START

9613402.1865

9309L095-WES-1353

0043043

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

Client : WESTINGHOUSE HANFORD
RFW# : 9309L095

W.O. #: 06168-002-001-9999-00
Date Received: 09-28-93

INORGANIC

The following is a summary of the quality control results and a description of any problems encountered during the analysis of this batch of samples:

1. All sample holding times as required by 40CFR136 were met with the exception of Nitrite by IC and Phosphate by IC, which were received past hold and Cyanide, which was analyzed past hold.

2. All preparation blank results were below the required detection limits.

3. All laboratory control standards (blank spikes) were within the control limits of 80-120%. All %RPD were within the 20% guidance limit.

4. All calibration verification checks were within the required control limits of 90-110%. Calibration verification is performed using independent standards.

5. Matrix spike recoveries are summarized on the Inorganic Accuracy Report contained within this document. All recoveries were within the 75-125% guidance limits. All %RPD were within the 20% guidance limit.

6. Replicate results are summarized on the Inorganic Precision Report contained within this document. All results were within the 20% RPD guidance limit.

7. The analytical methods applied by the laboratory, unless otherwise requested, for all inorganic analyses are derived from the USEPA Method for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020), Standard Methods for the Examination of Water and Wastewater 16 ed. and Test Methods for Evaluating Solid Waste (USEPA SW846).

FEB 1996
RECEIVED
EDMC

NOV 1993
RECEIVED
SDLA

Margaret M. Beaty for
J. Peter Hershey, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

10/26/93
Date

pas/i09-095

0001

9613902.1866

DON'T SAY IT --- *Write It!*

DATE: April 25, 1994

TO: 9309L095-WES-1353

FROM: Pat Reich H4-19

Telephone: 372-2785

cc:

SUBJECT: DATA VALIDATION REPORT FOR 200-BP-1, 3RD QTR GROUNDWATER SAMPLING

The validation report for this package is filed in SDG # 25016-WES-1275.

Pat Reich
SDLA

54-3000-101 (12/92) GEF014

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 10/21/93

CLIENT: WESTINGHOUSE HANFORD

WESTON BATCH #: 9309L095

WORK ORDER: 06168-002-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B094Z9	Alkalinity	88.0		MG/L	2.0	1.0
		Chloride by IC	15.4		MG/L	1.0	4.0
		Fluoride by IC	0.50	u	MG/L	0.50	1.0
		Nitrite by IC	0.25	u	MG/L	0.25	1.0
		Cyanide, Total	20.0	u	UG/L	20.0	1.0
		Phosphate by IC	0.25	u	MG/L	0.25	1.0
		Sulfate by IC	95.3		MG/L	5.0	20.0
		Nitrate Nitrite	2.4		MG-N/L	0.50	5.0
		Sulfate	91.3		MG/L	10.0	4.0
		Total Dissolved Solids	308		MG/L	5.0	1.0

WESTON Analytics Use Only
9309L095

Custody Transfer Record/Lab Work Request

WESTON

Page 1 of 1

Client: Westinghouse Hanford
Est. Final Proj. Sampling Date:
Work Order #: 01e168-002-001-9999-00
Project Contact/Phone #:
AD Project Manager: Josie Edwards
QC: CLP Del: CLP TAT: 35 Days
Date Rec'd: 9-28-93 Date Due: 11/02/93
Account #: WS-HANFORD

Refrigerator #																		
#/Type Container	Liquid						2VOA 3PC	1GC	1GC	1GC/1PC	1PC	1GC	1PC	1PC	1PC	1PC	1PC	
	Solid																	
Volume	Liquid						1PC	250ml	1PC	1PC	1PC	500ml	500ml	250ml	250ml	250ml	1PC	
	Solid																	
Preservatives							HNO3	none	HCl	HNO3	NaOH	none	H2SO4	none	none	none	HNO3	
ANALYSES REQUESTED		VOA	BNA	Pest/PCB	Herb		Rec'd on	Trans	Fe	Metal	CN	Fe Sol Sol Sol	NH2 NO3	ALK	TDS	Sol	Sol Metal	
		ORGANIC								INORG								

MATRIX CODES:	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	WESTON Analytics Use Only										
S - Soil								I	SUB		Sol Metal	TDS	Fe Sol Sol Sol Fe Sol Fe Sol	Inf	Alk	TDS	Sol	Sol Metal
SE - Sediment																		
SO - Solid																		
SL - Sludge																		
W - Water	001	B094Z9			W	9/26/93	0826	X	X	X	X	X	X	X	X	X	X	
O - Oil																		
A - Air	002	B09500			W	9/26/93	0826											X
DS - Drum Solids																		
DL - Drum Liquids																		
L - EP/TCLP Leachate																		
WI - Wipe																		
X - Other																		
F - Fish																		
		Metals = HSL + Bi, Si																

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
Temp = 2.9°C
SAF#93-266

DATE/REVISIONS:
1.
2.
3.
4.
5.
6.

WESTON Analytics Use Only

Samples were:
1) Shipped ✓ or Hand Delivered
Airbill # 2519009702
2) Ambient or Chilled
3) Received in Good Condition (Y) or N
4) Labels Indicate Properly Preserved (Y) or N
5) Received Within Holding Times Y or (N)

COC Tape was:
1) Present on Outer Package (Y) or N
2) Unbroken on Outer Package (Y) or N
3) Present on Sample (Y) or N
4) Unbroken on Sample (Y) or N
COC Record Present Upon Sample Rec'd (Y) or N

Discrepancies Between Samples Labels and COC Record? Y or (N)
NOTES:

Relinquished by	Received by	Date	Time
Emery	B. Burnett	9-28-93	12:45
B.B. 9-28-93			

Relinquished by	Received by	Date	Time
	B.B. 9-28-93		

RFW 21-21-001/A-7/91 ____ L372 ____ L373 ____ L375 ____ L377 ____ L378 Ref# N/A Cooler# N/A 381-596a

9613402.1868

96T3402.1869

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator KD LEE/GG HAMILTON

Company Contact PH BUTCHER

Telephone (509) 376-5045

Project Designation/Sampling Locations 200-BP-1

Collection Date 9/24/93

Ice Chest No. 82

Field Logbook No. WHC-N-446 p.

Bill of Lading/Airbill No. 2519009702

Offsite Property No. W93-0-0796-

Method of Shipment ~~WESTON~~ EMERY AJS 9/27/93

Shipped to WESTON

Possible Sample Hazards/Remarks 9309L095

Sample Identification

001 B094Z9

1, 1L, P, WATER; METALS-CLP TAL(Ca,Mg,Na,K,Fe,Mn,Si,Al,Bi), SELENIUM (HNO3 pH<2) UNFILTERED
1, 500ml, G, WATER; IC ANIONS(F,Cl,SO4,NO2,PO4)
1, 500ml, P, WATER; NO2/NO3(H2SO4 pH<2)
1, 250ml, P, WATER; ALKALINITY
1, 250ml, P, WATER; TDS
1, 250ml, P, WATER; SULFATE
1, 1L, P, WATER; CYANIDE(NaOH pH>12)
3, 2L, P, WATER; GROSS ALPHA/BETA, GAMMA SPEC(Cs-137,Co-60,Ru-106), Pu-238, Pu-239/240, Sr-90, TOTAL URANIUM(HNO3 pH<2)
1, 250ml, Gs, WATER; TRITIUM
1, 1L, G/P, WATER; Tc-99(HCl pH<2)

002 B09500

1, 1L, P, WATER; METALS-CLP TAL(Ca,Mg,Na,K,Fe,Mn,Si,Al,Bi), SELENIUM (HNO3 pH<2) FILTERED

Temp = 2.9°C

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished By	Date	Time	Received By	Date	Time
K.D. Lee	9/24/93	1044	AJ Simpson AJ SIMPSON	9/27/93	0811
AJ Simpson AJ SIMPSON	9/27/93	0811			
EMERY	9-28-93	1214C		9/28/93	1245

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments: relinq. to frig # 38 by K.D. Lee 9/24/93 1044

A-6000-407 (12/92) WEF061

9613902.1870

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector KD LEE/GG HAMILTON Date Sampled 9/24/93 Time 0926 hours

Company Contact PH BUTCHER Telephone (509) 376-5045

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
B0 9429	1, 1L, P	WATER	METALS-CLP TAL(Ca,Mg,Na,K,Fe,Mn,Si,Al,Bi),
			SELENIUM (HNO3 pH<2)
	1, 500ml, G	WATER	IC ANIONS(F,Cl,SO4,NO2,PO4)
	1, 500ml, P	WATER	NO2/NO3(H2SO4 pH<2)
	1, 250ml, P	WATER	ALKALINITY
	1, 250ml, P	WATER	TDS
	1, 250ml, P	WATER	SULFATE
	1, 1L, P	WATER	CYANIDE (NaOH pH>12)
	3, 2L, P	WATER	GROSS ALPHA/BETA, GAMMA SPEC(Cs-137,Co-60,
			Ru-106), Pu-238, Pu-239/240, Sr-90, TOTAL
			URANIUM (HNO3 pH<2)
	1, 250ml, Gs	WATER	TRITIUM
	1, 1L, G/P	WATER	Tc-99 (HCl pH<2)
B09500	1, 1L, P	WATER	METALS-CLP TAL(Ca,Mg,Na,K,Fe,Mn,Si,Al,Bi),
			SELENIUM (HNO3 pH<2)
			TASK #: 93-266
			OPC #: W93-0-0796-4
			BOL #: 2519009702

Field Information** _____

Special Handling and/or Storage _____

Possible Sample Hazards _____

PART II: LABORATORY SECTION

Received by _____ Title _____ Date _____

Analysis Required _____

* Indicate whether sample is soil, sludge, water, etc.

