are qualified as estimated, "J" 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)

Spike Recovery

3. The Matrix Spike recovery for Silver 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

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

<u>Analyte</u>	<u>Samples</u>
Arsenic	1-M003, 2-M003, 3-M003, 5-M003 and 1-M203.
Lead	1-M003, 2-M203 and 3-M003.
Selenium	1-M003, 2-M003, 3-M003, 5-M003, 6-M003 and 1-M203.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
All water samples	Pb	+ /U	R	1
All water samples	As, Cu, Zn.	+	J	2
All water samples	Ag	+ /U	R	3
1-M003, 2-M003, 3-M003, 5-M003 and 1-M203.	As	+ /U	J /UJ	4
1-M003, 2-M203 and 3-M003.	Pb			
1-M003, 2-M003, 3-M003, 5-M003, 6-M003 and 1-M203.	Se			

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

QL - denotes data validation qualifier

0000022

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

1-M003

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

Lab Code: WESTON

Case No.: NWS

SAS No.:

SDG No.: CLP522

Matrix (soil/water): WATER

Lab Sample ID: 911152201

Level (low/med): LOW

Date Received: 11/22/91

% 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 JY
7440-39-3	Barium	34.00	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	44.60			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	16.60	B		P J2
7439-89-6	Iron	6980.00			P
7439-92-1	Lead	12.30		WS	F JY
7439-95-4	Magnesium				NR
7439-96-5	Manganese	57.10			P
7439-97-6	Mercury	.10	U		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.10	B	W	F JY
7440-22-4	Silver	10.00	U	N	P R3
7440-23-5	Sodium	4950.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	39.80			P J2
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FORM I - IN

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U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

2-M203

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP522

Matrix (soil/water): WATER Lab Sample ID: 911152202

Level (low/med): LOW Date Received: 11/22/91

% 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
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
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
7440-22-4	Silver	10.00	U	N	P
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

R1

R3

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

03/90

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U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

2-M003

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

Lab Code: WESTON

Case No.: NWS

SAS No.:

SDG No.: CLP522

Matrix (soil/water): WATER

Lab Sample ID: 911152203

Level (low/med): LOW

Date Received: 11/22/91

% 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	W	F J2,4
7440-39-3	Barium	26.50	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	5.20			P
7440-70-2	Calcium				NR
7440-47-3	Chromium	640.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	28.00			P J2
7439-89-6	Iron	57600.00			P
7439-92-1	Lead	47.80		S	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	68.70			P
7439-97-6	Mercury	.11	B		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.00	U	W	F UJ4
7440-22-4	Silver	10.00	U	N	P R3
7440-23-5	Sodium	5020.00			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	145.00			P
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

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U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

3-M003

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP522

Matrix (soil/water): WATER Lab Sample ID: 911152204

Level (low/med): LOW Date Received: 11/22/91

% 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
7440-39-3	Barium	40.20	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	4.00	B		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	30.10			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	7270.00			P
7439-92-1	Lead	6.30		W	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	17.30			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
7440-22-4	Silver	10.00	U	N	P
7440-23-5	Sodium	3910.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	79.10			P
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

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EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

5-M003

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

Lab Code: WESTON

Case No.: NWS

SAS No.:

SDG No.: CLP522

Matrix (soil/water): WATER

Lab Sample ID: 911152205

Level (low/med): LOW

Date Received: 11/22/91

% 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
7440-39-3	Barium	57.00	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	5.40			P
7440-70-2	Calcium				NR
7440-47-3	Chromium	452.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	17.50	B		P
7439-89-6	Iron	33500.00			P
7439-92-1	Lead	32.10		S	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	196.00			P
7439-97-6	Mercury	.25			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.00	U	W	F
7440-22-4	Silver	10.00	U	N	P
7440-23-5	Sodium	6780.00			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	74.90			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

6-M003

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP522

Matrix (soil/water): WATER Lab Sample ID: 911152206

Level (low/med): LOW Date Received: 11/22/91

% 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	19.20		S	F J2
7440-39-3	Barium	128.00	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	14.00			P
7440-70-2	Calcium				NR
7440-47-3	Chromium	438.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	17.50	B		P J2
7439-89-6	Iron	86100.00			P
7439-92-1	Lead	49.80		S	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	550.00			P
7439-97-6	Mercury	.16	B		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.00	U W		F UJ4
7440-22-4	Silver	10.00	U N		P R3
7440-23-5	Sodium	2550.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	386.00			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

1-M203

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

Lab Code: WESTON

Case No.: NWS

SAS No.:

SDG No.: CLP522

Matrix (soil/water): WATER

Lab Sample ID: 911152208

Level (low/med): LOW

Date Received: 11/22/91

% 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 J4
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	45.10			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	7360.00			P
7439-92-1	Lead	17.20		S	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	50.40			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	F UJ4
7440-22-4	Silver	10.00	U	N	P R3
7440-23-5	Sodium	5050.00			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	33.80			P J2
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

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000011

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.1.6 <u>Form I (Final Data)</u> - Are all Form I's present and complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are soil sample results for each parameter corrected for percent solids?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are computation/transcription errors less than 10% of reported values?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are all "less than IML" values properly coded with "U"?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was a brief physical description of samples given on Form I's?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were the result qualifiers used correctly with final data?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If yes, were dilutions noted on Form I's?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Cyanide distillation (14 days) exceeded?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Title: Evaluation of Metals for the Contract
 Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

Date: Feb. 1990
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	YES	NO	N/A
Other Metals analysis (6 months) . . . exceeded?	—	<input checked="" type="checkbox"/>	—

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

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

Date: Feb. 1990
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	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	<input checked="" type="checkbox"/>	__	__
Legible?	<input checked="" type="checkbox"/>	__	__
Properly Labeled?	<input checked="" type="checkbox"/>	__	__

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?	<input checked="" type="checkbox"/>	__	__
Is record of 5 point calibration present for Hg analysis?	<input checked="" type="checkbox"/>	__	__

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?	<input type="checkbox"/>	__	<input checked="" type="checkbox"/>
Furnace AA?	<input checked="" type="checkbox"/>	__	__
Cyanides?	<input type="checkbox"/>	__	<input checked="" type="checkbox"/>

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 $\pm 10\%$ of true value.
2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

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 NA

ACTION: Flag associated data as estimated if standards are not within $\pm 10\%$ of true values (except CRUL 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?	___	<input checked="" type="checkbox"/>	___
Cyanide Analysis?	___	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Atomic Absorption Analysis?	___	<input checked="" type="checkbox"/>	___

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?	<input checked="" type="checkbox"/>	___	___
Present and complete for AA and ICP when both are used for same analyte?	<input checked="" type="checkbox"/>	___	___

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%	<input checked="" type="checkbox"/>	___	___
Hg - 80-120%	<input checked="" type="checkbox"/>	___	___
Cyanides 85-115%	<input type="checkbox"/>	___	<input checked="" type="checkbox"/>

* The reviewer will calculate correlation coefficient.

STANDARD OPERATING PROCEDURE

Title: Evaluation of Metals Data for the
Contract Laboratory Program
Appendix A.1: Data Assessment - Contract
Compliance (Total Review - Inorganics)

Date: Feb. 1990
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YES NO N/A

ACTION: Flag as estimated (J) all positive data (not flagged with a "U") analyzed between a calibration standard with \bar{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 $< IEL$ as estimated (U), if the ICV or CCV \bar{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 (CRL Standards for AA and ICP) -

A.1.9.3.1 Was a CRL 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 $2 \times CRL$ (or $2 \times IEL$ when $IEL > CRL$) 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 \pm CRL
- ICP Analysis - **True Value \pm $2 \times CRL$
- CN Analysis - **True Value \pm $0.5 \times$ True Value.

* Find the results of mid-range standard in the raw data.

** True value of CRA, CRI or mid-range standard. Substitute IEL for CRL when $IEL > CRL$.

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

Date: Feb. 1990
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	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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ACTION: If no, write in Contract Problems/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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is mid-range standard within control limits:			
Cyanide 80 - 120%R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For both AA and ICP when both are used for same analyte?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was an initial calibration blank analyzed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

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A.1.9.4.2 Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IEL when IEL > CRDL). Are all calibration blanks (when IEL < CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	<input checked="" type="checkbox"/>	___	___
Are all calibration blanks less than two times Instrument Detection Limit (when IEL > CRDL)?	<input checked="" type="checkbox"/>	___	___
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 2xIEL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.			
A.1.9.5 <u>FORM III (Preparation Blank)</u> -			
(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?	<input checked="" type="checkbox"/>	___	___
each batch?	<input checked="" type="checkbox"/>	___	___
each matrix type?	<input checked="" type="checkbox"/>	___	___
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	___	<input checked="" type="checkbox"/>
ACTION: If no for any of the above, flag as estimated (J) all associated positive data <10 x IELs 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 IEL is less than or equal to CRDL?	___	<input checked="" type="checkbox"/>	___
If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?	___	<input checked="" type="checkbox"/>	___

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	YES	NO	N/A
<u>ACTION:</u> 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 <u>DL</u> when <u>DL</u> is greater than CRDL?	<input checked="" type="checkbox"/>		
<u>ACTION:</u> 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?		<input checked="" type="checkbox"/>	
<u>ACTION:</u> If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6 <u>Form IV (ICP Interference Check Sample)</u>			
A.1.9.6.1 Present and complete?	<input checked="" type="checkbox"/>		
(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)?	<input checked="" type="checkbox"/>		
<u>ACTION:</u> 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%)?	<input checked="" type="checkbox"/>		
If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	<input checked="" type="checkbox"/>		
<u>ACTION:</u> 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").			

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	YES	NO	NA
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each conc. range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<p>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.</p> <p>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).</p>			
A.1.9.7.2 Was field blank used for spiked sample?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<p>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.</p> <p>NOTE: Matrix spike analysis should be performed on a field blank when it is the only aqueous sample in SDG.</p>			
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If no, is sample concentration greater than or equal to four times spike concentration?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<p>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.</p>			

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Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ACTION: If no, write in the Contract - Problem/Non - Compliance section of "Data Assessment Narrative".			

A.1.9.7.4 Water

Are any spike recoveries:

(a) less than 30%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) between 30-74%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(c) between 126-150%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(d) greater than 150%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) between 10-74%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) between 126-200%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) greater than 200%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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".

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	YES	NO	N/A
A.1.9.8 <u>Form VI (Lab Duplicates)</u>			
A.1.9.8.1 Present and complete for: each 20 samples?	<input checked="" type="checkbox"/>	—	—
each matrix type?	<input checked="" type="checkbox"/>	—	—
each concentration range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	—	—
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
<p>ACTION: If no for any the above, flag as estimated (J) all data >CRCL* for which duplicate sample was not analyzed.</p> <p>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.</p>			
A.1.9.8.2 Was field blank used for duplicate analysis?	—	<input checked="" type="checkbox"/>	—
<p>ACTION: If yes, flag all data >CRCL* as estimated (J) for which field blank was used as duplicate.</p> <p>NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.</p>			
A.1.9.8.3 Are all values within control limits (RPD 20% or difference < ±CRCL)?	<input checked="" type="checkbox"/>	—	—
If no, are all results outside the control limits flagged with an * on Form I's and VI?	<input checked="" type="checkbox"/>	—	—
<p>ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".</p> <p>NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than ICL.</p>			

* Substitute ICL for CRCL when ICL > CRCL.

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	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?		<input checked="" type="checkbox"/>	
ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5 ANALYSIS 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?		<input checked="" type="checkbox"/>	
Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL?		<input checked="" type="checkbox"/>	
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%?		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Is any **difference between sample and duplicate (where sample and/or duplicate is less than 5x*CRDL) :			
> 2x*CRDL?		<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

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_____ 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? YES NO N/A

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 ILL.
 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? YES NO N/A

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? YES NO N/A

Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL? YES NO N/A

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

* Substitute ILL for CRDL when ILL > CRDL.

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

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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 CRIL*

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

>100%?

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

>2x *CRIL?

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 IRL for CRIL when IRL > CRIL.

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

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	YES	NO	N/A
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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%	___	[<u>✓</u>]	___
	between 50% and 79%	___	[<u>✓</u>]	___
	between 121% and 150%	___	[<u>✓</u>]	___
	greater than 150%	___	[<u>✓</u>]	___

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?	___	[<u> </u>]	[<u> </u>]	[<u>✓</u>]
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ACTION: If yes, qualify all associated positive data as estimated.

Is LCS "Found" value lower than the Control limits on Form VII?	___	[<u> </u>]	[<u> </u>]	[<u>✓</u>]
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ACTION: If yes, qualify all associated data as estimated.

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	YES	NO	N/A
A.1.9.11 <u>Form IX (ICP Serial Dilution) -</u>			
NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x ILL.			
A.1.9.11.1 Was Serial Dilution analysis performed for:			
each 20 samples?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each concentration range (i.e. low, med.)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ACTION: If no for any of the above, flag all positive data greater than or equal to 10xILLs 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ACTION: If yes, flag all associated data $\geq 10 \times \text{ILL}$ as estimated (J).			
NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SOG.			
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 ILL or greater.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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 ILLs only. Are any % difference values:			
> 10%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
$\geq 100\%$?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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YES NO N/A

ACTION: Flag as estimated (J) all associated equal to or greater than 10xMCLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xMCLs for which PD is greater than or equal to 100%.

A.1.9.12 Furnace Atomic Absorption (AA) CC 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 CRL?

[✓] -- --

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 $SD \leq 4 \times SA$.

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	YES	NO	N/A
A.1.9.13 <u>Form VIII (Method of Standard Addition Results)</u>			
A.1.9.13.1 Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is any Form I result coded with "S" or a "+"?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If yes, reject (red-line) affected data.			
A.1.9.13.3 Was *MSA required for any sample but not performed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is coefficient of correlation for MSA less than 0.995?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If no, note exception under contract problem/non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14 <u>Dissolved/Total or Inorganic/Total Analytes -</u>			
A.1.9.14.1 Were any analyses performed for dissolved as well as total analytes on the same sample(s)??	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

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- 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 CPIL as well as total concentration.
 2. Apply the following questions only if inorganic (or dissolved) results are (i) above CPIL, and (ii) greater than total constituents.
 3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.

YES NO N/A

- 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? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Case/SAS number? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| EPA sample No.? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| SDG No.? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Contract No.? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Correct units? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Matrix? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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

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	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?	—	<input checked="" type="checkbox"/>	—
(b) all analytes analyzed by GFAA?	—	<input checked="" type="checkbox"/>	—
(c) all analytes analyzed by AA Flame?	—	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) Mercury?	—	<input checked="" type="checkbox"/>	—
(e) Cyanide?	—	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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 $CRIL$, $2 \times IIL$ when $IIL > CRIL$.

Do concentrations of field blank(s) fall below $CRIL$ (or $2 \times IIL$ when $IIL > CRIL$) 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.

