START 9613408.2156 9302L511-WES-1031 83

0043455

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

WESTON

Client: WESTINGHOUSE HANFORD
RFW #: 9302L511

W.O. #: 06168-002-001-9999-00
Date Received: 02-04-93

GC/MS VOLATILE

The set of samples consisted of three (3) water samples collected on 02-02-93.

The samples were analyzed according to criteria set forth in CLP SOW 03/90 for TCL Volatile target compounds on 02-09-93.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. Non-target compounds were not detected in these samples.

2. All system monitoring compound (surrogate) recoveries were within EPA QC limits.

3. All matrix spike recoveries were within EPA QC limits.

4. The laboratory blank contained the common contaminant Acetone at a level less than 2x the CRQL.

5. All internal standard area and retention time criteria were met.

03.18.93
Date

J. Peter Hershey, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

sma/voa/02-511v.cn

FEB 1996
RECEIVED
EDMC

015

WESTON Analytics Use Only
9303L511

Custody Transfer Record/Lab Work Request

WESTON

Page 1 of 1

Client: Westinghouse-Hanford
Est. Final Proj. Sampling Date:
Work Order #: CLOLWB-COA-CO1-9999-00
Project Contact/Phone #:
AD Project Manager: Josie Edwards
QC: CLP Del: CLP TAT: 35 DAY
Date Rec'd: 3/4/93 Date Due: 3/11/93
Account #: WB-HANFORD

Refrigerator #		1				3				1		3						
#/Type Container	Liquid	3G				1G	1P	1P	1P	1D		1P						
	Solid																	
Volume	Liquid	40ml				500	250	1L	1L	1L		1L						
	Solid																	
Preservatives		NCL				—	HNO3	—	HNO3	NaOH		HNO3						
ANALYSES REQUESTED →		ORGANIC							INORG									
		VOA	BNA	Pest/PCB	Herb	Aromatics	Halo Aliph	Air TDS	Metal	CN		Fish metals						

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
Wi - Wipe
X - Other
F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	WESTON Analytics Use Only: CLP SVOA				8021 8010 8020 8015	8260	8240	8010						
001	B082N6			W	9/2/93						✓	✓	✓	✓	✓					
002	B082N8															✓				
003	B082N9						✓													
004	B082W0										✓	✓	✓	✓	✓					
005	B082W2															✓				
006	B082W3						✓													
007	B082P0										✓	✓	✓	✓	✓					
008	B082P2															✓				
009	B082P3						✓													

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

Temp - - 6.5°C

DATE/REVISIONS: BAD INFO TO FOLLOW

1.
2.
3.
4.
5.
6.

ORIGINAL RE-WRITTEN

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
EMCRY	SPerkins	3/4/93	1130		SD 3/4/93		
	SP 3/4/93						

WESTON Analytics Use Only

Samples were:
1) Shipped X or Hand Delivered
Airbill # EMCRY
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't Y or N

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

JCP 3-4-93

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

9613408.2157

9613408.2158

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator PH BUTCHER

Company Contact PH BUTCHER

Telephone (509)376-5045

Project Designation/Sampling Locations 200-BP-1

Collection Date 2-2-93

Ice Chest No. SML-142

Field Logbook No. EFL-1020

Bill of Lading/Airbill No. 2519007975

Offsite Property No. W93-0-0226-20

Method of Shipment EMERY

Shipped to WESTON

Possible Sample Hazards/Remarks N/A

Sample Identification

B082N6
- 1, 1L, P, WATER, TAL METALS+Bi(HNO3) (UNFILTERED)
- 1, 500ml, G, WATER, ANIONS(PO4,SO4,Cl,F)
- 1, 250ml, P, WATER, NO2/NO3 (H2SO4)
- 1, 1L, P, WATER, ALKALINITY/TDS
- 1, 1L, P, WATER, CLP-CYANIDE(NaOH)

B082N8
- 1, 1L, P, WATER, TAL METALS+Bi(HNO3) (FILTERED)

B082N9
- 3, 40ml, Gs, WATER, CLP-VOA

[] Field Transfer of Custody	Chain of Possession	(Sign and Print Names)
Relinquished by: 2-2-93 1440 B. WHITTEN	Received by: PAM COLE	Date/Time: 2/3/93 0817
Relinquished by: PAM COLE 2/3/93 0817	Received by:	Date/Time:
Relinquished by: EMERY	Received by: Susan Pesko	Date/Time: 2/4/93 1130
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments: FRIG # 1

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

003

9613408.2159

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator PH BUTCHER

Company Contact PH BUTCHER

Telephone (509)376-5045

Project Designation/Sampling Locations 200-BP-1

Collection Date 2-2-93

Ice Chest No. SML-142

Field Logbook No. EFL-1020

Bill of Lading/Airbill No. 2519007975

Offsite Property No. W93-0-0226-20

Method of Shipment EMERY

Shipped to WESTON

Possible Sample Hazards/Remarks N/A

Sample Identification

BO 82W0
- 1, 1L, P, WATER, TAL METALS+Bi(HNO3) (UNFILTERED)
- 1, 500ml, G, WATER, ANIONS(PO4,SO4,Cl,F)
- 1, 250ml, P, WATER, NO2/NO3 (H2SO4)
- 1, 1L, P, WATER, ALKALINITY/TDS
- 1, 1L, P, WATER, CLP-CYANIDE(NaOH)

BO 82W2
- 1, 1L, P, WATER, TAL METALS+Bi(HNO3) (FILTERED)

BO 82W3
- 3, 40ml, Gs, WATER, CLP-VOA

TEMP = 6.5°C

[] Field Transfer of Custody	Chain of Possession	(Sign and Print Names)
Relinquished by: 2-2-93 1440 Bill Whitten B WHITTEN	Received by: PAM COLE Pam Cole	Date/Time: 2/3/93 0826
Relinquished by: PAM COLE 2/3/93 0826 Pam Cole	Received by:	Date/Time:
Relinquished by: EMERY	Received by: Susan Pena	Date/Time: 2/4/93 1120
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments: FAIG FF 1

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

004

9613408.2160

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator PH BUTCHER

Company Contact PH BUTCHER

Telephone (509)376-5045

Project Designation/Sampling Locations 200-BP-1

Collection Date 2-2-93

Ice Chest No. SML-142

Field Logbook No. EFL-1020

Bill of Lading/Airbill No. 25191007975

Offsite Property No. W93-0-0226-20

Method of Shipment EMERY

Shipped to WESTON

Possible Sample Hazards/Remarks N/A

Sample Identification

B082P0
- 1, 1L, P, WATER, TAL METALS+Bi(HNO3) (UNFILTERED)
- 1, 500ml, G, WATER, ANIONS(PO4,SO4,Cl,F)
- 1, 250ml, P, WATER, NO2/NO3 (H2SO4)
- 1, 1L, P, WATER, ALKALINITY/TDS
- 1, 1L, P, WATER, CLP-CYANIDE(NaOH)

B082P2
- 1, 1L, P, WATER, TAL METALS+Bi(HNO3) (FILTERED)

B082P3
- 3, 40ml, Gs, WATER, CLP-VOA

[] Field Transfer of Custody	Chain of Possession	(Sign and Print Names)
Relinquished by: 2-2-93 1440 B WHITEN	Received by: PA MCOLE	Date/Time: 2/3/93 0823
Relinquished by: PAM COLE 2/3/93 0823	Received by:	Date/Time:
Relinquished by: EMERY	Received by: Susan Perks	Date/Time: 2/4/93 100
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments: FRIG # 4

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

005

9613408.2161 9302L511

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector KD LEE/GG HAMILTON Date Sampled 2-2-93 Time 1234 hours

Company Contact PH BUTCHER Telephone (509) 376-5045

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
B082N6	1, 1L, P	WATER	TAL METALS + Bi (HNO3) UNFILTERED
	1, 500ml, G	"	ANIONS (PO4,SO4,Cl,F)
	1, 250ml, P	"	NO2/NO3 (H2SO4)
	1, 1L, P	"	ALKALINITY, TDS
	1, 1L, P	"	CLP-CYANIDE (NaOH)
B082N8	1, 1L P	WATER	TAL METALS + Bi (HNO3) FILTERED
B082N9	3, 40ml, Gs	WATER	CLP-VOA
			TASK #: 93-011
			OPC#: W93-0-0226-20
			BOL#: 2519007975

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(05/9

00

9613408.2162

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector KD LEE/GG HAMILTON Date Sampled 2-2-93 Time _____ hours

Company Contact PH BUTCHER Telephone (509) 376-5045

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
B082W0	1, 1L, P	WATER	TAL METALS + Bi (HNO3) UNFILTERED
	1, 500ml, G	•	ANIONS (PO4,SO4,Cl,F)
	1, 250ml, P	•	NO2/NO3 (H2SO4)
	1, 1L, P	•	ALKALINITY, TDS
	1, 1L, P	•	CLP-CYANIDE (NaOH)
B082W2	1, 1L P	WATER	TAL METALS + Bi (HNO3) FILTERED
B082W3	3, 40ml, Gs	WATER	CLP-VOA
			TASK #: 93-011
			OPC#: W93-0-0226-20
			BOL#: 2519007975

