START 9713505.2528

B09555-TMA-589 TMA

0045816

141

COPY

NOV 1993 RECEIVED SDLA

WESTINGHOUSE HANFORD COMPANY

Results of Analyses For:

GENERAL CHEMISTRY
Case No. 09-034
(TMA/ARLI W.O. Nos. A3-09-034)

METALS & NITRATE/NITRITE
Case No. N3-09-056
(TMA/Skinner & Sherman W.O. Nos. S3-09-137, S3-09-138 & S3-09-139)

November 2, 1993

TMA Master Work Order N3-09-056

RECORD COPY

NOV 1996 RECEIVED EDMC

5/8/96 sai

9213505.2529 B09555

HANFORD ANALYTICAL SERVICES MANAGEMENT

RECORD OF DISPOSITION

ROD-93-0199
Record of Disposition No.

DATE: November 5, 1993 | LABORATORY: TMA

PROJECT TITLE/NO.: 200-BP-1 Groundwater Sampling — 8th Round/ 93-266 | NCR NO.: None

SAMPLE IDENTIFICATION NUMBERS:

— B09551 — B09553 — B09555

DESCRIPTION OF EVENT:

►► Sulfate analysis was requested by both EPA 300.0 and EPA 375.4 methods.

DISPOSITION OF SAMPLES:

►► Cancel sulfate analysis by EPA 375.4, and perform analysis by EPA 300.0. Analysis for metals is to include the full CLP target analysis list plus silica and bismuth.

APPROVAL SIGNATURES:

J. A. Lerch/ Jay Lerch — 11/5/93
OSM Project Coordinator (Print/Sign Name) — Date

M. A. Buckmaster/ Mark Buckmaster — 11/8/93
Technical Representative (Print/Sign Name) — Date

N/A
Quality Assurance (Print/Sign Name) — Date

PAGE 1 TMA/Norcal CHAIN OF CUSTODY ORD # M3-09-056
RCVD: 09/15/93 DUE: 10/20/93 09/15/93 14:42:57 KEEP: 10/20/94 DISP: S

DASH	SAMPLE IDENTIFICATION		STORED	TESTS for FRACTIONS with work in DEPT: SU and CATEGOR		
01A-W	B09555	UNFILTERED	ARLI	WH043	WH128	WH131
01C-W	B09555 MS	UNFILTERED	ARLI	WH043		
01D-W	B09555 DUP	UNFILTERED	ARLI	WH043	WH128	WH131

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
Eyamamoto	9/15/93	ARLI	9/15/93	C. Harris	9/16/9

9713505.2531 000002 A

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator KD LEE/GG HAMILTON

Company Contact PH BUTCHER

Telephone (509) 376-5045

Project Designation/Sampling Locations 200 - BP-1

Collection Date 9/11/93

Ice Chest No. GWS042

Field Logbook No. EFL-1020

Bill of Lading/Airbill No. 2536956067

Offsite Property No. W93-D-0718-31

Method of Shipment ~~TMA~~ EMERY DCC 9/13/93

Shipped to TMA

Possible Sample Hazards/Remarks

Sample Identification

BO 9555

2, 500ml ~~1, 1L,~~ P, WATER; METALS-CLP TAL(Ca,Mg,Na,K,Fe,Mn,Si,Al,Bi), SELENIUM (HNO3 pH<2) UNFILTERED

1, 500ml, G, WATER; IC ANIONS(F,Cl,SO4,NO2,PO4)

1, 500ml, P, WATER; NO2/NO3(H2SO4 pH<2)

1, 250ml, P, WATER; ALKALINITY

1, 500ml, P, WATER; TDS

1, 500ml, P, WATER; SULFATE

1, 1L, P, WATER; CYANIDE(NaOH pH>12)

3, 2L ~~1, 4L & 1, 2L,~~ P, WATER; GROSS ALPHA/BETA, GAMMA SPEC(Cs-137,Co-60,Ru-106), Pu-238, Pu-239/240, Sr-90, TOTAL URANIUM(HNO3 pH<2)

1, 250ml, Gs, WATER; TRITIUM

1, 1L, G/P, WATER; Tc-99(HCl pH<2)

BO 9556

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

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

Relinquished By	Date	Time	Received By	Date	Time
K.D. Lee	9/11/93	1330	PC Cole	9/13/93	0831
PC Cole	9/13/93	0831	H. Narcise TMA/NORCAL	9-15-93	11:05

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

relinq. to Sig# 2C by K.D. Lee 9/11/93 1330

A-6000-407 (12/92) WEF061

9713505.2532

000002B

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector: KD LEE/GG HAMILTON — Date Sampled: 9/11/93 — Time: 1034 hours

Company Contact: PH BUTCHER — Telephone: (509) 376-5045

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
BO 9555	~~1, 1L, P~~ KDL 9/11/93 2, 500ml P	WATER	METALS-CLP TAL(Ca,Mg,Na,K,Fe,Mn,Si,Al,Bi),
			SELENIUM (HNO3 pH<2)
	1, 500ml, G	WATER	IC ANIONS(F,Cl,SO4,NO2,PO4)
	1, 500ml, P	WATER	NO2/NO3(H2SO4 pH<2)
	1, 250ml, P	WATER	ALKALINITY
	1, 500ml, P	WATER	TDS
	1, 500ml, P	WATER	SULFATE
	1, 1L, P	WATER	CYANIDE (NaOH pH>12)
	~~1, 4L & 1, 2L, P~~ 3, 2L, P KDL 9/11/93	WATER	GROSS ALPHA/BETA, GAMMA SPEC(Cs-137,Co-60,
			Ru-106), Pu-238, Pu-239/240, Sr-90, TOTAL
			URANIUM (HNO3 pH<2)
	1, 250ml, Gs	WATER	TRITIUM
	1, 1L, G/P	WATER	Tc-99 (HCl pH<2)
BO 9556	1, 1L, P	WATER	METALS-CLP TAL(Ca,Mg,Na,K,Fe,Mn,Si,Al,Bi),
			SELENIUM (HNO3 pH<2)
			TASK #: 93-266
			OPC #: WA93-0-0718-31
			BOL #: 7531-95606T

Field Information**

Special Handling and/or Storage

Possible Sample Hazards

PART II: LABORATORY SECTION

Received by [signature] Title SAMPLE CONTROL TECHNICIAN Date 9-15-93

Analysis Required

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

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

A-6000-406(05/90)

9713505.2533

SAMPLE LOG-IN SHEET

LAB NAME : TMA/ARLI

PAGE : 1 OF 1

RECEIVED BY (PRINT NAME): D. WHITAKER

LOG-IN-DATE : 9-16-93

RECEIVED BY (SIGNATURE): D. Whitaker

ICE CHEST NO. SML-374

REMARKS:

1. Custody Seal(s) — Present / Absent* Intact / Broken
2. Custody Seal Nos: _____
3. Chain of Custody Records — Present / Absent*
4. Traffic Reports or Packing List — Present / Absent*
5. Airbill — Airbill / Sticker Present / Absent*
6. Airbill No.: 7289153690
7. Sample Tags — Present / Absent*
8. Sample Tag Numbers — Listed / Not Listed on Chain of Custody
9. Sample Condition: — Intact / Broken* / Leaking
10. Does information on custody records, traffic reports, and sample tags agree? — Yes / No*
11. Date Recieved at Lab: 9-16-93
12. Temp of ice chest 4 °C
13. Time Recieved: 0900

EPA SAMPLE #	CORRESPONDING SAMPLE TAG #	CORRESPONDING ASSIGNED LAB #	REMARKS: CONDITION OF SAMPLE SHIPMENT, ETC
	B09396	A309035/36	
	B09555	A309034	

SAMPLE TRANSFER

Fraction: _____

Area #: _____

By: _____

On: _____

* Contact SMO and attach record of resolution

Reviewed By: _____ Logbook No.: _____

Date: _____ Logbook Page No.: _____

FORM DC-1

9713505.2534

000004

FedEx EXPRESS

USE THE INTERNATIONAL AIR WAYBILL FOR SHIPMENTS TO PUERTO RICO AND ALL NON-U.S. LOCATIONS

QUESTIONS? CALL 800-238-5355 TOLL FREE.

TRACKING NUMBER

7289153690

30955

1 SENDER'S FEDERAL EXPRESS ACCOUNT NUMBER: 0941-5760-9

Date: 9-15-93

From (Your Name) Please Print: SAMPLE CONTROL

Your Phone Number (Very Important): $10-235-2633

Company: T A /NORCAL

Department/Floor No.

Street Address: 2030 WRIGHT AVE

City: RICHMOND State: CA ZIP Required: 94804

2 To (Recipient's Name) Please Print: CAROLE HARRIS

Recipient's Phone Number (Very Important): (818)357-3247

Company: TMA/ARLI+

Department/Floor No.

Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 160 TAYLOR STREET

City: MONROVIA, State: CA. ZIP Required: 91016

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.): 2340-6406

H IF HOLD FOR PICK-UP, Print FEDEX Address Here

Street Address

City State ZIP Required

3 PAYMENT

1 [X] Bill Sender Acct. No. Req'd
2 [ ] Bill Recipient's FedEx Acct. No. Fill in Account Number below (req'd.)
3 [ ] Bill 3rd Party FedEx Acct. No. Fill in Acct. Number below (req'd.)
4 [ ] Bill Credit Card Fill in Credit Card No. below (req'd.)
5 [ ] Cash/Check

Acct. Credit Card No. Exp. Date

4 SERVICES (Check only one box)

Priority Overnight
- 11 [X] OTHER PACKAGING
- 10 [ ] FEDEX LETTER*
- 12 [ ] FEDEX PAK*
- 13 [ ] FEDEX BOX
- 14 [ ] FEDEX TUBE

Standard Overnight
- 51 [ ] OTHER PACKAGING
- 56 [ ] FEDEX LETTER*
- 52 [ ] FEDEX PAK*
- 53 [ ] FEDEX BOX
- 54 [ ] FEDEX TUBE

Economy Two-Day
- 30 [ ] ECONOMY*

Government Overnight
- 46 [ ] GOVT LETTER
- 41 [ ] GOVT PACKAGE

Freight Service
- [ ] OVERNIGHT FREIGHT**
- 80 [ ] TWO-DAY FREIGHT**

5 DELIVERY AND SPECIAL HANDLING (Check services required)
- 1 [ ] HOLD FOR PICK-UP
- 2 [X] DELIVER WEEKDAY
- 3 [ ] DELIVER SATURDAY
- 4 [ ] DANGEROUS GOODS
- 5 [ ]
- 6 [ ] DRY ICE
- 7 [ ] OTHER SPECIAL SERVICE
- 8 [ ]
- [ ] SATURDAY PICK-UP
- [ ] HOLIDAY DELIVERY

6 PACKAGES: 3 WEIGHT in Pounds Only: 3

Total Total 291

DIM SHIPMENT (Chargeable Weight) [ ] lbs. ____ X ____ X ____

Received At: [X] Regular Stop [ ] Drop Box [ ] BSC [ ] On-Call Stop [ ] Station

Emp. No. Date

[ ] Cash Received
[ ] Return Shipment
[ ] Third Party [ ] Chg. To Del. [ ] Chg. To Hold

Street Address

City State Zip

Received By: X

Date/Time Received FedEx Employee Number

7 Release Signature

Federal Express Use

Base Charges

Declared Value Charge

Other 1

Other 2

Total Charges

REVISION DATE 11/92
PART #137204 FXEM 3/93
FORMAT #155

155

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TMA/ARLI
Thermo Analytical Inc.

RADIATION DOSE RATE SURVEY FORM

Date 9/16/93 COMPANY TMA/UNOCAL OTHER ORD # 7289153690

Surveyor's Name MARK S. McCRAY

Model No. HP-210 / ESP-1 Model No. AC-3-7 / ESP-1

Serial Nos. 710289 / 02619 Serial Nos. 407726 / 02628

Calibration Date 4/26/93 Calibration Date OUT OF CALIBRATION.

Instrument Calibration Factor 0.280 Instrument Calibration Factor NA

Sample	Location	HP-210 CPM	HP-210 Factor	HP-210 DPM	AC-3-7 CPM	AC-3-7 Factor	AC-3-7 DPM	Source of Background	Activity pCi/gm or pCi/L
Background		36.0			NA				
Consistency		7,230	0.2907		NA	NA			
Smear: STOLLER		25.0			NA			None	
SML 374		26.0			NA			None	
SML 357		36.0			NA			None	
Reported WITC (12) samples each < 500 pCi/gm									

Comments

All OK ✓ Approved MSM

Not OK Date 9/26/93

GENERAL CHEMISTRY RESULTS

CASE NO. 09-034

Water Sample #:

B09555

CASE NARRATIVE

Sulfate was only analyzed by Method 300.0 as agreed by Jeff Lerch in a telephone conversation with Dolores Sanchez on August 30, 1993.

No problems were encountered during sample analysis. All QC results were acceptable.

Maureen Parrish

Maureen Parrish

TMA Inc. REPORT Work Order # A3-09-034

Received: 09/15/93 10/27/93 07:43:47

REPORT TO: Westinghouse Hanford Company
2355 Stevens Dr.,MSIN-H4-23
345 Hills Street/3000 Area
Richland, WA 99352
ATTEN: Jeanette Duncan

PREPARED BY: Thermo Analytical, Inc.
160 Taylor Street
Monrovia, CA 91016
ATTEN: Ms. Carole Harris
PHONE: 818-357-3247

Maureen Parrish
CERTIFIED BY

CONTACT: MKP CIH

CLIENT: WHC SAMPLES: 2
COMPANY: Westinghouse Hanford Company
FACILITY:

This report is for the sole and exclusive use of the client to whom it is addressed and represents only those samples herein described. Samples not destroyed in testing are retained a maximum of 30 days unless otherwise requested.

WORK ID: 200-BP-1
TAKEN: By Westinghouse Staff
TRANS: Federal Express
TYPE: Liquid
P.O. #: N3-09-056-SU-AR
INVOICE: under separate cover

SAMPLE IDENTIFICATION

01	B09555
01	B09555 MS
01	B09555 Duplicate
01	B09555
01	B09555 Duplicate
01	B09555
01	B09555 Duplicate
02	Wet Chemistry Blank
02	LCS

TEST CODES and NAMES used on this workorder

WCCLPL	Anions & Wet Chem.
WCLCS	Lab Control Sample Summary
WCL L	Chloride - WH120
WCQCD	Quality Control Summary
WCQCS	Quality Control Summary
WF L	Fluoride in Water
WNO2 L	Nitrite (Liquids)
WPO4 L	Phosphate in Liquids
WSO4 L	Sulfate (in Waters)
W ALK	Alkalinity
W TDS	Dissolved Solids

97L3505.2538

TMA Inc. REPORT

Work Order # A3-09-034

Received: 09/15/93

Results by Sample

SAMPLE ID B09555 FRACTION 01A TEST CODE WCCLPL NAME Anions & Wet Chem.

Date & Time Collected 09/11/93 Category

ANIONS AND WET CHEMISTRY - LIQUIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	13.5	mg/L	0.4
Fluoride	300.0	0.2	mg/L	0.1
Phosphate	300.0	<0.4	mg/L	0.4
Sulfate	300.0	16	mg/L	1.0
Nitrite Nitrogen	300.0	<0.1	mg/L	0.1

FORM I

TRA Inc. REPORT Work Order # A3-09-034

Received: 09/15/93

Results by Sample

SAMPLE ID B09555 FRACTION 01D TEST CODE WCCLPL NAME Anions & Wet Chem.

Date & Time Collected 09/11/93 Category

ANIONS AND WET CHEMISTRY - LIQUIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Alkalinity	310.1	120	mg/L	2

FORM I

9713505.2540

TMA Inc. REPORT Work Order # A3-09-034

Received: 09/15/93

Results by Sample

SAMPLE ID B09555 FRACTION 01F TEST CODE WCCLPL NAME Anions & Wet Chem.