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	YES	NO	N/A
A.1.9.17 <u>Form X, XI, XII (Verification of Instrumental Parameters)</u>			

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: IIL is not required for Cyanide.)

Are IILs 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 IIL greater than CRIL for any analyte?

If yes, is the concentration on Form I of the sample analyzed on the instrument whose IIL exceeds CRIL, greater than 5 x IIL?

ACTION: If no, flag as estimated all values less than five times IIL of the instrument whose IIL exceeds CRIL.

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

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YES NO N/A

A.1.9.17.3 Form XI (Linear Ranges)

Was any sample result higher than high linear range
 of ICP. _ (Y) _

Was any sample result higher than the highest
 calibration standard for non-ICP parameters? _ (Y) _

If yes for any of the above, was the
 sample diluted to obtain the result on Form I? (Y) _ _

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
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Case#	<u>NWS</u>	Site	<u>Naval Weapons Station</u>	Matrix:	Soil <u> </u>
SDG#	<u>CLP 522</u>	Lab	<u>Roy F. Weston</u>	Water	<u>✓</u>
Contractor	<u>Roy F. Weston</u>	Reviewer	<u>Heathland EST</u>	Other	<u> </u>

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. The CRDL standard for Lead was below 50%.
All data rejected.
2. The CRDL Standards for Arsenic, Copper and Zinc were above the upper control limit.
All positive results are qualified as estimated.
3. The Matrix Spike recovery for Silver was below 30%. All data is rejected.

~~DBH 4/24/92~~

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

Date: Feb. 1990
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~~PBH 4/24/92~~

...2.2 Contract-Problems/Non-Compliance

~~PBH 4/24/92~~

MS Reviewer: _____ Date: _____

Signature

Contractor Reviewer: Paul B. Hamby Date: 4/24/92

Signature

Verified by: Paul B. Hamby Date: 4/28/92

LABORATORY: Roy F. Wetzel CASE NO. NWS SWW NO. 380 SAMPLE TYPE/SDG: CLP 522

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 1-M003, 2-M203, 2-M003,

3-M003, 5-M003, 6-M003, 1-M203

FIELD DUP. #'S: _____ LAB DUP. #'S: 2-M203 MATRIX SPIKE #: 2-M203

SERIAL DILUTION SAMPLE NO. 2-M203 COMPLETION DATE: 4/24/82 REVIEWERS INITIALS: PBH

Parameter	Detection Limits		Field Blank	Calib. Ver. IR			CRDL Std Ver. I R		Calibration Blanks			P B R L E A P N	ICP ICS I R		M S t p r i x k	Lab Dup RPD Diff	LCS I R	Ser Dil I D	M e t h	
	CRDL	IDL		Continued			Init	Fin	Continued				Init	Fin						
				1	2	3			1	2	3									
Al	200	91	N/A																	
As	10	2		98	98	98	91	(146)	2.1	U	U	U	U		84		81		F	
Ba	200	16		101	102	103	102		U	U	U	U	U	91	90	93		104	P	
Be	5	1																		
Cd	5	2		100	103	100	95	103	100	U	U	U	U	U	102	99	91		102	P
Cu	3000	47																		
Co	10	4		98	99	101	99	106	112	U	U	U	U	U	103	101	91		103	P
Cs	50	11																		
Cr	25	6		102	104	104	102	118	(123)	U	U	U	U	U	104	102	91		104	P
Fa	100	46		99	101	102	101			U	U	U	U	U	104	102	92		105	P
Pb	3	2		104	98	101	103	(0)		U	U	U	U	U			94		97	F
Mn	5000	29																		
Mn	15	2		99	100	100	98	103	103	U	U	U	U	U	88	82	91		104	P
Hg	0.2	0.04		101	102	101	102			U	U	U	U	U			102		99	CV
Ni	40	11																		
K	5000	694																		
Se	5	2		103	101	100	103	86		U	U	U	U	U			96		96	F
Ag	10	3		104	106	105	102	101	101	U	U	U	U	U	107	104	(0)		98	P
Mo	5000	110		102	104	107	103			U	U	U	U	U					105	P
Pt	10																			
V	50	8																	000037	
Zn	20	6		99	101	101	99	(124)	(150)	U	U	U	U	U	96	95	101	260	106	P

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.6: CLP Data Assessment
 Summary Form (Inorganics)

Date: Feb. 1990
 Number: HW-2
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CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited) scope Date: 4/27/92 Case #: NWS
 Site: Naval Weapons Station Lab Name: Roy Weston
 Reviewer's Initials: PBL Number of Samples: 7

Analytes Rejected Due to Exceeding Review Criteria:*

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

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

ICP		2										2	
Flame AA													
Furnace AA		1										1	
Mercury													
Total		3										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
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INORGANIC REGIONAL DATA ASSESSMENT

Region II

CASE NO. NWS

SITE Naval Weapon Station

LABORATORY Roy F. Weston

NO. OF SAMPLES/
MATRIX 2 waters

SDG# CLP 522

REVIEWER (IF NOT ESD) Heartland ESI

SG# 390

REVIEWER'S NAME Paul B. Humby

IPC: ACTION: FYI

COMPLETION DATE 4/27/92

DATA ASSESSMENT SUMMARY

	ICP	AA	Hg	CYANIDE
1. HOLDING TIMES	0	0	0	NA
2. CALIBRATIONS	↓	Z	↓	↓
3. BLANKS	↓	0	↓	↓
4. ICS	↓	↓	↓	↓
5. LCS	↓	↓	↓	↓
6. DUPLICATE ANALYSIS	↓	↓	↓	↓
7. MATRIX SPIKE	Z	↓	↓	↓
MSA	↓	↓	↓	↓
9. SERIAL DILUTION	0	↓	↓	↓
10. SAMPLE VERIFICATION	↓	↓	↓	↓
11. OTHER QC	↓	↓	↓	↓
12. OVERALL ASSESSMENT	↓	↓	↓	↓

- 0 = 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: _____

000039
000041

HEARTLAND ENVIRONMENTAL
SERVICES, INC.



April 26, 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.

<u>Navy No.</u>	<u>RFW No.</u>
11-001	911157001
11-002	911157002

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.

100000

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# 9112570, the analysis of two (2) field water sample and one (1) matrix spike and duplicate pair. Overall, the inorganic data quality was fair.

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 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.
2. The CRDL Standard for Zinc was above the upper control limit. All positive results are qualified as estimated, "J" 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.

000002

Metals Data Assessment Narrative (continued - Page 2)

Spike Recovery

3. The Matrix Spike recoveries for Arsenic and Selenium was below 30%. All positive and non-detect results are rejected.
4. The Matrix Spike recovery for Lead was above 150%. All positive results are rejected.

Duplicate

5. The Duplicate Analyses for Chromium, Iron and Manganese were 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

No deficiencies in this section.

MSA

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

<u>Analyte</u>	<u>Samples</u>
Lead	11-002.
Selenium	11-001.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
All water samples	As and Pb	+/U	R	1
All water samples	Zn	+	J	2
All water samples	As and Se	+/U	R	3
All water samples	Pb	+	R	4
All water samples	Cr, Fe, Mn.	+/U	J/UJ	5
11-002 11-001	Pb Se	+/U	J/UJ	6

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

QL - denotes data validation qualifier

000004

0000016

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

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

11-001

Lab Code: WESTON Case No.: N.W.S SAS No.:

SDG No.: CLP570

Matrix (soil/water): WATER

Lab Sample ID: 911157001

Level (low/med): LOW

Date Received: 11/27/91

% 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				
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	2.00	U	N	F
7440-41-7	Beryllium	136.00	B		P
7440-43-9	Cadmium				NR
7440-70-2	Calcium	3.00	U		P
7440-47-3	Chromium				NR
7440-48-4	Cobalt	881.00	*		P
7440-50-8	Copper	16.60	B		NR
7439-89-6	Iron	96000.00	*		P
7439-92-1	Lead	51.50	N*		F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	83.70	*		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	WN	F
7440-22-4	Silver	10.00	U		P
7440-23-5	Sodium	2610.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	181.00			P
	Cyanide				NR

R1,3
J5
J5
R4
J5
R3

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

0000017

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

11-002

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

Lab Code: WESTON Case No.: N.W.S SAS No.: SDG No.: CLP570

Matrix (soil/water): WATER Lab Sample ID: 911157002

Level (low/med): LOW Date Received: 11/27/91

% 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
7440-39-3	Barium	33.70	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	108.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	16100.00		*	P
7439-92-1	Lead	2.90	B	*NW	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	23.20		*	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	N	F
7440-22-4	Silver	10.00	U		P
7440-23-5	Sodium	3050.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	77.70			P
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FORM I - IN

03/90

000006

STANDARD OPERATING PROCEDURE

Title: Evaluation of Metals Data for the
Contract Laboratory Program
Appendix A.1: Data Assessment - Contract
Compliance (Total Review - Inorganics)

Date: Feb. 1990
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	YES	NO	N/A
A.1.1 <u>Contract Compliance Screening Report (CCS)</u> - Present? <u>ACTION:</u> If no, contact RSCC.	<input type="checkbox"/>	—	✓
A.1.2 <u>Record of Communication (from RSCC)</u> - Present? <u>ACTION:</u> If no, request from RSCC.	<input type="checkbox"/>	—	✓
A.1.3 <u>Trip Report</u> - Present and complete? <u>ACTION:</u> If no, contact RSCC for trip report.	<input type="checkbox"/>	—	✓
A.1.4 <u>Sample Traffic Report</u> - Present or on file? Legible? <u>ACTION:</u> If no, request from Regional Sample Control Center (RSCC).	<input type="checkbox"/> <input type="checkbox"/>	— —	✓ ✓
A.1.5 <u>Cover Page</u> - Present? Is cover page properly filled in and signed by the lab manager or the manager's designee? <u>ACTION:</u> 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?	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	— — — — —	— — ✓ ✓ —
<u>ACTION:</u> If no for any of the above, contact RSCC for clarification.			

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

Date: Feb. 1990
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	YES	NO	N/A
A.1.6 <u>Form I (Final Data)</u> - Are all Form I's present and complete? [<u>Y</u>]		--	--
<u>ACTION:</u> 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?	[<u>Y</u>]	--	--
Are soil sample results for each parameter corrected for percent solids?	[]	--	<u>Y</u>
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?	[<u>Y</u>]	--	--
Are computation/transcription errors less than 10% of reported values?	[<u>Y</u>]	--	--
Are all "less than IIDL" values properly coded with "U"?	[<u>Y</u>]	--	--
Was a brief physical description of samples given on Form I's?	[<u>Y</u>]	--	--
Were the result qualifiers used correctly with final data?	[<u>Y</u>]	--	--
<u>ACTION:</u> 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?	--	[<u>Y</u>]	--
If yes, were dilutions noted on Form I's?	[<u>Y</u>]	--	--
<u>ACTION:</u> 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?	--	[<u>Y</u>]	--
Cyanide distillation (14 days) exceeded?	--	[]	<u>Y</u>

Title: Evaluation of Metals for the Contract Laboratory Program
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	YES	NO	N/A
Other Metals analysis (6 months) . . . exceeded?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

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	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	[X]	--	--
Legible?	[X]	--	--
Properly Labeled?	[X]	--	--
<p><u>ACTION:</u> 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.</p>			
<p>A.1.9 <u>Data Validation and Verification</u></p>			
<p>A.1.9.1 <u>Calibration</u></p>			
A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	[X]	--	--
Is record of 5 point calibration present for Hg analysis?	[X]	--	--
<p><u>ACTION:</u> If no for any of the above, write in the Contract Problem/Non-Compliance section of the "Data Assessment Narrative".</p>			
A.1.9.1.2 Is record of 4 point calibration present for:			
Flame AA?	[]	--	✓
Furnace AA?	[X]	--	--
Cyanides?	[]	--	✓
<p><u>NOTE:</u> 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.</p> <p>2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CREL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".</p>			

STANDARD OPERATING PROCEDURE

Title: Evaluation of Metals Data for the
Contract Laboratory Program
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Compliance (Total Review - Inorganics)

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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.

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
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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 $< IEL$ as estimated (U), 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? YES NO N/A

ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).

Was ICV for cyanides distilled? YES NO N/A

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

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

A.1.9.3.1 Was a CRL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)? YES NO N/A

*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis? YES NO N/A

Was a $2 \times CRL$ (or $2 \times IEL$ when $IEL > CRL$) analyzed (CRI) for each ICP run? YES NO N/A
 (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 \pm CRL
- ICP Analysis - **True Value \pm $2 \times CRL$
- CN Analysis - **True Value \pm $0.5 \times$ True Value.

* Find the results of mid-range standard in the raw data.

** True value of CRA, CRI or mid-range standard. Substitute IEL for CRL when $IEL > CRL$.

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
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 Number: H-2
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	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.

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A.1.9.4.2 Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IIL when IIL > CRDL). Are all calibration blanks (when IIL < CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	<input checked="" type="checkbox"/>	—	—
Are all calibration blanks less than two times Instrument Detection Limit (when IIL > CRDL)?	<input checked="" type="checkbox"/>	—	—
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 2xIIL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.			
A.1.9.5 <u>FORM III (Preparation Blank)</u> -			
(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?	<input checked="" type="checkbox"/>	—	—
each batch?	<input checked="" type="checkbox"/>	—	—
each matrix type?	<input checked="" type="checkbox"/>	—	—
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
ACTION: If no for any of the above, flag as estimated (J) all associated positive data <10 x IILs 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 IIL is less than or equal to CRDL?	—	<input checked="" type="checkbox"/>	—
If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?	—	<input checked="" type="checkbox"/>	—

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	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 ILL when ILL is greater than CRDL?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6 <u>Form IV (ICP Interference Check Sample)</u>			
A.1.9.6.1 Present and complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(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)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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%)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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").			

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	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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each conc. range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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 SOG.			
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If no, is sample concentration greater than or equal to four times spike concentration?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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.			

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Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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%	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) between 30-74%	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(c) between 125-150%	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(d) greater than 150%	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ACTION: If less than 30%, reject all associated aqueous
 data; if between 30-74%, flag all associated
 aqueous data as estimated (J); if between
 125-150%, 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%	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) between 10-74%	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) between 125-200%	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) greater than 200%	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

ACTION: If less than 10%, reject all associated data; if
 between 10-74%, flag all associated data as estimated;
 if between 125-200%, 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".

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	YES	NO	N/A
A.1.9.8 Form VI (Lab Duplicates)			
A.1.9.8.1 Present and complete for: each 20 samples?	<input checked="" type="checkbox"/>	—	—
each matrix type?	<input checked="" type="checkbox"/>	—	—
each concentration range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	—	—
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>

ACTION: If no for any the above, flag as estimated (J) all data $>CREL$ 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 $>CREL$ 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 SOG.