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(05/9

01

9613408.2163

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector KD LEE/GG HAMILTON Date Sampled 2-2-93 Time _____ hours

Company Contact PH BUTCHER Telephone (509) 376-5045

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
B082P0	1, 1L, P	WATER	TAL METALS + Bi (HNO3) UNFILTERED
	1, 500ml, G	"	ANIONS (PO4,SO4,Cl,F)
	1, 250ml, P	"	NO2/NO3 (H2SO4)
	1, 1L, P	"	ALKALINITY, TDS
	1, 1L, P	"	CLP-CYANIDE (NaOH)
B082P2	1, 1L P	WATER	TAL METALS + Bi (HNO3) FILTERED
B082P3	3, 40ml, Gs	WATER	CLP-VOA
			TASK #: 93-011
			OPC#: N93-0-0226-20
			BOL#: 2519007975

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(05/9

Signature Security Service

Contractor	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT)
W&C		

PART I – TO BE COMPLETED BY ORIGINATOR

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

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

Routing Emery ☒ Contractor ☐ Vendor

Shipped to	Off-site Custodian
Weston ~~208~~ Welch Pool Rd. Lionville, PA 19341	Full Title

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
1 lbs.	Sample #: [illegible] Cooler ID: [illegible] Polycooler with groundwater samples packed in wet ice and vermiculite	N/A
1 lbs.	Sample #: 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 [illegible]

Bill of lading # [illegible]

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 11-1140	Date

Location of Property (Area & Bldg.)	Contact PH Butcher	Phone (509) 376-6045

Date Ready for Shipment	Cost Code to be Charged WR1[illegible]	Approximate Date This Property will be Returned

Originated By	Date	Authorized By	Date
Signature and Name of Property Control	Custodian Date	Property Management Approval	Date

PART II – TO BE COMPLETED BY SHIPPING

Signature of Recipient	Return Order No.	Date Issued	Purchase Order No.	Date Issued
Date 2 3 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

54-3000-479 (09/89)

012

Signature Security Servic

Contractor	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT)
WHC		W13-0-0226-20

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 Weston
208 Welch Pool Rd.
Lionville, PA 19341

Off-site Custodian

Full Title

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
1 lbs. 12	Sample #: B0B2N6, B0B2N8, B0B2N9, B0B2P0, B0B2P1, B0B2P2, B0B2P3, B0B2P4, B0B2P5, B0B2N7, B0B2N4, B0B2N5 Cooler ID: SML-142 Polycooler with groundwater samples packed in wet ice and vermiculite	N/A
1 lbs.	Sample #: 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 Area

Bill of lading # 2510007175

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
	11 11 70	2-7-92

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

Date Ready for Shipment	Cost Code to be Charged	Approximate Date This Property will be Returned
2/12/92	W0120 / 6L25A	N/A

Originated By	Date	Authorized By	Date
P Butcher			

Signature and Name of Property Control	Custodian Date	Property Management Approval	Date
			2/12/92

PART II – TO BE COMPLETED BY SHIPPING

Signature of Recipient	Return Order No.	Date Issued	Purchase Order No.	Date Issued
[illegible]				
Date 2 5 92				

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

54-3000-479(09/89)

013

ENT

Check ☐ COD ☐ FCCOD ☐

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

EMERY WORLDWIDE — A CF Company

E Shipper's Account Number: 850281585

SERVICES **

UNITED STATES / CANADA: Same Day (Extra Charges) ☐ · AM ☒ · PM ☐ · Second Day ☐ · Saturday Delivery ☐

INTERNATIONAL: Express ☐ · Standard Plus ☐ · Preferred ☐ · Standard ☐ · Business Documents ☐ · Customs Clearance ☐ · Delivery ☐

Date: 02-03-95 · Origin: BGC · Shipment Number: 251900797 5

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:
JOSIE KING
RF WESTON INC
208 WELSH POOL ROAD
LIONVILLE PA 19341
Hold for Pick Up ☐
Canada ☐

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 PL3EA W93-0-0226 #2099352 #22

E Consignee's Account Number

Description	Pcs	L	W	H	Total Pieces	Total Weight (in lbs)
2 COOLER ID SML 142 62# SML 175 61# WATER SAMPLES	2	24	16	17	2	132

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

Declared Value $

251900797 5

Remarks: OVERNIGHT DELIVERY SIGNATURE SECURITY SERVICE

Shipper's Signature X C.R. Kj... 2-3-95

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 ☐ OC/AO $

3-PHL-A

Terms and Conditions of Ba...

CONSIGNEE — PACKAGE

P10

Roy F. Weston, Inc. - Lionville Laboratory
Volatiles by GC/MS, HSL List

RFW Batch Number: 9302L511 Client: WESTINGHOUSE HANFORD Work Order: 6168-02-0 Report Date: 03/05/93 16:47 Page: 1a

015

	Cust ID:	B082N9		B082N9		B082N9		B082W3		B082P3		VBLK	
Sample Information	RFW#:	003		003 MS		003 MSD		006		009		93LVX024-MB1	
	Matrix:	WATER		WATER		WATER		WATER		WATER		WATER	
	D.F.:	1.00		1.00		1.00		1.00		1.00		1.00	
	Units:	UG/L		UG/L		UG/L		UG/L		UG/L		UG/L	
Surrogate Recovery	Toluene-d8	100	%	104	%	99	%	99	%	101	%	101	%
	Bromofluorobenzene	100	%	104	%	100	%	97	%	103	%	100	%
	1,2-Dichloroethane-d4	102	%	98	%	98	%	94	%	99	%	96	%
Chloromethane		10	U	10	U	10	U	10	U	10	U	10	U
Bromomethane		10	U	10	U	10	U	10	U	10	U	10	U
Vinyl Chloride		10	U	10	U	10	U	10	U	10	U	10	U
Chloroethane		10	U	10	U	10	U	10	U	10	U	10	U
Methylene Chloride		3	J	4	J	3	J	3	J	10	U	10	U
Acetone		10	U	10	U	10	U	10	U	10	U	10	
Carbon Disulfide		10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethene		10	U	101	%	104	%	10	U	10	U	10	U
1,1-Dichloroethane		10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloroethene (total)		10	U	10	U	10	U	10	U	10	U	10	U
Chloroform		10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloroethane		10	U	10	U	10	U	10	U	10	U	10	U
2-Butanone		10	U	10	U	10	U	10	U	10	U	10	U
1,1,1-Trichloroethane		10	U	10	U	10	U	10	U	10	U	10	U
Carbon Tetrachloride		10	U	10	U	10	U	10	U	10	U	10	U
Bromodichloromethane		10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloropropane		10	U	10	U	10	U	10	U	10	U	10	U
cis-1,3-Dichloropropene		10	U	10	U	10	U	10	U	10	U	10	U
Trichloroethene		10	U	104	%	104	%	10	U	10	U	10	U
Dibromochloromethane		10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloroethane		10	U	10	U	10	U	10	U	10	U	10	U
Benzene		10	U	104	%	102	%	10	U	10	U	10	U
trans-1,3-Dichloropropene		10	U	10	U	10	U	10	U	10	U	10	U
Bromoform		10	U	10	U	10	U	10	U	10	U	10	U
4-Methyl-2-pentanone		10	U	10	U	10	U	10	U	10	U	10	U
2-Hexanone		10	U	10	U	10	U	10	U	10	U	10	U
Tetrachloroethene		10	U	10	U	10	U	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane		10	U	10	U	10	U	10	U	10	U	10	U
Toluene		10	U	104	%	99	%	10	U	10	U	10	U

*= Outside of EPA CLP QC limits.

9613408.2167

RFW Batch Number: 9302L511 Client: WESTINGHOUSE HANFORD Work Order: 6168-02-0 Page: 1b

016

Cust ID:	BO82N9	BO82N9	BO82N9	BO82W3	BO82P3	VBLK
RFW#:	003	003 MS	003 MSD	006	009	93LVX024-MB1
Chlorobenzene	10 U	103 %	100 %	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U	10 U	10 U
Xylene (total)	10 U	10 U	10 U	10 U	10 U	10 U

*= Outside of EPA CLP QC limits.

9613408.2168

9613408.2169

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

B082N9

Lab Name: Roy F. Weston, Inc. Work Order: 6168-02-0

Client: WESTINGHOUSE HANFORD

Matrix: (soil/water) WATER

Lab Sample ID: 9302L511-003

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: AX2915

Level: (low/med) LOW

Date Received: 02/04/93

% Moisture: not dec.

Date Analyzed: 02/09/93

GC Column: DB624 ID: .53(mm)

Dilution Factor: 1.00

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	3	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

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1E

CLIENT SAMPLE NO.