Date & Time Collected 09/11/93 Category

ANIONS AND WET CHEMISTRY - LIQUIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Tot. Dissolved Solids	160.1	239	mg/kg	5

FORM I

9713505.2541

TMA

Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc.

QUALITY ENVIRONMENTAL SERVICES

NOV 1993
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Report for

TMA/Hanford

WORK ORDER #S309139

Scientific Services Since 1922

TMA
Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc.
300 Second Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521 (617) 890-7200
1-800-4 LAB TEST FAX (617) 890-3883

1 5/8/96

9713505.2542

 Skinner&Sherman REPORT Work Order # S3-09-139

Received: 09/16/93 11/01/93 13:57:22

REPORT TMA/NORCAL
TO 2030 Wright Avenue
Richmond, CA 94804

ATTEN Dan Steurmer

CLIENT HANFORD NOR SAMPLES 2
COMPANY TMA/NORCAL Hanford
FACILITY Richmond, CA

PREPARED TMA / Skinner & Sherman Labs.
BY 300 Second Avenue
P.O. Box 521
Waltham, MA 02254

ATTEN Client Services
PHONE (617) 890-7200

CERTIFIED BY

CONTACT DP

WORK ID N3-09-056
TAKEN By Client
TRANS Fedex
TYPE Water NO3NO2
P.O. # N3-09-056
INVOICE under separate cover

SAMPLE IDENTIFICATION		TEST CODES and NAMES used on this workorder	
01	B09555	NO3NO2	Nitrate/Nitrite
01	B09555D		
01	B09555S		
02	LCSW		

This report is rendered upon all of the following conditions: Skinner & Sherman Laboratories, Inc., retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted, before the analysis. Client will be responsible for Skinner & Sherman costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Skinner & Sherman Laboratories, Inc., will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

TMA
Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc.
300 Second Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521 (617) 890-7200
1-800-4 LAB TEST FAX (617) 890-3883

9713505.2543

Received: 09/16/93

Results by Sample

SAMPLE ID B09555 SAMPLE # 01 FRACTIONS: A
Date & Time Collected 09/11/93 Category WATER

NO3NO2 0.42
mg N/L

SAMPLE ID B09555D SAMPLE # 01 FRACTIONS: B
Date & Time Collected 09/11/93 Category WATER

NO3NO2 0.42
mg N/L

SAMPLE ID B09555S SAMPLE # 01 FRACTIONS: C
Date & Time Collected 09/11/93 Category WATER

NO3NO2 2.42
mg N/L

SAMPLE ID LCSW SAMPLE # 02 FRACTIONS: A
Date & Time Collected not specified Category WATER

NO3NO2 2.02
mg N/L

TMA
Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc.

This report is rendered upon all of the following conditions: Skinner & Sherman Laboratories, Inc., retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted, before the analysis. Client will be responsible for Skinner & Sherman costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Skinner & Sherman Laboratories, Inc., will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

300 Second Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521 (617) 890-7200
1-800-4 LAB TEST, FAX (617) 890-3883

9713505.2544

TMA/Skinner & Sherman Laboratories
Sample Login Sheet

9/10/93 BP

Workorder 5309135/9 Client Hanford Nor Number/Type of Samples 1 water
Protocol CLP Turnaround 33 Day Cooler Temp: 4 °C,or N/A Cooler Yes/No
Custodian: B. Prouk Shipper & # Fed Ex SDG/Batch# NA
Custody Seal: Present/Absent/Intact/Not Client Case# N309056
Purchase Order/Contract# N309056 Client Contact D Sanchez
Tag#: Present/Absent/NA/(See COC) Chain of Custody: Present/Absent/NA,#

Sample Containers - Intact/Broken Comment:
Client Comment? Yes/No
Sample labels agree with Chain of Custody Information? Yes/No (Comment)
Client paperwork agrees with samples and Chain of Custody? Yes/No (Comment)
Shipment Dates: 9/16/93
List any date with paperwork/shipment problems & specify the problem:

NA

	Client ID	Matrix	Received	pH*	Test(s) & QC	Holding Times
1	B09556	water	9/16/93	1.27	DS NO3 NO2	
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

These samples are from a site known to have Radioactive Contamination: Yes ✓ No
These samples have detectable amounts of Radioactive Material: Yes No ✓

Subcontract: Yes/No, To: Date:

Reviewed Date

Complete 9/17/93

* EPA/CLP required

Rev 1.7

Page:

022

9713505.2545

PAGE 1 TMA/Norcal CHAIN OF CUSTODY ORD # M3-09-056

RCVD: 09/15/93 DUE: 10/20/93 09/15/93 14:44:05 KEEP: 10/20/94 DISP: S

DASH	SAMPLE IDENTIFICATION			STORED	TESTS for FRACTIONS with work in DEPT: SU and CATEGORY					
01B-W	B09555		UNFILTERED	S&S	WH007	WH008	WH011	WH075A	WH137	WH386
01E-W	B09555	MS	UNFILTERED	S&S	WH007	WH008	WH011	WH075A	WH137	WH386
01F-W	B09555	DUP	UNFILTERED	S&S	WH007	WH008	WH011	WH075A	WH137	WH386
01G-W	L C S			S&S	WH007	WH008	WH075A	WH137	WH386	
02A-W	B09556		FILTERED	S&S	WH007	WH008	WH075A	WH386		
02B-W	B09556	MS	FILTERED	S&S	WH007	WH008	WH075A	WH386		
02C-W	B09556	DUP	FILTERED	S&S	WH007	WH008	WH075A	WH386		
02D-W	L C S			S&S	WH007	WH008	WH075A	WH386		

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
Uyamamoto	9/15/93	Skinner	9/15/93	[illegible]	9/16/93

9713505.2546

TMA
Thermo Analytical Inc.

Skinner & Sherman Labs., Inc.
300 Second Avenue
Post Office Box 521
Waltham, MA 02254-0521
(617) 890-7200
FAX (617) 890-3883

RECORD COPY

NOV 1993
RECEIVED
SDLA

October 22, 1993

TMA/NORCAL
2030 Wright Avenue
Richmond, CA 94804
Attention: Dan Stuermer

Quality Control Narrative

Scope
One (1) water sample was submitted to TMA/Skinner & Sherman Laboratories, Inc. on September 16, 1993 from TMA/Norcal. The sample was analyzed for the USEPA CLP metals, bismuth, silicon and cyanide. The analysis was performed under TMA/Skinner and Sherman work order S309137.

Methodology
The sample was prepared, analyzed and reported in accordance with the USEPA Contract Laboratory Program ILMO2. Bismuth was analyzed by flame atomic absorption spectroscopy.

Discussion
All quality control requirements were met for the samples with no exceptions.

Please feel free to call if there are any questions concerning the data package.

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

Steven Provencal

Steven R. Provencal
Lead Chemist

5/8/96 SW

9713505.2547

WESTINGHOUSE/HANFORD

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-056 SAS No.: SDG No.: B09555

SOW No.: ILM02.1

SAMPLE NUMBER:	Lab Sample ID.
B09555	09137-01S
B09555D	09137-01S2
B09555S	09137-01DS

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES

If yes-were raw data generated before application of background corrections? Yes/No NO

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Steven Provencal Name: Steven R. Provencal

Date: 10/22/93 Title: Lead Chemist

9715505.2548

WESTINGHOUSE/HANFORD

1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B09555

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-056SAS No.: SDG No.: B09555

Matrix (soil/water): WATER Lab Sample ID: 09137-01S

Level (low/med): LOW Date Received: 09/16/93

% 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	15.5	U		P
7440-36-0	Antimony	12.9	B		P
7440-38-2	Arsenic	2.7	B		P
7440-39-3	Barium	104	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	30900			P
7440-47-3	Chromium	74.2			P
7440-48-4	Cobalt	3.0	U		P
7440-50-8	Copper	5.1	B		P
7439-89-6	Iron	664			P
7439-92-1	Lead	1.1	U		P
7439-95-4	Magnesium	10200			P
7439-96-5	Manganese	11.3	B		P
7439-97-6	Mercury	0.20	U		AV
7440-02-0	Nickel	38.0	B		P
7440-09-7	Potassium	7750			P
7782-49-2	Selenium	2.3	U		P
7440-22-4	Silver	3.7	U		P
7440-23-5	Sodium	13600			P
7440-28-0	Thallium	2.4	B		P
7440-62-2	Vanadium	16.5	B		P
7440-66-6	Zinc	8.5	U		P
	Cyanide	10.0	U		CA
7440-69-9	Bismuth	500	U		A
7440-21-3	Silicon	29000			P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

2

97 16505.2549

FEDERAL EXPRESS

QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL PACKAGE TRACKING NUMBER 7290260353

7290260353

RECIPIENT'S COPY

Date 9-15-93

From (Your Name) Please Print: Sample Control

Your Phone Number (Very Important): (310-535-2633

Company: I A A /NUPCAL

Department/Floor No.:

Street Address: 2[illegible] WRIGHT AVE

City: RICHMOND State: CA ZIP Required: 9 4 8 0 4

To (Recipient's Name) Please Print: Antonia

Recipient's Phone Number (Very Important): (617) 890-7200

Company: Skinner and Sherman Laboratories

Department/Floor No.:

Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 300 Second Avenue

City: Waltham State: MA ZIP Required: 02254-0521

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.): 2340-6406

H IF HOLD FOR PICK-UP, Print FEDEX Address Here: Street Address

City State ZIP Required

3 PAYMENT 1 [X] Bill Sender 2 [ ] Bill Recipient's FedEx Acct. No. 3 [ ] Bill 3rd Party FedEx Acct. No. 4 [ ] Bill Credit Card 5 [ ] Cash/Check

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)
- 11 [X] OTHER PACKAGING
- 16 [ ] FEDEX LETTER*
- 12 [ ] FEDEX PAK*
- 13 [ ] FEDEX BOX
- 14 [ ] FEDEX TUBE

Standard Overnight (Delivery by next business afternoon. No Saturday delivery†)
- 51 [ ] OTHER PACKAGING
- 56 [ ] FEDEX LETTER*
- 52 [ ] FEDEX PAK*
- 53 [ ] FEDEX BOX
- 54 [ ] FEDEX TUBE

Economy Two-Day (Delivery by second business day †)
- 30 [ ] ECONOMY*

* Economy Letter rate not available. Minimum charge: One pound economy rate.

Government Overnight (Restricted for authorized users only)
- 46 [ ] GOV'T LETTER
- 41 [ ] GOV'T PACKAGE

Freight Service (for packages over 150 lbs.)
- 70 [ ] OVERNIGHT FREIGHT** (Confirmed reservation required)
- 80 [ ] TWO-DAY FREIGHT**

† Delivery commitment may be later in some areas.

*Declared Value Limit $500. **Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)
- 1 [ ] HOLD FOR PICK-UP (Fill in Box H)
- 2 [X] DELIVER WEEKDAY
- 3 DELIVER SATURDAY (Extra charge) (Not available to all locations) [ ]
- 4 [ ] DANGEROUS GOODS (Extra charge)
- 5 [ ]
- 6 [ ] DRY ICE (Dangerous Goods Shipper's Declaration not required) Dry Ice, 9, UN 1845, ____ x ____ kg. 004 III
- 7 [ ] OTHER SPECIAL SERVICE
- 8 [ ]
- 9 [ ] SATURDAY PICK-UP (Extra charge)
- [ ]
- 12 [ ] HOLIDAY DELIVERY (If offered) (Extra charge)

6

PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
1		
Total 1	Total 48	Total *

DIM SHIPMENT (Chargeable Weight) [ ] ____ lbs.

L x W x H

Received At: X [ ] Regular Stop [ ] Drop Box [ ] B.S.C. [ ] On-Call Stop [ ] Station

7 Release Signature:

Emp. No. Date

[ ] Cash Received
[ ] Return Shipment
[ ] Third Party [ ] Chg. To Del. [ ] Chg. To Hold

Street Address

City State Zip

Received By: X [signature]

Date/Time Received: 9/10/93 10:15 FedEx Employee Number

Federal Express Use: Base Charges; Declared Value Charge; Other 1; Other 2; Total Charges

REVISION DATE 11/92 PART #137204 FXE/I 3/93 FORMAT #155

155

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189

9713505.2550

TMA/Skinner & Sherman Laboratories
Sample Login Sheet

Workorder S309137 Client Hanford Nar Number/Type of Samples 2-water
Protocol CLP Turnaround 33 Day Cooler Temp: 4 °C, or N/A Cooler Yes/No
Custodian: B Prouty Shipper & # FedEx SDG/Batch# N/A
Custody Seal: Present/Absent/Intact/Not Client Case# N309056
Purchase Order/Contract# N309056 Client Contact D Sanchez
Tag#: Present/Absent/NA/(See COC) Chain of Custody: Present/Absent/NA,#

Sample Containers Intact/Broken Comment:
Client Comment? Yes/No
Sample labels agree with Chain of Custody Information? Yes/No (Comment)
Client paperwork agrees with samples and Chain of Custody? Yes/No (Comment)
Shipment Dates: 9/16/93
List any date with paperwork/shipment problems & specify the problem:

N/A

	Client ID	Matrix	Received	pH*	Test(s) & QC	Holding Times
1	B09555	water	9/16/93	1.71, 12.06 D.S	TM/CN	CLP mtls + Bi + S
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

These samples are from a site known to have Radioactive Contamination: Yes ✓ No
These samples have detectable amounts of Radioactive Material: Yes No ✓

Subcontract: Yes/No, To: Date:

Reviewed Date

Comp 9/17/93 BP

* EPA/CLP required

Rev 1.7

9713505.2551

TMA/Norcal CHAIN OF CUSTODY ORD # N3-09-056

: 09/15/93 DUE: 10/20/93 09/15/93 14:44:05 KEEP: 10/20/94 DISP: S

DASH	SAMPLE IDENTIFICATION			STORED	TESTS for FRACTIONS with work in DEPT: SU and CATEGORY					
01B-W	B09555		UNFILTERED	S&S	WH007	WH008	WH011	WH075A	WH137	WH386
01E-W	B09555	MS	UNFILTERED	S&S	WH007	WH008	WH011	WH075A	WH137	WH386
01F-W	B09555	DUP	UNFILTERED	S&S	WH007	WH008	WH011	WH075A	WH137	WH386
01G-W	L C S			S&S	WH007	WH008	WH075A	WH137	WH386	
02A-W	B09556		FILTERED	S&S	WH007	WH008	WH075A	WH386		
02B-W	B09556	MS	FILTERED	S&S	WH007	WH008	WH075A	WH386		
02C-W	B09556	DUP	FILTERED	S&S	WH007	WH008	WH075A	WH386		
02D-W	L C S			S&S	WH007	WH008	WH075A	WH386		

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
Yyamamoto	9/15/93	Skinner	9/15/93	[illegible]	9/16/93

TMA
Thermo Analytical Inc.

Skinner & Sherman Labs., Inc.
300 Second Avenue
Post Office Box 521
Waltham, MA 02254-0521
(617) 890-7200
FAX (617) 890-3883

9713505.2552

RECORD COPY

NOV 1993 RECEIVED SDLA

October 22, 1993

TMA/NORCAL
2030 Wright Avenue
Richmond, CA 94804
Attention: Dan Stuermer

Quality Control Narrative

Scope
One (1) water sample was submitted to TMA/Skinner & Sherman Laboratories, Inc. on September 16, 1993. The sample was analyzed for the USEPA CLP metals plus bismuth and silicon. The analysis was performed under TMA/Skinner and Sherman work order S309138.

Methodology
The sample was prepared, analyzed and reported in accordance with the USEPA Contract Laboratory Program Statement of Work ILM02. Bismuth was analyzed by flame atomic absorption spectroscopy.

Discussion
All quality control requirements were met for the samples with following exceptions:

The chromium laboratory duplicate exceeded the control limit requirements.

Please feel free to call if there are any questions concerning the data package.