A.1.9.8.3 Are all values within control limits (RPD 20% or difference $< \pm CREL$)?

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 ILL.

* Substitute ILL for CREL when $ILL > CREL$.

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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 $10 \times CRDL^*$? YES NO N/A

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
 $Difference > \pm CRDL^*$

Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times $CRDL^*$? YES NO N/A

Is any **difference between sample and duplicate greater than $CRDL^*$ where sample and/or duplicate is less than 5 times $CRDL^*$? YES NO N/A

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
 $Difference > 2 \times CRDL^*$

Is any RPD (where sample and duplicate are both greater than or equal to 5 times $CRDL^*$) :

$> 100\%$? YES NO N/A

Is any **difference between sample and duplicate (where sample and/or duplicate is less than $5 \times CRDL^*$) :

$> 2 \times CRDL^*$? YES NO N/A

* Substitute IDL for CRDL when $IDL > CRDL$.

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

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_____ 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? YES NO N/A

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 ILL.
 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? YES NO N/A

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? YES NO N/A

Is any **difference between sample and duplicate greater than *CRDL where sample and/or duplicate is less than 5 times *CRDL? YES NO N/A

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

* Substitute ILL for CRDL when ILL > CRDL.

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

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	YES	NO	N/A
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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 IRL for CRDL when IRL > CRDL.

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

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	YES	NO	N/A
A.1.9.10.2 <u>Aqueous LCS</u>			

Circle all LCS values outside control limits
 (80 - 120% - except aqueous Ag and Sb).

Is any LCS recovery: less than 50%?	___	<u>(✓)</u>	___
between 50% and 79%?	___	<u>(✓)</u>	___
between 121% and 150%?	___	<u>(✓)</u>	___
greater than 150%?	___	<u>(✓)</u>	___

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:
- 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).
 - 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?	___	<u>()</u>	<u>(✓)</u>
--	-----	------------	------------

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

Is LCS "Found" value lower than the Control limits on Form VII?	___	<u>()</u>	<u>(✓)</u>
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ACTION: If yes, qualify all associated data as estimated.

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	YES	NO	N/A
A.1.9.11 <u>FORM IX (UCP Serial Dilution) -</u>			
NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x <u>IDL</u> .			
A.1.9.11.1 Was Serial Dilution analysis performed for:			
each 20 samples?	<input checked="" type="checkbox"/>	___	___
each matrix type?	<input checked="" type="checkbox"/>	___	___
each concentration range (i.e. low, med.)?	<input checked="" type="checkbox"/>	___	___
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?	___	<input checked="" type="checkbox"/>	___
ACTION: If yes, flag all associated data $\geq 10 \times \text{IDL}$ 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.	<input checked="" type="checkbox"/>	___	___
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%?	___	<input checked="" type="checkbox"/>	___
$\geq 100\%$?	___	<input checked="" type="checkbox"/>	___

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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) CC 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?

YES NO N/A

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 CTRL?

YES NO N/A

Was a dilution analyzed for sample with post digestion spike recovery less than 40%?

YES NO N/A

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?

YES NO N/A

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 SD < 4xSA.

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	YES	NO	N/A
A.1.9.13 <u>Form VIII (Method of Standard Addition Results)</u>			
A.1.9.13.1 Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is any Form I result coded with "S" or a "+"?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If yes, reject (red-line) affected data.			
A.1.9.13.3 Was *MSA required for any sample but not performed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is coefficient of correlation for MSA less than 0.995?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If no, note exception under contract problem/non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14 <u>Dissolved/Total or Inorganic/Total Analytes -</u>			
A.1.9.14.1 Were any analyses performed for dissolved as well as total analytes on the same sample(s)..	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

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- 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.

YES NO N/A

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".

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	YES	NO	NA
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?	—	<input checked="" type="checkbox"/>	—
(b) all analytes analyzed by GFAA?	—	<input checked="" type="checkbox"/>	—
(c) all analytes analyzed by AA Flame?	—	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) Mercury?	—	<input checked="" type="checkbox"/>	—
(e) Cyanide?	—	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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 $CRDL$, $2 \times ILL$ when $ILL > CRDL$.

Do concentrations of field blank(s) fall below $CRDL$ (or $2 \times ILL$ when $ILL > CRDL$) 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.

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	YES	NO	NA
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)? YES NO NA

ICP Interelement Correction Factors (annually)? YES NO NA

ICP Linear Ranges (quarterly)? YES NO NA

ACTION: If no, contact EPO of the lab.

A.1.9.17.2 ~~Form X~~ (Instrument Detection Limits) - (Note: IIL is not required for Cyanide.)

Are IILs present for: all the analytes? YES NO NA

all the instruments used? YES NO NA

For both AA and ICP when both are used for same analyte? YES NO NA

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

Is IIL greater than CRIL for any analyte? YES NO NA

If yes, is the concentration on Form I of the sample analyzed on the instrument whose IIL exceeds CRIL, greater than 5 x IIL? YES NO NA

ACTION: If no, flag as estimated all values less than five times IIL of the instrument whose IIL exceeds CRIL.

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	YES	NO	N/A
A.1.9.17.3 Form XI (Linear Ranges)			
Was any sample result higher than high linear range of ICP?	—	<input checked="" type="checkbox"/>	—
Was any sample result higher than the highest calibration standard for non-ICP parameters?	—	<input checked="" type="checkbox"/>	—
If yes for any of the above, was the sample diluted to obtain the result on Form I?	<input checked="" type="checkbox"/>	—	—
<u>ACTION:</u> 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%?	—	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<u>ACTION:</u> 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
SOP# CLP 570 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. The CRDL Standards for Arsenic and Lead were below 50%. All data is rejected.

2. The CRDL Standard for Zinc was above the upper control limit. All positive results are qualified as estimated.

3. The Matrix spike recoveries for Arsenic and Selenium were below 30%. All data is rejected.

4. The Matrix Spike recovery for Lead was above 150%. All positive data is rejected.

5. The Duplicate Analyses for Chromium and Iron and Manganese were outside the control limit. All data is qualified as estimated.

PBH 4/24/92

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 570

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 11-001 and 11-002

FIELD DUP. #'S: _____ LAB DUP. #'S: 11-001 Field Blank _____ MATRIX SPIKE #: 11-001

SERIAL DILUTION SAMPLE NO. 11-001 COMPLETION DATE: 4/24/92 REVIEWERS INITIALS: PBH

Parameter	Detection Limits		Field Blank	Calib. Ver. XR			CRDL Std Ver. XR		Calibration Blanks			P B R L E A P N	ICP ICS XR		M S t p r i x k	Lab Dup RPD Diff	LCS XR	Ser Dil ID	Meth			
	CRDL	IDL		Continued			Init	Fin	Continued				Init	Fin								
				1	2	3			1	2	3											
Al	200	91	NA																			
Bb	60	20																				
Bc	10	2		94	95	96	93	(0)		U	U	U	U	U		(0)		94	F			
Ba	200	16		97	96	95	95			U	U	U	U	U	82	82	91	13.5	97	1.4	P	
Be	5	1																				
Cc	5	2		93	94	95	99	107	107	U	U	U	U	U	93	93	82		91			P
Ca	5000	47																				
Cd	10	4		98	98	97	97	106	103	U	U	U	U	U	95	95	49	(57)	95	0.6	P	
Cs	50	11																				
Co	25	6		101	100	100	100	162	118	U	U	U	U	U	96	96	88	20	96	100	P	
Cr	100	46		99	99	97	98			U	U	U	U	U	91	91	89	(68)	96	0.3	P	
Pb	3	2		101	100	103	104	(27)		U	U	U	U	U		(160)	(39)	84				F
Mg	5000	29																				
Mn	15	2		99	98	96	97	99	98	U	U	U	U	U	86	84	101	(62)	96	0	P	
Bz	0.2	0.04		101	102	101	102			U	U	U	U	U					99			CV
Ni	40	11																				
K	5000	694																				
Se	5	2		97	98	102	94	100		U	U	U	U	U		(28)		95				F
Ag	10	3		106	106	104	105	96	100	U	U	U	U	U	95	95	89		102			P
Cu	5000	110		95	96	96	95			U	U	U	U	U				1.8	97	8.3	P	
Pt	10																					
V	50	8		103	102	100	101	44	97	U	U	U	U	U	85	85			0000	33		
Zn	20	6		97	97	96	97	120	(138)	U	U	U	U	U	88	88	93	0.12	48	64	P	

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.6: CLP Data Assessment
 Summary Form (Inorganics)

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

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited scope) Date: 4/27/92 Case #: NWS
 Site: Naval Weapons Station Lab Name: Roy Weston
 Reviewer's Initials: PBL Number of Samples: 2

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Inter-ferences	Spike Recovery	Duplicates Lab/Field	Detection Limits	LCS	Serial Dilution	MSA	Total Analytes	Rejection
ICP						2						2	
Flame AA													
Furnace AA		2				1						3	
Mercury													
Total		2				3						5	
Other													

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

ICP		1				3						4	
Flame AA													
Furnace AA													
Mercury													
Total		1				3						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 2 waters

SDG# CLP 570

REVIEWER (IF NOT ESD) Heartland ESI

SO# 390

REVIEWER'S NAME Paul B. Humby

IPO: ACTION: FYI

COMPLETION DATE 4/27/92

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	Z		
8. MSA				
9. SERIAL DILUTION	O	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: _____

000034
 000041



April 26, 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.

<u>Navy No.</u>	<u>RFW No.</u>
6-M003	911258101
6-M203	911258102
1-M003	911258103

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.

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# 9112581, the analysis of three (3) field water sample and one (1) matrix spike and duplicate pair. Overall, the inorganic data quality was fair.

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 and Lead were above 150%. All positive results are rejected if within the concentration range applied by the Region II Protocol.
2. The CRDL Standards for Copper and Zinc were above the upper control limit. All positive results are qualified as estimated, "J" 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)

Spike Recovery

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

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".

<u>Analyte</u>	<u>Samples</u>
Lead	6-M203

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
All water samples	Pb and As	+	R	1
All water samples	Cu and Zn	+	J	2
All water samples	Ag	+/U	R	3
All water samples	Pb and As	+/U	J/UJ	4
6-M203	Pb	+/U	J/UJ	5

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

QL - denotes data validation qualifier

0000015

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

6-M003

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP581

Matrix (soil/water): WATER Lab Sample ID: 911258101

Level (low/med): LOW Date Received: 12/02/91

% 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	2.80	B	N	F
7440-39-3	Barium	62.30	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.20	B		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	114.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	43.90			P
7439-89-6	Iron	56400.00			P
7439-92-1	Lead	24.90		SN	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	89.20			P
7439-97-6	Mercury	.89			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.00	U		F
7440-22-4	Silver	12.50		N	P
7440-23-5	Sodium	2030.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	99.20			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:
 Color After: COLORLESS Clarity After: CLEAR Artifacts:
 Comments:

FORM I - IN

03/90

000005

0000016

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

6-M203

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP581

Matrix (soil/water): WATER Lab Sample ID: 911258102

Level (low/med): LOW Date Received: 12/02/91

% 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 0J4
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	WN	F 0J4,5
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
7440-22-4	Silver	10.00	U	N	P R3
7440-23-5	Sodium	140.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	9.70	B		P J2
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FORM I - IN

03/90

000006

0000017

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

1-M003

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

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP581

Matrix (soil/water): WATER Lab Sample ID: 911258103

Level (low/med): LOW Date Received: 12/02/91

% 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	215.00	N		F R1
7440-39-3	Barium	87.80	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	23.50			P
7440-70-2	Calcium				NR
7440-47-3	Chromium	245.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	37.00			P J2
7439-89-6	Iron	355000.00			P
7439-92-1	Lead	4.50	N		F R1
7439-95-4	Magnesium				NR
7439-96-5	Manganese	342.00			P
7439-97-6	Mercury	.80			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	7.70	S		F
7440-22-4	Silver	60.10	N		P R3
7440-23-5	Sodium	4120.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	314.00			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:
 Color After: COLORLESS Clarity After: CLEAR Artifacts:
 Comments:

STANDARD OPERATING PROCEDURE

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 <u>Contract Compliance Screening Report (CCS)</u> - Present? <u>ACTION:</u> If no, contact RSCC.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.2 <u>Record of Communication (from RSCC)</u> - Present? <u>ACTION:</u> If no, request from RSCC.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.3 <u>Trip Report</u> - Present and complete? <u>ACTION:</u> If no, contact RSCC for trip report.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.4 <u>Sample Traffic Report</u> - Present or on file? Legible?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<u>ACTION:</u> If no, request from Regional Sample Control Center (RSCC).			
A.1.5 <u>Cover Page</u> - Present? Is cover page properly filled in and signed by the lab manager or the manager's designee? <u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If no for any of the above, contact RSCC for clarification.			

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.1.6 <u>Form I (Final Data)</u> - Are all Form I's present and complete?	<input checked="" type="checkbox"/>	__	__
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?	<input checked="" type="checkbox"/>	__	__
Are soil sample results for each parameter corrected for percent solids?	<input type="checkbox"/>	__	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	__	__
Are computation/transcription errors less than 10% of reported values?	<input checked="" type="checkbox"/>	__	__
Are all "less than MDL" values properly coded with "U"?	<input checked="" type="checkbox"/>	__	__
Was a brief physical description of samples given on Form I's?	<input checked="" type="checkbox"/>	__	__
Were the result qualifiers used correctly with final data?	<input checked="" type="checkbox"/>	__	__
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?	__	<input checked="" type="checkbox"/>	__
If yes, were dilutions noted on Form I's?	<input checked="" type="checkbox"/>	__	__
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?	__	<input checked="" type="checkbox"/>	__
Cyanide distillation (14 days) exceeded?	__	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Title: Evaluation of Metals for the Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract Compliance (Total Review - Inorganics)

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

	YES	NO	N/A
Other Metals analysis (6 months) exceeded?	—	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

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.1.8.3 Are all raw data to support all sample analyses and QC operations present?	<input checked="" type="checkbox"/>	---	---
Legible?	<input checked="" type="checkbox"/>	---	---
Properly Labeled?	<input checked="" type="checkbox"/>	---	---

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?	<input type="checkbox"/>	---	<input checked="" type="checkbox"/>
Furnace AA?	<input checked="" type="checkbox"/>	---	---
Cyanides?	<input type="checkbox"/>	---	<input checked="" type="checkbox"/>

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 $\pm 10\%$ of true value.
 2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

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

ACTION: Flag associated data as estimated if standards are not within $\pm 10\%$ 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?	___	[<input checked="" type="checkbox"/>]	___
Cyanide Analysis?	___	[<input type="checkbox"/>]	[<input checked="" type="checkbox"/>]
Atomic Absorption Analysis?	___	[<input checked="" type="checkbox"/>]	___

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?	[<input checked="" type="checkbox"/>]	___	___
Present and complete for AA and ICP when both are used for same analyte?	[<input checked="" type="checkbox"/>]	___	___

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%	[<input checked="" type="checkbox"/>]	___	___
Hg - 80-120%	[<input checked="" type="checkbox"/>]	___	___
Cyanides 85-115%	[<input type="checkbox"/>]	___	[<input checked="" type="checkbox"/>]

The reviewer will calculate correlation coefficient.

