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PPS46-PNL-009

0046405

200-BP-1
GROUNDWATER ANALYSIS PROJECT

PROJECT READINESS STANDARDS DATA PACKAGE

Revision 0

JAN 1997
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EDMC

November 12, 1990

Prepared by: B.M. Gillespie

Pacific Northwest Laboratory

(PNL Project #16772)

5-29-96
MC

INTRODUCTION

This data package contains the results obtained by Pacific Northwest Laboratory (PNL) staff in the characterization of standards for the assessment of project readiness for the 200-BP-1 Groundwater Analysis Project. The samples were submitted for analysis by Westinghouse Hanford Company (WHC) Environmental Quality Assurance (EQA) Department under the Draft Technical Project Plan (TPP) 17662 and the Draft Quality Assurance Project Plan (QAPjP) ALO-001. The analytical procedures required for analysis were defined in the Test Instructions (TI) prepared by the PNL 200-BP-1 Project Management Office in accordance with the Draft QAPjP ALO-001. This data report contains no technical assessment of the analytical results.

The two standards were submitted (Table 1) without the appropriate WHC Chain of Custody (COC) and Sample Analysis Request Forms. The samples were delivered at room temperature to 329TRL5. The WHC SOW, PNL TPP 16772 and the QAPjP ALO-001 require samples to arrive under refrigerated conditions with a WHC COC and Sample Analysis Request. The samples were taken to Building 3720 for analysis.

The requested analysis for these samples were selenium analysis for one sample and cyanide analysis for the other sample. There were no further requests for analysis of the other parameters of interest addressed in the QAPjP ALO-001. The quality control (QC) requirements for each sample are defined in the test instructions for each sample. The QC requirements outlined in the EPA CLP-SOW (No. 788) and requested in the WHC SOW were followed. Sample duplicates, methods blank and matrix spikes were analyzed. All QC data are include in this Data Package/Report.

The data in this package are reported in two tables: a selenium analysis data table and a cyanide analysis data table. The chemical analysis data are reported on a per received basis. That is, no corrections were made for the weight percent water in the samples. Three appendices are provided; one for Test Instruction, one for Chain of Custody and Sample Analysis Request Forms and one that contains the primary analytical data.

CERTIFICATION STATEMENT

I certify that this data package is in compliance with the terms and conditions of the TPP 16772, for completeness, for other than the conditions detailed herein. Release of the data contained in this hard-copy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Project Manager or the Project Manager's designee, as verified by the following signature.

B. M. Gillespie — 11-12-90

B. M. Gillespie
200-BP-1 Project Manager

Date

Quality Control

I certify that I have reviewed all data in this report/package for completeness of the QC data and for compliance with project QC requirements as defined in the TPP 16772 and the QAPjP ALO-001.

J. L. Daniel — 11/12/90

J. L. Daniel
PNL ACL Quality Representative

Date

Table 1: 200-BP-1 Sample Numbers

WHC Sample Number	PNL ALO Sample Number
Sample 1 (PPS-46)	90-6137
Sample 2 (PP/CLP Inorg in Soil)	90-6138

SELENIUM ANALYSIS RESULTS

The sample and its accompanying QC samples were prepared by procedure PNL-ALO-101, Acid Digestion for Metal Analysis. The methodology is consistent with CLP Inorganic acid digestion for metals. The sample solution was then analyzed by Graphite Furnace Atomic Absorption Analysis (GFAA) according to procedure PNL-ALO-215, Selenium (Atomic Absorption, Furnace Method). The methodology is comparable to CLP SOW 788 Method 270.2. A primary analysis of the sample was performed to determine the dilution factor necessary to bring the concentration of the samples to mid-range of the calibration curve. The sample, sample duplicate and matrix spikes required a 16x dilution: thus the spike was diluted to less than 1ppb and was not quantifiable. For a check analysis, the sample was analyzed by a different method to verify the concentration of selenium in the sample. The results was 92.1 mg/Kg selenium by Inductively Coupled Plasma - Atomic Emission Spectrometry, thus verifying the GFAA selenium results.

Since only one sample was analyzed in duplicate, the precision obtained from duplicate analyses for this sample is the standard deviation, 4.24 mg/Kg, and the relative standard deviation (RSD) is 4.24%. Control charts are in the process of being compiled with the results of blanks, standards and duplicates of sample analyses as the project proceeds. These are not in place yet to ascertain precision and accuracy of the method on these matrices.

The quarterly detection limit found for the Perkin Elmer 5000 GFAA instrument used for the selenium analysis in this report was found to be 1.5 μg/L. This detection limit determination was performed to CLP protocol.

The CLP SOW (No. 788) hold time was met. The defined hold time for metals is 180 days.

Table 2: Selenium Analysis

Customer ID: "1" CRM Priority PollutnT/CLP Soil
Inorganic Trace Metals, Lot 207
Lab Sample #: 90-6137

		Sample Results mg/Kg	P.D. Spike %Rec	(c) Spike Sample Results(ug/L)	Sample Results(ug/L)	Analytical Post Dig. %Rec
90-6137-B-1	Sample	103		42.0	25.5	107
90-6137-B-2	Duplicate	97		40.3	23.9	106
90-6137-B-3	Sample+ P.D.Spike	101	(a)	18.4	0.1	113
90-6137-B-5	Blank (b)	<0.5				

Notes:
(a) A (P)re(D)igestion Spike equal to 10 ug/L in the final digestion volume was added to B-3 and B-4. The B-3 results of 101 mg/Kg required a 16x dilution to maintain results within the calibration range; thus the spike was diluted to less that 1ppb and was not quantifiable.
(b) The average sample weights of B-1 and B-2 are used to calculate the blank in mg/Kg. The final digestate dilution concentration was less than 2 ug/L.
(c) The Post Digestion Analytical Spikes were 15.4 ug/L.