** Use back of page for additional information relative to sample location.

A-6000-406(05/90)

ONE NICKEL BEHIND THE TAPE

Signature Security Service

Contractor	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT)
WIC		W93-010796-4

PART I – TO BE COMPLETED BY ORIGINATOR

Department	Section	Unit
Env. Eng. & Tech.	Geosciences	Geochem. & Hydrochem.

The following items are to be shipped from ☐ Contractor ☐ Vendor

Routing Emery ☐ Contractor ☐ Vendor

Shipped to
Roy F. Weston
256 Welsh Pool Rd.
Lyonvill, PA 19341-1313

Off-site Custodian

Full Title

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
1 52 lbs.	Sample #: B04429 B09500 Cooler ID: 82 Polycooler with groundwater samples packed in wet ice and vermiculite	N/A
~~1~~ lbs.	~~Sample #:~~ ATS 9/27/93 Cooler ID: Polycooler with groundwater samples packed in wet ice and vermiculite	N/A

☐ Classified ☒ Unclassified ☐ Shipped Under DOE Contract ☐ Shipped Under Contractor's Use Permit Contract

Necessity for the Off-Site Use of this Property

Sampling supports RI/FS work in the 200 a UNA.

Bill of lading # 2519009702

CERTIFICATION OF THE RADIATION MONITORING RELEASE MUST BE SECURED THE SAME DAY THAT MATERIAL IS DELIVERED TO SHIPPING.

RM Clearance for Public Release	RM Survey No	Date
[illegible]	U-156341	9/27/93

Location of Property (Area & Bldg.)	Contact	Phone
200 BP-1	PH Butcher	(509) 376-5045

Date Ready for Shipment	Cost Code to be Charged	Approximate Date This Property will be Returned
9/27/93	W01232/ [illegible]	NA

Originated By	Date	Authorized By	Date
P.H. Butcher	9/27/93	A.J. Simpson	9/27/93

Signature and Name of Property Control	Custodian Date	Property Management Approval	Date
		[illegible]	9/27/93

PART II – TO BE COMPLETED BY SHIPPING

Signature of Recipient	Return Order No.	Date Issued	Purchase Order No.	Date Issued
[illegible]				
Date 9/27/93				

DISTRIBUTION

By Originator	Shipping Operation – Sign all Copies and Forward to:
White, Green, Yellow, Pink – Property Management Goldenrod – Retain	White – Property Management Green – Property Control Custodian (Issuing Office) Yellow – Retain Pink – Originator

0023

54-3000-479 (09/89)

9309L095 (117)

FORM OF PAYMENT

Check ☐ GBL ☐ FCCOD ☐

Bill to Shipper ☒ Bill to Consignee ☐ Third Party Billing ☐

EMERY WORLDWIDE — A CF Company

SERVICES

UNITED STATES / CANADA: Same Day (Extra Charges) ☐; AM ☒; PM ☐; Second Day ☐; Saturday Delivery ☐; Standard Plus ☐; Preferred ☐; Standard ☐

INTERNATIONAL: Express ☐; Business Documents ☐; Customs Clearance ☐; Delivery ☐

E Shipper's Account Number: 850281585

Date: 09-27-93 | Origin: PSC | Shipment Number: 251900970 2

From:
WESTINGHOUSE SHIPPING DEPT. (509) 376-6665
U.S. DEPARTMENT OF ENERGY C/O
WESTINGHOUSE HANFORD
BLDG 1163
2355 STEVENS DRIVE
RICHLAND WA Canada ☐

To:
RF WESTON INC
RF WESTON INC
256 WELSH POOL ROAD
LIONVILLE PA USA Canada ☐

Hold for Pick Up ☐

Tariff Dest. | Gateway

Check to Shipper $

EMERY WORLDWIDE will accept Consignee's check with all risks being assumed by Shipper, including but not limited to non-payment, fraud and misrepresentation.

Customer's Reference Numbers: W81232 PU3EA W93-0-0796#4 PH BUTCHER

Zip: 99352

E Consignee's Account Number

Zip: 19341

Description	Pcs	L	W	H	Total Pieces	Total Weight (In Lbs)
1 COOLER ID: 82 WATER SAMPLES	1	21	16	17	1	52

FOR INFORMATION OR RATES CALL 1-800 44 EMERY (1-800-443-6379)

Declared Value $

2519009702

Remarks: OVERNIGHT DELIVERY SIGNATURE SECURITY SERVICE

Shipper's Signature: 9378

Zip Ship ☐ — For shipments within the 50 United States Shipper has the option to check this box and, by checking, agrees that the Zip Ship conditions, described in the area to the right, apply.

Mark if Emery Packaging is used: Urgent Letter 9X12 ☐; Urgent Pack 12X15 ☐

International Shipments: Free Domicile ☐; Commodity Code

Third Party Account Number mandatory for Third Party Billing. E Third Party Account Number

International Customs Value | International Insurance

Base Charge

Total Transportation Charges | Other Charges/Advance at Origin ☐ OCA/O- $

3-PhL-A

Terms and Conditions on Back

9613402.1872

0024

EMERY WORLDWIDE — A CF Company

SIGNATURE AND TALLY RECORD

60029-46 (8/88) Litho USA

DATE: 09-27-93 SHIPMENT NO.: 2519009702 (111)
SHIPPER: WESTINGHOUSE SHIPPING DEPT. (509) 376-6665
REFERENCE NO.: W93-0-079684

SHIPPER NAME AND ADDRESS	CONSIGNEE NAME AND ADDRESS
WESTINGHOUSE SHIPPING DEPT. (509) 376-6665 U.S. DEPARTMENT OF ENERGY C/O WESTINGHOUSE HANFORD COMPANY 2355 STEVENS DRIVE 1163 BUILDING PO BOX 1970 RICHLAND WA 99352	RF WESTON INC 256 WELSH POOL ROAD LIONVILLE PA 19341

Pieces	Weight	Description/Marks	Emery Authorization No.
1	52 LBS	COOLER ID 82 WATER SAMPLES	

EACH PERSON HANDLING OR TAKING CUSTODY OF THIS SHIPMENT MUST SIGN AND COMPLETE THE INFORMATION BELOW

Name of Person/Company	Transship Point/Destination	Signature of Person Accepting Custody	Time/Date
1 DENNIS FINLEY WESTINGHOUSE HANFORD CO shipping dept	RICHLAND WA		11:30
2.			
3.			
4.			
5. Jim Madison	PHL		0900
6. WD SNYDER EWW	PHL		091
7.			
8.			

SPECIAL HANDLING INSTRUCTIONS

CONSIGNEE COPY

9613402.1873

0025

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

Client : WESTINGHOUSE HANFORD
RFW# : 9309L095

W.O. #: 06168-002-001-9999-00
Date Received: 09-28-93

METALS

1. This narrative covers the analysis of (2) two water samples.

2. The samples were prepared and analyzed in accordance with the following protocols: CLP SOW 3/90.

3. ICVs, CCVs, and LCSs stock standards were purchased from Inorganic Ventures Laboratory and High Purity.

4. All analyses were performed within the required holding times.

5. All Initial and Continuing Calibration Verifications (ICV/CCV's) were within control limits.

6. All Initial and Continuing Calibration Blanks (ICB/CCB's) were within control limits.

7. All Preparation/Method Blanks were below Reporting Limits.

8. All ICP Interference Check Samples (ICSA and ICSAB) were within control limits.

9. All Laboratory Control Samples (LCS) were within the 80-120% control limits.

10. All Serial Dilution percent differences were within USEPA SOW control limits except for:

RFW #	Element	%Difference
001	Calcium	11.5
	Iron	11.8
	Magnesium	12.3

11. All Matrix Spike recoveries were within the 75-125% control limits (exception allowed when sample concentration exceeds the spike added concentration by a factor of 4 or more).

    Matrix spike analyses are not required for Ca, Mg, Na, and K in waters and soils.

WESTON

12. All Duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits for samples values greater than 5X Reporting Limit, or +/- the Reporting Limits for sample values less than 5X Reporting Limit except for:

RFW #	Element	%RPD
001	Selenium	112.1

13. Method of Standard Additions (MSA) analyses were performed on the following samples:

Element	Sample #'s
Selenium	001R, 002

14. The code CV is currently in use by the laboratory for both mercury instruments in operation (HG1 and HG2). HG1 is complete with autosampler and software, but still requires manual digestion; HG2 is operated by the analyst, produces a strip chart and also requires manual digestion.

15. HG1 requires less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionally scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 ml. For soils, 0.1 gram of sample is taken to a final volume of 50 ml (including all reagents).

16. ICP Interelement Correction Factors for IC1 and IC3 are included in this package, but do not appear on EDD.

17. The graphite furnace time that appears on form XIV is the time of the first injection. The time that appears on the data is the print time.

18. Solubles and totals were digested within the same digestion batch; therefore, will have the same flags.

Mary Recchres

Raymond A. Siery
Inorganic Section Manager
Lionville Analytical Laboratory

11/17/93
Date

pas/m09-095

9613402.1876

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

Client: WESTINGHOUSE HANFORD
RFW #: 9309L095

W.O. #: 06168-002-001-9999-00
Date Received: 09-28-93

CLP METALS ADDENDUM

1. A discrepancy exists between raw data and Form XIVs analytical spikes recovery calculations performed for graphite furnace AA analytes. Instrument software calculates spike recoveries based on absolute values below the IDL for sample results. This is hard-coded by the vendor and is currently not correctable. CLP convention (SOW ILM02.0, Exhibit E, Section V, Item 6, page E-20) requires that when values fall below the IDL, the sample result is equal to zero (0) for the purposes of calculating the percent recovery. The Form XIVs contain the correct calculation.