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 NA

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 (U), 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?

YES NO NA

ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).

Was ICV for cyanides distilled?

YES NO
 PBH 4/23/92

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

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

A.1.9.3.1 Was a CRL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?

YES NO NA

*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?

YES NO NA

Was a $2 \times CRL$ (or $2 \times IDL$ when $IDL > CRL$) analyzed (CRI) for each ICP run?

YES NO NA

(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 \pm CRL
- ICP Analysis - **True Value \pm $2 \times CRL$
- CN Analysis - **True Value \pm $0.5 \times$ 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 CRL when $IDL > CRL$.

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

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

	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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is mid-range standard within control limits:			
Cyanide 80 - 120%R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For both AA and ICP when both are used for same analyte?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was an initial calibration blank analyzed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/non-compliance section of the Data Assessment Narrative.			

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A.1.9.4.2 Circle all calibration blank values on Data Summary Sheet that are above CRDL (or 2 x IIL when IIL > CRDL). Are all calibration blanks (when IIL < CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	<input checked="" type="checkbox"/>	___	___
Are all calibration blanks less than two times Instrument Detection Limit (when IIL > CRDL)?	<input checked="" type="checkbox"/>	___	___
<p><u>ACTION:</u> 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 2xIIL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.</p>			
A.1.9.5 <u>FORM III (Preparation Blank) -</u>			
(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?	<input checked="" type="checkbox"/>	___	___
each batch?	<input checked="" type="checkbox"/>	___	___
each matrix type?	<input checked="" type="checkbox"/>	___	___
both AA and ICP when both are used for same analyte?	<input checked="" type="checkbox"/>	___	___
<p><u>ACTION:</u> If no for any of the above, flag as estimated (J) all associated positive data <10 x IILs for which prep. blank was not analyzed.</p>			
<p><u>NOTE:</u> 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).</p>			
A.1.9.5.2 Is concentration of prep. blank greater than CRDL when IIL is less than or equal to CRDL?	___	<input checked="" type="checkbox"/>	___
If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?	___	<input checked="" type="checkbox"/>	___

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	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 IEL when IEL is greater than CRDL?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6 <u>Form IV (ICP Interference Check Sample)</u>			
A.1.9.6.1 Present and complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(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)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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%)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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").			

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	YES	NO	NA
<hr/>			
A.1.9.7 <u>Form V A (Spiked Sample Recovery - Pre-Digestion/Pre-Distillation)-</u> (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?	<input checked="" type="checkbox"/>	---	---
each matrix type?	<input checked="" type="checkbox"/>	---	---
each conc. range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	---	---
For both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	---	<input checked="" type="checkbox"/>
<u>ACTION:</u> 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.			
<u>NOTE:</u> 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?	---	<input checked="" type="checkbox"/>	---
<u>ACTION:</u> If yes, flag all positive data less than 4 x spike added as estimated (J) for which field blank was used as spiked sample.			
<u>NOTE:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	---
If no, is sample concentration greater than or equal to four times spike concentration?	<input checked="" type="checkbox"/>	---	---
<u>ACTION:</u> 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.			

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Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) between 30-74%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) between 125-150%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(d) greater than 150%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 125-150%, 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%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) between 10-74%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) between 125-200%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) greater than 200%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 125-200%, 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".

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A.1.9.8 Form VI (Lab Duplicates)			
A.1.9.8.1 Present and complete for: each 20 samples?	<input checked="" type="checkbox"/>	---	---
each matrix type?	<input checked="" type="checkbox"/>	---	---
each concentration range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	---	---
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	---	<input checked="" type="checkbox"/>

ACTION: If no for any the above, flag as estimated (J) all data >CRIL* 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 >CRIL* 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 < ±CRIL)?

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 CRIL when IDL > CRIL.

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	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 $10 \times *CRDL^*$?		<input checked="" type="checkbox"/>	
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 $Difference > \pm CRDL^*$			
Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times $*CRDL^*$?		<input checked="" type="checkbox"/>	
Is any **difference between sample and duplicate greater than $*CRDL$ where sample and/or duplicate is less than 5 times $*CRDL$?		<input checked="" type="checkbox"/>	
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 $Difference > 2 \times CRDL^*$			
Is any RPD (where sample and duplicate are both greater than or equal to 5 times $*CRDL$) :			
$> 100\%$?		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Is any **difference between sample and duplicate (where sample and/or duplicate is less than $5 \times *CRDL$) :			
$> 2 \times *CRDL^*$?		<input type="checkbox"/>	<input checked="" type="checkbox"/>

* Substitute IDL for CRDL when $IDL > CRDL$.

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

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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 IHL. 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 IHL for CRDL when IHL > CRDL.

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

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YES NO NA

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.

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	YES	NO	N/A
A.1.9.11 <u>Form IX (ICP Serial Dilution) -</u>			
NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x IIDL.			
A.1.9.11.1 Was Serial Dilution analysis performed for:			
each 20 samples?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
each concentration range (i.e. low, med.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ACTION: If no for any of the above, flag all positive data greater than or equal to 10xIIDLs 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ACTION: If yes, flag all associated data $\geq 10 \times \text{IIDL}$ 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 IIDL or greater.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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 IIDLs only. Are any % difference values:			
> 10%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
≥ 100%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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YES NO N/A

ACTION: Flag as estimated (J) all associated equal to or greater than 10XRLs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10XRLs for which PD is greater than or equal to 100%.

A.1.9.12 Furnace Atomic Absorption (AA) OC 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 CRL?

[✓] -- --

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 SP4XR.

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	YES	NO	NA
A.1.9.13 <u>Form VIII (Method of Standard Addition Results)</u>			
A.1.9.13.1 Present?	[<input checked="" type="checkbox"/>]	___	___
If no, is any Form I result coded with "S" or a "+"?	___	[<input checked="" type="checkbox"/>]	___
<u>ACTION:</u> 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?	___	[<input checked="" type="checkbox"/>]	___
<u>ACTION:</u> If yes, reject (red-line) affected data.			
A.1.9.13.3 Was *MSA required for any sample but not performed?	___	[<input checked="" type="checkbox"/>]	___
Is coefficient of correlation for MSA less than 0.995?	___	[<input checked="" type="checkbox"/>]	___
Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	___	[<input checked="" type="checkbox"/>]	___
<u>ACTION:</u> 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?	[<input checked="" type="checkbox"/>]	___	___
<u>ACTION:</u> If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14 <u>Dissolved/Total or Inorganic/Total Analytes -</u>			
A.1.9.14.1 Were any analyses performed for dissolved as well as total analytes on the same sample(s)..	___	[<input checked="" type="checkbox"/>]	___
Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	___	[<input checked="" type="checkbox"/>]	___

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

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- | | 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 CPEL as well as total concentration. | | | |
| 2. Apply the following questions only if inorganic (or dissolved) results are (i) above CPEL, 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".

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	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?	___	[<input checked="" type="checkbox"/>]	___
(b) all analytes analyzed by GFAA?	___	[<input checked="" type="checkbox"/>]	___
(c) all analytes analyzed by AA Flame?	___	[<input type="checkbox"/>]	[<input checked="" type="checkbox"/>]
(d) Mercury?	___	[<input checked="" type="checkbox"/>]	___
(e) Cyanide?	___	[<input type="checkbox"/>]	[<input checked="" type="checkbox"/>]

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 $CRIL$, $2 \times IDL$ when $IDL > CRIL$.

Do concentrations of field blank(s) fall below $CRIL$ (or $2 \times IDL$ when $IDL > CRIL$) 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.

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_____ 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)? YES NO N/A

ICP Interelement Correction Factors (annually)? YES NO N/A

ICP Linear Ranges (quarterly)? YES NO N/A

ACTION: If no, contact DPO of the lab.

A.1.9.17.2 Form X (Instrument Detection Limits) - (Note: IIL is not required for Cyanide.)

Are IILs present for: all the analytes? YES NO N/A

all the instruments used? YES NO N/A

For both AA and ICP when both are used for same analyte? YES NO N/A

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

Is IIL greater than CRDL for any analyte? YES NO N/A

If yes, is the concentration on Form I of the sample analyzed on the instrument whose IIL exceeds CRDL, greater than 5 x IIL? YES NO N/A

ACTION: If no, flag as estimated all values less than five times IIL of the instrument whose IIL exceeds CRDL.

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

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Case# NWS Site Naval Weapons Station Matrix: Soil
 SDG# CLP 581 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. The CRDL Standard for lead and Arsenic were above 150%. All positive data is rejected.
2. The CRDL Standard for Copper and Zinc were below the lower control limit. All data is qualified as estimated.
3. The Matrix Spike recovery for Silver was below 30%. All data rejected.
4. The Matrix Spike recoveries for lead and Arsenic were below the lower control limit. All data qualified as estimated.

PBH 4/23/92

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 4/23/92~~

...2.2 Contract-Problems/Non-Compliance

~~PBH 4/23/91~~

MS Reviewer:

Signature

Date:

Contractor Reviewer:

Signature

Date:

Verified by:

Richard D. Scayalio

Date:

LABORATORY: Roy E. Weston CASE NO. NWS SCW NO. 390 SAMPLE TYPE/SDG: CLP 581

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 6-M003, 6M203 and 1-M003

FIELD DUP. #'S: _____ LAB DUP. #'S: 6-M003 Field Blank _____ MATRIX SPIKE #: 6-M003

SERIAL DILUTION SAMPLE NO. 6-M003 COMPLETION DATE: 4/23/92 REVIEWERS INITIALS: PBH

Parameter	I		Field Blank	IIA			IIB		III			P B R L E A P N	IV		M S t p r i x k	Lab Dup RPD DiL	LCS I R	Ser Dil I D	M e t h			
	Detection Limits			Calib. Ver. XR			CRDL Std Ver. I R		Calibration Blanks				ICP ICS I R									
	UG/L			Continued					Continued													
	CRDL	IDL		Init	1	2	3	Init	Fin	Init	1		2	3						Init	Fin	
Al	200	91	NA																			
Ba	10	2		99	103	101	103	(211)		U	U	U	U	U		(35)	22	96	F			
Ba	200	16		98	100	99	99			U	U	U	U	U	85	87	94	58	98	100	P	
Be	5	1																				
Cd	5	2		99	105	103	99	116	103	U	U	U	U	U	98	104	97	0	100	100	P	
Cd	5000	47																				
Cd	10	4		99	104	106	110	112	113	U	U	U	U	U	100	106	102	9.5	99	4.8	P	
Cd	50	11																				
Cd	25	6		102	105	104	103	(123)	117	U	U	U	U	U	100	101	91	27	96	100	P	
Cr	100	46		100	105	107	109			U	U	U	U	U	95	101	233	5	100	2.2	P	
Pb	3	2		107	94	94	98	(293)		U	U	U	U	U			(45)	8	97		F	
Mg	5000	29																				
Mn	15	2		100	105	106	106	107	111	U	U	U	U	U	93	95	98	9	100	32	P	
Hg	0.2	0.04		102	102	101	102			U	U	U	U	U			85	1	99		CU	
Ni	40	11																				
K	5000	694																				
Se	5	2		103	100	103	101	90		U	U	U	U	U			102	200	102		F	
Ag	10	3		108	110	110	107	110	108	U	U	U	U	U	100	109	(78)	200	82	100	P	
Na	5000	110		97	98	97	98			U	U	163	198	U			4	46	20.5		P	
Li	10																					
V	50	8																				
Zn	20	6		100	105	107	109	(139)	(130)	U	U	U	U	U	7.8	95	101	100	14.1	103	0.7	P

000033

Title: Evaluation of Metals Data for the
Contract Laboratory Program
Appendix A.6: CLP Data Assessment
Summary Form (Inorganics)

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

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited scope) Date: 4/27/92 Case #: NWS
Site: Naval Weapons Station Lab Name: Ray Weston
Reviewer's Initials: PBL Number of Samples: 3

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding	Calibration	Prep Blank	Field Blank	Inter- ferences	Spike Recovery	Duplicates		Detection Limits	LCS	Serial Dilution	MSA	Total Analytes	Rejection
	Times						Lab	Field						
ICP		1				1							2	
Flame AA														
Furnace AA		2											2	
Mercury														
Total		3				1							4	
Other														

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

ICP		2											2	
Flame AA														
Furnace AA						2							2	
Mercury														
Total		2				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
 LABORATORY Roy F. Weston
 SDG# CLP 581
 SO# 390
 IFO: ACTION: FYI

SITE Naval Weapon Station
 NO. OF SAMPLES/
 MATRIX 3 waters
 REVIEWER (IF NOT ESD) Heartland EST
 REVIEWER'S NAME Paul B. Humby
 COMPLETION DATE 4/27/92

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	↓	↓		
6. DUPLICATE ANALYSIS	Z			
7. MATRIX SPIKE	O			
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.



April 26, 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 no (0) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

<u>Navy No.</u>	<u>RFW No.</u>
02-M03	911258001
02-M23	911258002
02-M63	911258003

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.

000001

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# 9112580, the analysis of three (3) field water sample and no (0) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The Quality Assurance samples were found in SDG 581 for this data group.

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 and Lead were above 150%. All positive results are rejected if within the concentration range applied by the Region II Protocol.
2. The CRDL Standards for Copper and Zinc were above the upper control limit. All positive results are qualified as estimated, "J" 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.

000002

Metals Data Assessment Narrative (continued - Page 2)

Spike Recovery

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

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".