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CYANIDE ANALYSIS RESULTS

The sample and its accompanying QC samples were prepared by procedure PNL-ALO-270, Total Cyanide in Waters, Solids or Sludges. The methodology is comparable to CLP SOW 788 Method 335.2 distillation and colorimetric technique for the analysis of cyanide. By mistake, a spiked blank was analyzed instead of a matrix spike duplicate. A matrix spike duplicate will be included in subsequent batch analyses. There are two problems that needed to be addressed. 1) The spiked blank was at the 250 μg level rather than at the PNL-ALO-270 protocol level of 100 μg. The recovery was 98.55%. 2) The blank was turbid which resulted in a false positive absorbance at 578 nm. The absorber frit is being ultrasonically cleaned to prevent the recurrence of this problem.

Since only one sample was analyzed in duplicate, the precision obtained from duplicate analyses for this sample is the standard deviation, 4.10 mg/Kg, and the relative standard deviation (RSD) is 11.0%. Control charts are in the process of being compiled with the results of blanks, standards and duplicates of sample analyses as the project proceeds. These are not in place yet to ascertain precision and accuracy of the method on these matrices. The method detection limit was determined by CLP protocol to be 1 μg/L.

The sample was received on September 11, 1990 and was analyzed on September 20, 1990. The CLP SOW (No. 788) hold time was met. The defined hold time for cyanide is 12 days.

Table 2: Cyanide Analysis

Customer ID: 2" CRM Priority PollutnT/CLP Soil
Inorganic Trace Metals, Lot 207
Lab Sample #: 90-6138

Sample Receipt Date: 9/11/90
Sample Analysis Date: 9/20/90

		Sample Wt (g)	Sample Results mg/Kg	Spike (ug)	Spike Sample Results(ug)	Sample Results(ug)	%Rec
90-6138-G-1	Sample		40.2				
90-6138-G-2	Duplicate		34.4				
90-6138-G-3	Sample+ Spike	10.01	58.5	250	586.07	207.84	83.1
90-6138-G-5	Blank (a)		0.1				
			mg/Kg				
90-6138-G-4	LCS (0689) (b)	1.48	4.97			7.38	88.5
			ug				
90-6138-G-6	Blank+ Spike		246.4	250			98.6

Notes:
(a) The average sample weights of B-1 and B-2 are used to calculate the blank in mg/Kg.
(b) True Value for EPA-ICF CN(0689), CN = 5.62 mg/Kg.

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This analyses plan modified 9/11/90 in agreement with a discussion , P Salter-RW Perusse on 9/10/90

Laboratory Analyses Of Sample ERA Lot 207 Report mg/kg

Sample 1

Use method 3050, SW-846 & method 7471, SW-846
(per Pat Salter Selenium only, using PNL procedures)

Selenium

Sample 2

Use method 9010 or 9012, SW-846
or equivalent

(modification, 10 grams of sample into appropriate aliquot of water in the distillation flask (step 7.2.1)

Cyanide

Received by B.N. Bilbrey
9-11-90
at 9:30 am

9713524.0035

SAMPLE RECEIPT FORM

Delivered by:_____ Date/Time: 9/12/90 8:45

Received by: JAMES ROBBINS FROM PAT SOULTER

Customer Sample Number(s): PPS-4.6 PP/CLP INORG IN SOIL (#1 and #2)

ALO Sample Number(s): 90-6137 + 90-6138

1. Customer Chain-of-Custody Form: Present_____ Absent ✓

2. Additional Shipping Forms (list): Attached

3. Custody Seals on Shipping and/or Sample Containers and their Conditions.

   Present_____ Absent ✓

   If Present, Condition:_____

4. Sample Tag(s) ID Numbers if not Recorded on the Chain-of-Custody Record or on Sample Vial.

   Notes: CLIENT SAMPLE I.D. NOT IDENTIFIED ON VIAL AS THESE ARE OUTSIDE STANDARDS

5. Condition of Shipping Container (Verify that ice still exists such that samples are at refrigerated temperature).

   DRY SAMPLES AT ROOM TEMPERATURE (UNSATISFACTORY)

6. Condition of Sample Vials.

   O.K.

7. Verification of Agreement or Nonagreement of Information on Receiving Documents.

8. Resolution of Problems or Discrepancies.

RETURN COMPLETED FORM TO PROJECT MANAGER

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In accordance with PNL-ALO-010, Rev. 2, no internal PNL Chain-of-Custody was required for these samples.

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SAIC

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1100-PKB.92
October 2, 1992

RECEIVED
OCT 09 1992
CORRESPONDENCE CONTROL

Mr. Mark A. Buckmaster
Westinghouse Hanford Company
P.O. Box 1970, MSIN H4-55
Richland, WA 99352

Subject: Deliverable for 200-BP-1 Data Validation, Task Order S-92-19 Rev. D, WHC Contract No. MLW-SVV-073750

Dear Mr. Buckmaster:

Enclosed is the subject deliverable required by the referenced SAIC Task Order and WHC contract. Included in this deliverable, please find a copy of the Data Validation Summary Report for Data Package PPS-46. This deliverable was prepared by Golder Associates with support from Ken Ridgway of SAIC under the direction of Kent M. Angelos.