BO82N9

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Roy F. Weston, Inc. Work Order: 6168-02-0

Client: WESTINGHOUSE HANFORD

Matrix: (soil/water) WATER

Lab Sample ID: 9302L511-003

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: AX2915

Level: (low/med) LOW

Date Received: 02/04/93

% Moisture: not dec.

Date Analyzed: 02/09/93

GC Column: DB624 ID: .53(mm)

Dilution Factor: 1.00

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				

FORM 1 VOA-TIC 3/90

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

BO82W3

Lab Name: Roy F. Weston, Inc. Work Order: 6168-02-0

Client: WESTINGHOUSE HANFORD

Matrix: (soil/water) WATER

Lab Sample ID: 9302L511-006

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: AX2911

Level: (low/med) LOW

Date Received: 02/04/93

% Moisture: not dec.

Date Analyzed: 02/09/93

GC Column: DB624 ID: .53(mm)

Dilution Factor: 1.00

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	3	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

6

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1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

B082W3

Lab Name: Roy F. Weston, Inc. Work Order: 6168-02-0

Client: WESTINGHOUSE HANFORD

Matrix: (soil/water) WATER

Lab Sample ID: 9302L511-006

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: AX2911

Level: (low/med) LOW

Date Received: 02/04/93

% Moisture: not dec.

Date Analyzed: 02/09/93

GC Column: DB624 ID: .53(mm)

Dilution Factor: 1.00

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

BO82P3

Lab Name: Roy F. Weston, Inc. Work Order: 6168-02-0

Client: WESTINGHOUSE HANFORD

Matrix: (soil/water) WATER

Lab Sample ID: 9302L511-009

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: AX2912

Level: (low/med) LOW

Date Received: 02/04/93

% Moisture: not dec.

Date Analyzed: 02/09/93

GC Column: DB624 ID: .53(mm)

Dilution Factor: 1.00

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

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1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

BO82P3

Lab Name: Roy F. Weston, Inc. Work Order: 6168-02-0

Client: WESTINGHOUSE HANFORD

Matrix: (soil/water) WATER

Lab Sample ID: 9302L511-009

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: AX2912

Level: (low/med) LOW

Date Received: 02/04/93

% Moisture: not dec.

Date Analyzed: 02/09/93

GC Column: DB624 ID: .53(mm)

Dilution Factor: 1.00

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				

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

Client : WESTINGHOUSE HANFORD
RFW# : 9302L511

W.O. #: 06168-002-001-9999-00
Date Received: 02-04-93

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 Phosphate by IC (received past hold).

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

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).

2.25.93
Date

J. Peter Hershey, Ph.D.
Laboratory Manager
Lionville Analytical Laboratory

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ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 02/18/93

CLIENT: WESTINGHOUSE HANFORD
WORK ORDER: 06168-002-001-9999-00

WESTON BATCH #: 9302L511

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-001	B082N6	Alkalinity	105		MG/L	2.0
		Chloride by IC	15.6		MG/L	5.0
		Fluoride by IC	0.51		MG/L	0.50
		Cyanide, Total	26.8		UG/L	20.0
		Phosphate by IC	0.25	u	MG/L	0.25
		Sulfate by IC	115		MG/L	5.0
		Nitrate Nitrite	7.7		MG-N/L	1.0
		Total Dissolved Solids	369		MG/L	5.0
-004	B082W0	Alkalinity	180		MG/L	2.0
		Chloride by IC	7.1		MG/L	0.25
		Fluoride by IC	1.8		MG/L	0.50
		Cyanide, Total	10.0	u	UG/L	10.0
		Phosphate by IC	0.25	u	MG/L	0.25
		Sulfate by IC	13.4		MG/L	2.5
		Nitrate Nitrite	0.10	u	MG-N/L	0.10
		Total Dissolved Solids	223		MG/L	5.0
-007	B082P0	Alkalinity	120		MG/L	2.0
		Chloride by IC	8.8		MG/L	0.25
		Fluoride by IC	0.50	u	MG/L	0.50
		Cyanide, Total	10.0	u	UG/L	10.0
		Phosphate by IC	0.25	u	MG/L	0.25
		Sulfate by IC	13.7		MG/L	2.5
		Nitrate Nitrite	0.28		MG-N/L	0.10
		Total Dissolved Solids	208		MG/L	5.0

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

Client: WESTINGHOUSE HANFORD
RFW #: 9302L511

W.O. #: 06168-002-001-9999-00
Date Received: 02-04-93

CLP METALS

1. This narrative covers the analysis of six (6) 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 form Inorganic Ventures Laboratory.

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.

11. 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	Cadmium	200.0

12. Method of Standard Additions (MSA) analyses was performed on the following sample:

Element	Sample #
Selenium	002

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13. 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)
except for:

RFW #	Element	%Recovery
001S	Arsenic	74.3
	Lead	59.0
	Selenium	71.0

A Post-Matrix Spike analysis was performed for those ICP elements that did not meet the specified control limits (exception allowed for Ag).

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

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 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

3.9.93
Date

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

Client: WESTINGHOUSE HANFORD
RFW #: 9302L511

W.O. #: 06168-002-001-9999-00
Date Received: 02-04-93

CLP METALS ADDENDUM

1. Following Exhibit E, Section V, Item 10, page E-23 of the USEPA Statement of Work for Inorganics Analysis, Document Number ILM02.0 ICP Instrument Detection Limits (IDLs) are reported for two (2) ICP instruments. The instrument identification numbers are "IC1" and "IC3". The highest IDL for the two instruments is used for reporting concentration values in this sample data package.

2. 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
Inorganic Section Manager

3.9.93
Date

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ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 03/04/93

CLIENT: WESTINGHOUSE HANFORD
WORK ORDER: 06168-002-001-9999-00

WESTON BATCH #: 9302L511

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-001	BO82N6	Silver, Total	10.0	u	UG/L	10.0
		Aluminum, Total	200	u	UG/L	200
		Arsenic, Total	10.0	u	UG/L	10.0
		Barium, Total	200	u	UG/L	200
		Beryllium, Total	5.0	u	UG/L	5.0
		Bismuth, Total	150	u	UG/L	150
		Calcium, Total	52900		UG/L	5000
		Cadmium, Total	5.0	u	UG/L	5.0
		Cobalt, Total	50.0	u	UG/L	50.0
		Chromium, Total	10.0	u	UG/L	10.0
		Copper, Total	25.0	u	UG/L	25.0
		Iron, Total	253		UG/L	100
		Mercury, Total	0.20	u	UG/L	0.20
		Potassium, Total	9100		UG/L	5000
		Magnesium, Total	14600		UG/L	5000
		Manganese, Total	26.7		UG/L	15.0
		Sodium, Total	35100		UG/L	5000
		Nickel, Total	40.0	u	UG/L	40.0
		Lead, Total	3.0	u	UG/L	3.0
		Antimony, Total	60.0	u	UG/L	60.0
		Selenium, Total	5.0	u	UG/L	5.0
		Thallium, Total	10.0	u	UG/L	10.0
		Vanadium, Total	50.0	u	UG/L	50.0
		Zinc, Total	20.0	u	UG/L	20.0
-002	BO82N8	Silver, Soluble	10.0	u	UG/L	10.0
		Aluminum, Soluble	200	u	UG/L	200
		Arsenic, Soluble	10.0	u	UG/L	10.0
		Barium, Soluble	200	u	UG/L	200
		Beryllium, Soluble	5.0	u	UG/L	5.0
		Bismuth, Soluble	150	u	UG/L	150
		Calcium, Soluble	46000		UG/L	5000
		Cadmium, Soluble	5.0	u	UG/L	5.0
		Cobalt, Soluble	50.0	u	UG/L	50.0
		Chromium, Soluble	10.0	u	UG/L	10.0
		Copper, Soluble	25.0	u	UG/L	25.0
		Iron, Soluble	100	u	UG/L	100
		Mercury, Soluble	0.20	u	UG/L	0.20
		Potassium, Soluble	7700		UG/L	5000
		Magnesium, Soluble	12700		UG/L	5000

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 03/04/93

CLIENT: WESTINGHOUSE HANFORD
WORK ORDER: 06168-002-001-9999-00

WESTON BATCH #: 9302L511

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-002	B082N8	Manganese, Soluble	20.7		UG/L	15.0
		Sodium, Soluble	30200		UG/L	5000
		Nickel, Soluble	40.0	u	UG/L	40.0
		Lead, Soluble	3.7		UG/L	3.0
		Antimony, Soluble	60.0	u	UG/L	60.0
		Selenium, Soluble	5.0	u	UG/L	5.0
		Thallium, Soluble	10.0	u	UG/L	10.0
		Vanadium, Soluble	50.0	u	UG/L	50.0
		Zinc, Soluble	20.0	u	UG/L	20.0