Mary Lechner

for Raymond A. Siery
Inorganic Section Manager
Lionville Analytical Laboratory

11/17/93
Date

mlj\clp-met.nar

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 11/13/93

CLIENT: WESTINGHOUSE HANFORD

WESTON BATCH #: 9309L095

WORK ORDER: 06168-002-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-001	B094Z9	Silver, Total	10.0	u	UG/L	10.0	1.0
		Aluminum, Total	200	u	UG/L	200	1.0
		Arsenic, Total	10.0	u	UG/L	10.0	1.0
		Barium, Total	200	u	UG/L	200	1.0
		Beryllium, Total	5.0	u	UG/L	5.0	1.0
		Bismuth, Total	150	u	UG/L	150	1.0
		Calcium, Total	45000		UG/L	5000	1.0
		Cadmium, Total	5.0	u	UG/L	5.0	1.0
		Cobalt, Total	50.0	u	UG/L	50.0	1.0
		Chromium, Total	19.9		UG/L	10.0	1.0
		Copper, Total	25.0	u	UG/L	25.0	1.0
		Iron, Total	1020		UG/L	100	1.0
		Mercury, Total	0.20	u	UG/L	0.20	1.0
		Potassium, Total	8220		UG/L	5000	1.0
		Magnesium, Total	13200		UG/L	5000	1.0
		Manganese, Total	43.6		UG/L	15.0	1.0
		Sodium, Total	21500		UG/L	5000	1.0
		Nickel, Total	40.0	u	UG/L	40.0	1.0
		Lead, Total	3.0	u	UG/L	3.0	1.0
		Antimony, Total	60.0	u	UG/L	60.0	1.0
		Selenium, Total	50.0	u	UG/L	50.0	10.0
		Silicon, Total	17100		UG/L	100	1.0
		Thallium, Total	10.0	u	UG/L	10.0	1.0
		Vanadium, Total	50.0	u	UG/L	50.0	1.0
		Zinc, Total	20.0	u	UG/L	20.0	1.0

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 11/13/93

CLIENT: WESTINGHOUSE HANFORD

WESTON BATCH #: 9309L095

WORK ORDER: 06168-002-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT	DILUTION FACTOR
-002	B09500	Silver, Soluble	10.0	u	UG/L	10.0	1.0
		Aluminum, Soluble	200	u	UG/L	200	1.0
		Arsenic, Soluble	10.0	u	UG/L	10.0	1.0
		Barium, Soluble	200	u	UG/L	200	1.0
		Beryllium, Soluble	5.0	u	UG/L	5.0	1.0
		Bismuth, Soluble	150	u	UG/L	150	1.0
		Calcium, Soluble	41900		UG/L	5000	1.0
		Cadmium, Soluble	5.0	u	UG/L	5.0	1.0
		Cobalt, Soluble	50.0	u	UG/L	50.0	1.0
		Chromium, Soluble	10.0	u	UG/L	10.0	1.0
		Copper, Soluble	25.0	u	UG/L	25.0	1.0
		Iron, Soluble	100	u	UG/L	100	1.0
		Mercury, Soluble	0.20	u	UG/L	0.20	1.0
		Potassium, Soluble	7570		UG/L	5000	1.0
		Magnesium, Soluble	12400		UG/L	5000	1.0
		Manganese, Soluble	20.9		UG/L	15.0	1.0
		Sodium, Soluble	20300		UG/L	5000	1.0
		Nickel, Soluble	40.0	u	UG/L	40.0	1.0
		Lead, Soluble	3.0	u	UG/L	3.0	1.0
		Antimony, Soluble	60.0	u	UG/L	60.0	1.0
		Selenium, Soluble	6.7		UG/L	5.0	1.0
		Silicon, Soluble	16100		UG/L	100	1.0
		Thallium, Soluble	10.0	u	UG/L	10.0	1.0
		Vanadium, Soluble	50.0	u	UG/L	50.0	1.0
		Zinc, Soluble	20.0	u	UG/L	20.0	1.0

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

B094Z9

Lab Name: ROY F. WESTON, INC - L372 Contract: 6168-02-01

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP095

Matrix (soil/water): WATER Lab Sample ID: 930909501

Level (low/med): LOW Date Received: 9/28/93

% 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	58.80	B		P
7440-36-0	Antimony	20.00	U		P
7440-38-2	Arsenic	4.20	B		F
7440-39-3	Barium	31.90	B	*	P
7440-41-7	Beryllium	1.00	U		P
7440-43-9	Cadmium	2.00	U		P
7440-70-2	Calcium	45000.00		E	P
7440-47-3	Chromium	19.90			P
7440-48-4	Cobalt	7.50	B		P
7440-50-8	Copper	8.60	B		P
7439-89-6	Iron	1020.00		E	P
7439-92-1	Lead	2.00	U		F
7439-95-4	Magnesium	13200.00		E	P
7439-96-5	Manganese	43.60			P
7439-97-6	Mercury	.10	U		CV
7440-02-0	Nickel	15.10	B		P
7440-09-7	Potassium	8220.00			P
7782-49-2	Selenium	20.00	U	W*	F
7440-22-4	Silver	3.00	U		P
7440-23-5	Sodium	21500.00			P
7440-28-0	Thallium	2.00	U	M	F
7440-62-2	Vanadium	22.00	B		P
7440-66-6	Zinc	8.20	B		P
	Cyanide	20.00	U		C

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

9613402.1880

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09500

Lab Name: ROY F. WESTON, INC - L372 Contract: 6168-02-01

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP095

Matrix (soil/water): WATER Lab Sample ID: 930909502

Level (low/med): LOW Date Received: 9/28/93

% 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	29.90	B		P
7440-36-0	Antimony	20.00	U		P
7440-38-2	Arsenic	3.50	B		F
7440-39-3	Barium	19.10	B	*	P
7440-41-7	Beryllium	1.00	U		P
7440-43-9	Cadmium	2.00	U		P
7440-70-2	Calcium	41900.00		E	P
7440-47-3	Chromium	3.00	U		P
7440-48-4	Cobalt	5.00	U		P
7440-50-8	Copper	4.40	B		P
7439-89-6	Iron	43.90	B	E	P
7439-92-1	Lead	2.00	U		F
7439-95-4	Magnesium	12400.00		E	P
7439-96-5	Manganese	20.90			P
7439-97-6	Mercury	.10	U		CV
7440-02-0	Nickel	8.00	U		P
7440-09-7	Potassium	7570.00			P
7782-49-2	Selenium	6.70		S*	F
7440-22-4	Silver	3.00	U		P
7440-23-5	Sodium	20300.00			P
7440-28-0	Thallium	2.00	U		F
7440-62-2	Vanadium	13.40	B		P
7440-66-6	Zinc	8.80	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

9613402.1881

VALIDATION SUMMARY

9613402.1882

9309L095-WES-1353

FEB 1994
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TQO

MEMORANDUM

TO: 200-BP-1 Project QA Record

January 26, 1994

FR: Kent Angelos, Golder Associates Inc.

RE: METALS DATA VALIDATION PACKAGE, DATA PACKAGE ID: 9309L095-WES-1353 (913-1719, WES1353M.BP1)

INTRODUCTION

This memo presents the results of data validation on data package 9309L095-WES-1353 consisting of two water samples analyzed for CLP Target Analyte List (TAL) metals, cyanide, bismuth and silicon. The samples were analyzed by the Weston Analytics laboratory of Lionville, Pennsylvania using the CLP protocol (SOW 3/90) for TAL metals and cyanide, and SW-846 methods for bismuth and silicon. The following table provides information regarding the sample identification, date, media and analysis performed.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B094Z9*	9/13/93	WATER	see Note 1
B09500*	9/14/93	WATER	

RECEIVED
FEB 1 1994
VALIDATION DOCUMENTATION
SDLA

Notes:

* Indicates samples which received 100% validation.

1. Sample B094Z9 was analyzed for CLP TAL metals, cyanide, bismuth and silicon. Sample B09500 was analyzed for CLP TAL metals, bismuth and silicon only.

Data validation was conducted in accordance with the WHC statement of work (WHC 1993) and validation procedures (WHC 1992). Attachments 1 through 5 provide the following information as indicated below:

Attachment 1. Glossary of Data Reporting Qualifiers
Attachment 2. Summary of Data Qualifications
Attachment 3. Qualified Data Summary and Annotated Laboratory Reports
Attachment 4. Laboratory Narrative and Chain-of-Custody Documentation
Attachment 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met with the exception of those items discussed under "Minor Deficiencies".

Accuracy. Goals for accuracy were met.

Sample Result Verification. All sample results were supported in the raw data.

9613402.1883

MEMORANDUM

FEB 1994
RECEIVED
TQO

TO: 200-BP-1 Project QA Record January 26, 1993

FR: Kent Angelos, Golder Associates Inc.

RE: GENERAL CHEMISTRY DATA VALIDATION PACKAGE: 9309L095-WES-1353 (913-1719, WES1353C.BP1)

INTRODUCTION

This memo presents the results of data validation on data package 9309L095-WES-1353 consisting of one water sample analyzed for general chemistry parameters. The sample(s) were analyzed by the Weston Analytics laboratory of Lionville, Pennsylvania using the WHC approved methods. The following table provides information regarding the sample identification, date, media and analysis performed.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B094Z9*	9/13/93	WATER	see Note 1

FEB 1 1994
VALIDATION DOCUMENTATION
SDLA

Notes:

* Indicates sample(s) which received 100% validation.

1. All sample(s) were analyzed for alkalinity, anions by ion chromatography (chloride, fluoride, nitrite, phosphate and sulfate), cyanide, nitrate+nitrite, sulfate by EPA method and total dissolved solids.