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

Steven Provencal

Steven R. Provencal
Lead Chemist

1 5/8/96 80

9713505.2553

WESTINGHOUSE/HANFORD

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-056 SAS No.: SDG No.: B09556

SOW No.: ILM02.1

SAMPLE NUMBER:	Lab Sample ID.
B09556	09138-01S
B09556D	09138-01S2
B09556S	09138-01DS

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES

If yes-were raw data generated before application of background corrections? Yes/No NO

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Steven Provencal Name: Steven R. Provencal

Date: 10/22/93 Title: Lead Chemist

SAMPLE NUMBER:

B09556

INORGANIC ANALYSIS DATA SHEET

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-056SAS No.: SDG No.: B09556

Matrix (soil/water): WATER Lab Sample ID: 09138-01S

Level (low/med): LOW Date Received: 09/16/93

% 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	15.5	U		P
7440-36-0	Antimony	17.2	B		P
7440-38-2	Arsenic	1.7	U		P
7440-39-3	Barium	104	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	31700			P
7440-47-3	Chromium	23.5		*	P
7440-48-4	Cobalt	3.0	U		P
7440-50-8	Copper	2.9	U		P
7439-89-6	Iron	276			P
7439-92-1	Lead	1.1	U		P
7439-95-4	Magnesium	10400			P
7439-96-5	Manganese	5.9	B		P
7439-97-6	Mercury	0.20	U		AV
7440-02-0	Nickel	22.8	B		P
7440-09-7	Potassium	7880			P
7782-49-2	Selenium	2.3	U		P
7440-22-4	Silver	3.7	U		P
7440-23-5	Sodium	14000			P
7440-28-0	Thallium	2.2	U		P
7440-62-2	Vanadium	15.9	B		P
7440-66-6	Zinc	9.8	B		P
	Cyanide				NR
7440-69-9	Bismuth	500	U		A
7440-21-3	Silicon	29900			P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

2

9713505.2555

TMA/Skinner & Sherman Laboratories
Sample Login Sheet

Workorder 5309138 Client Hanford Nor Number/Type of Samples 1 water
Protocol CLP Turnaround 33 Day Cooler Temp: 4 °C,or N/A Cooler Yes/No
Custodian: B Powell Shipper & # Fed Ex SDG/Batch# N/A
Custody Seal: Present/Absent/Intact/Not Client Case# N309056
Purchase Order/Contract# N309056 Client Contact D. Sanchez
Tag#: Present/Absent/NA/(See COC) Chain of Custody: Present/Absent/NA,#

Sample Containers - Intact/Broken Comment:
Client Comment? Yes/No
Sample labels agree with Chain of Custody Information? Yes/No (Comment)
Client paperwork agrees with samples and Chain of Custody? Yes/No (Comment)
Shipment Dates: 9/16/93
List any date with paperwork/shipment problems & specify the problem:

N/A

	Client ID	Matrix	Received	pH*	Test(s) & QC	Holding Times
1	B09556	Water	9/16/93	1.43	D.S Tm	
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

These samples are from a site known to have Radioactive Contamination: Yes ✓ No
These samples have detectable amounts of Radioactive Material: Yes No ✓

Subcontract: Yes/No, To: Date: BP

Reviewed Date 9/17/93 Comp

* EPA/CLP required

Rev 1.7

9713505.2556

TMA/Norcal CHAIN OF CUSTODY ORD # M3-09-056

: 09/15/93 DUE: 10/20/93 09/15/93 14:44:05 KEEP: 10/20/94 DISP: S

DASH	SAMPLE IDENTIFICATION			STORED	TESTS for FRACTIONS with work in DEPT: SU and CATEGORY					
01B-W	B09555		UNFILTERED	S&S	WH007	WH008	WH011	WH075A	WH137	WH386
01E-W	B09555	MS	UNFILTERED	S&S	WH007	WH008	WH011	WH075A	WH137	WH386
01F-W	B09555	DUP	UNFILTERED	S&S	WH007	WH008	WH011	WH075A	WH137	WH386
01G-W	L C S			S&S	WH007	WH008	WH075A	WH137	WH386	
02A-W	B09556		FILTERED	S&S	WH007	WH008	WH075A	WH386		
02B-W	B09556	MS	FILTERED	S&S	WH007	WH008	WH075A	WH386		
02C-W	B09556	DUP	FILTERED	S&S	WH007	WH008	WH075A	WH386		
02D-W	L C S			S&S	WH007	WH008	WH075A	WH386		

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
yyamamoto	9/15/93	Skinner	9/15/93	[illegible]	9/16/93

9213505.2557

TMA
Thermo Analytical Inc.

TMA/Norcal
2030 Wright Avenue
P. O. Box 4040
Richmond, CA 94804-0040
(510) 235-2633 Fax No. (510) 235-0438

RECORD COPY

December 2, 1993

DEC 1993
RECEIVED
SDLA

Ref: TMA/Norcal N3-09-058-7243

Ms. Briana Colley
Westinghouse Hanford Company
345 Hills Street
Richland, WA 99352

Dear Ms. Colley:

Enclosed is the data report for the one water sample received September 15, 1993 from location 200-BP-1. Results are given for gross alpha, gross beta, tritium, strontium-90, technetium-99, total uranium, isotopic plutonium, and gamma scan analyses. The data package is paginated 1 through 288.

Please call if you have any questions concerning this data.

Sincerely,

D. P. Kharkar

Dinkar P. Kharkar, Ph.D.
Manager, Nuclear Programs

DPK/ss

Enclosure: Data Package

SDG: 7243
Contact: Dinkar Kharkar

TMA NORCAL

REPORTING GROUP 7243

Client: Westinghouse Hanford
Contract: MBH-SVV-069262

CASE NARRATIVE

1.0 GENERAL

TMA/Norcal Sample Delivery Group 7243 is comprised of the sample listed on the Chain-of-Custody documents below. This sample group was processed under the Westinghouse Hanford Company Statement of Work P.O. MBH-SVV-069262.

1.1 Chains-of-Custody

This report includes data for the one water sample from location 200-BP-1 delivered under Field Log Book #EFL-1020. A Chain-of-Custody number was not provided.

1.2 Sample Volume

Three 2000 mL, one 1000 plastic bottles, and one 250 mL glass bottle containing the sample were received for the analyses.

1.3 Missing Samples

The sample listed on the Chain-of-Custody document was received.

1.4 Holding Times

The samples were collected on September 11, 1993 and sample processing was initiated within 180 days of collection.

2.0 QUALITY CONTROL

The internal quality control consisted of one sample each of a laboratory control sample, a blank, and a replicate. All original analyses were performed with QC samples 7243-02 through 7243-04.

The QC samples were prepared by the Quality Control Department. Copies of the QC notebook pages are included in this data package.

2.1 Laboratory Control Samples

The LCS recoveries for all nuclides were acceptable. The MDA's of the results for all analyses met the RDL's except for technetium-99 and plutonium-238, due to a low chemical yield and a high background of the counter in the region of intetest, respectively.

2.0 QUALITY CONTROL (cont'd)

2.2 Reagent Blanks

The MDA's of the results for all analyses met the RDL's. The 2 σ error for strontium-90 was underlined because it was larger than both the MDA and the result implying that the MDA may not be a good estimate of the "real" minimum detectable activity. Elevated technetium-99 was found in the blank. Although the technetium-99 blank appears high on a nominal aliquot basis, it is below the RDL on a per sample basis.

2.3 Duplicates

Results were satisfactory for all duplicate analyses. The MDA for iron-59 for the duplicate of sample BO9555 was higher that the RDL due to the higher background of the detector in the region of intrest. The 2σ error for strontium-90 for the original and the duplicate of sample BO9555 was underlined because it was larger than both the MDA and the result, implying that the MDA may not be a good estimate of the "real" minimum detectable activity.

3.0 ANALYSIS NOTES

3.1 Gross Alpha Analyses

The average MDA for gross alpha was (2 $\pm$ 1) pCi/L. Gross alpha activity above the RDL was not found in the sample.

3.2 Gross Beta Analyses

The average MDA for gross beta was (2 $\pm$ 0) pCi/L. Gross beta activity above the RDL was found in the sample.

3.3 Tritium Analyses

The average MDA for tritium was (200 $\pm$ 0) pCi/L. Tritium activity above the RDL was not found in the sample.

3.4 Strontium-90 Analyses

The average yield for four analyses was (82 $\pm$ 3)%. The lowest yield was 81% and the highest was 84%. The average MDA was (0.8 $\pm$ 0.1) pCi/L. Strontium-90 activity above the RDL was not found in the sample.

3.5 Technetium-99 Analyses

The average yield for four analyses was (45 $\pm$ 32)%. The lowest yield was 24% and the highest was 59%. The average MDA was (5 $\pm$ 4) pCi/L. Technetium-99 activity above the RDL was not found in the sample.

3.0 ANALYSIS NOTES (cont'd)

3.6 Total Uranium Analyses

The average MDA for total uranium was (0.1 ± 0.4) μg/L. A total uranium concentration of 2.6 ug/L was found in the sample.

3.7 Isotopic Plutonium Analyses

The average yield for four analyses was (41 ± 30)%. The lowest yield was 23% and the highest was 59%. The average MDA was (0.04 ± 0.05) pCi/L. Isotopic plutonium activity was not found in the sample.

3.8 Gamma Scan Analyses

A gamma scan analysis found no activity above the RDL in the sample.

9713505.2561

N309058-04

TMA NORCAL

REPORTING GROUP 7243

DUPLICATE

B09555

SDG 7243
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

DUPLICATE
Lab sample id N309058-04
Dept sample id 7243-004

ORIGINAL
Lab sample id N309058-01
Dept sample id 7243-001
Received 09/15/93

Client sample id B09555
Location/Matrix 200-BP-1 LIQUID
Collected 09/11/93
Chain of custody id EFL-1020

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Gross Alpha	1.4	1.2	1	3	J	80A	-0.023	1.2	2	U	200	363
Gross Beta	8.8	1.5	2	4		80B	7.5	1.5	2		16	50
Tritium	25	140	200	400	U	H	54	140	200	U	-	
Strontium 90	-0.060	1.0	0.9	2	U	Y	-0.085	0.99	0.8	U	-	
Technetium 99	5.0	2.0	3	5	B	TC	3.5	1.9	4	U	35	100
Total Uranium (ug/L)	2.6	0.46	0.04			U_T	2.6	0.46	0.04		0	42
Plutonium 238	-0.003	0.005	0.02	0.05	U	PU	0	0.017	0.04	U	-	
Plutonium 239/240	0.003	0.005	0.02	0.05	U	PU	0.002	0.012	0.02	U	-	
GAMMA SCAN ANALYTES												
Sodium 22	U		10		U	GAM	U		9	U	-	
Potassium 40	U		300		U	GAM	U		100	U	-	
Manganese 54	U		10		U	GAM	U		9	U	-	
Iron 59	U		40	30	U	GAM	U		20	U	-	
Cobalt 58	U		20		U	GAM	U		10	U	-	
Cobalt 60	U		20	30	U	GAM	U		10	U	-	
Niobium 94	U		10		U	GAM	U		9	U	-	
Ruthenium 103	U		20		U	GAM	U		10	U	-	
Ruthenium 106	U		100		U	GAM	U		80	U	-	
Tin 113	U		20		U	GAM	U		10	U	-	
Cesium 134	U		10		U	GAM	U		10	U	-	
Cesium 137	U		10	20	U	GAM	U		10	U	-	
Cerium 144	U		80		U	GAM	U		40	U	-	
Europium 152	U		30	40	U	GAM	U		20	U	-	
Europium 154	U		20	40	U	GAM	U		10	U	-	
Europium 155	U		40		U	GAM	U		20	U	-	
Radium 226	U		30		U	GAM	U		20	U	-	
Radium 228	U		60		U	GAM	U		40	U	-	
Thorium 228	U		20		U	GAM	U		10	U	-	

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DUP
Version 2.27
Report date 12/02/93

9713505.2562

TMA NORCAL

REPORTING GROUP 7243

N309058-04

B09555

DUPLICATE, cont.

SDG 7243
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

DUPLICATE
Lab sample id N309058-04
Dept sample id 7243-004

ORIGINAL
Lab sample id N309058-01
Dept sample id 7243-001
Received 09/15/93

Client sample id B09555
Location/Matrix 200-BP-1 LIQUID
Collected 09/11/93
Chain of custody id EFL-1020

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI-FIERS	RPD %	3σ TOT	PROT LIMIT
Thorium 232	U		60		U	GAM	U		40	U	-		

TEST	DUPLICATE PLANCHET	SUF-FIX	ALIQUOT	ANALYZED	REVIEWED	BY	ORIGINAL PLANCHET	SUF-FIX	ALIQUOT	ANALYZED	REVIEWED	BY
80A/80	7243-004		0.300 L	10/12/93	10/13/93	DPK	7243-001		0.300	10/12/93	10/13/93	DPK
80B/80	7243-004		0.300 L	10/12/93	10/13/93	DPK	7243-001		0.300	10/12/93	10/13/93	DPK
H	7243-004		0.0100 L	10/13/93	11/17/93	DPK	7243-001		0.0100	10/13/93	11/17/93	DPK
Y	7243-004		1.00 L	11/02/93	11/05/93	DPK	7243-001		1.00	11/02/93	11/05/93	DPK
TC	7243-004		0.200 L	11/18/93	11/18/93	DPK	7243-001		0.200	11/18/93	11/18/93	DPK
U_T	7243-004		0.0200 L	10/07/93	10/12/93	DPK	7243-001		0.0200	10/07/93	10/12/93	DPK
PU	7243-004		1.00 L	10/22/93	10/28/93	DPK	7243-001		1.00	10/26/93	10/28/93	DPK
GAM	7243-004		0.500 L	10/13/93	10/20/93	DPK	7243-001		0.500	10/12/93	10/20/93	DPK

QC-15612 - 15616

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DUP
Version 2.27
Report date 12/02/93

9713505.2563

TMA NORCAL

REPORTING GROUP 7243

N309058-01

DATA SHEET

B09555

SDG 7243
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N309058-01
Dept sample id 7243-001
Received 09/15/93
Client sample id B09555
Location/Matrix 200-BP-1 LIQUID
Collected 09/11/93
Chain of custody id EFL-1020

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	Alpha	-0.023	1.2	2	3	U	80A
Gross Beta	Beta	7.5	1.5	2	4		80B
Tritium	10028-17-8	54	140	200	400	U	H
Strontium 90	10098-97-2	-0.085	0.99	0.8	2	U	Y
Technetium 99	14133-76-7	3.5	1.9	4	5	U	TC
Total Uranium (ug/L)	7440-61-1	2.6	0.46	0.04			U_T
Plutonium 238	13981-16-3	0	0.017	0.04	0.05	U	PU
Plutonium 239/240		0.002	0.012	0.02	0.05	U	PU
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		9		U	GAM
Potassium 40	13966-00-2	U		100		U	GAM
Manganese 54	13966-31-9	U		9		U	GAM
Iron 59	14596-12-4	U		20	30	U	GAM
Cobalt 58	13981-38-9	U		10		U	GAM
Cobalt 60	10198-40-0	U		10	30	U	GAM
Niobium 94	14681-63-1	U		9		U	GAM
Ruthenium 103	13968-53-1	U		10		U	GAM
Ruthenium 106	13967-48-1	U		80		U	GAM
Tin 113	13966-06-8	U		10		U	GAM
Cesium 134	13967-70-9	U		10		U	GAM
Cesium 137	10045-97-3	U		10	20	U	GAM
Cerium 144	14762-78-8	U		40		U	GAM
Europium 152	14683-23-9	U		20	40	U	GAM
Europium 154	15585-10-1	U		10	40	U	GAM
Europium 155	14391-16-3	U		20		U	GAM
Radium 226	13982-63-3	U		20		U	GAM
Radium 228	15262-20-1	U		40		U	GAM
Thorium 228	14274-82-9	U		10		U	GAM