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 03/04/93

CLIENT: WESTINGHOUSE HANFORD
WORK ORDER: 06168-002-001-9999-00

WESTON BATCH #: 9302L511

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-004	BO82W0	Silver, Total	10.0	u	UG/L	10.0
		Aluminum, Total	200	u	UG/L	200
		Arsenic, Total	10.0	u	UG/L	10.0
		Barium, Total	200	u	UG/L	200
		Beryllium, Total	5.0	u	UG/L	5.0
		Bismuth, Total	150	u	UG/L	150
		Calcium, Total	15900		UG/L	5000
		Cadmium, Total	5.0	u	UG/L	5.0
		Cobalt, Total	50.0	u	UG/L	50.0
		Chromium, Total	10.0	u	UG/L	10.0
		Copper, Total	25.0	u	UG/L	25.0
		Iron, Total	100	u	UG/L	100
		Mercury, Total	0.20	u	UG/L	0.20
		Potassium, Total	6070		UG/L	5000
		Magnesium, Total	5000	u	UG/L	5000
		Manganese, Total	36.8		UG/L	15.0
		Sodium, Total	33700		UG/L	5000
		Nickel, Total	40.0	u	UG/L	40.0
		Lead, Total	3.0	u	UG/L	3.0
		Antimony, Total	60.0	u	UG/L	60.0
		Selenium, Total	5.0	u	UG/L	5.0
		Thallium, Total	10.0	u	UG/L	10.0
		Vanadium, Total	50.0	u	UG/L	50.0
		Zinc, Total	28.1		UG/L	20.0
-005	BO82W2	Silver, Soluble	10.0	u	UG/L	10.0
		Aluminum, Soluble	200	u	UG/L	200
		Arsenic, Soluble	10.0	u	UG/L	10.0
		Barium, Soluble	200	u	UG/L	200
		Beryllium, Soluble	5.0	u	UG/L	5.0
		Bismuth, Soluble	150	u	UG/L	150
		Calcium, Soluble	17900		UG/L	5000
		Cadmium, Soluble	5.0	u	UG/L	5.0
		Cobalt, Soluble	50.0	u	UG/L	50.0
		Chromium, Soluble	10.0	u	UG/L	10.0
		Copper, Soluble	25.0	u	UG/L	25.0
		Iron, Soluble	100	u	UG/L	100
		Mercury, Soluble	0.20	u	UG/L	0.20
		Potassium, Soluble	7180		UG/L	5000
		Magnesium, Soluble	5180		UG/L	5000

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 03/04/93

CLIENT: WESTINGHOUSE HANFORD
WORK ORDER: 06168-002-001-9999-00

WESTON BATCH #: 9302L511

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-005	B082W2	Manganese, Soluble	42.8		UG/L	15.0
		Sodium, Soluble	37900		UG/L	5000
		Nickel, Soluble	40.0	u	UG/L	40.0
		Lead, Soluble	3.0	u	UG/L	3.0
		Antimony, Soluble	60.0	u	UG/L	60.0
		Selenium, Soluble	5.0	u	UG/L	5.0
		Thallium, Soluble	10.0	u	UG/L	10.0
		Vanadium, Soluble	50.0	u	UG/L	50.0
		Zinc, Soluble	20.0	u	UG/L	20.0

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 03/04/93

CLIENT: WESTINGHOUSE HANFORD
WORK ORDER: 06168-002-001-9999-00

WESTON BATCH #: 9302L511

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-007	B082P0	Silver, Total	10.0	u	UG/L	10.0
		Aluminum, Total	200	u	UG/L	200
		Arsenic, Total	10.0	u	UG/L	10.0
		Barium, Total	200	u	UG/L	200
		Beryllium, Total	5.0	u	UG/L	5.0
		Bismuth, Total	150	u	UG/L	150
		Calcium, Total	29700		UG/L	5000
		Cadmium, Total	5.0	u	UG/L	5.0
		Cobalt, Total	50.0	u	UG/L	50.0
		Chromium, Total	10.0	u	UG/L	10.0
		Copper, Total	25.0	u	UG/L	25.0
		Iron, Total	104		UG/L	100
		Mercury, Total	0.20	u	UG/L	0.20
		Potassium, Total	6680		UG/L	5000
		Magnesium, Total	9650		UG/L	5000
		Manganese, Total	15.0	u	UG/L	15.0
		Sodium, Total	9760		UG/L	5000
		Nickel, Total	40.0	u	UG/L	40.0
		Lead, Total	3.0	u	UG/L	3.0
		Antimony, Total	60.0	u	UG/L	60.0
		Selenium, Total	5.0	u	UG/L	5.0
		Thallium, Total	10.0	u	UG/L	10.0
		Vanadium, Total	50.0	u	UG/L	50.0
		Zinc, Total	20.0	u	UG/L	20.0
-008	B082P2	Silver, Soluble	10.0	u	UG/L	10.0
		Aluminum, Soluble	200	u	UG/L	200
		Arsenic, Soluble	10.0	u	UG/L	10.0
		Barium, Soluble	200	u	UG/L	200
		Beryllium, Soluble	5.0	u	UG/L	5.0
		Bismuth, Soluble	150	u	UG/L	150
		Calcium, Soluble	28500		UG/L	5000
		Cadmium, Soluble	5.0	u	UG/L	5.0
		Cobalt, Soluble	50.0	u	UG/L	50.0
		Chromium, Soluble	10.0	u	UG/L	10.0
		Copper, Soluble	25.0	u	UG/L	25.0
		Iron, Soluble	100	u	UG/L	100
		Mercury, Soluble	0.20	u	UG/L	0.20
		Potassium, Soluble	5300		UG/L	5000
		Magnesium, Soluble	9240		UG/L	5000

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 03/04/93

CLIENT: WESTINGHOUSE HANFORD
WORK ORDER: 06168-002-001-9999-00

WESTON BATCH #: 9302L511

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-008	B082P2	Manganese, Soluble	15.0	u	UG/L	15.0
		Sodium, Soluble	9320		UG/L	5000
		Nickel, Soluble	40.0	u	UG/L	40.0
		Lead, Soluble	3.0	u	UG/L	3.0
		Antimony, Soluble	60.0	u	UG/L	60.0
		Selenium, Soluble	5.0	u	UG/L	5.0
		Thallium, Soluble	10.0	u	UG/L	10.0
		Vanadium, Soluble	50.0	u	UG/L	50.0
		Zinc, Soluble	20.0	u	UG/L	20.0

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

B082N6

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

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP511

Matrix (soil/water): WATER Lab Sample ID: 930251101

Level (low/med): LOW Date Received: 2/04/93

% 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	64.00	U		P
7440-36-0	Antimony	57.00	U		P
7440-38-2	Arsenic	4.30	B	N	F
7440-39-3	Barium	34.40	B		P
7440-41-7	Beryllium	1.00	U		P
7440-43-9	Cadmium	4.00	U	*	P
7440-70-2	Calcium	52900.00			P
7440-47-3	Chromium	8.00	B		P
7440-48-4	Cobalt	8.00	U		P
7440-50-8	Copper	9.00	U		P
7439-89-6	Iron	253.00			P
7439-92-1	Lead	2.00	U	NW	F
7439-95-4	Magnesium	14600.00			P
7439-96-5	Manganese	26.70			P
7439-97-6	Mercury	.10	U		CV
7440-02-0	Nickel	19.00	U		P
7440-09-7	Potassium	9100.00			P
7782-49-2	Selenium	2.20	B	NW	F
7440-22-4	Silver	7.00	U		P
7440-23-5	Sodium	35100.00			P
7440-28-0	Thallium	2.00	U		F
7440-62-2	Vanadium	17.50	B		P
7440-66-6	Zinc	8.00	U		P
	Cyanide	26.80			C

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

B082N8

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

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP511

Matrix (soil/water): WATER Lab Sample ID: 930251102

Level (low/med): LOW Date Received: 2/04/93

% 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	64.00	U		P
7440-36-0	Antimony	57.00	U		P
7440-38-2	Arsenic	4.90	B	N	F
7440-39-3	Barium	27.80	B		P
7440-41-7	Beryllium	1.00	U		P
7440-43-9	Cadmium	4.00	U	*	P
7440-70-2	Calcium	46000.00			P
7440-47-3	Chromium	7.00	U		P
7440-48-4	Cobalt	8.00	U		P
7440-50-8	Copper	9.00	U		P
7439-89-6	Iron	43.10	B		P
7439-92-1	Lead	3.70		NW	F
7439-95-4	Magnesium	12700.00			P
7439-96-5	Manganese	20.70			P
7439-97-6	Mercury	.10	U		CV
7440-02-0	Nickel	19.00	U		P
7440-09-7	Potassium	7700.00			P
7782-49-2	Selenium	4.50	B	NS	F
7440-22-4	Silver	7.00	U		P
7440-23-5	Sodium	30200.00			P
7440-28-0	Thallium	2.00	U		F
7440-62-2	Vanadium	20.60	B		P
7440-66-6	Zinc	8.00	U		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