Should you have any questions, please do not hesitate to contact the following: Mr. Kent Angelos of Golder Associates at (206) 883-0777, Michael Hoxie or myself at (509) 943-3133.

Sincerely yours,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

for

P. K. Brockman
Program Manager

PKB/mkc

Enclosures

cc w/encl:
B. Bechtold, WHC
LB/Task S-92-19 Deliv File

cc w/o encl:
R. Henckel, WHC
D. Martin, Albq
D. Wilson, Whc

cc: w/encl (including original data package):
D. Leech, WHC

1845 Terminal Drive, Suite 202, Richland, Washington 99352 (509) 943-3133
Other SAIC Offices: Albuquerque, Boston, Colorado Springs, Dayton, Huntsville, Las Vegas, Los Angeles, McLean, Oak Ridge, Orlando, Palo Alto, San Diego, Seattle, and Tucson

9213524.0038

Report To

Westinghouse Hanford Company
Richland, Washington

Data Validation Report
200-BP-1 RI/FS
Laboratory: Pacific Northwest Laboratory
Data Package: PPS-46
Sample Matrix: Soil
Analysis Type: Inorganics/Cyanide

Prepared By

Golder Associates Inc.
Redmond, Washington

September 30, 1992

913-1719

9713524.0039

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APPENDIX A As-Qualified Data Summary
APPENDIX B Data Review Supporting Documentation, SDG PPS-46

1. INTRODUCTION

This report presents the results of data validation on the following sample delivery group and sample numbers which were analyzed by the Pacific Northwest Laboratory - Richland, WA laboratory. The HEIS sample numbers associated with this group by SDG are listed below:

Data Package ID	HEIS Sample Numbers	Matrix
SDG: PPS-46	PPS-46, PP/CLP	Soil

Sample identificaions, locations and sample dates are provided in the tabular data summary provided in Attachment 3. Data validation was conducted in accordance with the Westinghouse Hanford Company statement of work (WHC 1991) and validation procedures (WHC 1992).

2. DATA QUALITY OBJECTIVES

Completeness

The data package was complete for all requested analyses and met the data quality objectives of the work plan with the exception of the chain of custody which was missing. Data quality objectives for the project specified the use of CLP methods for the TAL metals/cyanide analytes and the use of standard methods for all other parameters.

Sample Quantitation Limits

Sample quantitation limits were met with the exception of minor differences due to dilution factors.

3. QUALIFIED DATA

This section presents a summary of the qualifications required based on validation of the subject data package.

3.1 Major Deficiencies

The following presents a summary of the rejected data.

Inorganics

No deficiencies were identified requiring rejection of data.

Cyanide

No deficiencies were identified requiring rejection of data.

3.2 Minor Deficiencies

The following qualifications were required as a result of the validation. Attachment 2 provides a summary of the samples affected.

3.2.1 Metals

No deficiencies were identified requiring qualification.

3.2.2 Wet Chemistry

Holding Times

- No chain of custody was provided with the data packet, therefore the sampling date is unknown. As a conservative measure cyanide results have been qualified as estimated (J)

4. CONCLUSION

Sections 1 through 3 present a summary of the data quality for the subject data package. The results contained in this report are acceptable for use.

The appendices provide supporting documentation and a tabular summary of the qualified data. The original, as-recieved data package is enclosed for submittal to the project QA record.

5. REFERENCES

WHC, 1991, Westinghouse Hanford Company, Validation of 200-BP-1 Data, Statement of Work, Revision A, November 1991. Westinghouse Hanford Company, Richland, Washington.

WHC, 1992, Data Validation Procedures for Chemical Analyses, Westinghouse Hanford Company, Richland, Washington.

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APPENDIX A

AS QUALIFIED DATA SUMMARY

Laboratory Martin Marietta	SDG	PPS-46			
Sample Number		PPS-46		PP/CLP	
Remarks		total		total	
Sample Date		4-1-91		4-1-91	
Inorganic Analytes	CRQL	Result	Q	Result	Q
Aluminum	40	NR		NR	
Antimony	12	NR		NR	
Arsenic	2	NR		NR	
Barium	40	NR		NR	
Beryllium	1	NR		NR	
Cadmium	1	NR		NR	
Calcium	1000	NR		NR	
Chromium	2	NR		NR	
Cobalt	10	NR		NR	
Copper	5	NR		NR	
Iron	20	NR		NR	
Lead	1	NR		NR	
Magnesium	1000	NR		NR	
Manganese	3	NR		NR	
Mercury	0.04	NR		NR	
Nickel	8	NR		NR	
Potassium	1000	NR		NR	
Selenium	1	103.24		NR	
Silver	2	NR		NR	
Sodium	1000	NR		NR	
Thallium	2	NR		NR	
Vanadium	10	NR		NR	
Zinc	4	NR		NR	
Cyanide	5	NR		40.18	J
Bismuth	10	NR		NR	
Nitrate by IC	4	NR		NR	
Phosphate by IC	4	NR		NR	
Sulfate by IC	4	NR		NR	

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APPENDIX B

DATA REVIEW SUPPORTING DOCUMENTATION

SDG: PPS-46

Samples: PPS-46, PP/CLP

CONTAINS:

ATTACHMENT 1 - GLOSSARY OF DATA REPORTING QUALIFIERS
ATTACHMENT 2 - SUMMARY OF DATA QUALIFICATIONS
ATTACHMENT 3 - AS QUALIFIED LABORATORY DATA
ATTACHMENT 4 - DATA VALIDATION SUPPORTING DOCUMENTATION

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

B- Indicates tha compound or analyte was analyzed for and detected. The value reported is less than the CRQL but greater than the IDL.