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 12/02/93

9713505.2564

TMA NORCAL

REPORTING GROUP 7243

N309058-01

DATA SHEET, cont

B09555

SDG	7243	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309058-01	Client sample id	B09555
Dept sample id	7243-001	Location/Matrix	200-BP-1 LIQUID
Received	09/15/93	Collected	09/11/93
		Chain of custody id	EFL-1020

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		40		U	GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N309058-01	80A/80	7243-001		0.300 L	10/12/93	10/13/93	DPK
N309058-01	80B/80	7243-001		0.300 L	10/12/93	10/13/93	DPK
N309058-01	H	7243-001		0.0100 L	10/13/93	11/17/93	DPK
N309058-01	Y	7243-001		1.00 L	11/02/93	11/05/93	DPK
N309058-01	TC	7243-001		0.200 L	11/18/93	11/18/93	DPK
N309058-01	U_T	7243-001		0.0200 L	10/07/93	10/12/93	DPK
N309058-01	PU	7243-001		1.00 L	10/26/93	10/28/93	DPK
N309058-01	GAM	7243-001		0.500 L	10/12/93	10/20/93	DPK

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.27
Report date	12/02/93

9713505.2565

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator KD LEE/GG HAMILTON

Company Contact PH BUTCHER

Telephone (509) 376-5045

Project Designation/Sampling Locations 200 - BP-1

Collection Date 9/11/93

Ice Chest No. GWS042

Field Logbook No. EFL-1020

Bill of Lading/Airbill No. 2536956066T

Offsite Property No. W93-D-0718-31

Method of Shipment ~~TMA~~ EMERY DCC 9/13/93

Shipped to TMA

Possible Sample Hazards/Remarks

Sample Identification

BO 9555

2, 200 ml ~~1, 1L,~~ KDL 9/11/93 P, WATER; METALS-CLP TAL(Ca,Mg,Na,K,Fe,Mn,Si,Al,Bi), SELENIUM (HNO3 pH<2) UNFILTERED

1, 500ml, G, WATER; IC ANIONS(F,Cl,SO4,NO2,PO4)

1, 500ml, P, WATER; NO2/NO3(H2SO4 pH<2)

1, 250ml, P, WATER; ALKALINITY

1, 500ml, P, WATER; TDS

1, 500ml, P, WATER; SULFATE

1, 1L, P, WATER; CYANIDE(NaOH pH>12)

3, 2L ≡ ~~1, 4L & 1, 2L,~~ KDL 9/11/93 P, WATER; GROSS ALPHA/BETA, GAMMA SPEC(Cs-137,Co-60,Ru-106), Pu-238, Pu-239/240, Sr-90, TOTAL URANIUM(HNO3 pH<2)

1, 250ml, Gs, WATER; TRITIUM

1, 1L, G/P, WATER; Tc-99(HCl pH<2)

BO 9556

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

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

Relinquished By	Date	Time	Received By	Date	Time
KD Lee K.D. Lee	9/11/93	1330	PC Cole PC Cole	9/13/93 PCC 9/14/93	0831
PC Cole PC Cole	9/13/93 PCC 9/14/93	0831	H. Narciso TMA/NORCAL	9-15-93	11:05

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

relinq. to frig # 2C by KD Lee 9/11/93 1330

A-6000-407 (12/92) WEF061

9713505.2566

Westinghouse Hanford Company

SAMPLE ANALYSIS REQUEST

PART I: FIELD SECTION

Collector KD LEE/GG HAMILTON Date Sampled 9/11/93 Time 1034 hours

Company Contact PH BUTCHER Telephone (509) 376-5045

Sample Number	Number and Type of Sample Containers	Type of Sample*	Analysis Requested
BO 9555	~~1, 1L, P~~ KDL 9/11/93 2, 500ml P	WATER	METALS-CLP TAL(Ca,Mg,Na,K,Fe,Mn,Si,Al,Bi),
			SELENIUM (HNO3 pH<2)
	1, 500ml, G	WATER	IC ANIONS(F,Cl,SO4,NO2,PO4)
	1, 500ml, P	WATER	NO2/NO3(H2SO4 pH<2)
	1, 250ml, P	WATER	ALKALINITY
	1, 500ml, P	WATER	TDS
	1, 500ml, P	WATER	SULFATE
	1, 1L, P	WATER	CYANIDE (NaOH pH>12)
	~~1, 4L & 1, 2L, P~~ 3, 2L, P KDL 9/11/93	WATER	GROSS ALPHA/BETA, GAMMA SPEC(Cs-137,Co-60,
			Ru-106), Pu-238, Pu-239/240, Sr-90, TOTAL
			URANIUM (HNO3 pH<2)
	1, 250ml, Gs	WATER	TRITIUM
	1, 1L, G/P	WATER	Tc-99 (HCl pH<2)
BO 9556	1, 1L, P	WATER	METALS-CLP TAL(Ca,Mg,Na,K,Fe,Mn,Si,Al,Bi),
			SELENIUM (HNO3 pH<2)
			TASK #: 93-266
			OPC #: W93-0-0718-31
			BOL #: 7531695606T

Field Information** _____

Special Handling and/or Storage _____

Possible Sample Hazards _____

PART II: LABORATORY SECTION

Received by [signature] Title SAMPLE CONTROL TECHNICIAN Date 9-15-93

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(

OVERNIGHT DELIVERY 567

Signature Security Service

Contractor	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT)
WHC		1993-0-071831

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 TMA/NORCAL
2030 Wright Ave.
Richmond, CA 94804

Off-site Custodian

Full Title

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
1 53 lbs.	Sample #: B0FSS, B0FS56 Cooler ID: 60S042 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 NA	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 # 2-3695606T

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

RM Clearance for Public Release	RM Survey No.	Date
[illegible]	156356	9-14-93

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

Date Ready for Shipment	Cost Code to be Charged	Approximate Date This Property will be Returned
~~9/14/93~~ 9/14/93	WB1232 / PL31 A	NA

Originated By	Date	Authorized By	Date
PH Butcher	~~9/14/93~~ 9/14/93	PH Butcher PH Butcher	~~9/14/93~~ 9/14/93

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
[illegible]			50	
Date				

DISTRIBUTION

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

54-3000-479 (09/89)

9713505.2568

FORM OF PAYMENT

heck ☐ GBL ☐ FCCOD ☐

Bill to Shipper [X] Bill to Consignee ☐ Third Party Billing ☐

Shipper's Account Number: 850281585

EMERY WORLDWIDE — A CF Company

SERVICES **

UNITED STATES / CANADA: Same Day (Extra Charges) ☐; [X] AM ☐ PM; Second Day ☐ Saturday Delivery

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

Date: 09-~~03~~-93 (14) | Origin: PSC | Shipment Number: 253695606

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

To:
TMA/NORCAL
[redacted] TMA/NORCAL
2030 WRIGHT AVENUE
RICHMOND CA USA ☐ Canada

Tariff Dest. | Gatew

Check to Shipper $

Hold for Pick Up ☐

EMERY WORLDWID will accept Consign check with all risk being assumed by Shipper, including but not limited to non-payment, frau and misrepresenta

Customer's Reference Numbers: 81232 PUSEA W93-0-0718#31 H BUTCHER

Zip: 99352

E Consignee's Account Number

Zip: 94804

Description	Pcs.	L	W	H	Total Pieces	Total Weight (in Lbs.)
COOLER ID: GWS 042 ATER SAMPLES	1	14	16	17	1	53

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

Declared Value $

253695606T

Remarks
VERNIGHT DELIVERY
IGNATURE SECURITY SERVICE

pper's nature X 5-14-93

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

se Charge

Total Transportation Charges | Other Charges/Advance at Origin ☐ OC/AO- $

1-OAK-A

Terms and Conditions on Back

9713505.2569

VALIDATION SUMMARY

9713505.2570

RECEIVED
JAN 25 1994
VALIDATION DOCUMENT
SDLA

MEMORANDUM

TO: 200-BP-1 Project QA Record

January 24, 1994

FR: Michael Higgins, Golder Associates Inc

RE: WET CHEMISTRY ANALYSIS DATA VALIDATION SUMMARY FOR DATA PACKAGE B09555-TMA-589 (913-1719)

INTRODUCTION

This memorandum presents the results of data validation on data package B09555-TMA-589 consisting of one (1) water sample analyzed for wet chemical analyses. The samples were analyzed by Thermo Analytical Inc., (TMA)/Skinner & Sherman Laboratories, Inc., of Waltham, Massachusetts using EPA methodology (EPA 1983). A list of the samples validated is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B09555*	09/11/93	WATER	SEE NOTE 1

Notes:

* Indicates the sample which was 100% validated.

1 Sample was analyzed for ion chromatography (IC) anions (F, Cl, SO4, NO2, PO4), nitrite/nitrate (NO2/NO3), alkalinity, and total dissolved solids (TDS).

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

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

JAN 1994
RECEIVED

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 with the following exception:

- Sulfate which was reported at a detection limit of 1000 ug/l, but specified in the 200-BP-1 work plan (DOE-RL 1992) at 250 ug/l.

Completeness. The data package was complete for all requested analyses. One (1) sample was validated in this data package with a total of 8 determinations reported, of which 8 determinations were deemed valid. This results in a completeness of 100 percent which meets the work plan objectives of 90% (DOE-RL 1990).

MAJOR DEFICIENCIES

No major deficiencies were identified during data validation which required qualification of data as unusable.

MINOR DEFICIENCIES

The following is a summary of the minor deficiencies identified during validation which required qualification of data.

Holding Times

Nitrite and ortho-phosphate, which have holding time criteria of 2 days, were analyzed 10 days past the maximum holding time criteria. Therefore, the associated samples have been qualified as estimated (UJ).

REFERENCES

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

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

EPA, 1983, Methods for Chemical Analysis of Water and Wastes (EPA 600/4-79-020), U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Revised March 1983. Cincinnati, Ohio.

WHC 1992, Data Validation Procedures for Chemical Analyses, WHC-SD-EN-SPP-002, Rev. 1, 1993. Westinghouse Hanford Company, Richland, Washington.

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

9713505.2572

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

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

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

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

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

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

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

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

9713505.2574

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

B09555-TMA-589

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B09555 + B09556	REVIEWER: [illegible]	DATE: 940114	PAGE 1 OF 1
COMMENTS:			
~~COMPOUND~~ ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
~~SILICON~~	~~J~~	~~B09555~~	~~LCS %R = 200%~~
~~SILICON~~	~~J~~	~~B09556~~	~~LCS %R = 180%~~
NITRITE	UJ	B09555	HT > 48 HR
ORTHO PO4	UJ	B09555	HT > 48 HR
~~ANTIMONY~~	~~U~~	~~B09555 + 6~~	~~Present in BLANK~~
~~Thallium~~	~~U~~	~~B09555 only~~	~~Present in blank~~
~~VANADIUM~~	~~U~~	~~B09555 + 6~~	~~PRESENT in blank~~

Verified [illegible] 940119

000

9713505.2576

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: B09555-TMA-589

Parameter	Samp# / Date / Location / Type	Units	Result	Q
	Samp#		B09555	
	Date		9-11-93	
	Location		699-54-57	
	Type		SPLIT-3,UF	
ALKALINITY		MG/L	120.000	
CHLORIDE-IC		MG/L	13.500	
FLUORIDE-IC		MG/L	0.200	
NITRITE-IC		MG/L	0.100	UJ
CYANIDE		UG/L	10.000	U
PHOSPHATE-IC		MG/L	0.400	UJ
NITRATE+NITRITE		MG-N/L	0.420	
SULFATE-IC		MG/L	16.000	
TOTAL DISSOLVED SOLIDS		MG/L	239.000	

UF - UNFILTERED

Verified 9409224 MCA

9415905.2597

TMA Inc. REPORT Work Order # A3-09-034

Received: 09/15/93 Results by Sample

SAMPLE ID B09555 FRACTION 01A TEST CODE WCCLPL NAME Anions & Wet Chem.

Date & Time Collected 09/11/93 Category

ANIONS AND WET CHEMISTRY - LIQUIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Chloride	300.0	13.5	mg/L	0.4
Fluoride	300.0	0.2	mg/L	0.1
Phosphate	300.0	<0.4 UJ	mg/L	0.4
Sulfate	300.0	16	mg/L	1.0
Nitrite Nitrogen	300.0	<0.1 UJ	mg/L	0.1

Verified 9/40118

FORM I

TMA Inc. REPORT Work Order # A3-09-034

eceived: 09/15/93

Results by Sample

AMPLE ID B09555 FRACTION 01D TEST CODE WCCLPL NAME Anions & Wet Chem.

Date & Time Collected 09/11/93 Category

ANIONS AND WET CHEMISTRY - LIQUIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Alkalinity	310.1	120	mg/L	2

Verified 9/10/18

FORM I

TMA Inc. REPORT Work Order # A3-09-034

eceived: 09/15/93 Results by Sample

AMPLE ID B09555 FRACTION 01F TEST CODE WCCLPL NAME Anions & Wet Chem.

Date & Time Collected 09/11/93 Category

ANIONS AND WET CHEMISTRY - LIQUIDS

ANALYSIS	METHOD	RESULT	UNITS	LIMIT
Tot. Dissolved Solids	160.1	239	mg/~~kg~~ L	5

Verified 940118

FORM I

9713505.2581

 Skinner&Sherman REPORT Work Order # S3-09-139

Received: 09/16/93 Results by Sample

SAMPLE ID B09555 SAMPLE # 01 FRACTIONS: A
Date & Time Collected 09/11/93 Category WATER

NO3NO2 0.42
mg N/L

SAMPLE ID B09555D SAMPLE # 01 FRACTIONS: B
Date & Time Collected 09/11/93 Category WATER

NO3NO2 0.42
mg N/L

SAMPLE ID B09555S SAMPLE # 01 FRACTIONS: C
Date & Time Collected 09/11/93 Category WATER

NO3NO2 2.42
mg N/L

SAMPLE ID LCSW SAMPLE # 02 FRACTIONS: A
Date & Time Collected not specified Category WATER

NO3NO2 2.02
mg N/L

Verified by 9/40118

C12

This report is rendered upon all of the following conditions: Skinner & Sherman Laboratories, Inc., retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted, before the analysis. Client will be responsible for Skinner & Sherman costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Skinner & Sherman Laboratories, Inc., will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

TMA
Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc.
300 Second Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521 (617) 890-7200
1-800-4 LAB TEST FAX (617) 890-3883

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

GENERAL CHEMISTRY RESULTS

CASE NO. 09-034

Water Sample #:

B09555

CASE NARRATIVE

Sulfate was only analyzed by Method 300.0 as agreed by Jeff Lerch in a telephone conversation with Dolores Sanchez on August 30, 1993.

No problems were encountered during sample analysis. All QC results were acceptable.

Maureen Parrish

Maureen Parrish

Received: 09/16/93

Test Methodology

TEST CODE NO3NO2 NAME Nitrate/Nitrite

USEPA Methods for Chemical Analysis of Water and Wastes
(EPA-600/4-79-020), Method 353.2 (modified) -- Colorimetric, Automated
Cadmium Reduction

C15

This report is rendered upon all of the following conditions: Skinner & Sherman Laboratories, Inc., retains ownership of this report until associated submitted invoice is satisfied. Expert witness services shall be available in conjunction with this report only if prior notification of this potential requirement was made and accepted, before the analysis. Client will be responsible for Skinner & Sherman costs and consulting fees if our services are required by subpoena or otherwise in legal proceedings. Total liability is limited to the invoice amount. The results listed refer only to tested samples and applicable parameters. Samples are not analyzed in accordance with New York State protocol unless indicated. Product endorsement is neither inferred nor implied. Skinner & Sherman Laboratories, Inc., will exercise due diligence but will not be responsible for lost or destroyed samples or evidence unless client makes appropriate insurance coverage arrangements. Samples are held for thirty days following issuance of report. Samples will be stored at client's expense, if authorized in writing.