B082W0

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

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP511

Matrix (soil/water): WATER Lab Sample ID: 930251104

Level (low/med): LOW Date Received: 2/04/93

% 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	64.00	U		P
7440-36-0	Antimony	57.00	U		P
7440-38-2	Arsenic	4.40	B	N	F
7440-39-3	Barium	13.10	B		P
7440-41-7	Beryllium	1.00	U		P
7440-43-9	Cadmium	4.00	U	*	P
7440-70-2	Calcium	15900.00			P
7440-47-3	Chromium	7.00	U		P
7440-48-4	Cobalt	8.00	U		P
7440-50-8	Copper	9.00	U		P
7439-89-6	Iron	20.40	B		P
7439-92-1	Lead	2.00	U	NW	F
7439-95-4	Magnesium	4610.00	B		P
7439-96-5	Manganese	36.80			P
7439-97-6	Mercury	.10	U		CV
7440-02-0	Nickel	19.00	U		P
7440-09-7	Potassium	6070.00			P
7782-49-2	Selenium	2.00	U	N	F
7440-22-4	Silver	7.00	U		P
7440-23-5	Sodium	33700.00			P
7440-28-0	Thallium	2.00	U		F
7440-62-2	Vanadium	7.00	U		P
7440-66-6	Zinc	28.10			P
	Cyanide	10.00	U		C

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

9613408.2189 000039

U.S. EPA - CLP

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

BO82W2

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

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP511

Matrix (soil/water): WATER Lab Sample ID: 930251105

Level (low/med): LOW Date Received: 2/04/93

% 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	64.00	U		P
7440-36-0	Antimony	57.00	U		P
7440-38-2	Arsenic	5.00	B	N	F
7440-39-3	Barium	17.80	B		P
7440-41-7	Beryllium	1.00	U		P
7440-43-9	Cadmium	4.00	U	*	P
7440-70-2	Calcium	17900.00			P
7440-47-3	Chromium	7.00	U		P
7440-48-4	Cobalt	8.00	U		P
7440-50-8	Copper	9.00	U		P
7439-89-6	Iron	13.50	B		P
7439-92-1	Lead	2.00	U	NW	F
7439-95-4	Magnesium	5180.00			P
7439-96-5	Manganese	42.80			P
7439-97-6	Mercury	.10	U		CV
7440-02-0	Nickel	19.00	U		P
7440-09-7	Potassium	7180.00			P
7782-49-2	Selenium	2.00	U	NW	F
7440-22-4	Silver	7.00	U		P
7440-23-5	Sodium	37900.00			P
7440-28-0	Thallium	2.00	U		F
7440-62-2	Vanadium	7.00	U		P
7440-66-6	Zinc	8.00	U		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

9613408.2190 0000040

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

B082P0

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

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP511

Matrix (soil/water): WATER Lab Sample ID: 930251107

Level (low/med): LOW Date Received: 2/04/93

% 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	64.00	U		P
7440-36-0	Antimony	57.00	U		P
7440-38-2	Arsenic	2.00	U	N	F
7440-39-3	Barium	73.00	B		P
7440-41-7	Beryllium	1.00	U		P
7440-43-9	Cadmium	4.00		*	P
7440-70-2	Calcium	29700.00			P
7440-47-3	Chromium	7.00	U		P
7440-48-4	Cobalt	8.00	U		P
7440-50-8	Copper	9.00	U		P
7439-89-6	Iron	104.00			P
7439-92-1	Lead	2.00	U	N	F
7439-95-4	Magnesium	9650.00			P
7439-96-5	Manganese	2.00	U		P
7439-97-6	Mercury	.10	U		CV
7440-02-0	Nickel	19.00	U		P
7440-09-7	Potassium	6680.00			P
7782-49-2	Selenium	2.00	U	NW	F
7440-22-4	Silver	7.00	U		P
7440-23-5	Sodium	9760.00			P
7440-28-0	Thallium	2.00	U		F
7440-62-2	Vanadium	8.70	B		P
7440-66-6	Zinc	13.80	B		P
	Cyanide	10.00	U		C

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

9613408.2191 000041

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

B082P2

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

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP511

Matrix (soil/water): WATER Lab Sample ID: 930251108

Level (low/med): LOW Date Received: 2/04/93

% 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	64.00	U		P
7440-36-0	Antimony	57.00	U		P
7440-38-2	Arsenic	2.00	U	N	F
7440-39-3	Barium	68.00	B		P
7440-41-7	Beryllium	1.00	U		P
7440-43-9	Cadmium	4.00	U	*	P
7440-70-2	Calcium	28500.00			P
7440-47-3	Chromium	7.00	U		P
7440-48-4	Cobalt	8.00	U		P
7440-50-8	Copper	9.00	U		P
7439-89-6	Iron	20.40	B		P
7439-92-1	Lead	2.00	U	N	F
7439-95-4	Magnesium	9240.00			P
7439-96-5	Manganese	2.00	U		P
7439-97-6	Mercury	.10	U		CV
7440-02-0	Nickel	19.00	U		P
7440-09-7	Potassium	5300.00			P
7782-49-2	Selenium	2.00	U	NW	F
7440-22-4	Silver	7.00	U		P
7440-23-5	Sodium	9320.00			P
7440-28-0	Thallium	2.00	U		F
7440-62-2	Vanadium	8.70	B		P
7440-66-6	Zinc	8.00	U		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

9613408.2192

VALIDATION SUMMARY

9613408.2193

9302L511-WES-1031

MEMORANDUM

TO: 200-BP-1 Project QA Record May 3, 1993

FR: Susan Winter, Golder Associates Inc.

RE: VOLATILE ORGANIC ANALYSIS DATA VALIDATION SUMMARY FOR DATA PACKAGE 9302L511-WES-1031

INTRODUCTION

This memo presents the results of data validation on data package 9302L511-WES-1031 consisting of three (3) low level water samples submitted for volatile organic analysis. The samples were analyzed by Weston Analytics according to the CLP protocol for TCL volatile compounds. A list of the samples included in this data set is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA
B082N9	02/02/93	WATER
B082W3	02/02/93	WATER
B082P3	02/02/93	WATER

Data validation was conducted in accordance with the revised WHC statement of work (WHC 1993) and validation procedures (Bechtold 1992) in which twenty percent (20%) of the samples were randomly assigned for validation. The samples in this data set were verified and blank adjusted as summarized below since they were not selected for full data validation.

Attachments 1 and 2 to this memo provide the data reporting qualifiers and a summary of the verified results.

DATA QUALITY OBJECTIVES

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

Blank Adjustment. Blank adjustment was not required since the only detected result in samples B082N9 and B082W3 was methylene chloride at 3 µg/L in both samples, all other sample results were non-detects. Methylene chloride was not present in the laboratory blank and therefore, no qualification was required.

REFERENCES

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

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

9613408.2195

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

GLOSSARY OF ORGANIC DATA REPORTING QUALIFIERS

B - Indicates the compound was analyzed for and detected in the associated blank. The "B" qualifier for organic data is applied by the laboratory only and is not applied by the data validators.

U - Indicates the compound 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 a 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 due to a quality control deficiency identified during data validation. The data are usable for decision making purposes.

UR - Indicates the compound was analyzed for and not detected; however, due to an identified quality control deficiency the data are unusable.

R - Indicates the compound was analyzed for and detected; however, 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.

9613408.2197

ATTACHMENT 2

AS QUALIFIED DATA SUMMARY

9613408.2198

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

B082N9

Lab Name: Roy F. Weston, Inc. Work Order: 6168-02-0

Client: WESTINGHOUSE HANFORD

Matrix: (soil/water) WATER

Lab Sample ID: 9302L511-003

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: AX2915

Level: (low/med) LOW

Date Received: 02/04/93

% Moisture: not dec.

Date Analyzed: 02/09/93

GC Column: DB624 ID: .53(mm)

Dilution Factor: 1.00

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	3	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

5/3/93

FORM 1 VOA Verified. 3/90

029

9613408.2199

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

B082W3

Lab Name: Roy F. Weston, Inc. Work Order: 6168-02-0

Client: WESTINGHOUSE HANFORD

Matrix: (soil/water) WATER

Lab Sample ID: 9302L511-006

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: AX2911

Level: (low/med) LOW

Date Received: 02/04/93

% Moisture: not dec.

Date Analyzed: 02/09/93

GC Column: DB624 ID: .53(mm)

Dilution Factor: 1.00

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	3	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

5/3/93

FORM 1 VOA Verified 3/90

9613408.2200

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

B082P3

Lab Name: Roy F. Weston, Inc. Work Order: 6168-02-0

Client: WESTINGHOUSE HANFORD

Matrix: (soil/water) WATER

Lab Sample ID: 9302L511-009

Sample wt/vol: 5.00 (g/mL) ML

Lab File ID: AX2912

Level: (low/med) LOW

Date Received: 02/04/93

% Moisture: not dec.

Date Analyzed: 02/09/93

GC Column: DB624 ID: .53(mm)

Dilution Factor: 1.00

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

FORM 1 VOA Verified 3/90

5/3/93

04

9613408.2201

MEMORANDUM

TO: 200-BP-1 Project QA Record May 3, 1993

FR: Susan Winter, Golder Associates Inc.