Data validation was conducted in accordance with the WHC statement of work (WHC 1993) and validation procedures (WHC 1992). Attachments 1 through 5 provide the following information as indicated below:

Attachment 1. Glossary of Data Reporting Qualifiers
Attachment 2. Summary of Data Qualifications
Attachment 3. Qualified Data Summary and Annotated Laboratory Reports
Attachment 4. Laboratory Narrative and Chain-of-Custody Documentation
Attachment 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met.

Sample Result Verification. All sample results were supported in the raw data.

9613402.1884

MEMORANDUM

TO: 200-BP-1 Project QA Record — January 26, 1994

FR: Kent Angelos, Golder Associates Inc.

RE: METALS DATA VALIDATION PACKAGE, DATA PACKAGE ID: 9309L095-WES-1353 (913-1719, WES1353M.BP1)

INTRODUCTION

This memo presents the results of data validation on data package 9309L095-WES-1353 consisting of two water samples analyzed for CLP Target Analyte List (TAL) metals, cyanide, bismuth and silicon. The samples were analyzed by the Weston Analytics laboratory of Lionville, Pennsylvania using the CLP protocol (SOW 3/90) for TAL metals and cyanide, and SW-846 methods for bismuth and silicon. The following table provides information regarding the sample identification, date, media and analysis performed.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B094Z9* B09500*	9/13/93 9/14/93	WATER WATER	see Note 1

Notes:

* Indicates samples which received 100% validation.

1. Sample B094Z9 was analyzed for CLP TAL metals, cyanide, bismuth and silicon. Sample B09500 was analyzed for CLP TAL metals, bismuth and silicon only.

Data validation was conducted in accordance with the WHC statement of work (WHC 1993) and validation procedures (WHC 1992). Attachments 1 through 5 provide the following information as indicated below:

Attachment 1. Glossary of Data Reporting Qualifiers
Attachment 2. Summary of Data Qualifications
Attachment 3. Qualified Data Summary and Annotated Laboratory Reports
Attachment 4. Laboratory Narrative and Chain-of-Custody Documentation
Attachment 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

This section presents a summary of data quality in terms of the referenced validation criteria.

Precision. Goals for precision were met with the exception of those items discussed under "Minor Deficiencies".

Accuracy. Goals for accuracy were met.

Sample Result Verification. All sample results were supported in the raw data.

Replaced Page 4/19/94

Detection Limits. Detection limit goals were met for all sample results as specified in the work plan (DOE-RL 1992), with the following exceptions:

- The detection limit for bismuth was listed in the work plan as 60 µg/L however the laboratory reported the results to a detection limit of 150 µg/L.

- The detection limit for silicon is not specified in the method reference however, a nominal detection limit of 0.3 mg/L is specified for the atomic absorption technique (APHA 1992). The detection limit achieved by the method was estimated to be 0.1 mg/L based on the analysis of the preparation blank which is well below the nominal value of 0.3 mg/L.

Completeness. The data package was complete for all requested analyses. Two samples were validated in this data package with a total of 51 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent, which meets the work plan objectives of 90% (DOE-RL 1990).

MAJOR DEFICIENCIES

No major deficiencies were identified which resulted in qualification of data as unusable.

MINOR DEFICIENCIES

Laboratory Blanks

- Aluminum, antimony, barium, cobalt, copper, iron, thallium, vanadium and zinc were detected in the laboratory blanks. Attachment 2 and 5 provide supporting documentation as to the samples affected and qualifications applied.

Spike Recovery

- The spike recovery for silicon, at 176%, exceeded the normal laboratory control limits of 75% to 125%. Therefore, all results for silicon have been qualified as estimated (J).

Laboratory Duplicates

- The duplicate sample relative percent differences (RPD) exceeded the control limits of one CRDL unit for selenium therefore, all results for selenium have been qualified as estimated (J for detects, UJ for non-detects).

ICP Serial Dilutions

- The ICP serial dilution percent difference was greater than 10% for calcium, iron and magnesium therefore, all positive results have been qualified as estimated (J).

REFERENCES

APHA 1992, Standard Methods for the Examination of Water and Wastewater, 18th Edition, 1992. American Public Health Association, 1015 Fifteenth Street NW, Washington, DC 20005.

DOE-RL, 1990, Remedial Investigation/Feasibility Study Work Plan for the 200-BP-1 Operable Unit Hanford Site, DOE-RL 88-32, U.S. Department of Energy, Richland, Washington.

DOE-RL, 1992, Remedial Investigation/Feasibility Study Work Plan for the 200-BP-1 Operable Unit Hanford Site, DOE/RL 88-32, Change Order 26, U.S. Department of Energy, Richland, Washington.

WHC, 1993, Westinghouse Hanford Company, Validation of 200-BP-1 Data, Statement of Work, Revision G, May 1993. Westinghouse Hanford Company, Richland, Washington.

WHC 1992, Data Validation Procedures for Chemical Analyses, WHC-SD-EN-SPP-002, Rev. 1, 1992. Westinghouse Hanford Company, Richland, Washington.

9613402.1887

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

B - Indicates the constituent was analyzed for and detected. The concentration reported is less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). The associated data should be considered usable for decision making purposes.

U - Indicates the constituent was analyzed for and not detected. The concentration reported is the sample detection limit corrected for aliquot size, dilution and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.

UJ - Indicates the constituent was analyzed for and not detected. Due to a minor quality control deficiency identified during data validation the concentration may not accurately reflect the sample detection limit. The associated data have been qualified as estimated but should be considered usable for decision making purposes.

BJ - Indicates the constituent was analyzed for and detected at a concentration less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). Due to a minor quality control deficiency identified during data validation the associated data have been qualified as estimated, but should be considered usable for decision making purposes.

J - Indicates the constituent was analyzed for and detected. Due to a minor quality control deficiency identified during data validation the associated data have been qualified as estimated, but should be considered usable for decision making purposes.

UR - Indicates the constituent was analyzed for and not detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.

R - Indicates the constituent was analyzed for and detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

9613402.1890

DATA QUALIFICATION SUMMARY - FORM B7

SDG: 9309L095-WES-1353	VALIDATOR: K. ANGELOS	DATE: April 13, 1994	PAGE 1 OF 1
COMMENTS: METALS			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
ALUMINUM	U	ALL	DETECTED IN LABORATORY BLANK
ANTIMONY	U	ALL	DETECTED IN LABORATORY BLANK
BARIUM	U	ALL	DETECTED IN LABORATORY BLANK
COBALT	U	ALL	DETECTED IN LABORATORY BLANK
COPPER	U	ALL	DETECTED IN LABORATORY BLANK
IRON	U	ALL	DETECTED IN LABORATORY BLANK
VANADIUM	U	ALL	DETECTED IN LABORATORY BLANK
ZINC	U	ALL	DETECTED IN LABORATORY BLANK
THALLIUM	UJ	ALL	DETECTED AT A NEGATIVE CONC. >IDL IN LABORATORY BLANK
SILICON	J	ALL	SPIKE RECOVERY >125%
SELENIUM	J/UJ	ALL	DUPLICATE RPD EXCEEDED ONE CRDL UNIT
CALCIUM, IRON, MAGNESIUM	J	ALL DETECTS	ICP SERIAL DILUTION >10% WHILE SAMPLE RESULT >50X IDL
VANADIUM	UJ	ALL	DETECTED AT NEGATIVE CONC. IN PREP. BLANK

Ans 6/13/94 Replaced Page

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ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: 9309L095-WES-1353

	Samp#	B09429		B09500	
	Date	9-24-93		9-24-93	
	Location	299-E33-39		299-E34-1	
	Type	UNFILT.		FILT.	
Parameter	Units	Result	Q	Result	Q
Aluminum	µg/L	58.800	U	29.900	U
Antimony	µg/L	20.000	U	20.000	U
Arsenic	µg/L	4.200	B	3.500	B
Barium	µg/L	31.900	U	19.100	U
Beryllium	µg/L	1.000	U	1.000	U
Cadmium	µg/L	2.000	U	2.000	U
Calcium	µg/L	45000.000	J	41900.000	J
Chromium	µg/L	19.900		3.000	U
Cobalt	µg/L	7.500	U	5.000	U
Copper	µg/L	8.600	U	4.400	U
Iron	µg/L	1020.000	J	43.900	U
Lead	µg/L	2.000	U	2.000	U
Magnesium	µg/L	13200.000	J	12400.000	J
Manganese	µg/L	43.600		20.900	
Mercury	µg/L	0.100	U	0.100	U
Nickel	µg/L	15.100	B	8.000	U
Potassium	µg/L	8220.000		7570.000	
Selenium	µg/L	20.000	UJ	6.700	J
Silver	µg/L	3.000	U	3.000	U
Sodium	µg/L	21500.000		20300.000	
Thallium	µg/L	2.000	UJ	2.000	UJ
Vanadium	µg/L	22.000	UJ	13.400	UJ
Zinc	µg/L	8.200	U	8.800	U
Cyanide	µg/L	20.000	U	N/R	
Bismuth	µg/L	150.000	U	150.000	
Silicon	µg/L	17100.000	J	16100.000	J

Verified
Mary Copeland
11/3/94
Page

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9613402.1892

9613402.1893

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

B094Z9

Lab Name: ROY F. WESTON, INC - L372 Contract: 6168-02-01

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP095

Matrix (soil/water): WATER Lab Sample ID: 930909501

Level (low/med): LOW Date Received: 9/28/93

% 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	58.80	~~B~~		P	u
7440-36-0	Antimony	20.00	U		P	
7440-38-2	Arsenic	4.20	B		F	
7440-39-3	Barium	31.90	~~B~~	*	P	u
7440-41-7	Beryllium	1.00	U		P	
7440-43-9	Cadmium	2.00	U		P	
7440-70-2	Calcium	45000.00		~~E~~	P	J
7440-47-3	Chromium	19.90			P	
7440-48-4	Cobalt	7.50	~~B~~		P	u
7440-50-8	Copper	8.60	~~B~~		P	u
7439-89-6	Iron	1020.00		~~E~~	P	J
7439-92-1	Lead	2.00	U		F	
7439-95-4	Magnesium	13200.00		~~E~~	P	J
7439-96-5	Manganese	43.60			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel	15.10	B		P	
7440-09-7	Potassium	8220.00			P	
7782-49-2	Selenium	20.00	~~U~~	W*	F	uJ
7440-22-4	Silver	3.00	U		P	
7440-23-5	Sodium	21500.00			P	
7440-28-0	Thallium	2.00	~~U~~	M	F	uJ
7440-62-2	Vanadium	22.00	~~B~~		P	uJ
7440-66-6	Zinc	8.20	~~B~~		P	u
	Cyanide	20.00	U		C	
	Bismuth	150	u			
	Silicon	17100				J