TMA
Thermo Analytical Inc.
Skinner & Sherman Laboratories Inc.
300 Second Avenue, P.O. Box 521, Waltham, Massachusetts 02254-0521 (617) 890-7200
1-800-4 LAB TEST FAX (617) 890-3883

9713505.2585

000002 A

Westinghouse Hanford Company

CHAIN OF CUSTODY

Custody Form Initiator KD LEE/GG HAMILTON

Company Contact PH BUTCHER

Telephone (509) 376-5045

Project Designation/Sampling Locations 200 - BP-1

Collection Date 9/11/93

Ice Chest No. GWS042

Field Logbook No. EFL-1020

Bill of Lading/Airbill No. 2536956067

Offsite Property No. W93-0-0718-31

Method of Shipment ~~TMA~~ EMERY DCC 9/13/93

Shipped to TMA

Possible Sample Hazards/Remarks

Sample Identification

B09555 KDL 9/11/93

2, 500 ~~1, 1L,~~ P, WATER; METALS-CLP TAL(Ca,Mg,Na,K,Fe,Mn,Si,Al,Bi), SELENIUM (HNO3 pH<2) UNFILTERED

1, 500ml, G, WATER; IC ANIONS(F,Cl,SO4,NO2,PO4)

1, 500ml, P, WATER; NO2/NO3(H2SO4 pH<2)

1, 250ml, P, WATER; ALKALINITY

1, 500ml, P, WATER; TDS

1, 500ml, P, WATER; SULFATE

1, 1L, P, WATER; CYANIDE(NaOH pH>12)

3, 2L ~~1, 4L & 1, 2L,~~ KDL 9/11/93 P, WATER; GROSS ALPHA/BETA, GAMMA SPEC(Cs-137,Co-60,Ru-106), Pu-238, Pu-239/240, Sr-90, TOTAL URANIUM(HNO3 pH<2)

1, 250ml, Gs, WATER; TRITIUM

1, 1L, G/P, WATER; Tc-99(HCl pH<2)

B09556

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

[] Field Transfer of Custody

Chain of Possession (Sign and Print Names)

Relinquished By	Date	Time	Received By	Date	Time
K.D. Lee	9/11/93	1330	PC Cole	9/13/93	0831
PC Cole	9/13/93 DCC 9/14/93	0831	H. Narciso TMA/NORCAL	9-15-93	11:05

Final Sample Disposition

Disposal Method:

Disposed by:

Date/Time:

Comments:

relinq. to Sigh 2C by KD Lee 9/11/93 1330

A-6000-407 (12/92) WEF061

C16

9713505.2586

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

WET CHEMISTRY DATA VALIDATION CHECKLIST - FORM A-7

PROJECT: 200 BP1	REVIEWER: Mch	DATE: 940113
LABORATORY: TMA	CASE: N3-09-056SAS	SDG: B09555 + 556
SAMPLES/MATRIX: H2O (2) B09555, B09556		

1. DATA PACKAGE COMPLETENESS

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

Data Package Item	Present?: Yes	No	N/A
Case Narrative	—	—	—
Cover Page	—	—	—
Traffic Reports/Chain-of-Custody	—	—	—
Sample Analysis Data Report Forms	—	—	—
Standards Data	—	—	—
QC Summary			
Blanks Summary Report Forms	—	—	—
Spike Sample Recovery Report Forms	—	—	—
Duplicate Sample Analysis Report Forms	—	—	—
Laboratory Control Sample Report Forms	—	—	—
Raw Data			
Ion Chromatograph Chromatograms	—	—	—
TOC and TOX Instrument Printouts	—	—	—
Laboratory Bench Sheets	—	—	—
Additional Data			
Laboratory Sample Preparation Logs	—	—	—
Instrument Run Logs	—	—	—
Internal Laboratory Chain-of-Custory	—	—	—
Percent Solids Analysis Records	—	—	—
Reduction Formulae	—	—	—
Chemist Notebook Pages	—	—	—

NA
Mch. 940113

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).

Replaced 3/29/94

C18

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).

Reviewed 3/29/94

C19

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.

B095S-TMA-589

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.

C21

B09555 - TMA 589

HOLDING TIME SUMMARY - FORM B-I

SDG: B09555 B09556	REVIEWER: MIKE HIGGINS	DATE: 940114	PAGE 1 OF 1
COMMENTS: INORGANICS, METALS, CYANIDE + NET CHEMISTRY			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09555	Metals	9/11/93	10/11/93	10/12+15/93	30d	NA	NONE
	Bi		10/11/93	10/20/93	30d		
	Hg		09/28/93	09/28/93	17d		
	CN		09/22/93	09/23/93	12d		
B09556	Metals		10/11/93	10/12+15/93	30d		
	Bi		10/11/93	10/20/93	30d		
	Hg		09/28/93	09/28/93	17d		
	CN		09/22/93	09/23/93	12d		
B09555	IC ANIONS		NA	9/23/93	12d		
	NO_2/NO_3			10/08/93	27		
	ALKALITY			9/23/93	12		
	TDS			9/17/93	6		
	PO4			9/23/93	12 (48HR)		UJ Nondetect
	NO2			9/23/93	12 (48HR)		UJ "

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C2

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RECORD COPY

MEMORANDUM

TO: 200-BP-1 Project QA Record April 27, 1994

FR: Michael Higgins, Golder Associates Inc. RS for

RE: METALS ANALYSIS DATA VALIDATION SUMMARY FOR DATA PACKAGE B09555-TMA-589 (913-1719)

INTRODUCTION

This memorandum presents the results of data validation on data package B09555-TMA-589 consisting of two (2) water samples analyzed for CLP Target Analyte List (TAL) metals and cyanide. The samples were analyzed by Thermo Analytical Inc. (TMA)/Skinner & Sherman Laboratories, Inc., of Waltham, Massachusetts using the CLP statement of work (SOW) ILM02 for TAL metals and cyanide and SW-846 method 6010 for bismuth and silicon (EPA 1986). A list of the samples validated is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B09555*	09/11/93	WATER (UNFILTERED)	SEE NOTE 1
B09556	09/11/93	WATER (FILTERED)	

Notes:

* Indicates the sample which was 100% validated.

1 All samples were analyzed for CLP TAL metals plus bismuth, and silicon. In addition, the unfiltered sample was analyzed for cyanide.

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

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

DATA QUALITY OBJECTIVES

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

Revised 4-27-94
RS

Precision. Goals for precision were met except for RPD deficiencies as indicated below.

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 sample results as specified in the work plan (DOE-RL 1992) with the exception of the following:

- Bismuth was reported at a detection limit of 500 ug/l, but is specified in the 200-BP-1 work plan (DOE-RL 1990) at 60 ug/l.

- Silicon was reported at a detection limit of 500 ug/l, but not specified in the 200-BP-1 work plan (DOE-RL 1990). The detection limit of 58 ug/l is recommended as an estimated detection limit (EDL) for silicon (EPA 1986).

Completeness. The data package was complete for all requested analyses. A total of two (2) samples were validated in this data package with a total of 52 determinations reported, of which 52 were deemed valid. This results in a completeness of 100 percent which meets the work plan objectives of 90% (DOE-RL 1990).

MAJOR DEFICIENCIES

No deficiencies were identified during data validation which required qualification of data as unusable.

MINOR DEFICIENCIES

The following is a summary of the minor deficiencies identified during validation which required qualification of data.

Laboratory Blanks

- Antimony, thallium, and vanadium were detected in the associated laboratory blanks. Therefore, all sample results which are less than five times the respective blank concentration have been qualified as undetected (U).

- The absolute value of arsenic is above the IDL in the associated laboratory blank, therefore sample results for arsenic have been qualified as estimated. Attachments 3 and 5 provide a summary of qualification applied and supporting documentation.

Laboratory Control Sample

- Percent recoveries for silicon in the LCS was reported as 200 and 180 %. Therefore positive results were qualified as estimated (J).

Revised 4-27-94

9213505.2594

Duplicates

- The relative percent difference of chromium exceeded the CRDL limit for sample results less than 5 times the CRDL, therefore chromium for B09556 has been qualified as estimated.

REFERENCES

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

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

EPA, 1986, Test Methods for Evaluating Solid Waste (SW-846): Physical/Chemical Methods, U.S. Environmental Protection Agency, Office of Solid Waste, Washington, D.C.

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

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

Revised 4-27-94

9713505.2595

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

GLOSSARY OF INORGANIC DATA REPORTING QUALIFIERS

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

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

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

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

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

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

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

9713505.2597

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

B09555-TMA-589

DATA QUALIFICATION SUMMARY - FORM B-7

SDG: B09555 + B09556	REVIEWER: [illegible]	DATE: 940114	PAGE 1 OF 1
COMMENTS:			
~~COMPOUND~~ ANALYTE	QUALIFIER	SAMPLES AFFECTED	REASON
SILICON	J	B09555	LCS %R = 200%
SILICON	J	B09556	LCS %R = 180%
~~NITRITE~~	~~UJ~~	~~B09555~~	~~HT > 48 HR~~
~~ORTHO PO4~~	~~UJ~~	~~B09555~~	~~HT > 48 HR~~
ANTIMONY	U	B09555 + 6	Present in BLANK
Thallium	U	B09555 only	Present in blank
VANADIUM	U	B09555 + 6	PRESENT in blank
ARSENIC	BJ / UJ	B09555 B09556	Absolute value of negative blank
			contaminant is greater than IDL
CHROMIUM	J	B09556	Duplicate RPD
			exceeds ±CRDL for sample
			results < 5X CRDL

Revised 4-27-94

Verified with 940119 Replaced 3/29/94

9713505.2599

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: B09555-TMA-589

Parameter	Samp# / Date / Location / Type	B09555 9-11-93 699-54-57 SPLIT-3,UF		B09556 9-11-93 699-54-57 SPLIT-3,FIL	
	Units	Result	Q	Result	Q
ALUMINUM	UG/L	15.500	U	15.500	U
ANTIMONY	UG/L	12.900	U	17.200	U
ARSENIC	UG/L	2.700	BJ	1.700	UJ
BARIUM	UG/L	104.000	B	104.000	B
BERYLLIUM	UG/L	0.200	U	0.200	U
CADMIUM	UG/L	1.000	U	1.000	U
CALCIUM	UG/L	30900.000		31700.000	
CHROMIUM	UG/L	74.200		23.500	J
COBALT	UG/L	3.000	U	3.000	U
COPPER	UG/L	5.100	B	2.900	U
IRON	UG/L	664.000		276.000	
LEAD	UG/L	1.100	U	1.100	U
MAGNESIUM	UG/L	10200.000		10400.000	
MANGANESE	UG/L	11.300	B	5.900	B
MERCURY	UG/L	0.200	U	0.200	U
NICKEL	UG/L	38.000	B	22.800	B
POTASSIUM	UG/L	7750.000		7880.000	
SELENIUM	UG/L	2.300	U	2.300	U
SILVER	UG/L	3.700	U	3.700	U
SODIUM	UG/L	13600.000		14000.000	
THALLIUM	UG/L	2.400	U	2.200	U
VANADIUM	UG/L	16.500	U	15.900	U
ZINC	UG/L	8.500	U	9.800	B
CYANIDE	UG/L	10.000	U	N/R	
BISMUTH	UG/L	500.000	U	500.000	U
SILICON	UG/L	29000.000	J	29900.000	J

UF - UNFILTERED

Verified 4-27-94

Revised 4-27-94

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009

9713505.2601

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B09555

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-056SAS No.: SDG No.: B09555

Matrix (soil/water): WATER Lab Sample ID: 09137-01S

Level (low/med): LOW Date Received: 09/16/93

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	15.5	U		P	
7440-36-0	Antimony	12.9	~~B~~		P	U
7440-38-2	Arsenic	2.7	~~B~~		P	BJ
7440-39-3	Barium	104	B		P	
7440-41-7	Beryllium	0.20	U		P	
7440-43-9	Cadmium	1.0	U		P	
7440-70-2	Calcium	30900			P	
7440-47-3	Chromium	74.2			P	
7440-48-4	Cobalt	3.0	U		P	
7440-50-8	Copper	5.1	B		P	
7439-89-6	Iron	664			P	
7439-92-1	Lead	1.1	U		P	
7439-95-4	Magnesium	10200			P	
7439-96-5	Manganese	11.3	B		P	
7439-97-6	Mercury	0.20	U		AV	
7440-02-0	Nickel	38.0	B		P	
7440-09-7	Potassium	7750			P	
7782-49-2	Selenium	2.3	U		P	
7440-22-4	Silver	3.7	U		P	
7440-23-5	Sodium	13600			P	
7440-28-0	Thallium	2.4	~~B~~		P	U
7440-62-2	Vanadium	16.5	~~B~~		P	U
7440-66-6	Zinc	8.5	U		P	
	Cyanide	10.0	U		CA	
7440-69-9	Bismuth	500	U		A	
7440-21-3	Silicon	29000			P	J

Verified MMh/940118

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Revised 2 4-27-94 RS

9713505.2602

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B09556

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-056SAS No.: SDG No.: B09556

Matrix (soil/water): WATER Lab Sample ID: 09138-01S

Level (low/med): LOW Date Received: 09/16/93

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	15.5	U		P	
7440-36-0	Antimony	17.2	~~B~~		P	u
7440-38-2	Arsenic	1.7	~~U~~		P	uJ
7440-39-3	Barium	104	B		P	
7440-41-7	Beryllium	0.20	U		P	
7440-43-9	Cadmium	1.0	U		P	
7440-70-2	Calcium	31700			P	
7440-47-3	Chromium	23.5	✓	*	P	J
7440-48-4	Cobalt	3.0	U		P	
7440-50-8	Copper	2.9	U		P	
7439-89-6	Iron	276			P	
7439-92-1	Lead	1.1	U		P	
7439-95-4	Magnesium	10400			P	
7439-96-5	Manganese	5.9	B		P	
7439-97-6	Mercury	0.20	U		AV	
7440-02-0	Nickel	22.8	B		P	
7440-09-7	Potassium	7880			P	
7782-49-2	Selenium	2.3	U		P	
7440-22-4	Silver	3.7	U		P	
7440-23-5	Sodium	14000			P	
7440-28-0	Thallium	2.2	U		P	
7440-62-2	Vanadium	15.9	~~B~~		P	u
7440-66-6	Zinc	9.8	B		P	
	Cyanide				NR	
7440-69-9	Bismuth	500	U		A	
7440-21-3	Silicon	29900			P	J

Verified 9/20/18

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

- Revised 4-27-94 2

C11

FORM I - IN ILM02.1

9713505.2603

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

TMA
Thermo Analytical Inc.

Skinner & Sherman Labs., Inc.
300 Second Avenue
Post Office Box 521
Waltham, MA 02254-0521
(617) 890-7200
FAX (617) 890-3883

9713505.2604

B09555-TMA 589

RECORD COPY

NOV 1993
RECEIVED
SDLA

October 22, 1993

TMA/NORCAL
2030 Wright Avenue
Richmond, CA 94804
Attention: Dan Stuermer

Quality Control Narrative

Scope
One (1) water sample was submitted to TMA/Skinner & Sherman Laboratories, Inc. on September 16, 1993 from TMA/Norcal. The sample was analyzed for the USEPA CLP metals, bismuth, silicon and cyanide. The analysis was performed under TMA/Skinner and Sherman work order S309137.

Methodology
The sample was prepared, analyzed and reported in accordance with the USEPA Contract Laboratory Program ILMO2. Bismuth was analyzed by flame atomic absorption spectroscopy.

Discussion
All quality control requirements were met for the samples with no exceptions.

Please feel free to call if there are any questions concerning the data package.

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

Steven Provencal
Steven R. Provencal
Lead Chemist

TMA
Thermo Analytical Inc.

Skinner & Sherman Labs., Inc.
300 Second Avenue
Post Office Box 521
Waltham, MA 02254-0521
(617) 890-7200
FAX (617) 890-3883

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B09755-TMA-589

RECORD COPY

NOV 1993
RECEIVED
SDLA

October 22, 1993

TMA/NORCAL
2030 Wright Avenue
Richmond, CA 94804
Attention: Dan Stuermer

Quality Control Narrative

Scope
One (1) water sample was submitted to TMA/Skinner & Sherman Laboratories, Inc. on September 16, 1993. The sample was analyzed for the USEPA CLP metals plus bismuth and silicon. The analysis was performed under TMA/Skinner and Sherman work order S309138.