RE: GENERAL CHEMISTRY ANALYSIS DATA VALIDATION SUMMARY FOR DATA PACKAGE 9302L511-WES-1031

INTRODUCTION

This memo presents the results of data validation on data package 9302L511-WES-1031 consisting of three (3) water samples submitted for general chemistry analysis. The samples were analyzed by Weston Analytics using standard methods for all associated parameters. A list of the samples validated is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA
B082N6	02/02/93	WATER
B082W0	02/02/93	WATER
B082P0*	02/02/93	WATER

Data validation was conducted in accordance with the revised WHC statement of work (WHC 1993) and validation procedures (Bechtold 1992) in which twenty percent (20%) of the samples, marked with an asterisk (*), were randomly assigned for validation . Attachments 1 through 4 to this memo provide the data validation supporting documentation and a summary of the validated results.

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.

Detection Limits. Detection limit goals were met for all analyses.

Completeness. The data package was complete for all requested analyses. Three (3) samples were included in this data set with a total of 24 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent which meets the work plan objectives of 90%.

MAJOR DEFICIENCIES

No deficiencies were identified for the wet chemistry parameters which required rejection of data.

MINOR DEFICIENCIES

Holding Times

The phosphate analysis was performed out of the required holding time. Therefore, all associated sample results have been qualified as estimated (UJ).

REFERENCES

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

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

9613408.2203

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

B - Indicates the analyte was analyzed for and detected. The value reported is less than the contract required quantitation limit (CRQL) but greater than the instrument detection limit (IDL). The data are usable for decision making purposes.

U - Indicates the 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 analyte was analyzed for and not detected. Due to a 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.

BJ - Indicates the analyte was analyzed for and detected at a concentration greater than the IDL but less than the CRQL. The associated value is estimated due to a deficiency identified during data validation. The data are usable for decision making purposes.

J - Indicates the analyte was analyzed for and detected at a concentration greater than the CRQL. The associated value is estimated due to a deficiency identified during data validation. The data are usable for decision making purposes.

UR - Indicates the analyte was analyzed for and not detected; however, due to an identified quality control deficiency the data are unusable.

R - Indicates the analyte was analyzed and detected; however, due to an identified quality control deficiency the data are unusable.

9613408.2205

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY - FORM B-7

9302L511-WES-1031

SDG:	REVIEWER:	DATE: 5/03/93	PAGE 1 OF 1
COMMENTS: Wet Chemistry			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Phosphate	UJ	All	Analyzed out of holding time.

9613408.2207

ATTACHMENT 3

AS QUALIFIED DATA SUMMARY

9613408.2208

0000003

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 02/18/93

CLIENT: WESTINGHOUSE HANFORD
WORK ORDER: 06168-002-001-9999-00

WESTON BATCH #: 9302L511

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	Q	REPORTING LIMIT
-001	B082N6	Alkalinity	105		MG/L		2.0
		Chloride by IC	15.6		MG/L		5.0
	699-49-55A	Fluoride by IC	0.51		MG/L		0.50
		Cyanide, Total	26.8		UG/L		20.0
		Phosphate by IC	0.25		MG/L		0.25
		Sulfate by IC	115		MG/L		5.0
		Nitrate Nitrite	7.7		MG-N/L		1.0
		Total Dissolved Solids	369		MG/L		5.0
-004	B082W0	Alkalinity	180		MG/L		2.0
		Chloride by IC	7.1		MG/L		0.25
	699-60-57	Fluoride by IC	1.8		MG/L		0.50
		Cyanide, Total	10.0	u	UG/L		10.0
		Phosphate by IC	0.25		MG/L		0.25
		Sulfate by IC	13.4		MG/L		2.5
		Nitrate Nitrite	0.10	u	MG-N/L		0.10
		Total Dissolved Solids	223		MG/L		5.0
-007	B082P0	Alkalinity	120		MG/L		2.0
		Chloride by IC	8.8		MG/L		0.25
	699-54-57	Fluoride by IC	0.50	u	MG/L		0.50
		Cyanide, Total	10.0	u	UG/L		10.0
		Phosphate by IC	0.25		MG/L		0.25
		Sulfate by IC	13.7		MG/L		2.5
		Nitrate Nitrite	0.28		MG-N/L		0.10
		Total Dissolved Solids	208		MG/L		5.0

Verified
Validated B082P0 3/03/93

9613408.2209

ATTACHMENT 4

DATA VALIDATION SUPPORTING DOCUMENTATION

9613408.2210

WHC-SD-EN-SPP-002, Rev. 1

WET CHEMISTRY DATA VALIDATION CHECKLIST - FORM A-7

PROJECT: 200-BP-1	REVIEWER: [illegible]	DATE: 5/03/93
LABORATORY: Weston	CASE:	SDG: 9302L511
SAMPLES/MATRIX: Waters		-WES-1031
B082N6		
B082W0		
B082P0		

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	—	—	✓
5/3/93 ~~Percent Solids Analysis Records~~ TDS	✓	—	—
Reduction Formulae	—	—	✓
Chemist Notebook Pages	—	—	✓

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.

9613408.2214

HOLDING TIME SUMMARY - FORM B-1

9203L511-WES-1031

SDG:	REVIEWER: [illegible]	DATE: 5/03/93	PAGE 1 OF 1
COMMENTS: Wet Chemistry			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B082N6	Alkalinity	2/02/93	NA	2/09/93	NA	7	None
B082W0	Chloride			2/05/93		3	
B082P0	Fluoride			2/05/93		3	
	CN			2/16/93		14	
	Phosphate			2/05/93		3	UJ
	Sulfate			2/05/93		3	None
	NO_2/NO_3			2/16/93		14	
	TDS			2/08/93		6	

9613408.2215

MEMORANDUM

TO: 200-BP-1 Project QA Record May 4, 1993

FR: Susan Winter, Golder Associates Inc.

RE: METALS ANALYSIS DATA VALIDATION SUMMARY FOR DATA PACKAGE 9302L511-WES-1031

INTRODUCTION

This memo presents the results of data validation on data package 9302L511-WES-1031 consisting of six (6) water samples submitted for total and dissolved metals analysis. The samples were analyzed by Weston Analytics using the CLP protocol for TAL metals/cyanide analytes. A list of the samples validated is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA
B082N6	02/02/93	WATER
B082N8	02/02/93	WATER
B082W0	02/02/93	WATER
B082W2	02/02/93	WATER
B082P0*	02/02/93	WATER
B082P2	02/02/93	WATER

Data validation was conducted in accordance with the revised WHC statement of work (WHC 1993) and validation procedures (Bechtold 1992) in which twenty percent (20%) of the samples, marked with an asterisk (*), were randomly assigned for validation. Attachments 1 through 4 to this memo provide the data validation supporting documentation and a summary of the validated results.

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met with the exception of the laboratory duplicate as summarized under "Minor Deficiencies".

Accuracy. Goals for accuracy were met with the exception of the matrix spike and GFAA analytical spikes as summarized under "Minor Deficiencies".

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

Detection Limits. Detection limit goals were met for all analyses.

Completeness. The data package was complete for all requested analyses. Six (6) samples were validated in this data set with a total of 147 determinations reported, all of which were deemed valid. This results in a completeness of 100 percent which meets the work plan objectives of 90%.

MAJOR DEFICIENCIES

No deficiencies were identified for the metals fraction which required rejection of data.

MINOR DEFICIENCIES

Blanks

Calcium and cobalt were detected in the laboratory blank samples. However, since the all of the sample results for calcium were greater than five times the respective blank concentration, and the sample results for cobalt were all undetected no qualification was required.

Matrix Spike

Matrix spike percent recoveries for arsenic, lead and selenium were less than the 75% control limit, but greater than 30%. Therefore, the associated sample results have been qualified as estimated (UJ for non-detects, BJ for detects greater than the IDL but less than the CRDL, and J for detects greater than the CRDL).

Laboratory Duplicate

The duplicate relative percent difference for cadmium was greater than the control limit. Therefore, all associated sample results have been qualified as estimated (J for detects, UJ for non-detects).

GFAA Analytical Spikes

GFAA analytical spikes for the following samples were out of the control limit of 85%:

- Lead, samples B082N6, B082N8, B082W0, and B082W2.
- Selenium, samples B082N6, B082N8, B082W2, B082P0,and B082P2.

The associated sample results have been qualified as estimated (UJ for non-detects, BJ for detects less than the CRDL but greater than the IDL, and J for detects greater than the CRDL) with the exception of selenium in sample B082N8 which was analyzed by the method of standard additions (MSA).

REFERENCES

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

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

9613408.2217

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

9613408.2218

GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

B - Indicates the analyte was analyzed for and detected. The value reported is less than the contract required quantitation limit (CRQL) but greater than the instrument detection limit (IDL). The data are usable for decision making purposes.