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Verified RMA 1/25/94

FORM I - IN 03/90

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U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

B09500

Lab Name: ROY F. WESTON, INC - L372 Contract: 6168-02-01

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP095

Matrix (soil/water): WATER Lab Sample ID: 930909502

Level (low/med): LOW Date Received: 9/28/93

% 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	29.90	B		P	u
7440-36-0	Antimony	20.00	U		P	
7440-38-2	Arsenic	3.50	B		F	
7440-39-3	Barium	19.10	B	*	P	u
7440-41-7	Beryllium	1.00	U		P	
7440-43-9	Cadmium	2.00	U		P	
7440-70-2	Calcium	41900.00		E	P	J
7440-47-3	Chromium	3.00	U		P	
7440-48-4	Cobalt	5.00	U		P	
7440-50-8	Copper	4.40	B		P	u
7439-89-6	Iron	43.90	B	E	P	u
7439-92-1	Lead	2.00	U		F	
7439-95-4	Magnesium	12400.00		E	P	J
7439-96-5	Manganese	20.90			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel	8.00	U		P	
7440-09-7	Potassium	7570.00			P	
7782-49-2	Selenium	6.70		S*	F	J
7440-22-4	Silver	3.00	U		P	
7440-23-5	Sodium	20300.00			P	
7440-28-0	Thallium	2.00	U		F	uJ
7440-62-2	Vanadium	13.40	B		P	uJ
7440-66-6	Zinc	8.80	B		P	u
	Cyanide				NR	
	Bismuth	150	u			
	Silicon	16100				J

mut 4/13/94

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Verified 1/25/94

FORM I - IN 03/90

Replaced mut 4/13/94

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ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

Client : WESTINGHOUSE HANFORD
RFW# : 9309L095

W.O. #: 06168-002-001-9999-00
Date Received: 09-28-93

METALS

1. This narrative covers the analysis of (2) two water samples.

2. The samples were prepared and analyzed in accordance with the following protocols: CLP SOW 3/90.

3. ICVs, CCVs, and LCSs stock standards were purchased from Inorganic Ventures Laboratory and High Purity.

4. All analyses were performed within the required holding times.

5. All Initial and Continuing Calibration Verifications (ICV/CCV's) were within control limits.

6. All Initial and Continuing Calibration Blanks (ICB/CCB's) were within control limits.

7. All Preparation/Method Blanks were below Reporting Limits.

8. All ICP Interference Check Samples (ICSA and ICSAB) were within control limits.

9. All Laboratory Control Samples (LCS) were within the 80-120% control limits.

10. All Serial Dilution percent differences were within USEPA SOW control limits except for:

RFW #	Element	%Difference
001	Calcium	11.5
	Iron	11.8
	Magnesium	12.3

11. All Matrix Spike recoveries were within the 75-125% control limits (exception allowed when sample concentration exceeds the spike added concentration by a factor of 4 or more).

    Matrix spike analyses are not required for Ca, Mg, Na, and K in waters and soils.

WESTON

12. All Duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits for samples values greater than 5X Reporting Limit, or +/- the Reporting Limits for sample values less than 5X Reporting Limit except for:

RFW #	Element	%RPD
001	Selenium	112.1

13. Method of Standard Additions (MSA) analyses were performed on the following samples:

Element	Sample #'s
Selenium	001R, 002

14. The code CV is currently in use by the laboratory for both mercury instruments in operation (HG1 and HG2). HG1 is complete with autosampler and software, but still requires manual digestion; HG2 is operated by the analyst, produces a strip chart and also requires manual digestion.

15. HG1 requires less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionally scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 ml. For soils, 0.1 gram of sample is taken to a final volume of 50 ml (including all reagents).

16. ICP Interelement Correction Factors for IC1 and IC3 are included in this package, but do not appear on EDD.

17. The graphite furnace time that appears on form XIV is the time of the first injection. The time that appears on the data is the print time.

18. Solubles and totals were digested within the same digestion batch; therefore, will have the same flags.

Raymond A. Siery
Inorganic Section Manager
Lionville Analytical Laboratory

11/17/93
Date

9613402.1898

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

Client: WESTINGHOUSE HANFORD
RFW #: 9309L095

W.O. #: 06168-002-001-9999-00
Date Received: 09-28-93

CLP METALS ADDENDUM

1. A discrepancy exists between raw data and Form XIVs analytical spikes recovery calculations performed for graphite furnace AA analytes. Instrument software calculates spike recoveries based on absolute values below the IDL for sample results. This is hard-coded by the vendor and is currently not correctable. CLP convention (SOW ILM02.0, Exhibit E, Section V, Item 6, page E-20) requires that when values fall below the IDL, the sample result is equal to zero (0) for the purposes of calculating the percent recovery. The Form XIVs contain the correct calculation.

Raymond A. Siery
for Inorganic Section Manager
Lionville Analytical Laboratory

11/17/93
Date

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mlj\clp-met.nar

~~0014~~

9613402.1899

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator KD LEE/GG HAMILTON

Company Contact PH BUTCHER

Telephone (509) 376-5045

Project Designation/Sampling Locations 200-BP-1

Collection Date 9/24/93

Ice Chest No. 82

Field Logbook No. WHC-N-446 p.1

Bill of Lading/Airbill No. 2519009702

Offsite Property No. W93-0-0796-

Method of Shipment ~~WESTON~~ EMERY AJS 9/27/93

Shipped to WESTON

Possible Sample Hazards/Remarks 9309L095

Sample Identification

001 B09429

1, 1L, P, WATER; METALS-CLP TAL(Ca,Mg,Na,K,Fe,Mn,Si,Al,Bi), SELENIUM (HNO3 pH<2) UNFILTERED
1, 500ml, G, WATER; IC ANIONS(F,Cl,SO4,NO2,PO4)
1, 500ml, P, WATER; NO2/NO3(H2SO4 pH<2)
1, 250ml, P, WATER; ALKALINITY
1, 250ml, P, WATER; TDS
1, 250ml, P, WATER; SULFATE
1, 1L, P, WATER; CYANIDE(NaOH pH>12)
3, 2L, P, WATER; GROSS ALPHA/BETA, GAMMA SPEC(Cs-137,Co-60,Ru-106), Pu-238, Pu-239/240, Sr-90, TOTAL URANIUM(HNO3 pH<2)
1, 250ml, Gs, WATER; TRITIUM
1, 1L, G/P, WATER; Tc-99(HCl pH<2)

002 B09500

1, 1L, P, WATER; METALS-CLP TAL(Ca,Mg,Na,K,Fe,Mn,Si,Al,Bi), SELENIUM (HNO3 pH<2) FILTERED

Temp = 2.8°C

[] Field Transfer of Custody — Chain of Possession — (Sign and Print Names)

Relinquished By	Date	Time	Received By	Date	Time
K.D. Lee K.D. Lee	9/24/93	1044	AJ Simpson AJ SIMPSON	9/27/93	0811
AJ Simpson AJ SIMPSON	9/27/93	0811			
EMERY	9-28-93	1214	[illegible]	9/28/93	1245

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments: relinq. to frig # 38 by K.D. Lee 9/24/93 1044

01E

A-6000-07 (12/92) WEF061

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ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: 200 BP 1	REVIEWER: [illegible]	DATE: 1/25/94
LABORATORY: Western	CASE: ——	SDG: 9209095
SAMPLES/MATRIX: B094Z9, B09500		
water		

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	—	—	—

Not required

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

not Required

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 1/25/94

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.

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U.S. EPA - CLP

3
BLANKS

Lab name: ROY F. WESTON, INC. - L372 Contract: 6168-02-01

Lab code: WESTON Case No.: WEST SAS No.: SDG No.: CLP095

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	22.4	B	27.9	B	14.0	U	19.7	B	16.700	B	P
Antimony	22.7	B	20.0	U	20.0	U	20.0	U	20.000	U	P
Arsenic	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	F
Barium	19.1	B	12.7	B	5.4	B	4.0	U	4.000	U	P
Beryllium	1.0	U	1.0	U	1.0	U	1.0	U	1.000	U	P
Cadmium	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	P
Calcium	96.1	B	72.8	B	30.7	B	24.0	U	24.000	U	P
Chromium	3.0	U	3.0	U	3.0	U	3.0	U	3.000	U	P
Cobalt	8.1	B	5.9	B	5.0	U	5.0	U	5.000	U	P
Copper	5.3	B	3.8	B	3.0	U	3.0	U	3.000	U	P
Iron	17.2	B	11.6	B	5.6	B	5.0	U	10.800	B	P
Lead	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	F
Magnesium	97.6	B	78.9	B	46.7	B	42.0	U	42.000	U	P
Manganese	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	P
Mercury	.1	U	.1	U	.1	U			.100	U	CV
Nickel	8.0	U	8.0	U	8.0	U	8.0	U	8.000	U	P
Potassium	693.0	U	693.0	U	693.0	U	693.0	U	693.000	U	P
Selenium	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	F
Silver	3.0	U	3.0	U	3.0	U	3.0	U	3.000	U	P
Sodium	92.1	B	83.2	B	48.2	B	35.0	U	148.900	B	P
Thallium											NR
Vanadium	9.4	B	9.9	B	6.1	B	3.8	B	7.100	B	P
Zinc	4.6	B	3.3	B	3.0	U	3.0	U	4.200	B	P
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	10.000	U	C

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FORM III - IN 03/90

Verified 1/25/94

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U.S. EPA - CLP

3
BLANKS

Lab name: ROY F. WESTON, INC - L372 Contract: 6168-02-01

Lab code: WESTON Case No.: WEST SAS No.: SDG No.: CLP095

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic											NR
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead	2.0	U	2.0	U	2.0	U					F
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium	2.0	U	2.0	U	2.0	U					F
Silver											NR
Sodium											NR
Thallium	2.0	U	-2.1	B	2.0	U	-5.1	B			F
Vanadium											NR
Zinc											NR
Cyanide											NR

FORM III - IN B09479 B09500 03/90

Verified 11/25/94

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ROY F. WESTON INC.