Methodology
The sample was prepared, analyzed and reported in accordance with the USEPA Contract Laboratory Program Statement of Work ILM02. Bismuth was analyzed by flame atomic absorption spectroscopy.

Discussion
All quality control requirements were met for the samples with following exceptions:

The chromium laboratory duplicate exceeded the control limit requirements.

Please feel free to call if there are any questions concerning the data package.

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

Steven Provencal

Steven R. Provencal
Lead Chemist

9713505.2606

000002 A

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator KD LEE/GG HAMILTON

Company Contact PH BUTCHER

Telephone (509) 376-5045

Project Designation/Sampling Locations 200 - BP-1

Collection Date 9/11/93

Ice Chest No. GWS042

Field Logbook No. EFL-1020

Bill of Lading/Airbill No. 253695606T

Offsite Property No. W93-0-0718-31

Method of Shipment ~~TMA~~ EMERY DCC 9/13/93

Shipped to TMA

Possible Sample Hazards/Remarks

Sample Identification

BO9555

2, 500 ~~1L~~, ~~1L~~, P, WATER; METALS-CLP TAL(Ca,Mg,Na,K,Fe,Mn,Si,Al,Bi), SELENIUM (HNO3 pH<2) UNFILTERED

1, 500ml, G, WATER; IC ANIONS(F,Cl,SO4,NO2,PO4)

1, 500ml, P, WATER; NO2/NO3(H2SO4 pH<2)

1, 250ml, P, WATER; ALKALINITY

1, 500ml, P, WATER; TDS

1, 500ml, P, WATER; SULFATE

1, 1L, P, WATER; CYANIDE(NaOH pH>12)

3, 2L ~~1, 4L & 1, 2L~~, P, WATER; GROSS ALPHA/BETA, GAMMA SPEC(Cs-137,Co-60,Ru-106), Pu-238, Pu-239/240, Sr-90, TOTAL URANIUM(HNO3 pH<2)

1, 250ml, Gs, WATER; TRITIUM

1, 1L, G/P, WATER; Tc-99(HCl pH<2)

BO9556

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

[] Field Transfer of Custody

Chain of Possession (Sign and Print Names)

Relinquished By	Date	Time	Received By	Date	Time
K.D. Lee	9/11/93	1330	PCCole	9/13/93	0831
PCCole	9/13/93	0831	H. Marcelo TMA/NORCAL	9-15-93	11:05

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

relinq. to frig # 2C by KD Lee 9/11/93 1330

C15

A-6000-407 (12/92) WEF061

9713505.2607

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

B09555-TMA-589

9713505.2608

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

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

PROJECT: 200 BP1	REVIEWER: WWL	DATE: 970113
LABORATORY: TMA	CASE: N3-09-056SAS	SDG: B09555 + 556
SAMPLES/MATRIX (2) H2O B09555, B09556		

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	—	—	—

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

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? See Duplicate Summary page attached. ~~Yes~~ No N/A 4-27-9

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 all ICP

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

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

call ICP

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

17. ANALYTE QUANTITATION AND DETECTION LIMITS

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

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

18. OVERALL ASSESSMENT AND SUMMARY

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

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

COMMENTS (attach additional sheets as necessary):

Chain of custody / analysis requested select metals; laboratory performed complete TAL list, all analytes were reviewed.

B09555-TMA 589

HOLDING TIME SUMMARY - FORM B-1

SDG: B09555 B09556	REVIEWER: MIKE HIGGINS	DATE: 940114	PAGE 1 OF 1
COMMENTS: INORGANICS, METALS, CYANIDE + NET CHEMISTRY			

FIELD SAMPLE ID	ANALYSIS TYPE	DATE SAMPLED	DATE PREPARED	DATE ANALYZED	PREP. HOLDING TIME, DAYS	ANALYSIS HOLDING TIME, DAYS	QUALIFIER
B09555	Metals	9/11/93	10/11/93	10/12+15/93	30d	NA	NONE
	Bi		10/11/93	10/20/93	30d		
	Hg		09/28/93	09/28/93	17d		
	CN		09/22/93	09/23/93	12d		
B09556	Metals		10/11/93	10/12+15/93	30d		
	Bi		10/11/93	10/20/93	30d		
	Hg		09/28/93	09/28/93	17d		
	CN		09/22/93	09/23/93	12d		
B09555	IC ANIONS		NA	9/23/93	12d		
	NO_2/NO_3			10/08/93	27		
	ALKALITY			9/23/93	12		
	TDS			9/17/93	6		
	PO4			9/23/93	12 (48HR)		UJ Nondetect
	NO2			9/23/93	12 (48HR)		UJ "

Verified 11/01/94

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B09555-TMA-589

B09555-TMA-0589

BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: B09555 B09556	REVIEWER: Michael Higgins	DATE: 940118	PAGE 1 OF 1

COMMENTS:

SAMPLE ID	COMPOUND	RESULT	Q	RT	UNITS	5X RESULT	10X RESULT	SAMPLES AFFECTED	QUALIFIER
CCB	Antimony	12.5	B		µg/L	62.5		B09555	U
CCB	Thallium	3.8	B		µg/L	19.0		B09555	U
ICB	Vanadium	2.6	B		µg/L	13.0		B09555	U
CCB	Antimony	12.5	B		µg/L	62.5		B09556	U
ICB	Vanadium	2.6	B		µg/L	13		B09556	U
CCB	Arsenic	~~2.9~~ -1.8	~~B~~		µg/L	3.6 *		B09555	BJ
CCB	Arsenic	-1.77			µg/L	1.8 †		B09556	UJ

* 2x the absolute value of blank contaminant.

† 1x the " " " " " .

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3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-056SAS No.: SDG No.: B09555

Preparation Blank Matrix (soil/water): WATER

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

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	15.5	U	15.5	U	-17.0	B	15.5	U	15.500	U	P
Antimony	15.8	B	12.5	B	9.2	U	9.2	U	10.320	B	P
Arsenic	1.7	U	-1.8	B	-1.8	B	1.7	U	1.700	U	P
Barium	3.6	U	3.6	U	3.6	U	3.6	U	3.600	U	P
Beryllium	0.2	U	0.2	U	0.2	U	0.2	U	0.200	U	P
Cadmium	1.0	U	1.0	U	1.0	U	1.0	U	1.000	U	P
Calcium	24.2	U	24.2	U	24.2	U	24.2	U	24.200	U	P
Chromium	4.1	U	4.1	U	4.1	U	4.1	U	4.100	U	P
Cobalt	3.0	U	3.0	U	3.0	U	3.0	U	3.000	U	P
Copper	2.9	U	2.9	U	2.9	U	2.9	U	2.900	U	P
Iron	9.2	U	9.2	U	-31.6	B	-12.0	B	9.200	U	P
Lead	1.1	U	1.1	U	1.1	U	1.1	U	1.100	U	P
Magnesium	32.3	U	32.3	U	32.3	U	32.3	U	32.300	U	P
Manganese	1.3	U	1.3	U	1.3	U	1.3	U	1.300	U	P
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.200	U	AV
Nickel	3.9	U	3.9	U	3.9	U	3.9	U	3.900	U	P
Potassium	125.3	U	125.3	U	125.3	U	125.3	U	125.300	U	P
Selenium	2.3	U	2.3	U	2.3	U	2.3	U	2.300	U	P
Silver	3.7	U	3.7	U	-9.7	B	3.7	U	3.700	U	P
Sodium	41.2	U	41.2	U	193.1	B	41.2	U	41.200	U	P
Thallium	2.2	U	2.2	U	2.2	U	3.8	B	2.200	U	P
Vanadium	2.6	B	2.6	U	2.6	U	2.6	U	2.600	U	P
Zinc	8.5	U	8.5	U	8.5	U	8.5	U	10.660	B	P
Cyanide	10.0	U	10.0	U	10.0	U			10.000	U	CA
Bismuth	500.0	U	500.0	U	500.0	U			500.000	U	A
Silicon	17.4	U	17.4	U	17.4	U	17.4	U	34.100	B	P

FORM III - IN ILM02.1

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3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-056SAS No.: SDG No.: B09556

Preparation Blank Matrix (soil/water): WATER

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

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	15.5	U	15.5	U	-17.0	B	15.5	U	15.500	U	P
Antimony	15.8	B	12.5	B	9.2	U	9.2	U	9.200	U	P
Arsenic	1.7	U	-1.8	B	-1.8	B	1.7	U	1.700	U	P
Barium	3.6	U	3.6	U	3.6	U	3.6	U	3.600	U	P
Beryllium	0.2	U	0.2	U	0.2	U	0.2	U	0.200	U	P
Cadmium	1.0	U	1.0	U	1.0	U	1.0	U	1.000	U	P
Calcium	24.2	U	24.2	U	24.2	U	24.2	U	24.200	U	P
Chromium	4.1	U	4.1	U	4.1	U	4.1	U	4.100	U	P
Cobalt	3.0	U	3.0	U	3.0	U	3.0	U	3.000	U	P
Copper	2.9	U	2.9	U	2.9	U	2.9	U	2.900	U	P
Iron	9.2	U	9.2	U	-31.6	B	-12.0	B	-29.580	B	P
Lead	1.1	U	1.1	U	1.1	U	1.1	U	1.100	U	P
Magnesium	32.3	U	32.3	U	32.3	U	32.3	U	32.300	U	P
Manganese	1.3	U	1.3	U	1.3	U	1.3	U	1.300	U	P
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.200	U	AV
Nickel	3.9	U	3.9	U	3.9	U	3.9	U	3.900	U	P
Potassium	125.3	U	125.3	U	125.3	U	125.3	U	125.300	U	P
Selenium	2.3	U	2.3	U	2.3	U	2.3	U	2.300	U	P
Silver	3.7	U	3.7	U	-9.7	B	3.7	U	3.700	U	P
Sodium	41.2	U	41.2	U	193.1	B	41.2	U	45.840	B	P
Thallium	2.2	U	2.2	U	2.2	U	3.8	B	3.063	B	P
Vanadium	2.6	B	2.6	U	2.6	U	2.6	U	2.600	U	P
Zinc	8.5	U	8.5	U	8.5	U	8.5	U	8.500	U	P
Cyanide											NR
Bismuth	500.0	U	500.0	U	500.0	U	500.0	U	500.000	U	A
Silicon	17.4	U	17.4	U	17.4	U	17.4	U	102.700	B	P

Verified [illegible]

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3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-056SAS No.: SDG No.: B09556

Preparation Blank Matrix (soil/water): WATER

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

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	15.5	U	15.5	U	-17.0	B	15.5	U	15.500	U	P
Antimony	15.8	B	12.5	B	9.2	U	9.2	U	9.200	U	P
Arsenic	1.7	U	-1.8	B	-1.8	B	1.7	U	1.700	U	P
Barium	3.6	U	3.6	U	3.6	U	3.6	U	3.600	U	P
Beryllium	0.2	U	0.2	U	0.2	U	0.2	U	0.200	U	P
Cadmium	1.0	U	1.0	U	1.0	U	1.0	U	1.000	U	P
Calcium	24.2	U	24.2	U	24.2	U	24.2	U	24.200	U	P
Chromium	4.1	U	4.1	U	4.1	U	4.1	U	4.100	U	P
Cobalt	3.0	U	3.0	U	3.0	U	3.0	U	3.000	U	P
Copper	2.9	U	2.9	U	2.9	U	2.9	U	2.900	U	P
Iron	9.2	U	9.2	U	-31.6	B	-12.0	B	-29.580	B	P
Lead	1.1	U	1.1	U	1.1	U	1.1	U	1.100	U	P
Magnesium	32.3	U	32.3	U	32.3	U	32.3	U	32.300	U	P
Manganese	1.3	U	1.3	U	1.3	U	1.3	U	1.300	U	P
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.200	U	AV
Nickel	3.9	U	3.9	U	3.9	U	3.9	U	3.900	U	P
Potassium	125.3	U	125.3	U	125.3	U	125.3	U	125.300	U	P
Selenium	2.3	U	2.3	U	2.3	U	2.3	U	2.300	U	P
Silver	3.7	U	3.7	U	-9.7	B	3.7	U	3.700	U	P
Sodium	41.2	U	41.2	U	193.1	B	41.2	U	45.840	B	P
Thallium	2.2	U	2.2	U	2.2	U	3.8	B	3.063	B	P
Vanadium	2.6	B	2.6	U	2.6	U	2.6	U	2.600	U	P
Zinc	8.5	U	8.5	U	8.5	U	8.5	U	8.500	U	P
Cyanide											NR
Bismuth	500.0	U	500.0	U	500.0	U	500.0	U	500.000	U	A
Silicon	17.4	U	17.4	U	17.4	U	17.4	U	102.700	B	P

Verified 4/27/94

Revised 4-27-94

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B09555-TMA-589

WESTINGHOUSE/HANFORD

6

DUPLICATES

SAMPLE NUMBER:

B09556D

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: N3-09-056SAS No.: SDG No.: B09556

Matrix (soil/water): 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		15.5000	U	15.5000	U			P
Antimony		17.2100	B	13.5200	B	24.0		P
Arsenic		1.7000	U	1.9081	B	200.0		P
Barium		104.0300	B	104.0300	B	0.0		P
Beryllium		0.2000	U	0.2000	U			P
Cadmium		1.0000	U	1.0900	B	200.0		P
Calcium		31747.0000		31371.0000		1.2		P
Chromium	10.0	23.4700		4.5300	B	135.3	*	P
Cobalt		3.0000	U	3.0000	U			P
Copper		2.9000	U	2.9000	U			P
Iron	100.0	275.5600		201.2400		31.2		P
Lead		1.1000	U	1.1553	B	200.0		P
Magnesium	5000.0	10425.0000		10327.0000		0.9		P
Manganese		5.9000	B	3.4000	B	53.8		P
Mercury		0.2000	U	0.2000	U			AV
Nickel		22.8000	B	3.9000	U	200.0		P
Potassium	5000.0	7883.3000		7818.7000		0.8		P
Selenium		2.3000	U	2.3000	U			P
Silver		3.7000	U	3.7000	U			P
Sodium	5000.0	13951.0000		13799.0000		1.1		P
Thallium		2.2000	U	2.2000	U			P
Vanadium		15.9100	B	14.8000	B	7.2		P
Zinc		9.7800	B	10.0800	B	3.0		P
Cyanide								NR
Bismuth		500.0000	U	500.0000	U			A
Silicon		29905.0000		29595.0000		1.0		P

Chromium exceeds the ±CRDL for sample and duplicate when the sample result is less than 5xCRDL.(=50). This qualifies Cr result as estimated. (J).

4-27-94 ~~12~~ Revised

FORM VI - IN ILM02.1

027

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MEMORANDUM

TO: 200-BP-1 Project QA Record March 29, 1994

FR: Susan Winter, Golder Associates Inc.

RE: RADIOCHEMISTRY DATA VALIDATION SUMMARY FOR DATA PACKAGE: B09555-TMA-589 (913-1719)

INTRODUCTION

This memo presents the results of data validation on data package B09555-TMA-589 consisting of one (1) water sample for radiochemistry analysis. The sample was analyzed by the TMA laboratory using WHC approved methods. Information concerning the sample validated is provided in the following table.

SAMPLE ID	SAMPLE DATE	MEDIA	ANALYSIS
B09555*	09/11/93	WATER	Gross alpha Gross beta Tritium Strontium-90 Technetium-99 Total Uranium Plutonium-238 Plutonium-239/240 Gamma Spectroscopy

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* Indicates samples which received 100% validation.

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

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

DATA QUALITY OBJECTIVES

Precision. Goals for precision were met.

Accuracy. Goals for accuracy were met with the exception of the chemical yield and tracer recovery as summarized under "Major Deficiencies" below.