U- Indicates the compound or analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory. The data are usable for decision making purposes.

UJ- Indicates the compound or analyte was analyzed for and not detected. Due to an identified quality control deficiency identified during data validation the value reported may not accurately reflect the sample quantitation limit. The data are usable for decision making purposes.

J- Indicates the compound or analyte was analyzed for and detected. The associated value is estimated but the data are usable for decision making processes.

R- Indicates the compound or analyte was analyzed for and due to an identified quality control deficiency the data are unusable.

NJ- Indicates presumptive evidence of a compound at an estimated value.

N- Indicates presumptive evidence of a compound.

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: PPS-46	REVIEWER: S Schlicht	DATE: 9-25-92	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
CN	J	PP/CLP	No chain of custody to verify holding time

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ATTACHMENT 3

AS QUALIFIED LABORATORY DATA

Cyanide concentration in sample # 90-6138

PP/CLP

Sample #	90-6138-G1	90-6138-G2
Cyanide absorbance @578 nm.	0.475	0.406
Regression equation (conc. vs. abs.)	y = -2.62 + 351.37*(x)	y = -2.62 + 351.37*(x)
liquid dilution factor	2.50	2.50
Total cyanide recovered (µg)	410.70	350.09
percent solids of sediments	98.64	98.64
sample wt. (g.)	10.084	10.054
cyanide concentration in solid (mg/Kg)	**40.18** J	**34.35**

Cyanide spike recovery

Sample #	90-6138-G3	90-6138-G6
Cyanide absorbance @578 nm.	0.667	0.286
Regression equation (conc. vs. abs.)	y = -3.45 + 356.64*(x)	y = -2.62 + 351.37*(x)
liquid dilution factor	2.5	2.5
Total cyanide recovered (µg)	586.07	246.37
percent solids of sediments	98.64	N/A
sample wt. (g.)	10.013	N/A
cyanide spike added (µg)	250.00	250.00
Average cyanide conc. in solid (mg/Kg)	37.26	N/A
Sample recovery - spike (µg)	207.84	N/A
Cyanide spike recovery (%)	**83.14**	**98.55**

Laboratory control sample (LCS 0689) recovery

Sample #	90-6138-G4
Cyanide absorbance @578 nm.	0.05
Regression equation (conc. vs. abs.)	y = -3.05 + 356.02*(x)
liquid dilution factor	0.5
Total cyanide recovered (µg)	7.38
percent solids of sediments	100.00
sample wt. (g.)	1.483
cyanide concentration in solid (mg/Kg)	4.97
Consensus cyanide Conc. in LCS 0689	5.62
Cyanide recovery (%)	**88.51**

Cyanide concentration in procedural blank

James M. Robbins
10/21/90
LRB# 53932
PAGE# 27

Sample #	90-6138-G5
Cyanide absorbance @578 nm.	0.014
Regression equation (conc. vs. abs.)	y = -3.05 + 356.02*(x)
liquid dilution factor	0.5
Total cyanide recovered (µg)*	**0.97**

*blank was turbid due to exfoliation of precipitates from glass frit of absorber.

9.25.90

7

CLP/90-6137 SAMPLES WHC/ECOBPI FINAL ANALYTICAL RESULTS:

C3-7

FINAL ANALYSIS RESULTS

sample identification number	A analytical concentration (mg/L)	B analytical dilution factor	C post digestion dil(mL)	D dry wt of sample (g)	E element concentration (mg/Kg)	comments
(SA1) PPS-46 90-6137-B-1	0.0255	16	250	0.9880	103.239	J
(SA1D) 90-6137-B-2	0.0239	16	250	0.9898	96.585	
(SA1SPK) 90-6137-B-3	0.0249	16	250	0.9896	100.647	
(SA1BSPK) 90-6137-B-4	0.0018	1	250	NONE	0.450 µg/L	
(SA1B) 90-6137-B-5	0.0010	1	250	NONE	0.250 µg/L	

calculation formula: A×B×C÷D=E

09/20/90

LRB# 53933
PAG: # 7

9-29-9

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ATTACHMENT 4

DATA VALIDATION SUPPORTING DOCUMENTATION

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: 200-BP-1	REVIEWER: S. Schilde	DATE: 9-24-92
LABORATORY: PNL	CASE: —	SDG: PPS-46
SAMPLES/MATRIX: PPS-46, PP/CLP / soil		

1. COMPLETENESS AND CONTRACT COMPLIANCE

Review the data package for completeness and check off the items below. If any data review elements are missing contact the laboratory for submittal of the omitted data.