INORGANIC ACCURACY REPORT 11/13/93

CLIENT: WESTINGHOUSE HANFORD

WESTON BATCH #: 9309L095

WORK ORDER: 06168-002-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT		SPIKED AMOUNT	%RECOV	DILUTION FACTOR(SPK)
-001	B094Z9	Silver, Total	46.1	10.0	u	50.0	92.2	1.0
		Aluminum, Total	2090	200	u	2000	104	1.0
		Arsenic, Total	37.2	10.0	u	40.0	93.0	1.0
		Barium, Total	1980	200	u	2000	98.9	1.0
		Beryllium, Total	49.0	5.0	u	50.0	98.0	1.0
		Bismuth, Total	5160	150	u	5000	103	1.0
		Calcium, Total	74100	45000		25000	116	1.0
		Cadmium, Total	55.2	5.0	u	50.0	110	1.0
		Cobalt, Total	505	50.0	u	500	101	1.0
		Chromium, Total	214	19.9		200	96.8	1.0
		Copper, Total	246	25.0	u	250	98.6	1.0
		Iron, Total	2100	1020		1000	108	1.0
		Potassium, Total	32000	8220		25000	95.1	1.0
		Magnesium, Total	39300	13200		25000	104	1.0
		Manganese, Total	549	43.6		500	101	1.0
		Sodium, Total	47100	21500		25000	102	1.0
		Nickel, Total	510	40.0	u	500	102	1.0
		Lead, Total	15.7	3.0	u	20.0	78.5	1.0
		Antimony, Total	522	60.0	u	500	104	1.0
		Selenium, Total	7.6	50.0	u	10.0	76.0	1.0
		Silicon, Total	18900	17100		1000	176 *	1.0
		Thallium, Total	52.3	10.0	u	50.0	105	1.0
		Vanadium, Total	544	50.0	u	500	109	1.0
		Zinc, Total	521	20.0	u	500	104	1.0

Quality
Silicon as
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U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO.

B094Z9D

Lab Name: ROY F. WESTON, INC - L372 Contract: 6168-02-01

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP095

Matrix (water/soil): WATER Level (low/med): LOW

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

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

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	%RPD	Q	M
Aluminum		58.8000	B	34.5000	B	52.1		P
Antimony		20.0000	U	20.0000	U			P
Arsenic		4.2000	B	3.8000	B	10.0		F
Barium		31.9000	B	22.0000	B	36.7		P
Beryllium		1.0000	U	1.0000	U			P
Cadmium		2.0000	U	2.0000	U			P
Calcium		45032.6000		44688.0000		.8		P
Chromium	10.0	19.9000		21.4000		7.3		P
Cobalt		7.5000	B	5.0000	U	200.0		P
Copper		8.6000	B	4.8000	B	56.7		P
Iron		1016.8000		1040.7000		2.3		P
Lead		2.0000	U	2.0000	U			F
Magnesium	5000.0	13211.2000		13337.4000		.9		P
Manganese	15.0	43.6000		41.9000		4.0		P
Mercury								NR
Nickel		15.1000	B	10.3000	B	37.8		P
Potassium	5000.0	8215.6020		8134.8010		1.0		P
Selenium	5.0	2.0000	B	7.1000		112.1	*	F
Silver		3.0000	U	3.0000	U			P
Sodium	5000.0	21457.8000		21842.0000		1.8		P
Thallium		2.0000	U	2.0000	U			F
Vanadium		22.0000	B	12.3000	B	56.6		P
Zinc		8.2000	B	4.9000	B	50.4		P
Cyanide		20.0000	U	20.0000	U			C

FORM VI - IN

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U.S. EPA - CLP

9

ICP SERIAL DILUTIONS

EPA SAMPLE NO.

B094Z9L

Lab Name: ROY F. WESTON, INC - L372 Contract: 6168-02-01

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP095

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	58.80	B	70.00	U	100.0		P
Antimony	20.00	U	100.00	U			P
Arsenic							
Barium	31.90	B	27.00	B	15.4		P
Beryllium	1.00	U	5.00	U			P
Cadmium	2.00	U	10.00	U			P
Calcium	45032.60		50221.50		11.5	E	P
Chromium	19.90		56.00		181.4		P
Cobalt	7.50	B	25.00	U	100.0		P
Copper	8.60	B	15.00	U	100.0		P
Iron	1016.80		1136.50		11.8	E	P
Lead							
Magnesium	13211.20		14830.50	B	12.3	E	P
Manganese	43.60		54.50	B	25.0		P
Mercury							
Nickel	15.10	B	40.00	U	100.0		P
Potassium	8215.60		10294.50	B	25.3		P
Selenium							
Silver	3.00	U	15.00	U			P
Sodium	21457.80		23490.00	B	9.5		P
Thallium							
Vanadium	22.00	B	40.00	B	81.8		P
Zinc	8.20	B	25.00	B	204.9		P

FORM IX - IN

Quality Ca, Fe and Mg as J
1/25/94

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DATA VALIDATION SUPPORTING DOCUMENTATION
DATA PACKAGE ID: 9309L095-WES-1353
ANALYSIS TYPE: METALS

PROJECT: 200-BP-1
VALIDATOR: K. ANGELOS
DATE: 1/24/94

HOLDING TIMES

SAMPLE ID	ANALYSIS TYPE	SAMPLE DATE	EXTRACT DATE	ANALYSIS DATE	EXTRACT DAYS	ANALYSIS DAYS
B094Z9	ICP	9/24/93	10/25/93	11/10/93	31	47
	HG	9/24/93	10/20/93	10/21/93	26	27
	AA/BI	9/24/93	10/25/93	11/10/93	31	47
	AA/AS	9/24/93	10/25/93	11/10/93	31	47
	AA/PB	9/24/93	10/25/93	10/29/93	31	35
	AA/SE	9/24/93	10/25/93	11/3/93	31	40
	AA/TL	9/24/93	10/25/93	11/3/93	31	40
	ICP/SI	9/24/93	10/25/93	11/10/93	31	47
B09500	ICP	9/24/93	10/25/93	11/10/93	31	47
	HG	9/24/93	10/20/93	10/21/93	26	27
	AA/BI	9/24/93	10/25/93	11/10/93	31	47
	AA/AS	9/24/93	10/25/93	11/4/93	31	41
	AA/PB	9/24/93	10/25/93	10/29/93	31	35
	AA/SE	9/24/93	10/25/93	11/3/93	31	40
	AA/TL	9/24/93	10/25/93	11/3/93	31	40
	ICP/SI	9/24/93	10/25/93	11/10/93	31	47

Verified
1/28/94

DATA PACKAGE ID: 9309L095-WES-1353	VALIDATOR: K. ANGELOS	DATE: 1/24/94	PAGE: 1 OF: 1

COMMENTS: METALS

SAMPLE ID	COMPOUND/ANALYTE	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
CCB1	ALUMINUM	27.9	B		UG/L	139.5		B094Z~~7~~9	58.8 U
								B09500	29.9 U
ICB	ANTIMONY	22.7	B			113.5		NONE	NONE
ICB	BARIUM	19.1	B			95.5		B094Z~~7~~9	31.9 U
								B09500	19.1 U
ICB	CALCIUM	96.1	B			480.5		NONE	
ICB	COBALT	8.1	B			40.5		B094Z9	7.5 U
ICB	COPPER	5.3	B			26.5		B094Z~~7~~9	8.6 U
								B09500	4.4 U
ICB	IRON	17.2	B			86		B09500	43.9 U
ICB	MAGNESIUM	97.6	B			488		NONE	
PREP. BLANK	SODIUM	148.9	B			744.5		NONE	
CCB1	VANADIUM	9.9	B			49.5		B094Z~~7~~9	22 U
								B09500	13.4 U
ICB	ZINC	4.6	B			23		B094Z~~7~~9	8.2 U
								B09500	8.8 U
CCB	Thallium	-5.2	B			—		B094Z~~7~~9	2 UJ
								B09500	2 UJ

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1/28/94

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9613402.1913

MEMORANDUM

TO: 200-BP-1 Project QA Record January 26, 1993

FR: Kent Angelos, Golder Associates Inc.

RE: GENERAL CHEMISTRY DATA VALIDATION PACKAGE: 9309L095-WES-1353 (913-1719, WES1353C.BP1)

INTRODUCTION

This memo presents the results of data validation on data package 9309L095-WES-1353 consisting of one water sample analyzed for general chemistry parameters. The sample(s) were analyzed by the Weston Analytics laboratory of Lionville, Pennsylvania using the WHC approved methods. The following table provides information regarding the sample identification, date, media and analysis performed.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B094Z9*	9/13/93	WATER	see Note 1

Notes:

* Indicates sample(s) which received 100% validation.