Sample Result Verification. All sample results were supported in the raw data with the exception of the MDA value for technetium-99 in sample B09555. Therefore, the technetium-99 result was corrected from an undetected result to a positive result at 3.5 pCi/g.

Replaced 3/29/94

-001

Detection Limits. The required detection limit (RDL) goals according to the work plan (DOE-RL 1992) were not supported by the reported laboratory detection limits which were in general, lower than the work plan RDLs. Detection limit goals were met for all sample results with the exception of the radionuclides and associated samples summarized in the following table.

Radionuclide	Samples	Minimum Detectable Activity (MDA) pCi/L	Laboratory RDL pCi/L	Work Plan RDL (DOE-RL 1992) pCi/L
Technetium-99	LCS	8	5	15
Plutonium-238	LCS	0.07	0.05	Not specified
Iron-59	B09555 Duplicate	40	30	Not specified

Completeness. The data package was complete for all requested analyses. A total of one sample was validated in this data package with a total of 28 determinations reported all of which were deemed valid. This results in a completeness of 100 percent, which meets the work plan objectives of 90% (DOE-RL 1990).

MAJOR DEFICIENCIES

The following major deficiencies were identified during data validation which required qualification of data as unusable.

Tracer Recovery

- Plutonium-242 tracer recovery for the laboratory control sample (LCS) was less than 30%, therefore, the associated results for plutonium-238 and plutonium-239/240 have been qualified as unusable (R for detects, UR for nondetects). However, this rejection of data does not effect the percent completeness of this data package since the LCS is a required quality control sample only.

Chemical Yield

- Technetium-99 chemical yield for the LCS was less than 30%, therefore, the associated result has been qualified as unusable (R). However, this rejection of data does not effect the percent completeness of this data package since the LCS is a required quality control sample only.

MINOR DEFICIENCIES

The following minor deficiencies were identified during data validation which required qualification of data.

Replaced 3/29/94 -002

Laboratory Blank

- Technetium-99 was detected in the laboratory (reagent) blank at 17 pCi/L. Therefore, the technetium-99 result for B09555 duplicate, 5 pCi/L, which is less than ten times the blank value, has been qualified as estimated (J).

Laboratory Control Sample (LCS)

- The LCS sample result for tritium has been qualified as estimated (J) since the exact amount of standard added cannot be verified using the information provided.

REFERENCES

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

WHC 1992, Data Validation Procedures for Radiochemical Analyses, WHC-SD-EN-SPP-001, Rev. 0, 1992. Westinghouse Hanford Company, Richland, Washington.

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

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

Replaced 3/29/94 003

9713505.2623

ATTACHMENT 1

GLOSSARY OF DATA REPORTING QUALIFIERS

GLOSSARY OF RADIOCHEMISTRY DATA REPORTING QUALIFIERS

U - Indicates the constituent was analyzed for, but was not detected at a concentration above the minimum detectable activity (MDA). The concentration reported is the MDA corrected for sample aliquot size, dilution factors and percent solids (in the case of solid matrices) by the laboratory. The associated data should be considered usable for decision making purposes.

UJ - Indicates the constituent was analyzed for and was not detected at a concentration above the MDA. Due to a quality control deficiency identified during data validation, the concentration reported may not accurately reflect the sample MDA. The associated data should be considered usable for decision making purposes.

J - Indicates the constituent was analyzed for and detected. The concentration reported is qualified as estimated due to a quality control deficiency identified during data validation. The associated data should be considered usable for decision making purposes.

UR - Indicates the constituent was analyzed for and not detected. The concentration reported is qualified as unusable due to a quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

R - Indicates the constituent was analyzed for and detected. The concentration reported is qualified as unusable due to a quality control deficiency identified during data validation. The associated data should be considered unusable for decision making purposes.

9713505.2625

ATTACHMENT 2

SUMMARY OF DATA QUALIFICATIONS

DATA QUALIFICATION SUMMARY - FORM B-7

B09555-TMA-589

SDG:	REVIEWER:	DATE: 01/24/94	PAGE 1 OF 1
COMMENTS: Radiochemistry			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Technetium-99	J	B09555 Dup	Detected in blank at 17 pCi/L
Technetium-99	R	LCS	chemical yield <30%
Plutonium-238	UR	LCS	chem tracer % R <30%
Plutonium-239/240	R	↓	↓
Tritium	J	LCS	Amount of std. used in LCS cannot be exactly verified

1/24/94

3/29/94

Replaced 3/29/94

007

9716505.2627

ATTACHMENT 3

QUALIFIED DATA SUMMARY AND ANNOTATED LABORATORY REPORTS

Validated Data Summary, Data Package: B09555-TMA-589

	Samp#	B09555	
	Date	9-11-93	
	Location	699-54-57	
	Type	SPLIT-3	
Parameter	Units	Result	Q
GROSS ALPHA	pCi/L	2.000	U
GROSS BETA	pCi/L	7.500	
TRITIUM	pCi/L	200.000	U
STRONTIUM-90	pCi/L	0.800	U
TECHNETIUM-99	pCi/L	4.000	U
TOTAL URANIUM	UGM/L	2.600	
PLUTONIUM-238	pCi/L	0.040	U
PLUTONIUM-239/240	pCi/L	0.020	U
SODIUM-22	pCi/L	9.000	U
POTASSIUM-40	pCi/L	100.000	U
MANGANESE-54	pCi/L	9.000	U
IRON-59	pCi/L	20.000	U
COBALT-58	pCi/L	10.000	U
COBALT-60	pCi/L	10.000	U
NIOBIUM-94	pCi/L	9.000	U
RUTHENIUM-103	pCi/L	10.000	U
RUTHENIUM-106	pCi/L	80.000	U
TIN-113	pCi/L	10.000	U
CESIUM-134	pCi/L	10.000	U
CESIUM-137	pCi/L	10.000	U
CERIUM-144	pCi/L	40.000	U
EUROPIUM-152	pCi/L	20.000	U
EUROPIUM-154	pCi/L	10.000	U
EUROPIUM-155	pCi/L	20.000	U
RADIUM-226	pCi/L	20.000	U
RADIUM-228	pCi/L	40.000	U
THORIUM-228	pCi/L	10.000	U
THORIUM-232	pCi/L	40.000	U

9713505.2629

TMA NORCAL

REPORTING GROUP 7243

DATA SHEET

N309058-01

B09555

699-54-57
Split-3

SDG 7243 Client Westinghouse Hanford
Contact Dinkar Kharkar Contract MBH-SVV-069262

Lab sample id N309058-01 Client sample id B09555
Dept sample id 7243-001 Location/Matrix 200-BP-1 LIQUID
Received 09/15/93 Collected 09/11/93
Chain of custody id EFL-1020

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	Alpha	-0.023	1.2	2	3	U	80A
Gross Beta	Beta	7.5	1.5	2	4		80B
Tritium	10028-17-8	54	140	200	400	U	H
Strontium 90	10098-97-2	-0.085	0.99	0.8	2	U	Y
Technetium 99	14133-76-7	3.5	1.9	4	5	~~U~~	TC
Total Uranium (ug/L)	7440-61-1	2.6	0.46	0.04			U_T
Plutonium 238	13981-16-3	0	0.017	0.04	0.05	U	PU
Plutonium 239/240		0.002	0.012	0.02	0.05	U	PU
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		9		U	GAM
Potassium 40	13966-00-2	U		100		U	GAM
Manganese 54	13966-31-9	U		9		U	GAM
Iron 59	14596-12-4	U		20	30	U	GAM
Cobalt 58	13981-38-9	U		10		U	GAM
Cobalt 60	10198-40-0	U		10	30	U	GAM
Niobium 94	14681-63-1	U		9		U	GAM
Ruthenium 103	13968-53-1	U		10		U	GAM
Ruthenium 106	13967-48-1	U		80		U	GAM
Tin 113	13966-06-8	U		10		U	GAM
Cesium 134	13967-70-9	U		10		U	GAM
Cesium 137	10045-97-3	U		10	20	U	GAM
Cerium 144	14762-78-8	U		40		U	GAM
Europium 152	14683-23-9	U		20	40	U	GAM
Europium 154	15585-10-1	U		10	40	U	GAM
Europium 155	14391-16-3	U		20		U	GAM
Radium 226	13982-63-3	U		20		U	GAM
Radium 228	15262-20-1	U		40		U	GAM
Thorium 228	14274-82-9	U		10		U	GAM

Verified

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 12/02/93

1/21/94

DATA SHEETS
Page 1
SUMMARY DATA SECTION
Page 14

9713505.2630

TMA NORCAL

REPORTING GROUP 7243

N309058-01

DATA SHEET, cont

B09555

699-54-57
Split-3

SDG	7243	Client	Westinghouse Hanford
Contact	Dinkar Kharkar	Contract	MBH-SVV-069262
Lab sample id	N309058-01	Client sample id	B09555
Dept sample id	7243-001	Location/Matrix	200-BP-1 LIQUID
Received	09/15/93	Collected	09/11/93
		Chain of custody id	EFL-1020

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Thorium 232	7440-29-1	U		40		U	GAM

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N309058-01	80A/80	7243-001		0.300 L	10/12/93	10/13/93	DPK
N309058-01	80B/80	7243-001		0.300 L	10/12/93	10/13/93	DPK
N309058-01	H	7243-001		0.0100 L	10/13/93	11/17/93	DPK
N309058-01	Y	7243-001		1.00 L	11/02/93	11/05/93	DPK
N309058-01	TC	7243-001		0.200 L	11/18/93	11/18/93	DPK
N309058-01	U_T	7243-001		0.0200 L	10/07/93	10/12/93	DPK
N309058-01	PU	7243-001		1.00 L	10/26/93	10/28/93	DPK
N309058-01	GAM	7243-001		0.500 L	10/12/93	10/20/93	DPK

Verified

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DS
Version	2.27
Report date	12/02/93

9713505.2631

ATTACHMENT 4

LABORATORY NARRATIVE AND CHAIN-OF-CUSTODY DOCUMENTATION

SDG: 7243
Contact: Dinkar Kharkar

TMA NORCAL

REPORTING GROUP 7243

Client: Westinghouse Hanford
Contract: MBH-SVV-069262

CASE NARRATIVE

1.0 GENERAL

TMA/Norcal Sample Delivery Group 7243 is comprised of the sample listed on the Chain-of-Custody documents below. This sample group was processed under the Westinghouse Hanford Company Statement of Work P.O. MBH-SVV-069262.

1.1 Chains-of-Custody

This report includes data for the one water sample from location 200-BP-1 delivered under Field Log Book #EFL-1020. A Chain-of-Custody number was not provided.

1.2 Sample Volume

Three 2000 mL, one 1000 plastic bottles, and one 250 mL glass bottle containing the sample were received for the analyses.

1.3 Missing Samples

The sample listed on the Chain-of-Custody document was received.

1.4 Holding Times

The samples were collected on September 11, 1993 and sample processing was initiated within 180 days of collection.

2.0 QUALITY CONTROL

The internal quality control consisted of one sample each of a laboratory control sample, a blank, and a replicate. All original analyses were performed with QC samples 7243-02 through 7243-04.

The QC samples were prepared by the Quality Control Department. Copies of the QC notebook pages are included in this data package.

2.1 Laboratory Control Samples

The LCS recoveries for all nuclides were acceptable. The MDA's of the results for all analyses met the RDL's except for technetium-99 and plutonium-238, due to a low chemical yield and a high background of the counter in the region of intetest, respectively.

2.0 QUALITY CONTROL (cont'd)

2.2 Reagent Blanks

The MDA's of the results for all analyses met the RDL's. The 2 σ error for strontium-90 was underlined because it was larger than both the MDA and the result implying that the MDA may not be a good estimate of the "real" minimum detectable activity. Elevated technetium-99 was found in the blank. Although the technetium-99 blank appears high on a nominal aliquot basis, it is below the RDL on a per sample basis.

2.3 Duplicates

Results were satisfactory for all duplicate analyses. The MDA for iron-59 for the duplicate of sample BO9555 was higher that the RDL due to the higher background of the detector in the region of intrest. The 2σ error for strontium-90 for the original and the duplicate of sample BO9555 was underlined because it was larger than both the MDA and the result, implying that the MDA may not be a good estimate of the "real" minimum detectable activity.

3.0 ANALYSIS NOTES

3.1 Gross Alpha Analyses

The average MDA for gross alpha was (2 $\pm$ 1) pCi/L. Gross alpha activity above the RDL was not found in the sample.

3.2 Gross Beta Analyses

The average MDA for gross beta was (2 $\pm$ 0) pCi/L. Gross beta activity above the RDL was found in the sample.

3.3 Tritium Analyses

The average MDA for tritium was (200 $\pm$ 0) pCi/L. Tritium activity above the RDL was not found in the sample.

3.4 Strontium-90 Analyses

The average yield for four analyses was (82 $\pm$ 3)%. The lowest yield was 81% and the highest was 84%. The average MDA was (0.8 $\pm$ 0.1) pCi/L. Strontium-90 activity above the RDL was not found in the sample.

3.5 Technetium-99 Analyses

The average yield for four analyses was (45 $\pm$ 32)%. The lowest yield was 24% and the highest was 59%. The average MDA was (5 $\pm$ 4) pCi/L. Technetium-99 activity above the RDL was not found in the sample.

3.0 ANALYSIS NOTES (cont'd)

3.6 Total Uranium Analyses

The average MDA for total uranium was (0.1 ± 0.4) μg/L. A total uranium concentration of 2.6 ug/L was found in the sample.

3.7 Isotopic Plutonium Analyses

The average yield for four analyses was (41 ± 30)%. The lowest yield was 23% and the highest was 59%. The average MDA was (0.04 ± 0.05) pCi/L. Isotopic plutonium activity was not found in the sample.

3.8 Gamma Scan Analyses

A gamma scan analysis found no activity above the RDL in the sample.

9713505.2635

Westinghouse Hanford Company	CHAIN OF CUSTODY

Custody Form Initiator KD LEE/GG HAMILTON

Company Contact PH BUTCHER

Telephone (509) 376-5045

Project Designation/Sampling Locations 200 - BP-1

Collection Date 9/11/93

Ice Chest No. GWS042

Field Logbook No. EFL-1020

Bill of Lading/Airbill No. 2536956066T

Offsite Property No. W93-0-0718-31

Method of Shipment ~~TMA~~ EMERY DCC 9/13/93

Shipped to TMA

Possible Sample Hazards/Remarks

Sample Identification

BO9555

2, 500ml ~~1L~~, 1L, P, WATER; METALS-CLP TAL(Ca,Mg,Na,K,Fe,Mn,Si,Al,Bi), SELENIUM (HNO3 pH<2) UNFILTERED

1, 500ml, G, WATER; IC ANIONS(F,Cl,SO4,NO2,PO4)

1, 500ml, P, WATER; NO2/NO3(H2SO4 pH<2)

1, 250ml, P, WATER; ALKALINITY

1, 500ml, P, WATER; TDS

1, 500ml, P, WATER; SULFATE

1, 1L, P, WATER; CYANIDE(NaOH pH>12)

3, 2L ~~1, 4L & 1, 2L~~, P, WATER; GROSS ALPHA/BETA, GAMMA SPEC(Cs-137,Co-60,Ru-106), Pu-238, Pu-239/240, Sr-90, TOTAL URANIUM(HNO3 pH<2)

1, 250ml, Gs, WATER; TRITIUM

1, 1L, G/P, WATER; Tc-99(HCl pH<2)

BO9556

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

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

Relinquished By	Date	Time	Received By	Date	Time
K.D. Lee	9/11/93	1330	PCLole	9/13/93	0831
PCLole	9/13/93	0831	H. Narciso TMA/NORCAL	9-15-93	11:05

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

relinq. to frig # 2C by K.D. Lee 9/11/93 1330

A-6000-407 (12/92) WEF061

9713505.2636

ATTACHMENT 5

DATA VALIDATION SUPPORTING DOCUMENTATION

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

PROJECT: 200-BP-1	VALIDATOR: [illegible]	DATE: 01/21/94
LABORATORY: TMA	DATA PACKAGE: B-9555-TMA-589	
SAMPLES/MATRIX: B09555		
Waters.		