<u>Analyte</u>	<u>Samples</u>
Lead	02-M23 and 02-M03.
Selenium	02-M23

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
All water samples	Pb and As	+	R	1
All water samples	Cu and Zn	+	J	2
All water samples	Ag	+/U	R	3
All water samples	Pb and As	+/U	J/UJ	4
02-M03 and 02-M23 02-M23.	Pb Se	+/U	J/UJ	5

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

QL - denotes data validation qualifier

0000015

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

02-M03

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-05

Lab Code: WESTON

Case No.: NWS

SAS No.:

SDG No.: CLP580

Matrix (soil/water): WATER

Lab Sample ID: 911258001

Level (low/med): LOW

Date Received: 12/02/91

% 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
7440-39-3	Barium	16.10	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	15.40			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	3260.00			P
7439-92-1	Lead	3.30		W	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	5.50	B		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	3060.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	21.40			P
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FORM I - IN

03/90

000005

1
INORGANIC ANALYSIS DATA SHEET

02-M23

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-05

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP580

Matrix (soil/water): WATER Lab Sample ID: 911258002

Level (low/med): LOW Date Received: 12/02/91

% 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 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	77.60	B		P
7439-92-1	Lead	2.00	U	W	F UJ4,5
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 UJ5
7440-22-4	Silver	10.00	U		P R3
7440-23-5	Sodium	436.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	15.20	B		P J2
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

0000017

U.S. EPA - CLP

EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

02-M63

Lab Name: ROY F. WESTON, INC - L372 Contract: 1771-15-05

Lab Code: WESTON Case No.: NWS SAS No.: SDG No.: CLP580

Matrix (soil/water): WATER Lab Sample ID: 911258003

Level (low/med): LOW Date Received: 12/02/91

% 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 054
7440-39-3	Barium	82.70	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.00	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	419.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	24.60	B		P J2
7439-89-6	Iron	59800.00			P
7439-92-1	Lead	25.80		S	F J4
7439-95-4	Magnesium				NR
7439-96-5	Manganese	409.00			P
7439-97-6	Mercury	.92			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.00	U		F
7440-22-4	Silver	40.00	U		P R3
7440-23-5	Sodium	2600.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	132.00			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:
Comments:

000007

STANDARD OPERATING PROCEDURE

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 <u>Contract Compliance Screening Report (CCS)</u> - Present? <u>ACTION:</u> If no, contact RSOC.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.2 <u>Record of Communication (from RSOC)</u> - Present? <u>ACTION:</u> If no, request from RSOC.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.3 <u>Trip Report</u> - Present and complete? <u>ACTION:</u> If no, contact RSOC for trip report.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.4 <u>Sample Traffic Report</u> - Present or on file? Legible?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<u>ACTION:</u> If no, request from Regional Sample Control Center (RSOC).	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A.1.5 <u>Cover Page</u> - Present? Is cover page properly filled in and signed by the lab manager or the manager's designee? <u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If no for any of the above, contact RSOC for clarification.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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.1.6 <u>Form I (Final Data)</u> - Are all Form I's present and complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are soil sample results for each parameter corrected for percent solids?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are computation/transcription errors less than 10% of reported values?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are all "less than LUL" values properly coded with "U"?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was a brief physical description of samples given on Form I's?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were the result qualifiers used correctly with final data?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If yes, were dilutions noted on Form I's?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Cyanide distillation (14 days) exceeded?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

STANDARD OPERATING PROCEDURE

Title: Evaluation of Metals for the Contract
 Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

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

	YES	NO	NB
Other Metals analysis (6 months) exceeded?	—	<input checked="" type="checkbox"/>	—

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	NB
Digestion Log* for flame AA/ICP (Form XIII) present?	<input checked="" type="checkbox"/>	—	—
Digestion Log for furnace AA Form XIII present?	<input checked="" type="checkbox"/>	—	—
Distillation Log for mercury Form XIII present?	<input checked="" type="checkbox"/>	—	—
Distillation Log for cyanides Form XIII present?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
Are pH values (pH < 2 for all metals, pH > 12 for cyanide) present?	<input checked="" type="checkbox"/>	—	—
Percent solids calculation present for soils/sediments?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
Are preparation dates present on Digestion Log?	<input checked="" type="checkbox"/>	—	—
ICP	<input checked="" type="checkbox"/>	—	—
Flame AA	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
Furnace AA	<input checked="" type="checkbox"/>	—	—
Mercury	<input checked="" type="checkbox"/>	—	—
Cyanides	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

Date: Feb. 1990
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	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	<input checked="" type="checkbox"/>	___	___
Legible?	<input checked="" type="checkbox"/>	___	___
Properly Labeled?	<input checked="" type="checkbox"/>	___	___

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

A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	<input checked="" type="checkbox"/>	___	___
Is record of 5 point calibration present for Hg analysis?	<input checked="" type="checkbox"/>	___	___

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?	<input type="checkbox"/>	___	<input checked="" type="checkbox"/>
Furnace AA?	<input checked="" type="checkbox"/>	___	___
Cyanides?	<input type="checkbox"/>	___	<input checked="" type="checkbox"/>

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 $\pm 10\%$ of true value.
 2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CTRL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

STANDARD OPERATING PROCEDURE

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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

ACTION: Flag associated data as estimated if standards are not within $\pm 10\%$ 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.

Title: Evaluation of Metals Data for the
Contract Laboratory Program
Appendix A.1: Data Assessment - Contract
Compliance (Total Review - Inorganics)

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

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 $\leq IEL$ as estimated (U), 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?

YES NO N/A

ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).

Was ICV for cyanides distilled?

YES NO N/A

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

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

A.1.9.3.1 Was a CRL standard (CRA) analyzed after initial calibration for all AA metals (except Hg)?

YES NO N/A

*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis?

YES NO N/A

Was a $2 \times CRL$ (or $2 \times IEL$ when $IEL > CRL$) analyzed (CRI) for each ICP run?

YES NO N/A

(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 - $**True Value \pm CRL$
- ICP Analysis - $**True Value \pm 2CRL$
- CN Analysis - $**True Value \pm 0.5 \times True Value.$

* Find the results of mid-range standard in the raw data.

**True value of CRA, CRI or mid-range standard. Substitute IEL for CRL when $IEL > CRL$.

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	YES	NO	N/A
A.1.9.3.2 Was CRU analyzed after ICV/ICB and before the final CCV/CCB, and for every four hours of ICP run?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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 CRU 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.

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	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 IDEL when IDEL is greater than CRDL?	<input checked="" type="checkbox"/>		
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?		<input checked="" type="checkbox"/>	
ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCRDL.			
A.1.9.6 <u>Form IV (ICP Interference Check Sample)</u>			
A.1.9.6.1 Present and complete?	<input checked="" type="checkbox"/>		
(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)?	<input checked="" type="checkbox"/>		
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%)?	<input checked="" type="checkbox"/>		
If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	<input checked="" type="checkbox"/>		
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").			

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	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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each conc. range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If no, is sample concentration greater than or equal to four times spike concentration?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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.			

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	YES	NO	N/A
Are results outside the control limits (75-125%) flagged with "N" on Form I's and Form VA?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) between 30-74%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) between 125-150%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(d) greater than 150%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

ACTION: If less than 30%, reject all associated aqueous data; if between 30-74%, flag all associated aqueous data as estimated (J); if between 125-150%, 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%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) between 10-74%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(c) between 125-200%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) greater than 200%?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

ACTION: If less than 10%, reject all associated data; if between 10-74%, flag all associated data as estimated; if between 125-200%, 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".

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	YES	NO	N/A
A.1.9.8 <u>Form VI (Lab Duplicates)</u>			
A.1.9.8.1 Present and complete for: each 20 samples?	<input checked="" type="checkbox"/>	—	—
each matrix type?	<input checked="" type="checkbox"/>	—	—
each concentration range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	—	—
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>
<p>ACTION: If no for any the above, flag as estimated (J) all data $>CREL^*$ for which duplicate sample was not analyzed.</p> <p>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.</p>			
A.1.9.8.2 Was field blank used for duplicate analysis?	—	<input checked="" type="checkbox"/>	—
<p>ACTION: If yes, flag all data $>CREL^*$ as estimated (J) for which field blank was used as duplicate.</p> <p>NOTE: Duplicate analysis should be performed on a field blank when it is the only aqueous sample in SDG.</p>			
A.1.9.8.3 Are all values within control limits (RPD 20% or difference $< \pm CREL$)?	<input checked="" type="checkbox"/>	—	—
If no, are all results outside the control limits flagged with an * on Form I's and VI?	<input checked="" type="checkbox"/>	—	—
<p>ACTION: If no, write in the Contract - Problems/Non-Compliance section of "Data Assessment Narrative".</p> <p>NOTE: 1. RPD is not calculable for an analyte of the sample - duplicate pair when both values are less than ILL.</p>			

* Substitute ILL for $CREL$ when $ILL > CREL$.

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	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 $10 \times CRDL^*$?		<input checked="" type="checkbox"/>	
ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5 SOILS Circle all values on Data Summary Sheet that are: $RPD > 50\%$, or $Difference > \pm CRDL^*$			
Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times $CRDL^*$?		<input checked="" type="checkbox"/>	
Is any **difference between sample and duplicate greater than $CRDL^*$ where sample and/or duplicate is less than 5 times $CRDL^*$?		<input checked="" type="checkbox"/>	
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 $Difference > 2 \times CRDL^*$			
Is any RPD (where sample and duplicate are both greater than or equal to 5 times $CRDL^*$) :			
> 100%?		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Is any **difference between sample and duplicate (where sample and/or duplicate is less than $5 \times CRDL^*$) :			
> $2 \times CRDL^*$?		<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

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_____ 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 *CRIL and other value greater than or equal to 10 x *CRIL?

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 > ± CRIL*

Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRIL?

Is any **difference between sample and duplicate greater than *CRIL where sample and/or duplicate is less than 5 times *CRIL?

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

* Substitute IDL for CRIL when IDL > CRIL.

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

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	YES	NO	N/A
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A.1.9.9.4 Soil/Sediment

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

Difference > 2 x CRCL*

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

>100%?

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

>2x *CRCL?

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 CRCL when IDL > CRCL

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

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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%?	___	<input checked="" type="checkbox"/>	___
	between 50% and 79%?	___	<input checked="" type="checkbox"/>	___
	between 121% and 150%?	___	<input checked="" type="checkbox"/>	___
	greater than 150%?	___	<input checked="" type="checkbox"/>	___

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.

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YES NO NA

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 ILL.

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 10x ILLs 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 $\geq 10 \times \text{ILL}$ 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 ILL 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 ILLs only. Are any % difference values:

> 10%?

> 100%?

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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 CRCL?

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 $SD \geq 4 \times SA$.

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	YES	NO	N/A
A.1.9.13 <u>Form VIII (Method of Standard Addition Results)</u>			
A.1.9.13.1 Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is any Form I result coded with "S" or a "+"?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If yes, reject (red-line) affected data.			
A.1.9.13.3 Was *MSA required for any sample but not performed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is coefficient of correlation for MSA less than 0.995?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If no, note exception under contract problem/non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14 <u>Dissolved/Total or Inorganic/Total Analytes -</u>			
A.1.9.14.1 Were any analyses performed for dissolved as well as total analytes on the same sample(s)..	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

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- 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.

YES NO N/A

- 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? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Case/SAS number? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| EPA sample No.? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| SDG No.? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Contract No.? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Correct units? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Matrix? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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

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	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?	___	<input checked="" type="checkbox"/>	___
(b) all analytes analyzed by GFAA?	___	<input checked="" type="checkbox"/>	___
(c) all analytes analyzed by AA Flame?	___	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(d) Mercury?	___	<input checked="" type="checkbox"/>	___
(e) Cyanide?	___	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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 $CRDL$, $2 \times IDL$ when $IDL > CRDL$.

Do concentrations of field blank(s) fall below $CRDL$ (or $2 \times IDL$ 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.

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	YES	NO	N/A
A.1.9.17 <u>Form X, XI, XII (Verification of Instrumental Parameters)</u>			

A.1.9.17.1 Is verification report present for:

Instrument Detection Limits (quarterly)? YES NO N/A

ICP Interelement Correction Factors (annually)? YES NO N/A

ICP Linear Ranges (quarterly)? YES NO N/A

ACTION: If no, contact IPO of the lab.

A.1.9.17.2 Form X (Instrument Detection Limits) - (Note: IIL is not required for Cyanide.)

Are IILs present for: all the analytes? YES NO N/A

all the instruments used? YES NO N/A

For both AA and ICP when both are used for same analyte? YES NO N/A

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

Is IIL greater than CRIL for any analyte? YES NO N/A

If yes, is the concentration on Form I of the sample analyzed on the instrument whose IIL exceeds CRIL, greater than 5 x IIL? YES NO N/A

ACTION: If no, flag as estimated all values less than five times IIL of the instrument whose IIL exceeds CRIL.

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

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Case# NW3 Site Naval Weapons Station Matrix: Soil
SOP# CLP580 Lab Roy F. Weston Water ✓
Contractor Roy F. Weston Reviewer Paul B. Hunky 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. The CRDL standards for Arsenic and Lead were greater than 150%. All positive data is rejected.
2. The CRDL standards for Copper and Zinc were above the upper control limit. All positive data is qualified as estimated.
3. The Matrix Spike recovery for Silver was below 30%. All data is rejected.
4. The Matrix Spike recoveries for Lead and Arsenic was below the lower control limit. All data is qualified as estimated.

~~BBH 4/24/90~~

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Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

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

PBH 4/24/92

... 2.2 Contract-Problems/Non-Compliance

QC is found in different data packages,
samples were flagged properly.

PBH 4/24/92

MS Reviewer:

Signature

Date:

Contractor Reviewer:

Signature

Date:

Verified By:

Signature

Date:

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 580

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 02-M003, 02-17203

and 02-M603

FIELD DUP. #'S: _____ LAB DUP. #'S: 02-M003 Field Blank MATRIX SPIKE #: 6-M003

SERIAL DILUTION SAMPLE NO. 6-M003 COMPLETION DATE: 4/24/92 REVIEWERS INITIALS: PBH

Parameter	Detection Limits UG/L		Field Blank	Calib. Ver. XR			CRDL Std Ver. X R		Calibration Blanks			P B R L E A P N	ICP ICS X R		M S t p r i x k	Lab Dup RPD Diff	LCS X R	Ser Dil I D	M e t h			
	CRDL	IDL		Continued			Init	Fin	Continued				Init	Fin								
				Init	1	2			3	Init	1									2	3	
Al	200	91	UA																			
As	10	2		99	103	101	102	(211)		U	U	U	U	U	(35)	22	96	93	F			
Ba	200	16		98	100	99	99		U	U	U	U	U	85	87	94	58	98	100	P		
Be	5	1																				
Cd	5	2		99	105	103	99	116	103	U	U	U	U	U	98	104	97	0	100	100	P	
Ca	5000	47																				
Ce	10	4		99	104	106	10	112	113	U	U	U	U	U	100	106	102	9.5	99	4.8	P	
Cu	50	11																				
Cu	25	6		102	105	104	103	(125)	117	U	U	U	U	U	100	101	91	27	96	100	P	
Fe	100	46		100	105	107	109			U	U	U	U	U	95	101	203	5	100	2.2	P	
Pb	3	2		107	94	94	98	(243)		U	U	U	U	U			(45)	8	97		F	
Mg	5000	29																				
Mn	15	2		100	105	106	106	107	111	U	U	U	U	U	93	95	98	9	100	32	P	
Hg	0.2	0.04		102	102	101	102			U	U	U	U	U			85	1	99		CV	
Ni	40	11																				
K	5000	694																				
Se	5	2		103	100	103	101	90		U	U	U	U	U			102	0	102		F	
Ag	10	3		108	110	110	107	110	108	U	U	U	U	U	100	104	(7.8)	200	82	100	P	
	5000	110		97	98	97	98			U	U	163	196	U			4	96	20.5	P		
Pt	10																					
V	50	8																				
Zn	20	6	✓	100	105	107	109	(139)	(130)	U	U	U	U	U	8	95	101	100	14.1	103	0.7	P

000033

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.6: CLP Data Assessment
 Summary Form (Inorganics)

Date: Feb. 1990
 Number: HW-2
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CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited scope) Date: 4/27/92 Case #: NWS
 Site: Naval Weapons Station Lab Name: Roy Weston
 Reviewer's Initials: PBL Number of Samples: 3

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Inter-ferences	Spike Recovery	Duplicates Lab/Field	Detection Limits	Serial LCS Dilution	MSA	Total Analytes	Rejection
	ICP		2				1					2
Flame AA												
Furnace AA		2									2	
Mercury												
Total		3				1					4	
Other												

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

ICP		2									2	
Flame AA												
Furnace AA						2					2	
Mercury												
Total		2				2					4	
Other												

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

000034
 000040

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
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INORGANIC REGIONAL DATA ASSESSMENT

Region II

CASE NO. NWS
 LABORATORY Roy F. Weston
 SDG# CLP 580
 SC# 390
 DPO: ACTION: FII

SITE Naval Weapons Station
 NO. OF SAMPLES/
 MATRIX 3 waters
 REVIEWER (IF NOT ESD) Heathley EST
 REVIEWER'S NAME Paul B. Humby
 COMPLETION DATE 4/27/92

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	↓	↓	↓	↓
6. DUPLICATE ANALYSIS	↓	↓	↓	↓
7. MATRIX SPIKE	Z			
MSA	O			
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: _____

000035
 000041

HEARTLAND ENVIRONMENTAL
SERVICES, INC.