Data Package Item	Present?: Yes	No	N/A
Case Narrative	✓	—	—
Cover Page	✓	—	—
Traffic Reports	—	✓	—
Sample Data			
Inorganic Analysis Data Sheets	✓	—	—
Standards Data			
Initial and Continuing Calibration Verification	✓	—	—
CRDL Standard for AA and ICP	✓	—	—
QC Summary			
Blanks	✓	—	—
ICP Interference Check Summary	—	✗	✓
Spike Sample Recovery	✓	—	—
Post-Digestion Spike Sample Recovery	✓	—	✓
Duplicate	✓	—	—
Laboratory Control Sample	✓	—	—
Standard Addition Results	—	—	✓
ICP Serial Dilutions	—	—	✓
Instrument Detection Limits	✓	—	—
ICP Interelement Correction Factors	—	—	✓
ICP Linear Ranges	—	—	✓
Preparation Log	✓	—	—
Analysis Run Log	—	✓	—
Raw Data			
ICP Raw Data	—	—	✓
Furnace AA Raw Data	✓	—	—
Mercury Raw Data	—	—	✓
Cyanide Raw Data	✓	—	—
Additional Data			
Internal laboratory chain-of-custody	—	—	✓
Laboratory Sample Preparation Records	✓	—	—

Data Package Item	Present?: Yes	No	N/A
Percent Solids Analysis Records	✓		
Reduction Formulae	✓		
Instrument Run Logs	✓		
Chemist Notebook Pages	✓		

2. HOLDING TIMES

Have all samples been analyzed within holding times? Yes No N/A

ACTION: If any holding times have been exceeded qualify all affected results as estimated (J for detects and UJ for nondetects).

3. INITIAL CALIBRATIONS

Were all instruments calibrated daily, each set-up time and were the proper number of standards used? Yes No N/A

Are the correlation coefficients ≥0.995? Yes No N/A

Was a midrange cyanide standard distilled? Yes No N/A

ACTION: Qualify all data as unusable if reported from an analysis in which an instrument was not calibrated or was calibrated with less than the minimum number of standards. Qualify associated sample results >IDL as estimated (J) and results <IDL as estimated (UJ), if the correlation coefficient is <0.995 or the laboratory did not distill the midrange cyanide standard.

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION

Are ICV and CCV percent recoveries within control? Yes No N/A

Are there calculation errors? Yes No N/A

ACTION: Qualify all affected data in accordance with Section 8.3 of the validation requirements. If calculation errors are noted, contact the laboratory for clarification.

5. ICP INTERFERENCE CHECK SAMPLE

Has an ICS sample been analyzed at the proper frequency? Yes No N/A

Are the AB solution %R values within control? Yes No N/A

Are there calculation errors? Yes No N/A

ACTION: Qualify all affected data in accordance with Section 8.3 of the validation requirements. If calculation errors are noted, contact the laboratory for clarification.

6. LABORATORY BLANKS

Are target analytes present in the laboratory blanks? Yes (No) N/A

ACTION: Qualify all associated sample results for any analyte <5 times the amount in any laboratory blank as nondetected (U). If analyte concentrations in the blank are >CRDL or below the negative CRDL, verify the laboratory has redigested and reanalyzed associated samples with analyte concentrations <10 times the blank concentration. If the laboratory has not redigested and reanalyzed the samples, note in the validation narrative.

7. FIELD BLANKS

Are target analytes present in the field blanks? Yes No (N/A)

ACTION: Qualify all sample results for any analyte <5 times the amount in any valid field blank as nondetected (U).

8. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the control limits? (Yes) No N/A

ACTION: Qualify the affected sample data according to the following requirements:

If spike recovery is >125% and sample results are <IDL no qualification is required. If spike recovery is >125% or <75% qualify all positive results as estimated (J). If spike recovery is 30% to 74% qualify all nondetects as estimated (UJ). If spike recovery is <30%, reject all nondetects (R). If the field blank has been used for spike analysis, note in the validation narrative.

9. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits? (Yes) No N/A

Are there calculation errors? Yes (No) N/A

ACTION: Qualify the sample data according to the following requirements:

AQUEOUS LCS - Qualify as estimated (J), all sample results >IDL, for which the LCS %R falls within the range 50-79% or >120%. Qualify as estimated (UJ), all sample results <IDL, for which the LCS falls within the range of 50-79%. Qualify as unusable (R) all sample results, for which the LCS %R <50%.

SOLID LCS - Qualify as estimated (J), all sample results >IDL for which the LCS result is outside the established control limits. Qualify as estimated (UJ), all sample results <IDL for which the LCS %R are lower than the established control limits.

10. PERFORMANCE AUDIT ANALYSES

Are the performance audit sample results within the acceptance limits? Yes No N/A

ACTION: Note the results of the performance audit sample analyses in the data validation narrative.

11. DUPLICATE SAMPLE ANALYSIS

Are RPD values acceptable? Yes No N/A

ACTION: Qualify the results for all associated samples of the same matrix as estimated (J) if the RPD results fall outside the appropriate control limits. If field blanks were used for laboratory duplicates, note in the validation narrative.

12. ICP SERIAL DILUTION

Are the serial dilution results acceptable? Yes No N/A

Is there evidence of negative interference? Yes No N/A

ACTION: Qualify the associated data as estimated (J) for those analytes in which the %D is outside the control limits. If evidence of negative interference is found, use professional judgment to qualify the data.