U - Indicates the 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 analyte was analyzed for and not detected. Due to a 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.

BJ - Indicates the analyte was analyzed for and detected at a concentration greater than the IDL but less than the CRQL. The associated value is estimated due to a deficiency identified during data validation. The data are usable for decision making purposes.

J - Indicates the analyte was analyzed for and detected at a concentration greater than the CRQL. The associated value is estimated due to a deficiency identified during data validation. The data are usable for decision making purposes.

UR - Indicates the analyte was analyzed for and not detected; however, due to an identified quality control deficiency the data are unusable.

R - Indicates the analyte was analyzed and detected; however, due to an identified quality control deficiency the data are unusable.

9613408.2219

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY - FORM B-7

93021511-WFS-1031

SDG:	REVIEWER: [illegible]	DATE: 5/3/93	PAGE 1 OF 1
COMMENTS: Metals			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Arsenic	UJ/RJ	All	MS %R<75%
Lead	J/UJ	↓	↓
Selenium	UJ/RJ	↓	↓
Cadmium	J/UJ	All	Dup RPD is out of CL
Lead	J/UJ	B082N6	GFAA Analytical Spike out of CL
↓	↓	B082N8	↓
		B082W0	
		B082W2	
Selenium	RJ	B082N6	
↓	UJ	B082W2	↓
	None-analyzed by MSA	B082N8	
	UJ	B082P0	
	UJ	B082P2	

9613408.2221

ATTACHMENT 3

AS QUALIFIED DATA SUMMARY

9613408.2222

000036

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
699-49-55A

B082N6

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

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP511

Matrix (soil/water): WATER Lab Sample ID: 930251101

Level (low/med): LOW Date Received: 2/04/93

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	64.00	U		P	
7440-36-0	Antimony	57.00	U		P	
7440-38-2	Arsenic	4.30	~~B~~	N	F	BJ
7440-39-3	Barium	34.40	B		P	
7440-41-7	Beryllium	1.00	U		P	
7440-43-9	Cadmium	4.00	~~U~~	*	P	UJ
7440-70-2	Calcium	52900.00			P	
7440-47-3	Chromium	8.00	B		P	
7440-48-4	Cobalt	8.00	U		P	
7440-50-8	Copper	9.00	U		P	
7439-89-6	Iron	253.00			P	
7439-92-1	Lead	2.00	~~U~~	NW	F	UJ
7439-95-4	Magnesium	14600.00			P	
7439-96-5	Manganese	26.70			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel	19.00	U		P	
7440-09-7	Potassium	9100.00			P	
7782-49-2	Selenium	2.20	~~B~~	NW	F	BJ
7440-22-4	Silver	7.00	U		P	
7440-23-5	Sodium	35100.00			P	
7440-28-0	Thallium	2.00	U		F	
7440-62-2	Vanadium	17.50	B		P	
7440-66-6	Zinc	8.00	U		P	
	Cyanide	26.80			C	
7440-69-9	Bismuth	150.00	U		P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN verified. 03/90

5/3/93

9613408.2223

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U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
699-49-55A

B082N8

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

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP511

Matrix (soil/water): WATER Lab Sample ID: 930251102

Level (low/med): LOW Date Received: 2/04/93

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	64.00	U		P	
7440-36-0	Antimony	57.00	U		P	
7440-38-2	Arsenic	4.90	~~B~~	N	F	BJ
7440-39-3	Barium	27.80	B		P	
7440-41-7	Beryllium	1.00	U		P	
7440-43-9	Cadmium	4.00	~~U~~	*	P	UJ
7440-70-2	Calcium	46000.00			P	
7440-47-3	Chromium	7.00	U		P	
7440-48-4	Cobalt	8.00	U		P	
7440-50-8	Copper	9.00	U		P	
7439-89-6	Iron	43.10	B		P	
7439-92-1	Lead	3.70		NW	F	J
7439-95-4	Magnesium	12700.00			P	
7439-96-5	Manganese	20.70			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel	19.00	U		P	
7440-09-7	Potassium	7700.00			P	
7782-49-2	Selenium	4.50	~~B~~	NS	F	BJ
7440-22-4	Silver	7.00	U		P	
7440-23-5	Sodium	30200.00			P	
7440-28-0	Thallium	2.00	U		F	
7440-62-2	Vanadium	20.60	B		P	
7440-66-6	Zinc	8.00	U		P	
	Cyanide				NR	
7440-69-9	Bismuth	150.00	U		P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN verified 5/3/93

03/90

9613408.2224

0000038

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
699-60-57

B082W0

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

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP511

Matrix (soil/water): WATER Lab Sample ID: 930251104

Level (low/med): LOW Date Received: 2/04/93

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	64.00	U		P	
7440-36-0	Antimony	57.00	U		P	
7440-38-2	Arsenic	4.40	~~B~~	N	F	BJ
7440-39-3	Barium	13.10	B		P	
7440-41-7	Beryllium	1.00	U		P	
7440-43-9	Cadmium	4.00	~~U~~	*	P	UJ
7440-70-2	Calcium	15900.00			P	
7440-47-3	Chromium	7.00	U		P	
7440-48-4	Cobalt	8.00	U		P	
7440-50-8	Copper	9.00	U		P	
7439-89-6	Iron	20.40	B		P	
7439-92-1	Lead	2.00	~~U~~	NW	F	UJ
7439-95-4	Magnesium	4610.00	B		P	
7439-96-5	Manganese	36.80			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel	19.00	U		P	
7440-09-7	Potassium	6070.00			P	
7782-49-2	Selenium	2.00	~~U~~	N	F	UJ
7440-22-4	Silver	7.00	U		P	
7440-23-5	Sodium	33700.00			P	
7440-28-0	Thallium	2.00	U		F	
7440-62-2	Vanadium	7.00	U		P	
7440-66-6	Zinc	28.10			P	
	Cyanide	10.00	U		C	
7440-69-9	Bismuth	150.00	U		P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN Verified 5/3/93

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U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
699-60-57

B082W2

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

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP511

Matrix (soil/water): WATER Lab Sample ID: 930251105

Level (low/med): LOW Date Received: 2/04/93

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	64.00	U		P	
7440-36-0	Antimony	57.00	U		P	
7440-38-2	Arsenic	5.00	~~B~~	N	F	BJ
7440-39-3	Barium	17.80	B		P	
7440-41-7	Beryllium	1.00	U		P	
7440-43-9	Cadmium	4.00	~~U~~	*	P	UJ
7440-70-2	Calcium	17900.00			P	
7440-47-3	Chromium	7.00	U		P	
7440-48-4	Cobalt	8.00	U		P	
7440-50-8	Copper	9.00	U		P	
7439-89-6	Iron	13.50	B		P	
7439-92-1	Lead	2.00	~~U~~	NW	F	UJ
7439-95-4	Magnesium	5180.00			P	
7439-96-5	Manganese	42.80			P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel	19.00	U		P	
7440-09-7	Potassium	7180.00			P	
7782-49-2	Selenium	2.00	~~U~~	NW	F	UJ
7440-22-4	Silver	7.00	U		P	
7440-23-5	Sodium	37900.00			P	
7440-28-0	Thallium	2.00	U		F	
7440-62-2	Vanadium	7.00	U		P	
7440-66-6	Zinc	8.00	U		P	
	Cyanide				NR	
7440-69-9	Bismuth	150.00	U		P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN Verified 5/3/93 03/90

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U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
699-54-57

B082P0

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

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP511

Matrix (soil/water): WATER Lab Sample ID: 930251107

Level (low/med): LOW Date Received: 2/04/93

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	64.00	U		P	
7440-36-0	Antimony	57.00	U		P	
7440-38-2	Arsenic	2.00	U	N	F	UJ
7440-39-3	Barium	73.00	B		P	
7440-41-7	Beryllium	1.00	U		P	
7440-43-9	Cadmium	4.00		*	P	J
7440-70-2	Calcium	29700.00			P	
7440-47-3	Chromium	7.00	U		P	
7440-48-4	Cobalt	8.00	U		P	
7440-50-8	Copper	9.00	U		P	
7439-89-6	Iron	104.00			P	
7439-92-1	Lead	2.00	U	N	F	UJ
7439-95-4	Magnesium	9650.00			P	
7439-96-5	Manganese	2.00	U		P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel	19.00	U		P	
7440-09-7	Potassium	6680.00			P	
7782-49-2	Selenium	2.00	U	NW	F	UJ
7440-22-4	Silver	7.00	U		P	
7440-23-5	Sodium	9760.00			P	
7440-28-0	Thallium	2.00	U		F	
7440-62-2	Vanadium	8.70	B		P	
7440-66-6	Zinc	13.80	B		P	
	Cyanide	10.00	U		C	
7440-69-9	Bismuth	150.00	U		P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN Verified Validated 5/3/93 03/90

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U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
699-54-57