April 26, 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 no (0) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

<u>Navy No.</u>	<u>RFW No.</u>
05-M003	911258701
06-M003	911258702
06-M203	911258703

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 Form 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

000001

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# 9112587, the analysis of three (3) field water sample and no (0) matrix spike and duplicate pair. Overall, the inorganic data quality was fair. The Quality Assurance samples were found in SDG 581 for this data group.

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 and Lead were above 150%. All positive results are rejected if within the concentration range applied by the Region II Protocol.
2. The CRDL Standards for Copper and Zinc were above the upper control limit. All positive results are qualified as estimated, "J" 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.

000002

Metals Data Assessment Narrative (continued - Page 2)

Spike Recovery

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

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".

<u>Analyte</u>	<u>Samples</u>
Arsenic	05-M003.
Lead	06-M003 and 06-M203.
Selenium	06-M003.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
All water samples	Pb and As	+	R	1
All water samples	Cu and Zn	+	J	2
All water samples	Ag	+/U	R	3
All water samples	Pb and As	+/U	J/UJ	4
05-M003. 06-M003 and 06-M203 06-M003	As Pb Se	+/U	J/UJ	5

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

QL - denotes data validation qualifier

0000015

10-005-M003

Lab Name: Roy F. Weston, Inc.

Contract: 1771-15-03

Lab Code: WESTON

Case No: NWS

SAS No.:

SDG No.: CLP587

Matrix (soil/water): WATER

Lab Sample ID: 9112587001

Level (low/med): LOW

Date Received: 12/03/91

% 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	5.30	B	W	F
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	209.00			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	18.90	B		P
7439-89-6	Iron	35700.00			P
7439-92-1	Lead	50.00	S		F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	41.80			P
7439-97-6	Mercury	0.10	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		F
7440-23-5	Sodium	4340.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	86.50			P
	Cyanide				NR

R1

J2

J4

R3

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

15A

INORGANIC ANALYSIS DATA SHEET

10-006-M003

Lab Name: Roy F. Weston, Inc.

Contract: 1771-15-03

Lab Code: WESTON

Case No: NWS

SAS No.:

SDG No.: CLP587

Matrix (soil/water): WATER

Lab Sample ID: 9112587002

Level (low/med): LOW

Date Received: 12/03/91

% 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
7440-39-3	Barium	113.00	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	4.20	B		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	32.50			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.00	U		P
7439-89-6	Iron	7650.00			P
7439-92-1	Lead	2.60	B	W	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	37.30			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.00	U	W	F
7440-22-4	Silver	10.00	U		P
7440-23-5	Sodium	7120.00			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	248.00			P
	Cyanide				NR

0J4

R1

0J5

R3

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

0000016

INORGANIC ANALYSIS DATA SHEET

10-006-M203

Lab Name: Roy F. Weston, Inc.

Contract: 1771-15-03

Lab Code: WESTON

Case No: NWS

SAS No.:

SDG No.: CLP587

Matrix (soil/water): WATER

Lab Sample ID: 9112587003

Level (low/med): LOW

Date Received: 12/03/91

% 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
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	56.70	B		P
7439-92-1	Lead	2.00	U	W	F
7439-95-4	Magnesium				NR
7439-96-5	Manganese	2.00	U		P
7439-97-6	Mercury	0.10	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	219.00	B		P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	17.10	B		P
	Cyanide				NR

U34

U34,5

R3

J2

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

000007

STANDARD OPERATING PROCEDURE

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

Date: Feb. 1990
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	YES	NO	N/A
A.1.1 <u>Contract Compliance Screening Report (CCS)</u> - Present?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<u>ACTION:</u> If no, contact RSOC.			
A.1.2 <u>Record of Communication (from RSOC)</u> - Present?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<u>ACTION:</u> If no, request from RSOC.			
A.1.3 <u>Trip Report</u> - Present and complete?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<u>ACTION:</u> If no, contact RSOC for trip report.			
A.1.4 <u>Sample Traffic Report</u> - Present or on file?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
/ Legible?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<u>ACTION:</u> If no, request from Regional Sample Control Center (RSOC).			
A.1.5 <u>Cover Page</u> - Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is cover page properly filled in and signed by the lab manager or the manager's designee?			
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If no, prepare Telephone Record Log, and contact laboratory.			
Do numbers of samples correspond to numbers on Record of Communication?			
	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Do sample numbers on cover page agree with sample numbers on:			
(a) Traffic Report Sheet?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) Form I's?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If no for any of the above, contact RSOC for clarification.			

Title: Evaluation of Metals Data for the
 Contract Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

Date: Feb. 1990
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	YES	NO	N/A
A.1.6 <u>Form I (Final Data)</u> - Are all Form I's present and complete? <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	__	__
<u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	__	__
Are soil sample results for each parameter corrected for percent solids?	<input type="checkbox"/>	__	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	__	__
Are computation/transcription errors less than 10% of reported values?	<input checked="" type="checkbox"/>	__	__
Are all "less than IDL" values properly coded with "U"?	<input checked="" type="checkbox"/>	__	__
Was a brief physical description of samples given on Form I's?	<input checked="" type="checkbox"/>	__	__
Were the result qualifiers used correctly with final data?	<input checked="" type="checkbox"/>	__	__
<u>ACTION:</u> 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?	__	<input checked="" type="checkbox"/>	__
If yes, were dilutions noted on Form I's?	<input checked="" type="checkbox"/>	__	__
<u>ACTION:</u> 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?	__	<input checked="" type="checkbox"/>	__
Cyanide distillation (14 days) exceeded?	__	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Title: Evaluation of Metals for the Contract
 Laboratory Program
 Appendix A.1: Data Assessment - Contract
 Compliance (Total Review - Inorganics)

Date: Feb. 1990
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	YES	NO	N/A
Other Metals analysis (6 months) exceeded?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Title: Evaluation of Metals Data for the
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	YES	NO	N/A
A.1.8.3 Are all raw data to support all sample analyses and QC operations present?	<input checked="" type="checkbox"/>	___	___
Legible?	<input checked="" type="checkbox"/>	___	___
Properly Labeled?	<input checked="" type="checkbox"/>	___	___

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

A.1.9.1.1 Is record of at least 2 point calibration present for ICP analysis?	<input checked="" type="checkbox"/>	___	___
Is record of 5 point calibration present for Hg analysis?	<input checked="" type="checkbox"/>	___	___

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?	<input type="checkbox"/>	___	<input checked="" type="checkbox"/>
Furnace AA?	<input checked="" type="checkbox"/>	___	___
Cyanides?	<input type="checkbox"/>	___	<input checked="" type="checkbox"/>

- 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 $\pm 10\%$ of true value.
 2. For all AA (except Hg) and Cyanide analyses, one calibration standard is at CRCL level. If not, write in the Contract-Problem/Non-Compliance section of the "Data Assessment Narrative".

STANDARD OPERATING PROCEDURE

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YES NO NA

ACTION: Flag associated data as estimated if standards are not within $\pm 10\%$ of true values (except CRM 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.

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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 \leq IEL as estimated (U), 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? YES NO N/A

ACTION: If no, flag the excess samples (eleventh and up) data as estimated (J).

Was ICV for cyanides distilled? YES NO N/A

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)? YES NO N/A

*Was a mid-range calib. verification standard distilled and analyzed for cyanide analysis? YES NO N/A

Was a $2 \times$ CRDL (or $2 \times$ IEL when IEL $>$ CRDL) analyzed (CRI) for each ICP run?
(Note: CRI for AL, Ba, Ca, Fe, Mg, Na, or K is not required.) YES NO N/A

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

- AA Analysis - $**\text{True Value} \pm \text{CRDL}$
- ICP Analysis - $**\text{True Value} \pm 2\text{CRDL}$
- CN Analysis - $**\text{True Value} \pm 0.5 \times \text{True Value}$.

* Find the results of mid-range standard in the raw data.

** True value of CRA, CRI or mid-range standard. Substitute IEL for CRDL when IEL $>$ CRDL.

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	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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is mid-range standard within control limits:			
Cyanide 80 - 120%R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For both AA and ICP when both are used for same analyte?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was an initial calibration blank analyzed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was a continuing calibration blank analyzed after every 10 samples or every 2 hours (whichever is more frequent)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ACTION: If no, prepare Telephone Record Log, contact laboratory and write in the contract-problems/non-compliance section of the Data Assessment Narrative.			

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	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 IIL when IIL > CRDL). Are all calibration blanks (when IIL < CRDL) less than or equal to Contract Required Detection Limits (CRDL)?	<input checked="" type="checkbox"/>	___	___
Are all calibration blanks less than two times Instrument Detection Limit (when IIL > CRDL)?	<input checked="" type="checkbox"/>	___	___
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 2xIIL) and nearest good calibration blank. Flag five samples on either side of the calibration blank.			
A.1.9.5 <u>FORM III (Preparation Blank) -</u>			
(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?	<input checked="" type="checkbox"/>	___	___
each batch?	<input checked="" type="checkbox"/>	___	___
each matrix type?	<input checked="" type="checkbox"/>	___	___
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	___	<input checked="" type="checkbox"/>
ACTION: If no for any of the above, flag as estimated (J) all associated positive data < 10 x IILs 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 IIL is less than or equal to CRDL?	___	<input checked="" type="checkbox"/>	___
If yes, is the concentration of the sample with the least concentrated analyte less than 10 times the prep. blank value?	___	<input checked="" type="checkbox"/>	___

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	YES	NO	N/A
ACTION: If yes, reject (red-line) all associated data greater than CREL 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 IEL when IEL is greater than CREL?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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 CREL?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ACTION: If yes, reject (red-line) all associated data that has a concentration less than 10xCREL.			
A.1.9.6 <u>Form IV (ICP Interference Check Sample)</u>			
A.1.9.6.1 Present and complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(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)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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%)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is concentration of Al, Ca, Fe, or Mg lower than in ICS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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").			

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	YES	NO	N/A
<hr/>			
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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each conc. range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If no, is sample concentration greater than or equal to four times spike concentration?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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.			

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	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 125-150%	_	[✓]	_
(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 125-150%, 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 125-200%	_	[]	✓
(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 125-200%, 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".

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	YES	NO	N/A
A.1.9.8 Form VI (Lab Duplicates)			
A.1.9.8.1 Present and complete for: each 20 samples?	<input checked="" type="checkbox"/>	—	—
each matrix type?	<input checked="" type="checkbox"/>	—	—
each concentration range (i.e. low, med., high)?	<input checked="" type="checkbox"/>	—	—
both AA and ICP when both are used for same analyte?	<input type="checkbox"/>	—	<input checked="" type="checkbox"/>

ACTION: If no for any the above, flag as estimated (J) all data \times CRIL* 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 \times CRIL* 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 $< \pm$ CRIL)?

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 ILL.

* Substitute ILL for CRIL when ILL $>$ CRIL.

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	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 $10 \times CRDL^*$?		<input checked="" type="checkbox"/>	
ACTION: If yes, flag the associated data as estimated (J).			
A.1.9.8.5 <u>Aqueous</u> Circle all values on Data Summary Sheet that are: $RPD > 50\%$, or $Difference > \pm CRDL^*$			
Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times $CRDL^*$?		<input checked="" type="checkbox"/>	
Is any **difference between sample and duplicate greater than $CRDL$ where sample and/or duplicate is less than 5 times $CRDL$?		<input checked="" type="checkbox"/>	
ACTION: If yes, flag the associated data as estimated.			
A.1.9.8.6 <u>Soil/Sediment</u> Circle all values on Data Summary Sheet that are: $RPD > 100\%$, or $Difference > 2 \times CRDL^*$			
Is any RPD (where sample and duplicate are both greater than or equal to 5 times $CRDL$) :			
$> 100\%$?		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Is any **difference between sample and duplicate (where sample and/or duplicate is less than $5 \times CRDL$) :			
$> 2 \times CRDL^*$?		<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

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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 ILL.
 2. Flag all associated data only for field duplicate pair.

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

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 > ± CRIL*

Is any RPD greater than 50% where sample and duplicate are both greater than or equal to 5 times *CRIL?

Is any **difference between sample and duplicate greater than *CRIL where sample and/or duplicate is less than 5 times *CRIL?

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

* Substitute ILL for CRIL when ILL > CRIL.

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

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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 CRCL*

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

>100%?

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

>2x *CRCL?

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 IRL for CRCL when IRL > CRCL.

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

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A.1.9.10.2 Aqueous LCS

Circle all LCS values outside control limits
 (80 - 120% - except aqueous Ag and Sb).

	YES	NO	N/A
Is any LCS recovery: less than 50%	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
between 50% and 79%	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
between 121% and 150%	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
greater than 150%	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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.