13. FIELD DUPLICATE SAMPLES

Do the RPD values exceed the control limits? Yes No N/A

ACTION: Note the results of the field duplicate samples in the validation narrative.

14. FIELD SPLIT SAMPLES

Do the RPD values exceed the control limits? Yes No N/A

ACTION: Note the results of the field split samples in the validation narrative.

1516. FURNACE ATOMIC ABSORPTION QUALITY CONTROL

Do all applicable analyses have duplicate injections? Yes No N/A

Are applicable duplicate injection RSD values within control? Yes No N/A

If no, were samples rerun once as required? Yes No N/A

Does the RSD for the rerun fall within the control limits? Yes No N/A

Were analytical spike recoveries within the control limits? Yes No N/A

If no, were MSA analyses performed when required?	Yes	No	N/A
Are MSA correlation coefficients ≥0.995?	Yes	No	N/A
If no, was a second MSA analysis performed?	Yes	No	N/A

ACTION: If duplicate injections are outside the acceptance limits and the sample has not been reanalyzed or the reanalysis is outside the acceptance limits, qualify the associated data as estimated (J for detects and UJ for nondetects). If the analytical spike recovery is <40% qualify detects as estimated (J). If the analytical spike recovery is ≥10% but <40%, qualify all nondetects as estimated (UJ) and if the analytical spike recovery is <10%, reject all nondetects (R). If the sample absorbance is <50% of the analytical spike absorbance and the analytical spike recovery is <85% or >115%, qualify all results as estimated (J for detects and UJ for nondetects). If method of standard additions (MSA) was required but was not performed, the MSA samples were spiked incorrectly, or the MSA correllation coefficient was <0.995, qualify the associated detected results as estimated (J).

17. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly?	Yes	No	N/A
Are results within the calibrated range of the instruments and within the linear range of the ICP?	Yes	No	N/A
Are all detection limits below the CRQL?	Yes	No	N/A

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

18. OVERALL ASSESSMENT AND SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW?	Yes	No	N/A
Were project specific data quality objectives met for this analysis?	Yes	No	N/A

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

COMMENTS (attach additional sheets as necessary):

1. No WHC chain of custody, ∴ no sample date.
2. No RSD reported for GFAA analysis.

HOLDING TIME SUMMARY - FORM B-1

SDG: PPS46	REVIEWER: S. Schlicht	DATE: 9-24-90	PAGE 1 OF 1
COMMENTS: Se / CN			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
PPS-46	Se	NA	9-20-90	9-20-90	NA	NA	J
PP/CLP inorg in soil	CN	NA	9-20-90	9-20-90	NA	NA	J

NA - not available, samples received 9-11-90

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APPENDIX B

DATA REVIEW SUPPORTING DOCUMENTATION

SDG: PPS-46

Samples: PPS-46, PP/CLP

CONTAINS:

ATTACHMENT 1 - GLOSSARY OF DATA REPORTING QUALIFIERS
ATTACHMENT 2 - SUMMARY OF DATA QUALIFICATIONS
ATTACHMENT 3 - AS QUALIFIED LABORATORY DATA
ATTACHMENT 4 - DATA VALIDATION SUPPORTING DOCUMENTATION

9713524.0060

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

B- Indicates tha compound or analyte was analyzed for and detected. The value reported is less than the CRQL but greater than the IDL.

U- Indicates the compound or analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory. The data are usable for decision making purposes.

UJ- Indicates the compound or analyte was analyzed for and not detected. Due to an identified quality control deficiency identified during data validation the value reported may not accurately reflect the sample quantitation limit. The data are usable for decision making purposes.

J- Indicates the compound or analyte was analyzed for and detected. The associated value is estimated but the data are usable for decision making processes.

R- Indicates the compound or analyte was analyzed for and due to an identified quality control deficiency the data are unusable.

NJ- Indicates presumptive evidence of a compound at an estimated value.

N- Indicates presumptive evidence of a compound.

9713524.0061

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: PPS-46	REVIEWER: S Schubert	DATE: 9-25-92	PAGE 1 OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
CN	J	PP/CLP	No chain of custody to verify holding time

9713524.0063

ATTACHMENT 3

AS QUALIFIED LABORATORY DATA

Cyanide concentration in sample # 90-6138

PP/CLP

Sample #	90-6138-G1	90-6138-G2
Cyanide absorbance @578 nm.	0.475	0.406
Regression equation (conc. vs. abs.)	y = -2.62 + 351.37*(x)	y = -2.62 + 351.37*(x)
liquid dilution factor	2.50	2.50
Total cyanide recovered (µg)	410.70	350.09
percent solids of sediments	98.64	98.64
sample wt. (g.)	10.084	10.054
cyanide concentration in solid (mg/Kg)	**40.18** J	**34.36**

Cyanide spike recovery

Sample #	90-6138-G3	90-6138-G6
Cyanide absorbance @578 nm.	0.667	0.286
Regression equation (conc. vs. abs.)	y = -3.45 + 356.64*(x)	y = -2.62 + 351.37*(x)
liquid dilution factor	2.5	2.5
Total cyanide recovered (µg)	586.07	246.37
percent solids of sediments	98.64	N/A
sample wt. (g.)	10.013	N/A
cyanide spike added (µg)	250.00	250.00
Average cyanide conc. in solid (mg/Kg)	37.26	N/A
Sample recovery - spike (µg)	207.84	N/A
Cyanide spike recovery (%)	**83.14**	**98.55**