B082P2

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

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP511

Matrix (soil/water): WATER Lab Sample ID: 930251108

Level (low/med): LOW Date Received: 2/04/93

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M	Q
7429-90-5	Aluminum	64.00	U		P	
7440-36-0	Antimony	57.00	U		P	
7440-38-2	Arsenic	2.00	~~U~~	N	F	US
7440-39-3	Barium	68.00	B		P	
7440-41-7	Beryllium	1.00	U		P	
7440-43-9	Cadmium	4.00	~~U~~	*	P	US
7440-70-2	Calcium	28500.00			P	
7440-47-3	Chromium	7.00	U		P	
7440-48-4	Cobalt	8.00	U		P	
7440-50-8	Copper	9.00	U		P	
7439-89-6	Iron	20.40	B		P	
7439-92-1	Lead	2.00	~~U~~	N	F	US
7439-95-4	Magnesium	9240.00			P	
7439-96-5	Manganese	2.00	U		P	
7439-97-6	Mercury	.10	U		CV	
7440-02-0	Nickel	19.00	U		P	
7440-09-7	Potassium	5300.00			P	
7782-49-2	Selenium	2.00	~~U~~	NW	F	US
7440-22-4	Silver	7.00	U		P	
7440-23-5	Sodium	9320.00			P	
7440-28-0	Thallium	2.00	U		F	
7440-62-2	Vanadium	8.70	B		P	
7440-66-6	Zinc	8.00	U		P	
	Cyanide				NR	
7440-69-9	Bismuth	150.00	U		P	

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN Verified 03/90

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ATTACHMENT 4

DATA VALIDATION SUPPORTING DOCUMENTATION

WHC-SD-EN-SPP-002, Rev. 1

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: 200-BP-1	REVIEWER: [illegible]	DATE: 5/03/93
LABORATORY: Weston	CASE:	SDG: 9302L511-WES -1031
SAMPLES/MATRIX: Waters		
B082N6 B082W2		
B082N8 B082P0		
B082W0		
B082P2		

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.

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HOLDING TIME SUMMARY - FORM B-1

9302L511-WES-1031

SDG:	REVIEWER: [illegible]	DATE: 5/03/93	PAGE 1 OF 1
COMMENTS: Metals			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B082N6	ICP	02/02/93	NA	2/26/93	NA	24	None
B082N8	Bi	↓	↓	2/26/93	↓	24	↓
B082W0	As	↓	↓	2/27/93	↓	25	↓
B082W2	Pb	↓	↓	2/27/93	↓	25	↓
B082P0	Se	↓	↓	3/01/93	↓	27	↓
B082P2	Tl	↓	↓	3/01/93	↓	27	↓
	Hg	↓	↓	3/01/93	↓	27	↓

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.: CLP511

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	Preparation Blank	C	M
	5x								5x		
Aluminum	64.0	U	64.0	U	64.0	U	64.0	U	64.000	U	P
Antimony	57.0	U	57.0	U	57.0	U	57.0	U	57.000	U	P
Arsenic	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	F
Barium	5.0	U	5.0	U	5.0	U	5.0	U	-5.000	B	P
Beryllium	1.0	U	1.0	U	1.0	U	1.0	U	1.000	U	P
Cadmium	4.0	U	4.0	U	4.0	U	4.0	U	4.000	U	P
Calcium	17.0	U	17.0	U	17.0	U	17.0	U	160 32.000	B	P
Chromium	7.0	U	7.0	U	7.0	U	7.0	U	7.000	U	P
Cobalt	40.5 8.1	B	8.0	U	8.0	U	8.0	U	8.000	U	P
Copper	9.0	U	9.0	U	9.0	U	9.0	U	9.000	U	P
Iron	10.0	U	10.0	U	10.0	U	10.0	U	10.000	U	P
Lead	2.0	U	-2.1	B	2.0	U			2.000	U	F
Magnesium	44.0	U	44.0	U	44.0	U	44.0	U	44.000	U	P
Manganese	2.0	U	2.0	U	-2.0	B	-2.5	B	2.000	U	P
Mercury	.1	U	.1	U	.1	U	.1	U	.100	U	CV
Nickel	19.0	U	19.0	U	19.0	U	19.0	U	-21.000	B	P
Potassium	877.0	U	877.0	U	877.0	U	877.0	U	877.000	U	P
Selenium	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	F
Silver	7.0	U	7.0	U	7.0	U	7.0	U	7.000	U	P
Sodium	155.0	U	155.0	U	155.0	U	155.0	U	155.000	U	P
Thallium	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	F
Vanadium	7.0	U	7.0	U	7.0	U	7.0	U	7.000	U	P
Zinc	8.0	U	8.0	U	8.0	U	8.0	U	8.000	U	P
Cyanide	10.0	U	10.0	U	10.0	U			10.000	U	C

FORM III - IN 03/90

Calcium - all results are greater than 160 ug/L. No qualification required.

Cobalt - all results are already ND. No qualification required. 5/03/93

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5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

B082N6S

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

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP511

Matrix: WATER Level (low/med): LOW

% Solids for Sample: 0.0

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

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum	75-125	2081.7000		64.0000	U	2000.00	104.1		P
Antimony	75-125	525.7000		57.0000	U	500.00	105.1		P
Arsenic	75-125	34.0000		4.3000	B	40.00	74.3	N	F
Barium	75-125	2161.0000		34.4000	B	2000.00	106.3		P
Beryllium	75-125	51.9000		1.0000	U	50.00	103.8		P
Cadmium	75-125	51.2000		4.0000	U	50.00	102.4		P
Calcium									NR
Chromium	75-125	220.8000		8.0000	B	200.00	106.4		P
Cobalt	75-125	511.3000		8.0000	U	500.00	102.3		P
Copper	75-125	256.0000		9.0000	U	250.00	102.4		P
Iron	75-125	1301.9000		253.1000		1000.00	104.9		P
Lead	75-125	11.8000		2.0000	U	20.00	59.0	N	F
Magnesium									NR
Manganese	75-125	554.5000		26.7000		500.00	105.6		P
Mercury	75-125	.9920		.1000	U	1.00	99.2		CV
Nickel	75-125	536.6001		19.0000	U	500.00	107.3		P
Potassium									NR
Selenium	75-125	9.3000		2.2000	B	10.00	71.0	N	F
Silver	75-125	48.8000		7.0000	U	50.00	97.6		P
Sodium									NR
Thallium	75-125	50.7000		2.0000	U	50.00	101.4		F
Vanadium	75-125	550.3999		17.5000	B	500.00	106.6		P
Zinc	75-125	531.8000		8.0000	U	500.00	106.4		P
Cyanide	75-125	114.9670		26.7960		100.00	88.2		C

Comments:

FORM V (Part 1) - IN 03/90

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U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO.

B082N6D

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

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP511

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		64.0000	U	64.0000	U			P
Antimony		57.0000	U	57.0000	U			P
Arsenic		4.3000	B	5.5000	B	24.5		F
Barium		34.4000	B	25.9000	B	28.2		P
Beryllium		1.0000	U	1.0000	U			P
Cadmium	5.0	4.0000	U	10.3000		200.0	*	P
Calcium		52858.3000		43627.4000		19.1		P
Chromium	10.0	8.0000	B	15.0000		60.9	OK	P
Cobalt		8.0000	U	8.0000	U			P
Copper		9.0000	U	9.0000	U			P
Iron	100.0	253.1000		218.3000		14.8		P
Lead		2.0000	U	2.0000	U			F
Magnesium	5000.0	14634.1000		12111.4000		18.9		P
Manganese	15.0	26.7000		21.7000		20.7		P
Mercury		.1000	U	.1000	U			CV
Nickel		19.0000	U	19.0000	U			P
Potassium	5000.0	9101.0000		8126.1990		11.3		P
Selenium		2.2000	B	2.9000	B	27.5		F
Silver		7.0000	U	7.0000	U			P
Sodium		35062.1000		29014.6000		18.9		P
Thallium		2.0000	U	2.0000	U			F
Vanadium		17.5000	B	17.0000	B	2.9		P
Zinc		8.0000	U	8.0000	U			P
Cyanide	20.0	26.7960		29.3520		9.1		C

• FORM VI - IN

03/90

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ACCURACY DATA SUMMARY - FORM B-4

9302LS11-WES-1031

SDG:	REVIEWER: [illegible]	DATE: 5/03/93	PAGE 1 OF 1	
COMMENTS: GFAA Analytical Spikes				
SAMPLE ID	**COMPOUND**	**% RECOVERY**	**SAMPLE(S) AFFECTED**	**QUALIFIER REQUIRED**
B082N6	Lead	64%	B082N6	UJ
B082N8	↓	69%	↓ N8	J
B082WO	↓	79%	↓ WO	UJ
B082W2	↓	76	↓ W2	UJ
B082N6	Selenium	72%	B082N6	BJ
B082W2	↓ 5/3/93	~~64%~~ 83%	B082W2	UJ
B082N8	↓	62%	B082N8	None-analyzed by MSA
B082PO	↓	75%	B082PO	UJ
B082P2	↓	79%	B082P2	UJ

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