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	YES	NO	N/A
A.1.9.11 <u>FORM IX (ICP Serial Dilution) -</u>			
NOTE: Serial dilution analysis is required only for initial concentrations equal to or greater than 10 x ILL.			
A.1.9.11.1 Was Serial Dilution analysis performed for:			
each 20 samples?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each matrix type?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
each concentration range (i.e. low; med.)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ACTION: If no for any of the above, flag all positive data greater than or equal to 10xILLs 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ACTION: If yes, flag all associated data $\geq 10 \times \text{ILL}$ as estimated (J).			
NOTE: Serial dilution analysis should be performed on a field blank when it is the only aqueous sample in SOG.			
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 ILL or greater.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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 ILLs only. Are any % difference values:			
> 10%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
$\geq 100\%$?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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YES NO N/A

ACTION: Flag as estimated (J) all associated equal to or greater than 10xMILs for which percent difference is greater than 10% but less than 100%. Reject (red-line) all associated sample results equal to or greater than 10xMILs for which PD is greater than or equal to 100%.

A.1.9.12 Furnace Atomic Absorption (FAA) CC 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 GRAA?

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 CRL?

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.

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	YES	NO	NA
A.1.9.13 <u>Form VIII (Method of Standard Addition Results)</u>			
A.1.9.13.1 Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If no, is any Form I result coded with "S" or a "+"?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If yes, reject (red-line) affected data.			
A.1.9.13.3 Was *MSA required for any sample but not performed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is coefficient of correlation for MSA less than 0.995?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are MSA calculations outside the linear range of the calibration curve generated at the beginning of the analytical run?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>ACTION:</u> If no, note exception under contract problem/ non-compliance of data assessment narrative, or prepare a separate list.			
A.1.9.14 <u>Dissolved/Total or Inorganic/Total Analytes -</u>			
A.1.9.14.1 Were any analyses performed for dissolved as well as total analytes on the same sample(s)??	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Were any analyses performed for inorganic as well as total (organic + inorganic) analytes on the same sample(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

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- 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 CPDL as well as total concentration.
 2. Apply the following questions only if inorganic (or dissolved) results are (i) above CPDL, and (ii) greater than total constituents.
 3. At least one preparation blank, ICS, and LCS should be analyzed in each analytical run.

YES NO N/A

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".

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	YES	NO	NA
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?	___	<u>(X)</u>	___
(b) all analytes analyzed by GFAA?	___	<u>(X)</u>	___
(c) all analytes analyzed by AA Flame?	___	___	<u>(X)</u>
(d) Mercury?	___	<u>(X)</u>	___
(e) Cyanide?	___	___	<u>(X)</u>

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 $CRIL$, $2 \times IIL$ when $IIL > CRIL$.

Do concentrations of field blank(s) fall below $CRIL$ (or $2 \times IIL$ when $IIL > CRIL$) for all parameters of associated aqueous and soil samples?

___ ___ (X)

If no, was field blank value already rejected due to other QC criteria?

___ ___ (X)

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

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----- YES NO NA -----

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)?

YES NO NA

ICP Interelement Correction Factors (annually)?

YES NO NA

ICP Linear Ranges (quarterly)?

YES NO NA

ACTION: If no, contact LPO of the lab.

A.1.9.17.2 ~~Form X (Instrument Detection Limits)~~ - (Note: IIL is not required for Cyanide.)

Are IILs present for: all the analytes?

YES NO NA

all the instruments used?

YES NO NA

For both AA and ICP when both are used for same analyte?

YES NO NA

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

Is IIL greater than CRDL for any analyte?

YES NO NA

If yes, is the concentration on Form I of the sample analyzed on the instrument whose IIL exceeds CRDL, greater than 5 x IIL?

YES NO NA

ACTION: If no, flag as estimated all values less than five times IIL of the instrument whose IIL exceeds CRDL.

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	YES	NO	N/A
<u>A.1.9.17.3 Form XI (Linear Ranges)</u>			
Was any sample result higher than high linear range of ICP.	—	<input checked="" type="checkbox"/>	—
Was any sample result higher than the highest calibration standard for non-ICP parameters?	—	<input checked="" type="checkbox"/>	—
If yes for any of the above, was the sample diluted to obtain the result on Form I?	<input checked="" type="checkbox"/>	—	—
<u>ACTION:</u> 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%?	—	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<u>ACTION:</u> 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#	<u>NWS</u>	Site	<u>Naval Weapons Station</u>	Matrix: Soil	<u> </u>
SO#	<u>CLP 587</u>	Lab	<u>Roy F. Weston</u>	Water	<u>✓</u>
Contractor	<u>Roy F. Weston</u>	Reviewer	<u>Heartland EST</u>	Other	<u> </u>

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. The CRDL standards for Arsenic and lead was below above 150%, All data ^{positive} ~~reje~~ data is rejected. PBH 4/24/92
2. The CRDL standards for Copper and Zinc were above the upper control limit. All positive results are qualifial as estimated.
3. The Matrix Spike Recovery for Silver was below 30%. All data rejected.
4. The Matrix Spike recoverie for Lead and Arsenic were below the lower control limit. All data is qualifial as estimated.

~~PBH 4/24/92~~

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 4/24/92

2.2 Contract-Problems/Non-Compliance

QC appears in a different data package.
Form 1s were not flagged properly.

PBH 4/24/92

MS Reviewer:

Signature

Date:

Contractor Reviewer:

Signature

Date:

Verifier:

Signature

Date:

APPENDIX A.5

SUMMARY OF INORGANICS QUALITY CONTROL DATA

LABORATORY: Roy F. Weston CASE NO. NWS SOW NO. 390 SAMPLE TYPE/SDG: CLP 587

SITE/STUDY DESCRIPTION: Naval Weapons Station SAMPLE NOS: 105-M003, 106-M003, 106-M203

FIELD DUP. #'S: _____ LAB DUP. #'S: 6-M003 Field Blank _____ MATRIX SPIKE #: 6-M003

SERIAL DILUTION SAMPLE NO. 6-M003 COMPLETION DATE: 4/24/92 REVIEWERS INITIALS: PBK

Parameter	Detection Limits		Field Blank	Calib. Ver. XR			CRDL Std Ver. XR		Calibration Blanks			P B R L E A P N	ICP ICS XR		M S t p r i x k	Lab Dup RPD Diff	LCS XR	Ser Dil ID	M e t h			
	UG/L			Continued			Init	Fin	Continued				Init	Fin								
	CRDL	IDL		1	2	3			1	2	3											
Al	200	91	NA																			
As	10	2		99	103	101	102	(211)		U	U	U	U		(35)	22	96		F			
Ba	200	16		98	100	99	99			U	U	U	U	U	85	87	94	58	48	100	P	
Be	5	1																				
Cd	5	2		99	105	103	94	116	103	U	U	U	U	U	98	104	97	0	100	100	P	
Cu	5000	47																				
	10	4		99	104	106	110	112	113	U	U	U	U	U	100	106	102	9.5	99	4.8	P	
Cu	50	11																				
Co	25	6		102	105	104	103	(123)	112	U	U	U	U	U	100	101	91	27	96	100	P	
Fe	100	46		100	105	107	104			U	U	U	U	U	45	101	233	5	100	2.2	P	
Pb	3	2		107	94	94	98	(283)		U	U	U	U	U			(45)	8	97		F	
Mg	5000	29																				
Mn	15	2		100	105	106	106	107	111	U	U	U	U	U	93	95	98	9	100	32	P	
Hg	0.2	0.04		103	103	102	100			U	U	U	U	U			85	1	102		CV	
Ni	40	11																				
K	5000	694																				
Se	5	2		103	100	103	101	90		U	U	U	U	U			102	200	102	100	PF	
Ag	10	3		108	110	100	107	110	108	U	U	U	U	U	100	104	(7.8)	200	4	82	20.5	PP
	5000	110		97	98	97	98			U	U	163	196	U			4	46			P	
Pi	10																					
V	50	8																				
Zn	20	6		100	105	107	104	(139)	(130)	U	U	U	U	U	8	95	101	100	14.1	103	0.7	P

000033

STANDARD OPERATING PROCEDURE

Title: Evaluation of Metals Data for the
Contract Laboratory Program
Appendix A.6: CLP Data Assessment
Summary Form (Inorganics)

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

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: TAL Metals (limited scope) Date: 4/27/90 Case #: NWS
Site: Naval Weapons Station Lab Name: Roy Weston
Reviewer's Initials: PBL Number of Samples: 3

Analytes Rejected Due to Exceeding Review Criteria:*

	Holding Times	Calibration	Prep Blank	Field Blank	Inter-ferences	Spike Recovery	Duplicates Lab/Field	Detection Limits	LCS	Serial Dilution	MSA	Total Analytes	Rejection
	ICP		1				1						2
Flame AA													
Furnace AA		2										2	
Mercury													
Total		3				1						4	
Other													

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

ICP		2										2	
Flame AA													
Furnace AA						2						2	
Mercury													
Total		2				2						4	
Other													

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

000034
000040

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
 LABORATORY Roy F. Weston
 SDG# CLP 587
 SOW# 390
 IFO: ACTION# FYI

SITE Naval Weapons Station
 NO. OF SAMPLES/
 MATRIX 3 waters
 REVIEWER (IF NOT ESD) Haytland EST
 REVIEWER'S NAME Paul B. Humby
 COMPLETION DATE 4/27/92

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	Z		
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: _____

000035
 000041



HEARTLAND ENVIRONMENTAL SERVICES, INC.

P.O. BOX 163 ST. PETERS MO 63376

(314) 278-8232

April 26, 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.

<u>Navy No.</u>	<u>RFW No.</u>
01-M003	911262301
02-M003	911262302
03-M003	911262303
04-M003	911262304
04-M203	911262305
07-M003	911262306
07-M103	911262307

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 Wastewater 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 Form 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

000001

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# 9112623**, 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 Matrix 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.

000002

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
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 12/20/91

CLIENT: NAVAL WEAPONS/COLTSNECK
 WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9112L623

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-001	10-001-M003	BOD 5 Day	1.0	u MG/L	1.0
		Chloride	40.9	MG/L	5.0
		Chemical Oxygen Demand	31.0	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	0.056	MG/L	0.040
		Sulfate	59.7	MG/L	10.0
		Turbidity	228	NTU	0.050
-002	10-002-M003	BOD 5 Day	1.1	MG/L	1.0
		Chloride	5.8	MG/L	5.0
		Chemical Oxygen Demand	10.5	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	0.10	u MG-N/L	0.10
		Phosphate, as P	0.020	u MG/L	0.020
		Sulfate	18.0	MG/L	5.0
		Turbidity	36.6	NTU	0.050
-003	10-003-M003	BOD 5 Day	1.2	MG/L	1.0
		Chloride	8.0	MG/L	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	0.26	MG-N/L	0.10
		Phosphate, as P	0.040	u MG/L	0.040
		Sulfate	18.3	MG/L	5.0
		Turbidity	81.9	NTU	0.050
-004	10-004-M003	BOD 5 Day	3.3	MG/L	1.0
		Chloride	8.8	MG/L	5.0
		Chemical Oxygen Demand	91.5	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	0.10	u MG-N/L	0.10
		Phosphate, as P	0.38	MG/L	0.040
		Sulfate	20.3	MG/L	5.0
		Turbidity	560	NTU	0.050

000004

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 12/20/91

NAVAL WEAPONS/COLTSNECK
ORDER: 1771-15-03-0000

WESTON BATCH #: 9112L623

SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
=====	=====	=====	=====	=====
10-004-M203	BOD 5 Day	1.0	u MG/L	1.0
	Chloride	5.0	u MG/L	5.0
	Chemical Oxygen Demand	14.9	MG/L	5.0 J1
	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	0.020	u MG/L	0.020
	Sulfate	5.0	u MG/L	5.0
	Turbidity	0.070	NTU	0.050
	10-007-M003	BOD 5 Day	1.0	u MG/L
Chloride		6.5	MG/L	5.0
Chemical Oxygen Demand		44.3	MG/L	5.0 J1
Ammonia, as N		0.33	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		0.066	MG/L	0.040
Sulfate		108	MG/L	20.0
Turbidity		132	NTU	0.050
10-007-M103		BOD 5 Day	1.0	u MG/L
	Chloride	6.1	MG/L	5.0
	Chemical Oxygen Demand	79.7	MG/L	10.0 J1
	Ammonia, as N	0.32	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	0.040	u MG/L	0.040
	Sulfate	105	MG/L	20.0
	Turbidity	131	NTU	0.050

HEARTLAND ENVIRONMENTAL
SERVICES, INC.



April 26, 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 no (0) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

<u>Navy No.</u>	<u>RFW No.</u>
05-007-	911260701
05-008-	911260702

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 Wastewater 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 Form 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

000006

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# 9112607, the analysis of two (2) field water samples and no (0) 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.

000007

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
------------------	----------------	-----------	-----------	-------------------------

All Water Samples 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 12/16/91

CLIENT: NAVAL WEAPONS/COLTSNECK
 WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9112L607

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
=====	=====	=====	=====	=====	=====
-001	05-007-M003	BOD 5 Day	1.2	MG/L	1.0
		Chloride	7.0	MG/L	5.0
		Chemical Oxygen Demand	22.2	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	0.27	MG-N/L	0.10
		Phosphate, as P	0.051	MG/L	0.040
		Sulfate	59.9	MG/L	10.0
		Turbidity	398	NTU	0.050
-002	05-008-M003	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	7.7	MG/L	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	0.10 u	MG-N/L	0.10
		Phosphate, as P	0.040u	MG/L	0.040
		Sulfate	13.5	MG/L	5.0
		Turbidity	195	NTU	0.050

HEARTLAND ENVIRONMENTAL
SERVICES, INC.



April 26, 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.

<u>Navy No.</u>	<u>RFW No.</u>
05-M03	911260802

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 Wastewater 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.

000010

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# 9112608, the analysis of one (1) 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 Matrix Spike recovery for Phosphate 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.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
All Water Samples	Phosphate	+ /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 12/17/91

CLIENT: NAVAL WEAPONS/COLTSNECK
WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9112L608

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-002	03-005-M003	BOD 5 Day	3.8	MG/L	1.0
		Chloride	9.1	MG/L	5.0
		Chemical Oxygen Demand	187	MG/L	25.0
		Ammonia, as N	2.6	MG/L	0.10
		Nitrite, as N	0.10	u MG-N/L	0.10
		Nitrate, as N	0.62	MG-N/L	0.10
		Phosphate, as P	0.17	MG/L	0.040
		Sulfate	69.6	MG/L	10.0
		Turbidity	360	NTU	0.050

000013

HEARTLAND ENVIRONMENTAL
SERVICES, INC.



April 26, 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.

<u>Navy No.</u>	<u>RFW No.</u>
01-M03	911262401
02-M03	911262402
03-M03	911262403
04-M03	911262404
05-M03	911262405
06-M03	911262406
06-M13	911262407

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 Wastewater 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.

000014

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# 9112624, 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

No deficiencies in this section.