Laboratory control sample (LCS 0689) recovery

Sample #	90-6138-G4
Cyanide absorbance @578 nm.	0.05
Regression equation (conc. vs. abs.)	y = -3.05 + 356.02*(x)
liquid dilution factor	0.5
Total cyanide recovered (µg)	7.38
percent solids of sediments	100.00
sample wt. (g.)	1.483
cyanide concentration in solid (mg/Kg)	4.97
Consensus cyanide Conc. in LCS 0689	5.62
Cyanide recovery (%)	**88.51**

Cyanide concentration in procedural blank

James M. Robin
10/21/90
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Sample #	90-6138-G5
Cyanide absorbance @578 nm.	0.014
Regression equation (conc. vs. abs.)	y = -3.05 + 356.02*(x)
liquid dilution factor	0.5
Total cyanide recovered (µg)*	**0.97**

*blank was turbid due to exfoliation of precipitates from glass frit of absorber.

9-28-91

7

CLP/90-6137 SAMPLES WHC/EAGLE-1 FINAL ANALYTICAL RESULTS:

C3-7

FINAL ANALYSIS RESULTS

sample identification number	A analytical concentration (mg/L)	B analytical dilution factor	C post digestion dil(mL)	D dry wt of sample (g)	E element concentration (mg/Kg)	comments
(SA1) PPS-46 90-6137-B-1	0.0255	16	250	0.9880	103.239	J
(SA1D) 90-6137-B-2	0.0239	16	250	0.9898	96.585	
(SA1SPK) 90-6137-B-3	0.0249	16	250	0.9896	100.647	
(SA1BSPK) 90-6137-B-4	0.0018	1	250	NONE	0.450 µg/L	
(SA1B) 90-6137-B-5	0.0010	1	250	NONE	0.250 µg/L	

calculation formula: AxBxC÷D=E

Brian Brown 09/20/90

LRB# 53933
PAGE # 7

9713524.0065

ATTACHMENT 4

DATA VALIDATION SUPPORTING DOCUMENTATION

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: 200-BP-1	REVIEWER: S. Schilde	DATE: 9-24-92
LABORATORY: PNL	CASE: —	SDG: PPS-46
SAMPLES/MATRIX: PPS-46, PP/CLP / soil		

1. COMPLETENESS AND CONTRACT COMPLIANCE

Review the data package for completeness and check off the items below. If any data review elements are missing contact the laboratory for submittal of the omitted data.

Data Package Item	Present?:	Yes	No	N/A
Case Narrative		✓	—	—
Cover Page		✓	—	—
Traffic Reports		—	✓	—
Sample Data				
Inorganic Analysis Data Sheets		✓	—	—
Standards Data				
Initial and Continuing Calibration Verification		✓	—	—
CRDL Standard for AA and ICP		✓	—	—
QC Summary				
Blanks		✓	—	—
ICP Interference Check Summary		—	✗ SS 9-24-92	✓
Spike Sample Recovery		✓	—	—
Post-Digestion Spike Sample Recovery		✓	—	✓ SS 9/24/92
Duplicate		✓	—	—
Laboratory Control Sample		✓	—	—
Standard Addition Results		—	—	✓
ICP Serial Dilutions		—	—	✓
Instrument Detection Limits		✓	—	—
ICP Interelement Correction Factors		—	—	✓
ICP Linear Ranges		—	—	✓
Preparation Log		✓	—	—
Analysis Run Log		—	✓	—
Raw Data				
ICP Raw Data		—	—	✓
Furnace AA Raw Data		✓	—	—
Mercury Raw Data		—	—	✓
Cyanide Raw Data		✓	—	—
Additional Data				
Internal laboratory chain-of-custody		—	—	✓
Laboratory Sample Preparation Records		✓	—	—

Data Package Item	Present?: Yes	No	N/A
Percent Solids Analysis Records	✓		
Reduction Formulae	✓		
Instrument Run Logs	✓		
Chemist Notebook Pages	✓		

2. HOLDING TIMES

Have all samples been analyzed within holding times? Yes No N/A

ACTION: If any holding times have been exceeded qualify all affected results as estimated (J for detects and UJ for nondetects).

3. INITIAL CALIBRATIONS

Were all instruments calibrated daily, each set-up time and were the proper number of standards used? Yes No N/A

Are the correlation coefficients ≥0.995? Yes No N/A

Was a midrange cyanide standard distilled? Yes No N/A

ACTION: Qualify all data as unusable if reported from an analysis in which an instrument was not calibrated or was calibrated with less than the minimum number of standards. Qualify associated sample results > IDL as estimated (J) and results < IDL as estimated (UJ), if the correlation coefficient is < 0.995 or the laboratory did not distill the midrange cyanide standard.

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION

Are ICV and CCV percent recoveries within control? Yes No N/A

Are there calculation errors? Yes No N/A

ACTION: Qualify all affected data in accordance with Section 8.3 of the validation requirements. If calculation errors are noted, contact the laboratory for clarification.

5. ICP INTERFERENCE CHECK SAMPLE

Has an ICS sample been analyzed at the proper frequency? Yes No N/A

Are the AB solution %R values within control? Yes No N/A

Are there calculation errors? Yes No N/A

ACTION: Qualify all affected data in accordance with Section 8.3 of the validation requirements. If calculation errors are noted, contact the laboratory for clarification.