1. All sample(s) were analyzed for alkalinity, anions by ion chromatography (chloride, fluoride, nitrite, phosphate and sulfate), cyanide, nitrate+nitrite, sulfate by EPA method and total dissolved solids.

Data validation was conducted in accordance with the WHC statement of work (WHC 1993) and validation procedures (WHC 1992). Attachments 1 through 5 provide the following information as indicated below:

Attachment 1. Glossary of Data Reporting Qualifiers
Attachment 2. Summary of Data Qualifications
Attachment 3. Qualified Data Summary and Annotated Laboratory Reports
Attachment 4. Laboratory Narrative and Chain-of-Custody Documentation
Attachment 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

This section presents a summary of data quality in terms of the referenced validation criteria.

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met.

Sample Result Verification. All sample results were supported in the raw data.

Replaced page MS 4/13/94

Detection Limits. Detection limit goals were met for all sample results as specified in the work plan (DOE-RL 1992).

Completeness. The data package was complete for all requested analyses. One sample was validated in this data package with a total of 10 determinations reported, of which all were deemed valid. This results in a completeness of 100 percent, which meets the work plan objectives of 90% (DOE-RL 1990).

MAJOR DEFICIENCIES

No major deficiencies were identified which required rejection of data.

MINOR DEFICIENCIES

Holding Times

- Holding times for nitrite and phosphate were exceeded therefore all results have been qualified as estimated (UJ).

REFERENCES

DOE-RL, 1990, Remedial Investigation/Feasibility Study Work Plan for the 200-BP-1 Operable Unit Hanford Site, DOE-RL 88-32, U.S. Department of Energy, Richland, Washington.

DOE-RL, 1992, Remedial Investigation/Feasibility Study Work Plan for the 200-BP-1 Operable Unit Hanford Site, DOE/RL 88-32, Change Order 26, U.S. Department of Energy, Richland, Washington.

WHC, 1993, Westinghouse Hanford Company, Validation of 200-BP-1 Data, Statement of Work, Revision G, May 1993. Westinghouse Hanford Company, Richland, Washington.

WHC 1992, Data Validation Procedures for Chemical Analyses, WHC-SD-EN-SPP-002, Rev. 1, 1992. Westinghouse Hanford Company, Richland, Washington.

replaced page in 5/6/94 MDZ

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

B - Indicates the constituent was analyzed for and detected. The concentration reported is less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). The associated data should be considered usable for decision making purposes.

U - Indicates the constituent was analyzed for and not detected. The concentration reported is the sample detection limit corrected for aliquot size, dilution and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.

UJ - Indicates the constituent was analyzed for and not detected. Due to a minor quality control deficiency identified during data validation the concentration may not accurately reflect the sample detection limit. The associated data have been qualified as estimated but should be considered usable for decision making purposes.

BJ - Indicates the constituent was analyzed for and detected at a concentration less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL). Due to a minor quality control deficiency identified during data validation the associated data have been qualified as estimated, but should be considered usable for decision making purposes.

J - Indicates the constituent was analyzed for and detected. Due to a minor quality control deficiency identified during data validation the associated data have been qualified as estimated, but should be considered usable for decision making purposes.

UR - Indicates the constituent was analyzed for and not detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.

R - Indicates the constituent was analyzed for and detected. Due to a major quality control deficiency identified during data validation, the associated data have been qualified as unusable for decision making purposes.

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ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: 9309L095-WES-1353	VALIDATOR: K. ANGELOS	DATE: January 26, 1994	PAGE 1 OF 1
COMMENTS: GENERAL CHEMISTRY			
COMPOUND/ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
NITRITE AND PHOSPHATE BY IC	UJ	ALL	ANALYSIS HOLDING TIME EXCEEDED 48 HOURS

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ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: 9309L095-WES-1353

	Samp#	B09429	
	Date	9-24-93	
	Location	299-E34-1	
	Type	UNFILT.	
Parameter	Units	Result	Q
ALKALINITY	MG/L	84.000	
CHLORIDE	MG/L	15.400	
FLUORIDE	MG/L	0.500	U
NITRITE	MG/L	0.250	UJ
CYANIDE	MG/L	20.000	U
PHOSPHATE	MG/L	0.250	UJ
SULFATE-IC	MG/L	95.300	
NITRATE+NITRITE	MG-N/L	2.400	
SULFATE	MG/L	91.300	
TOTAL DISSOLVED SOLIDS	MG/L	308.000	

Verified
Draft
12/14/94

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ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 10/21/93

CLIENT: WESTINGHOUSE HANFORD

WESTON BATCH #: 9309L095

WORK ORDER: 06168-002-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT		DILUTION FACTOR
-001	B094Z9	Alkalinity	88.0		MG/L	2.0		1.0
		Chloride by IC	15.4		MG/L	1.0		4.0
		Fluoride by IC	0.50	u	MG/L	0.50		1.0
		Nitrite by IC	0.25	~~u~~	MG/L	0.25	uJ	1.0
		Cyanide, Total	20.0	u	UG/L	20.0		1.0
		Phosphate by IC	0.25	~~u~~	MG/L	0.25	uJ	1.0
		Sulfate by IC	95.3		MG/L	5.0		20.0
		Nitrate Nitrite	2.4		MG-N/L	0.50		5.0
		Sulfate	91.3		MG/L	10.0		4.0
		Total Dissolved Solids	308		MG/L	5.0		1.0

Verified
[illegible]
1/25/94

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ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

9613402.1923

ROY F. WESTON, INC.
LIONVILLE ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

Client : WESTINGHOUSE HANFORD
RFW# : 9309L095

W.O. #: 06168-002-001-9999-00
Date Received: 09-28-93

INORGANIC

The following is a summary of the quality control results and a description of any problems encountered during the analysis of this batch of samples:

1. All sample holding times as required by 40CFR136 were met with the exception of Nitrite by IC and Phosphate by IC, which were received past hold and Cyanide, which was analyzed past hold.

2. All preparation blank results were below the required detection limits.

3. All laboratory control standards (blank spikes) were within the control limits of 80-120%. All %RPD were within the 20% guidance limit.

4. All calibration verification checks were within the required control limits of 90-110%. Calibration verification is performed using independent standards.

5. Matrix spike recoveries are summarized on the Inorganic Accuracy Report contained within this document. All recoveries were within the 75-125% guidance limits. All %RPD were within the 20% guidance limit.

6. Replicate results are summarized on the Inorganic Precision Report contained within this document. All results were within the 20% RPD guidance limit.

7. The analytical methods applied by the laboratory, unless otherwise requested, for all inorganic analyses are derived from the USEPA Method for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020), Standard Methods for the Examination of Water and Wastewater 16 ed. and Test Methods for Evaluating Solid Waste (USEPA SW846).

RECEIVED

Margaret M. Beaty for
J. Peter Hershey, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

10/26/93
Date

NOV 1993
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SDLA

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Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator KD LEE/GG HAMILTON

Company Contact PH BUTCHER

Telephone (509) 376-5045

Project Designation/Sampling Locations 200-BP-1

Collection Date 9/24/93

Ice Chest No. 82

Field Logbook No. WHC-N-446 p.

Bill of Lading/Airbill No. 2519009702

Offsite Property No. W93-0-0796-

Method of Shipment ~~WESTON~~ EMERY AJS 9/27/93

Shipped to WESTON

Possible Sample Hazards/Remarks 9309L095

Sample Identification

001 B09429

1, 1L, P, WATER; METALS-CLP TAL(Ca,Mg,Na,K,Fe,Mn,Si,Al,Bi), SELENIUM (HNO3 pH<2) UNFILTERED
1, 500ml, G, WATER; IC ANIONS(F,Cl,SO4,NO2,PO4)
1, 500ml, P, WATER; NO2/NO3(H2SO4 pH<2)
1, 250ml, P, WATER; ALKALINITY
1, 250ml, P, WATER; TDS
1, 250ml, P, WATER; SULFATE
1, 1L, P, WATER; CYANIDE(NaOH pH>12)
3, 2L, P, WATER; GROSS ALPHA/BETA, GAMMA SPEC(Cs-137,Co-60,Ru-106), Pu-238, Pu-239/240, Sr-90, TOTAL URANIUM(HNO3 pH<2)
1, 250ml, Gs, WATER; TRITIUM
1, 1L, G/P, WATER; Tc-99(HCl pH<2)

002 B09500

1, 1L, P, WATER; METALS-CLP TAL(Ca,Mg,Na,K,Fe,Mn,Si,Al,Bi), SELENIUM (HNO3 pH<2) FILTERED

TEMP = 2.9°C

[] Field Transfer of Custody

Chain of Possession (Sign and Print Names)

Relinquished By	Date	Time	Received By	Date	Time
K.D. Lee K.D. Lee	9/24/93	1044	AJ Simpson AJ SIMPSON	9/27/93	0811
AJ Simpson AJ SIMPSON	9/27/93	0811			
EMERY	9-28-93	1214C		9/28/93	1245

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:
relinq. to frig # 3B by K.D. Lee 9/24/93 1044

012

A-6000-07 (12/92) WEF061

~~0020~~

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

WET CHEMISTRY DATA VALIDATION CHECKLIST - FORM A-7

PROJECT: 200 BP 1	REVIEWER: KMA	DATE: 1/25/94
LABORATORY: Western	CASE: ———	SDG: 9309095
SAMPLES/MATRIX: ~~B09427~~ B09429		
		KMA 1/28/94

1. DATA PACKAGE COMPLETENESS

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/Chain-of-Custody	—	—	—
Sample Analysis Data Report Forms	—	—	—
Standards Data	—	—	—
QC Summary			
Blanks Summary Report Forms	—	—	—
Spike Sample Recovery Report Forms	—	—	—
Duplicate Sample Analysis Report Forms	—	—	—
Laboratory Control Sample Report Forms	—	—	—
Raw Data			
Ion Chromatograph Chromatograms	—	—	—
TOC and TOX Instrument Printouts	—	—	—
Laboratory Bench Sheets	—	—	—
Additional Data			
Laboratory Sample Preparation Logs	—	—	—
Instrument Run Logs	—	—	—
Internal Laboratory Chain-of-Custory	—	—	—
Percent Solids Analysis Records	—	—	—
Reduction Formulae	—	—	—
Chemist Notebook Pages	—	—	—

Not Required

2. HOLDING TIMES

Were all samples analyzed within holding times? Yes (No) N/A

Action: If any holding times were 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 balance check conducted prior to the TDS analysis?	Yes	No	N/A
Was the titrant normality checked?	Yes	No	N/A

ACTION: Qualify all data as unusable (R) if reported from an analysis in which the above criteria were not met.