Matrix Spike Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

000015

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
------------------	----------------	-----------	-----------	-------------------------

All Water Sample data stands as reported without 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 12/31/91

CLIENT: NAVAL WEAPONS/COLTSNECK
 WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9112L624

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-001	05-001-M003	BOD 5 Day	2.9	MG/L	1.0
		Chloride	7.8	MG/L	5.0
		Chemical Oxygen Demand	19.7	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	0.046	MG/L	0.040
		Sulfate	12.6	MG/L	5.0
		Turbidity	443	NTU	0.050
-002	05-002-M003	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	8.0	MG/L	5.0
		Chemical Oxygen Demand	15.3	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	0.10 u	MG-N/L	0.10
		Phosphate, as P	0.040u	MG/L	0.040
		Sulfate	33.3	MG/L	5.0
		Turbidity	418	NTU	0.050
-003	05-003-M003	BOD 5 Day	1.2	MG/L	1.0
		Chloride	8.2	MG/L	5.0
		Chemical Oxygen Demand	19.7	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	0.14	MG-N/L	0.10
		Phosphate, as P	0.040u	MG/L	0.040
		Sulfate	24.5	MG/L	5.0
		Turbidity	177	NTU	0.050
-004	05-004-M003	BOD 5 Day	3.3	MG/L	1.0
		Chloride	7.8	MG/L	5.0
		Chemical Oxygen Demand	22.7	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	0.15	MG/L	0.040
		Sulfate	14.9	MG/L	5.0
		Turbidity	433	NTU	0.050

000017

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 12/31/91

CLIENT: NAVAL WEAPONS/COLTSNECK
 WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9112L624

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-005	05-005-M003	BOD 5 Day	1.7	MG/L	1.0
		Chloride	23.4	MG/L	5.0
		Chemical Oxygen Demand	30.0	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	MG-N/L	0.10
		Phosphate, as P	0.24	MG/L	0.040
		Sulfate	33.8	MG/L	5.0
		Turbidity	470	NTU	0.050
-006	05-006-M003	BOD 5 Day	7.7	MG/L	1.0
		Chloride	43.5	MG/L	5.0
		Chemical Oxygen Demand	40.3	MG/L	5.0
		Ammonia, as N	0.11	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	0.16	MG/L	0.040
		Sulfate	110	MG/L	20.0
		Turbidity	629	NTU	0.050
-007	05-006-M103	BOD 5 Day	6.9	MG/L	1.0
		Chloride	45.7	MG/L	5.0
		Chemical Oxygen Demand	10.9	MG/L	5.0
		Ammonia, as N	0.11	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	0.059	MG/L	0.040
		Sulfate	107	MG/L	20.0
		Turbidity	781	NTU	0.050



April 26, 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 samples and one (1) Matrix Spike and Duplicate pair were analysed by the Roy F. Weston Lionville Laboratory.

<u>Navy No.</u>	<u>RFW No.</u>
01-M003	911150401
02-M003	911150402
03-M003	911150403
04-M103	911150404
04-M003	911150405
04-M203	911150406
05-M003	911150407
06-M003	911150408

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 Wastewater 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.

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# 9112504**, the analysis of eight (8) 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 Matrix Spike recoveries for Phosphate and Nitrate were below the lower control limit. All positive and non-detect results are qualified as estimated, "J" or "UJ".
2. The Matrix Spike recovery for Chloride was 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.

000020

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
All Water Samples	Phosphate and Nitrate.	+/U	J/UJ	1
All water samples	Chloride	+	J	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 12/14/91

CLIENT: NAVAL WEAPONS/COLTSNECK
 WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9111L504

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-001	04-001-M003	BOD 5 Day	1.0	u MG/L	1.0
		Chloride	6.0	MG/L J2	5.0
		Chemical Oxygen Demand	2270	MG/L	500
		Nitrate Nitrite	1.0	u MG-N/L J1	1.0
		Ammonia, as N	0.10	u MG/L	0.10
		Phosphate, as P	0.58	MG/L J1	0.040
		Sulfate	23.2	MG/L	5.0
		Turbidity	242	NTU	0.050
-002	04-002-M003	BOD 5 Day	1.0	u MG/L	1.0
		Chloride	6.9	MG/L J2	5.0
		Chemical Oxygen Demand	50.8	MG/L	5.0
		Nitrate Nitrite	0.33	MG-N/L J1	0.10
		Ammonia, as N	0.39	MG/L	0.10
		Phosphate, as P	0.040u	MG/L J1	0.040
		Sulfate	31.8	MG/L	10.0
		Turbidity	509	NTU	0.050
-003	04-003-M003	BOD 5 Day	9.5	MG/L	1.0
		Chloride	5.0	u MG/L	5.0
		Chemical Oxygen Demand	20.7	MG/L	5.0
		Nitrate Nitrite	0.26	MG-N/L J1	0.10
		Ammonia, as N	0.10	u MG/L	0.10
		Phosphate, as P	0.048	MG/L J1	0.040
		Sulfate	9.9	MG/L	5.0
		Turbidity	250	NTU	0.050
-004	04-002-M103	BOD 5 Day	1.1	MG/L	1.0
		Chloride	7.2	MG/L J2	5.0
		Chemical Oxygen Demand	30.7	MG/L	5.0
		Nitrate Nitrite	0.20	MG-N/L J1	0.10
		Ammonia, as N	0.41	MG/L	0.10
		Phosphate, as P	0.040u	MG/L J1	0.040
		Sulfate	30.9	MG/L	5.0
		Turbidity	463	NTU	0.050

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 12/14/91

CLIENT: NAVAL WEAPONS/COLTSNECK
 WORK ORDER: 1771-15-03-0G00

WESTON BATCH #: 9111L504

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-005	04-004-M003	BOD 5 Day	1.0	u MG/L	1.0
		Chloride	5.0	u MG/L	5.0
		Chemical Oxygen Demand	23.6	MG/L	5.0
		Nitrate Nitrite	0.19	MG-N/L	J1 0.10
		Ammonia, as N	0.10	u MG/L	0.10
		Phosphate, as P	0.12	MG/L	J1 0.040
		Sulfate	11.1	MG/L	5.0
		Turbidity	2550	NTU	0.050
-006	04-004-M203	BOD 5 Day	2.6	MG/L	1.0
		Chloride	5.0	u MG/L	5.0
		Chemical Oxygen Demand	16.4	MG/L	5.0
		Nitrate Nitrite	0.40	MG-N/L	J1 0.10
		Ammonia, as N	0.10	u MG/L	0.10
		Phosphate, as P	0.040	MG/L	J1 0.020
		Sulfate	5.0	u MG/L	5.0
		Turbidity	5.3	NTU	0.050
-007	04-005-M003	BOD 5 Day	1.0	u MG/L	1.0
		Chloride	5.5	MG/L	J2 5.0
		Chemical Oxygen Demand	42.5	MG/L	20.0
		Nitrate Nitrite	0.32	MG-N/L	J1 0.10
		Ammonia, as N	0.10	u MG/L	0.10
		Phosphate, as P	0.63	MG/L	J1 0.040
		Sulfate	13.3	MG/L	5.0
		Turbidity	840	NTU	0.050
-008	04-006-M003	BOD 5 Day	1.0	u MG/L	1.0
		Chloride	5.6	MG/L	J2 5.0
		Chemical Oxygen Demand	13.5	MG/L	5.0
		Nitrate Nitrite	0.29	MG-N/L	J1 0.10
		Ammonia, as N	0.10	u MG/L	0.10
		Phosphate, as P	0.045	MG/L	J1 0.040
		Sulfate	9.9	MG/L	5.0
		Turbidity	0.46	NTU	0.050



April 26, 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.

<u>Navy No.</u>	<u>RFW No.</u>
01-M003	911154401
02-M003	911154402
03-M003	911154403
03-M203	911154404
04-M003	911154405
04-M103	911154406
05-M003	911154407

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 Wastewater 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.

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# 9112544**, 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 Matrix Spike recoveries for Phosphate and Nitrate were 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.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
All Water Samples	Phosphate and Nitrate.	+ /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 12/17/91

CLIENT: NAVAL WEAPONS/COLTSNECK
 WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9111L544

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-001	07-001-M003	BOD 5 Day	8.1	MG/L	1.0
		Chloride	11.8	MG/L	5.0
		Chemical Oxygen Demand	170	MG/L	25.0
		Nitrate Nitrite	0.52	MG-N/L	Jl 0.10
		Ammonia, as N	0.10 u	MG/L	0.10
		Phosphate, as P	0.61	MG/L	Jl 0.067
		Sulfate	10.0	MG/L	5.0
		Turbidity	505	NTU	0.050
-002	07-002-M003	BOD 5 Day	1.2	MG/L	1.0
		Chloride	27.8	MG/L	5.0
		Chemical Oxygen Demand	58.1	MG/L	10.0
		Nitrate Nitrite	2.2	MG-N/L	Jl 0.20
		Ammonia, as N	2.1	MG/L	0.10
		Phosphate, as P	0.21	MG/L	Jl 0.040
		Sulfate	38.7	MG/L	5.0
		Turbidity	1160	NTU	0.050
03	07-003-M003	BOD 5 Day	8.1	MG/L	1.0
		Chloride	9.7	MG/L	5.0
		Chemical Oxygen Demand	103	MG/L	10.0
		Nitrate Nitrite	0.19	MG-N/L	Jl 0.10
		Ammonia, as N	0.13	MG/L	0.10
		Phosphate, as P	1.0	MG/L	Jl 0.080
		Sulfate	33.9	MG/L	5.0
		Turbidity	1160	NTU	0.050
-004	07-003-M203	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	5.0 u	MG/L	5.0
		Chemical Oxygen Demand	12.8	MG/L	10.0
		Nitrate Nitrite	1.9	MG-N/L	Jl 0.20
		Ammonia, as N	0.10 u	MG/L	0.10
		Phosphate, as P	0.058	MG/L	Jl 0.020
		Sulfate	5.0 u	MG/L	5.0
		Turbidity	1.6	NTU	0.050

ROY F. WESTON INC.

INORGANICS DATA SUMMARY REPORT 12/17/91

CLIENT: NAVAL WEAPONS/COLTSNECK
 WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9111L544

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-005	07-004-M003	BOD 5 Day	2.9	MG/L	1.0
		Chloride	14.0	MG/L	5.0
		Chemical Oxygen Demand	59.5	MG/L	10.0
		Nitrate Nitrite	0.32	MG-N/L	JL 0.10
		Ammonia, as N	0.10 u	MG/L	0.10
		Phosphate, as P	0.12	MG/L	JL 0.040
		Sulfate	21.4	MG/L	5.0
		Turbidity	1130	NTU	0.050
-006	07-004-M103	BOD 5 Day	2.9	MG/L	1.0
		Chloride	13.8	MG/L	5.0
		Chemical Oxygen Demand	70.9	MG/L	10.0
		Nitrate Nitrite	0.27	MG-N/L	JL 0.10
		Ammonia, as N	0.10 u	MG/L	0.10
		Phosphate, as P	0.12	MG/L	JL 0.040
		Sulfate	22.2	MG/L	5.0
		Turbidity	1110	NTU	0.050
007	07-005-M003	BOD 5 Day	2.9	MG/L	1.0
		Chloride	26.7	MG/L	5.0
		Chemical Oxygen Demand	170	MG/L	25.0
		Nitrate Nitrite	0.27	MG-N/L	JL 0.10
		Ammonia, as N	0.10 u	MG/L	0.10
		Phosphate, as P	0.44	MG/L	JL 0.040
		Sulfate	44.0	MG/L	10.0
		Turbidity	455	NTU	0.050

HEARTLAND ENVIRONMENTAL
SERVICES, INC.



April 26, 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.

<u>Navy No.</u>	<u>RFW No.</u>
06-M003	911258101
06-M203	911258102

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 Wastewater 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 Form 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

000029

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# 9112581, 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.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
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All water data stands as reported without 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 12/17/91

CLIENT: NAVAL WEAPONS/COLTSNECK
 WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9112L581

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-001	03-006-M003	BOD 5 Day	1.0	u MG/L	1.0
		Chloride	5.7	MG/L	5.0
		Chemical Oxygen Demand	87.9	MG/L	20.0
		Ammonia, as N	0.10	u MG/L	0.10
		Nitrite, as N	0.10	u MG-N/L	0.10
		Nitrate, as N	0.52	MG-N/L	0.10
		Phosphate, as P	0.19	MG/L	0.040
		Sulfate	14.6	MG/L	5.0
		Turbidity	7.4	NTU	0.050
-002	03-006-M203	BOD 5 Day	1.0	u MG/L	1.0
		Chloride	5.0	u MG/L	5.0
		Chemical Oxygen Demand	11.3	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	0.10	u MG-N/L	0.10
		Phosphate, as P	0.020	u MG/L	0.020
		Sulfate	5.0	u MG/L	5.0
		Turbidity	0.070	NTU	0.050

HEARTLAND ENVIRONMENTAL
SERVICES, INC.



April 26, 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.

<u>Navy No.</u>	<u>RFW No.</u>
05-M003	911258701
06-M003	911258702
06-M203	911258703

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 Wastewater 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 Form 1s and the detailed data validation report for additional information. Specific comments are provided on the following pages.

000033

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# 9112587, 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

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.

SUMMARY OF DATA QUALIFICATIONS

<u>SAMPLE ID</u>	<u>ANALYTE</u>	<u>DL</u>	<u>QL</u>	<u>SPECIFIC FINDING</u>
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All water data stands as reported without 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 12/19/91

CLIENT: NAVAL WEAPONS/COLTSNECK
 WORK ORDER: 1771-15-03-0000

WESTON BATCH #: 9112L587

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
=====	=====	=====	=====	=====	=====
-001	10-005-M003	BOD 5 Day	3.6	MG/L	1.0
		Chloride	9.1	MG/L	5.0
		Chemical Oxygen Demand	56.0	MG/L	5.0
		Ammonia, as N	0.38	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	0.30	MG/L	0.040
		Sulfate	5.0 u	MG/L	5.0
		Turbidity	427	NTU	0.050
-002	10-006-M003	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	12.4	MG/L	5.0
		Chemical Oxygen Demand	51.6	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	1.6	MG-N/L	0.10
		Phosphate, as P	0.044	MG/L	0.040
		Sulfate	36.8	MG/L	5.0
		Turbidity	32.2	NTU	0.050
-003	10-006-M203	BOD 5 Day	1.0 u	MG/L	1.0
		Chloride	5.0 u	MG/L	5.0
		Chemical Oxygen Demand	7.5	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	0.10 u	MG-N/L	0.10
		Phosphate, as P	0.020u	MG/L	0.020
		Sulfate	5.0 u	MG/L	5.0
		Turbidity	0.11	NTU	0.050