6. LABORATORY BLANKS

Are target analytes present in the laboratory blanks? Yes (No) N/A

ACTION: Qualify all associated sample results for any analyte <5 times the amount in any laboratory blank as nondetected (U). If analyte concentrations in the blank are >CRDL or below the negative CRDL, verify the laboratory has redigested and reanalyzed associated samples with analyte concentrations <10 times the blank concentration. If the laboratory has not redigested and reanalyzed the samples, note in the validation narrative.

7. FIELD BLANKS

Are target analytes present in the field blanks? Yes No (N/A)

ACTION: Qualify all sample results for any analyte <5 times the amount in any valid field blank as nondetected (U).

8. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the control limits? (Yes) No N/A

ACTION: Qualify the affected sample data according to the following requirements:

If spike recovery is >125% and sample results are <IDL no qualification is required. If spike recovery is >125% or <75% qualify all positive results as estimated (J). If spike recovery is 30% to 74% qualify all nondetects as estimated (UJ). If spike recovery is <30%, reject all nondetects (R). If the field blank has been used for spike analysis, note in the validation narrative.

9. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits? (Yes) No N/A

Are there calculation errors? Yes (No) N/A

ACTION: Qualify the sample data according to the following requirements:

AQUEOUS LCS - Qualify as estimated (J), all sample results >IDL, for which the LCS %R falls within the range 50-79% or >120%. Qualify as estimated (UJ), all sample results <IDL, for which the LCS falls within the range of 50-79%. Qualify as unusable (R) all sample results, for which the LCS %R <50%.

SOLID LCS - Qualify as estimated (J), all sample results >IDL for which the LCS result is outside the established control limits. Qualify as estimated (UJ), all sample results <IDL for which the LCS %R are lower than the established control limits.

10. PERFORMANCE AUDIT ANALYSES

Are the performance audit sample results within the acceptance limits? Yes No N/A

ACTION: Note the results of the performance audit sample analyses in the data validation narrative.

11. DUPLICATE SAMPLE ANALYSIS

Are RPD values acceptable? Yes No N/A

ACTION: Qualify the results for all associated samples of the same matrix as estimated (J) if the RPD results fall outside the appropriate control limits. If field blanks were used for laboratory duplicates, note in the validation narrative.

12. ICP SERIAL DILUTION

Are the serial dilution results acceptable? Yes No N/A

Is there evidence of negative interference? Yes No N/A

ACTION: Qualify the associated data as estimated (J) for those analytes in which the %D is outside the control limits. If evidence of negative interference is found, use professional judgment to qualify the data.

13. FIELD DUPLICATE SAMPLES

Do the RPD values exceed the control limits? Yes No N/A

ACTION: Note the results of the field duplicate samples in the validation narrative.

14. FIELD SPLIT SAMPLES

Do the RPD values exceed the control limits? Yes No N/A

ACTION: Note the results of the field split samples in the validation narrative.

1516. FURNACE ATOMIC ABSORPTION QUALITY CONTROL

Do all applicable analyses have duplicate injections? Yes No N/A

Are applicable duplicate injection RSD values within control? Yes No N/A

If no, were samples rerun once as required? Yes No N/A

Does the RSD for the rerun fall within the control limits? Yes No N/A

Were analytical spike recoveries within the control limits? Yes No N/A

If no, were MSA analyses performed when required?	Yes	No	N/A
Are MSA correlation coefficients $\geq$0.995?	Yes	No	N/A
If no, was a second MSA analysis performed?	Yes	No	N/A

ACTION: If duplicate injections are outside the acceptance limits and the sample has not been reanalyzed or the reanalysis is outside the acceptance limits, qualify the associated data as estimated (J for detects and UJ for nondetects). If the analytical spike recovery is <40% qualify detects as estimated (J). If the analytical spike recovery is $\geq$10% but <40%, qualify all nondetects as estimated (UJ) and if the analytical spike recovery is <10%, reject all nondetects (R). If the sample absorbance is <50% of the analytical spike absorbance and the analytical spike recovery is <85% or >115%, qualify all results as estimated (J for detects and UJ for nondetects). If method of standard additions (MSA) was required but was not performed, the MSA samples were spiked incorrectly, or the MSA correllation coefficient was <0.995, qualify the associated detected results as estimated (J).

17. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly?	Yes	No	N/A
Are results within the calibrated range of the instruments and within the linear range of the ICP?	Yes	No	N/A
Are all detection limits below the CRQL?	Yes	No	N/A

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

18. OVERALL ASSESSMENT AND SUMMARY

Has the laboratory conducted the analysis in accordance with the analytical SOW?	Yes	No	N/A
Were project specific data quality objectives met for this analysis?	Yes	No	N/A

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

COMMENTS (attach additional sheets as necessary):

1. No WHC chain of custody, ∴ no sample date.
2. No RSD reported for GFAA analysis.

HOLDING TIME SUMMARY - FORM B-1

SDG: PPS-46	REVIEWER: S. Schuchert	DATE: 9-24-92	PAGE 1 OF 1
COMMENTS: Se/CN			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
PPS-46	Se	NA	9-20-90	9-20-90	NA	NA	J none. SSS 9-25-92
PP/CLP inorg in soil	CN	NA	9-20-90	9-20-90	NA	NA	J

NA - not available, samples received 9-11-90

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