4. INITIAL AND CONTINUING CALIBRATION VERIFICATION

Have ICV and CCV been analyzed at the proper frequency?	Yes	No	N/A
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 the validation requirements.

5. 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) and list the affected samples and analytes below.

6. 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).

7. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the acceptance limits?	Yes	No	N/A

ACTION: If the sample concentration exceeds the spike concentration by a factor of 4 or more, and spike recoveries are outside the acceptance limits, no qualification is necessary. If spike recovery is outside the control limits and the sample results are >CRQL, qualify the data as estimated (J). If the spike recovery is <30% and the sample results are less then the IDL qualify the data as unusable (R).

8. 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 affected results 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 %R 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.

9. 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 samples in the validation narrative.

10. DUPLICATE SAMPLE ANALYSIS

Are RPD values within the acceptance limits? Yes No N/A

Action: Qualify the results for all associated samples of the same matrix as estimated (J) if the RPD falls outside the acceptance limits.

11. FIELD DUPLICATE SAMPLES

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

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

12. FIELD SPLIT SAMPLES

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

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

13. ANALYTE QUANTITATION AND DETECTION LIMITS

Have results been reported and calculated correctly? Yes No N/A

Are instrument detection limits below the CRDL? 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).

14. 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.

9613402.1930

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WESTINGHOUSE HANFORD

DATE RECEIVED: 09/28/93 RFW LOT # :9309L095

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS	Days	Q
B094Z9								
ALKALINITY	001	W	93LAL059	09/24/93	10/04/93	10/04/93	10	
ALKALINITY	001 REP	W	93LAL059	09/24/93	10/04/93	10/04/93		
CHLORIDE BY IC	001	W	93LCC112	09/24/93	09/29/93	09/29/93	5	
CHLORIDE BY IC	001 REP	W	93LCC112	09/24/93	09/29/93	09/29/93		
CHLORIDE BY IC	001 MS	W	93LCC112	09/24/93	09/29/93	09/29/93		
CHLORIDE BY IC	001 MSD	W	93LCC112	09/24/93	09/29/93	09/29/93		
FLUORIDE BY IC	001	W	93LFC112	09/24/93	09/29/93	09/29/93		
FLUORIDE BY IC	001 REP	W	93LFC112	09/24/93	09/29/93	09/29/93		
FLUORIDE BY IC	001 MS	W	93LFC112	09/24/93	09/29/93	09/29/93		
FLUORIDE BY IC	001 MSD	W	93LFC112	09/24/93	09/29/93	09/29/93		
NITRITE BY IC	001	W	93L2C112	09/24/93	09/29/93	09/29/93		J/UJ
NITRITE BY IC	001 REP	W	93L2C112	09/24/93	09/29/93	09/29/93		
NITRITE BY IC	001 MS	W	93L2C112	09/24/93	09/29/93	09/29/93		
NITRITE BY IC	001 MSD	W	93L2C112	09/24/93	09/29/93	09/29/93		
TOTAL CYANIDE	001	W	93LC251	09/24/93	10/08/93	10/08/93	14	
TOTAL CYANIDE	001 REP	W	93LC251	09/24/93	10/08/93	10/08/93		
TOTAL CYANIDE	001 MS	W	93LC251	09/24/93	10/08/93	10/08/93		
TOTAL CYANIDE	001 MSD	W	93LC251	09/24/93	10/08/93	10/08/93		
PHOSPHATE BY IC	001	W	93LPC112	09/24/93	09/29/93	09/29/93	5	J/UJ
PHOSPHATE BY IC	001 REP	W	93LPC112	09/24/93	09/29/93	09/29/93		
PHOSPHATE BY IC	001 MS	W	93LPC112	09/24/93	09/29/93	09/29/93		
PHOSPHATE BY IC	001 MSD	W	93LPC112	09/24/93	09/29/93	09/29/93		
SULFATE BY IC	001	W	93LSC112	09/24/93	09/29/93	09/29/93		
SULFATE BY IC	001 REP	W	93LSC112	09/24/93	09/29/93	09/29/93		
SULFATE BY IC	001 MS	W	93LSC112	09/24/93	09/29/93	09/29/93		
SULFATE BY IC	001 MSD	W	93LSC112	09/24/93	09/29/93	09/29/93		
NITRATE NITRITE	001	W	93LNT185	09/24/93	10/16/93	10/16/93	22	
NITRATE NITRITE	001 REP	W	93LNT185	09/24/93	10/16/93	10/16/93		
NITRATE NITRITE	001 MS	W	93LNT185	09/24/93	10/16/93	10/16/93		
NITRATE NITRITE	001 MSD	W	93LNT185	09/24/93	10/16/93	10/16/93		
SULFATE	001	W	93LS4049	09/24/93	10/11/93	10/11/93	17	
SULFATE	001 REP	W	93LS4049	09/24/93	10/11/93	10/11/93		
SULFATE	001 MS	W	93LS4049	09/24/93	10/11/93	10/11/93		
SULFATE	001 MSD	W	93LS4049	09/24/93	10/11/93	10/11/93		
SUB-OUT TEST FOR SUB	001	W		09/24/93				

Mgt Verified 1/25/94

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9613402.1931

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WESTINGHOUSE HANFORD

DATE RECEIVED: 09/28/93 RFW LOT # :9309L095

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS	Dop	Q
TOTAL DISSOLVED SOLI	001	W	93LSS366	09/24/93	09/30/93	10/01/93		
TOTAL DISSOLVED SOLI	001 REP	W	93LSS366	09/24/93	09/30/93	10/01/93		

LAB QC:

Verified MWL 1/25/94

ALKALINITY	MB1	W	93LAL059	N/A	10/04/93	10/04/93
ALKALINITY	MB1 BS	W	93LAL059	N/A	10/04/93	10/04/93
ALKALINITY	MB1 BSD	W	93LAL059	N/A	10/04/93	10/04/93
ALKALINITY	MB2	W	93LAL059	N/A	10/04/93	10/04/93
ALKALINITY	MB2 BS	W	93LAL059	N/A	10/04/93	10/04/93
ALKALINITY	MB2 BSD	W	93LAL059	N/A	10/04/93	10/04/93
CHLORIDE BY IC	LC1	W	93LCC112	N/A	09/29/93	09/29/93
CHLORIDE BY IC	LC1 BS	W	93LCC112	N/A	09/29/93	09/29/93
CHLORIDE BY IC	MB1	W	93LCC112	N/A	09/29/93	09/29/93
CHLORIDE BY IC	MB1 BS	W	93LCC112	N/A	09/29/93	09/29/93
CHLORIDE BY IC	MB1 BSD	W	93LCC112	N/A	09/29/93	09/29/93
CHLORIDE BY IC	MB2	W	93LCC112	N/A	09/29/93	09/29/93
CHLORIDE BY IC	MB2 BS	W	93LCC112	N/A	09/29/93	09/29/93
FLUORIDE BY IC	LC1	W	93LFC112	N/A	09/29/93	09/29/93
FLUORIDE BY IC	LC1 BS	W	93LFC112	N/A	09/29/93	09/29/93
FLUORIDE BY IC	MB1	W	93LFC112	N/A	09/29/93	09/29/93
FLUORIDE BY IC	MB1 BS	W	93LFC112	N/A	09/29/93	09/29/93
FLUORIDE BY IC	MB1 BSD	W	93LFC112	N/A	09/29/93	09/29/93
FLUORIDE BY IC	MB2	W	93LFC112	N/A	09/29/93	09/29/93
FLUORIDE BY IC	MB2 BS	W	93LFC112	N/A	09/29/93	09/29/93
NITRITE BY IC	LC1	W	93L2C112	N/A	09/29/93	09/29/93
NITRITE BY IC	LC1 BS	W	93L2C112	N/A	09/29/93	09/29/93
NITRITE BY IC	MB1	W	93L2C112	N/A	09/29/93	09/29/93
NITRITE BY IC	MB1 BS	W	93L2C112	N/A	09/29/93	09/29/93
NITRITE BY IC	MB1 BSD	W	93L2C112	N/A	09/29/93	09/29/93
NITRITE BY IC	MB2	W	93L2C112	N/A	09/29/93	09/29/93
NITRITE BY IC	MB2 BS	W	93L2C112	N/A	09/29/93	09/29/93
TOTAL CYANIDE	LC1 L	W	93LC251	N/A	10/08/93	10/08/93
TOTAL CYANIDE	LC2 L	W	93LC251	N/A	10/08/93	10/08/93
TOTAL CYANIDE	MB1	W	93LC251	N/A	10/08/93	10/08/93
PHOSPHATE BY IC	LC1	W	93LPC112	N/A	09/29/93	09/29/93
PHOSPHATE BY IC	LC1 BS	W	93LPC112	N/A	09/29/93	09/29/93
PHOSPHATE BY IC	MB1	W	93LPC112	N/A	09/29/93	09/29/93