1. Completeness

1.1 Completeness Checklist (Complete the appropriate checklist for each analysis type and attach).

2. Calibration

2.1 Initial Calibration

Was instrument calibrated within specified time period or annually? See comments below. Yes (No) N/A

If NO, qualify all associated data as unusable (R).

Was each detector used for the associated data calibrated? (Yes) No N/A

If NO, qualify all associated data as unusable (R).

Are calibration standards NIST traceable or equivalent? (Yes) No N/A

If NO, qualify all associated data as unusable (R).

Were calibration standards expired? Yes (No) N/A

If YES, qualify all associated data as unusable (R).

Comments: The detectors used for gross alpha, gross beta, beta emitters (Tc-99 and Sr-90), and gamma spectroscopy were initially calibrated more than a year before sample analysis. However, if the CCV, LCS, and chemical or tracer recovery (if applicable) are all within limits, verifying that the instrument is calibrated properly, no qualification is required.

2.2 Continuing Calibration

Is check source identified by activity and radionuclides? (Yes) No N/A

If NO, qualify all associated data as estimated (J).

1/21/94 Has check source been counted ~~daily?~~ regularly (Yes) No N/A

If NO, qualify all associated data as unusable (R).

Are check source counts within ±3S control limits? (Yes) No N/A

If NO, qualify all associated data as unusable (R).

Have background counts been performed at least weekly and before and after all field and QC samples associated with the SDG? (Yes) No N/A

If NO, qualify all associated results as unusable (R).

Are background counts within ±3S control limits? (Yes) No N/A

If NO, qualify all associated results as unusable (R).

Comments:

Radionuclide	Sample	MDA	Lab RDL
Iron-59	B09555Dup	40	30 pCi/L
Tc-99	LCS	8	5 pCi/L
Pu-238	LCS	0.07	0.05 pCi/L

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

3. Blanks

Have reagent/method/field blanks been analyzed with the SDG? (Yes) No N/A

If NO, qualify all results >LLD as estimated (J).

Are positive results reported in the reagent/method/field blanks? (Yes) No N/A

If YES, qualify positive results less than the MDA as nondetects (U). Qualify sample results <10X the blank value but greater than the MDA as estimated (J).

Can blank results be verified/calculated properly? (Yes) No N/A

Comments:

Blank Technetium-99 is detected in the blank at 17 pCi/L. ~~Technetium was not detected in~~

B09555 The amount of Tc-99 present in sample B09555 is below the MDA therefore no qualification was required for this sample. ~~However, the lab dup of B09555 and~~

B09555 Dup ~~However,~~ Tc-99 was detected in B09555 Duplicate at 5.0 pCi/L. Therefore, this sample result was qualified as estimated (J).

LCS The Tc-99 ~~result~~ detected in ~~of~~ the LCS ~~was~~ is 240 pCi/L which is more than 10X17 pCi/L = 170 pCi/L Therefore, no qualification was required.

1/21/94

9713505.2640

TMA NORCAL

REPORTING GROUP 7243

N309058-03

REAGENT BLANK

Reagent Blank

SDG 7243 Client Westinghouse Hanford
Contact Dinkar Kharkar Contract MBH-SVV-069262

Lab sample id N309058-03 Client sample id Reagent Blank
Dept sample id 7243-003 Material/Matrix LIQUID

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Gross Alpha	Alpha	-0.048	1.2	2	3	U	80A
Gross Beta	Beta	-0.49	1.0	2	4	U	80B
Tritium	10028-17-8	29	140	200	400	U	H
Strontium 90	10098-97-2	0	0.99	0.8	2	U	Y
Technetium 99	14133-76-7	17	1.9	4	5		TC
Total Uranium (ug/L)	7440-61-1	U		0.04		UX	U_T
Plutonium 238	13981-16-3	-0.002	0.005	0.02	0.05	U	PU
Plutonium 239/240		0.012	0.009	0.02	0.05	U	PU
GAMMA SCAN ANALYTES							
Sodium 22	13966-32-0	U		8		U	GAM
Potassium 40	13966-00-2	U		100		U	GAM
Manganese 54	13966-31-9	U		8		U	GAM
Iron 59	14596-12-4	U		20	30	U	GAM
Cobalt 58	13981-38-9	U		8		U	GAM
Cobalt 60	10198-40-0	U		10	30	U	GAM
Niobium 94	14681-63-1	U		8		U	GAM
Ruthenium 103	13968-53-1	U		8		U	GAM
Ruthenium 106	13967-48-1	U		80		U	GAM
Tin 113	13966-06-8	U		9		U	GAM
Cesium 134	13967-70-9	U		9		U	GAM
Cesium 137	10045-97-3	U		8	20	U	GAM
Cerium 144	14762-78-8	U		40		U	GAM
Europium 152	14683-23-9	U		20	40	U	GAM
Europium 154	15585-10-1	U		10	40	U	GAM
Europium 155	14391-16-3	U		20		U	GAM
Radium 226	13982-63-3	U		20		U	GAM
Radium 228	15262-20-1	U		30		U	GAM
Thorium 228	14274-82-9	U		20		U	GAM
Thorium 232	7440-29-1	U		30		U	GAM

Verified

1/21/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 12/02/93

REAGENT BLANKS
Page 1
SUMMARY DATA SECTION
Page 8

N309058-03

TMA NORCAL
REPORTING GROUP 7243

BLANK, cont.

Reagent Blank

SDG 7243 Client Westinghouse Hanford
Contact Dinkar Kharkar Contract MBH-SVV-069262

Lab sample id N309058-03 Client sample id Reagent Blank
Dept sample id 7243-003 Material/Matrix LIQUID

LAB SAMPLE	TEST	PLANCHET	SUFFIX	ALIQUOT	ANALYZED	REVIEWED	BY
N309058-03	80A/80	7243-003		0.300 L	10/12/93	10/13/93	DPK
N309058-03	80B/80	7243-003		0.300 L	10/12/93	10/13/93	DPK
N309058-03	H	7243-003		0.0100 L	10/13/93	11/17/93	DPK
N309058-03	Y	7243-003		1.00 L	11/02/93	11/05/93	DPK
N309058-03	TC	7243-003		0.200 L	10/20/93	11/18/93	DPK
N309058-03	U_T	7243-003		0.0200 L	10/07/93	10/12/93	DPK
N309058-03	PU	7243-003		1.00 L	10/22/93	10/28/93	DPK
N309058-03	GAM	7243-003		0.500 L	10/12/93	10/20/93	DPK

QC-15605 - 15611

Verified

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DS
Version 2.27
Report date 12/02/93

1/21/94

4. Detection Limits and Sample Results

Can LLDs and MDAs be verified? (Yes) No N/A

If NO, qualify all results as estimated detects (J) or estimated nondetects (UJ).

Do reported results meet the detection limit requirements? Yes (No) N/A

Note discrepancies in the validation report narrative.

Can reported results be verified? (Yes) No N/A

If NO, note missing data in the validation report. Correct results on the photocopied report forms and include in the validation report.

Comments:

The Tc-99 MDA value for sample B09555 is calculated as 3.28 pCi/g and the result is calculated as 3.500. Therefore, the "U" qualifier has been removed from the ~~Fo~~ lab report form and Tc99 is reported as a positive result at 3.5 pCi/g.

3/29/94

Replaced 3/29/94

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

5. Radiometric and Gravimetric Yields

Were spikes/tracers/chemical yields analyzed in each SDG and/or sample as appropriate for the analytical method? (Yes) No N/A

If NO or if inappropriate tracers were used qualify associated results as unusable (R).

Was a field blank used for the spike/tracer/chemical yield analysis? Yes (No) N/A

If YES, note in the validation narrative.

Is spike/tracer/chemical yield recovery within the limits of 30-105% for sample results <4X the spike activity? Yes (No) N/A

Verify the spike recoveries and qualify associated results as follows:

%R:	<30%	30-105%	>105%	>115%
<LLD	R	acceptable	UJ	R
>LLD	R	acceptable	J	R

Comments:

Technetium-99 chemical yield for the laboratory control sample is 23.6%. Therefore, the associated result has been qualified as unusable (R).

Plutonium-242 tracer recovery for the LCS is 23%. Therefore, the associated results for plutonium-238 and plutonium-239/240 have been qualified as unusable (R/UR).

6. Duplicate Samples and Analyses

Has at least one duplicate analysis been performed for every 10 samples in the SDG? Yes No N/A

If NO, qualify all associated results as estimated (J).

Has the field blank been used for duplicate or MS/MSD analysis? Yes No N/A

Are RPD values ≤35% for results >5X the LLD and within ±2X the LLD for results <5X the LLD? Yes No N/A

If NO, qualify associated results <LLD as estimated nondetects (UJ) and all associated results >LLD as estimated detects (J).

Comments:

9713505.2645

N309058-04

TMA NORCAL

REPORTING GROUP 7243

DUPLICATE

B09555

SDG 7243
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

DUPLICATE
Lab sample id N309058-04
Dept sample id 7243-004

ORIGINAL
Lab sample id N309058-01
Dept sample id 7243-001
Received 09/15/93

Client sample id B09555
Location/Matrix 200-BP-1 LIQUID
Collected 09/11/93
Chain of custody id EFL-1020

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALIFIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALIFIERS	RPD %	3σ TOT	PROT LIMIT
Gross Alpha	1.4	1.2	1	3	J	80A	-0.023	1.2	2	U	200	363	
Gross Beta	8.8	1.5	2	4		80B	7.5	1.5	2		16	50	
Tritium	25	140	200	400	U	H	54	140	200	U	-		
Strontium 90	-0.060	1.0	0.9	2	U	Y	-0.085	0.99	0.8	U	-		
Technetium 99	5.0	2.0	3	5	~~J~~ J	TC	3.5	1.9	4	U	35	100	
Total Uranium (ug/L)	2.6	0.46	0.04			U_T	2.6	0.46	0.04		0	42	
Plutonium 238	-0.003	0.005	0.02	0.05	U	PU	0	0.017	0.04	U	-		
Plutonium 239/240	0.003	0.005	0.02	0.05	U	PU	0.002	0.012	0.02	U	-		
GAMMA SCAN ANALYTES													
Sodium 22	U		10		U	GAM	U		9	U	-		
Potassium 40	U		300		U	GAM	U		100	U	-		
Manganese 54	U		10		U	GAM	U		9	U	-		
Iron 59	U		40	30	U	GAM	U		20	U	-		
Cobalt 58	U		20		U	GAM	U		10	U	-		
Cobalt 60	U		20	30	U	GAM	U		10	U	-		
Niobium 94	U		10		U	GAM	U		9	U	-		
Ruthenium 103	U		20		U	GAM	U		10	U	-		
Ruthenium 106	U		100		U	GAM	U		80	U	-		
Tin 113	U		20		U	GAM	U		10	U	-		
Cesium 134	U		10		U	GAM	U		10	U	-		
Cesium 137	U		10	20	U	GAM	U		10	U	-		
Cerium 144	U		80		U	GAM	U		40	U	-		
Europium 152	U		30	40	U	GAM	U		20	U	-		
Europium 154	U		20	40	U	GAM	U		10	U	-		
Europium 155	U		40		U	GAM	U		20	U	-		
Radium 226	U		30		U	GAM	U		20	U	-		
Radium 228	U		60		U	GAM	U		40	U	-		
Thorium 228	U		20		U	GAM	U		10	U	-		

Verified

1/21/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-DUP
Version 2.27
Report date 12/02/93

DUPLICATES
Page 1
SUMMARY DATA SECTION
Page 12

9713505.2646

N309058-04

TMA NORCAL

REPORTING GROUP 7243

B09555

DUPLICATE, cont.

SDG	7243			Client	Westinghouse Hanford
Contact	Dinkar Kharkar			Contract	MBH-SVV-069262
DUPLICATE		ORIGINAL			
Lab sample id	N309058-04	Lab sample id	N309058-01	Client sample id	B09555
Dept sample id	7243-004	Dept sample id	7243-001	Location/Matrix	200-BP-1 LIQUID
		Received	09/15/93	Collected	09/11/93
				Chain of custody id	EFL-1020

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI-FIERS	RPD %	3σ TOT	PROT LIMIT
Thorium 232	U		60		U	GAM	U		40	U	-		

TEST	DUPLICATE PLANCHET	SUF-FIX	ALIQUOT	ANALYZED	REVIEWED	BY	ORIGINAL PLANCHET	SUF-FIX	ALIQUOT	ANALYZED	REVIEWED	BY
80A/80	7243-004		0.300 L	10/12/93	10/13/93	DPK	7243-001		0.300	10/12/93	10/13/93	DPK
80B/80	7243-004		0.300 L	10/12/93	10/13/93	DPK	7243-001		0.300	10/12/93	10/13/93	DPK
H	7243-004		0.0100 L	10/13/93	11/17/93	DPK	7243-001		0.0100	10/13/93	11/17/93	DPK
Y	7243-004		1.00 L	11/02/93	11/05/93	DPK	7243-001		1.00	11/02/93	11/05/93	DPK
TC	7243-004		0.200 L	11/18/93	11/18/93	DPK	7243-001		0.200	11/18/93	11/18/93	DPK
U_T	7243-004		0.0200 L	10/07/93	10/12/93	DPK	7243-001		0.0200	10/07/93	10/12/93	DPK
PU	7243-004		1.00 L	10/22/93	10/28/93	DPK	7243-001		1.00	10/26/93	10/28/93	DPK
GAM	7243-004		0.500 L	10/13/93	10/20/93	DPK	7243-001		0.500	10/12/93	10/20/93	DPK

QC-15612 - 15616

Verified

1/21/94

Lab id	TMAN
Protocol	WHC-HASM
Version	Ver 1.0
Form	DVD-DUP
Version	2.27
Report date	12/02/93

7. Laboratory Control Samples

Are LCS results within the control limits of 80-120% — Yes No N/A

If NO, qualify results as follows:

%R:	<50%	50-79%	>120%
Results < LLD:	R	UJ	R
Results > LLD:	R	J	R

Has at least one LCS been analyzed with the SDG? — Yes No N/A

If NO, qualify all associated results as estimated (J).

Comments: The exact amount of tritium standard added to the LCS cannot be verified. Therefore, the LCS result only has been qualified as estimated (J).

Replaced 3/29/94

9713505.2648

N309058-02

TMA NORCAL

REPORTING GROUP 7243

LAB CONTROL SAMPLE

Lab Control Sample

SDG 7243
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N309058-02
Dept sample id 7243-002

Client sample id Lab Control Sample
Material/Matrix LIQUID

ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALIFIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	69	6.5	1	3		80A	74.7	3.0	92	69-131	80-120
Gross Beta	130	4.6	2	4		80B	131	5.2	99	76-124	80-120
Tritium	5000	300	200	400	J	H	5410	220	92	83-117	80-120
Strontium 90	15	1.0	0.9	2		Y	14.8	0.59	101	80-120	80-120
Technetium 99	240	15	8	5	~~U~~ R	TC	255	10	94	82-118	80-120
Total Uranium (ug/L)	34	6.2	0.4		X	U_T	32.6	1.3	104	68-132	80-120
Plutonium 238	0.024	0.036	0.07	0.05	~~U~~ UR	PU	0	0			80-120
Plutonium 239/240	1.3	0.23	0.05	0.05	R	PU	1.13	0.045	115	67-133	80-120
GAMMA SCAN ANALYTES											
Sodium 22	U		10		U	GAM					
Potassium 40	U		200		U	GAM					
Manganese 54	U		10		U	GAM					
Iron 59	U		30	30	U	GAM					
Cobalt 58	U		10		U	GAM					
Cobalt 60	360	26		30		GAM	394	16	91	76-124	80-120
Niobium 94	U		20		U	GAM					
Ruthenium 103	U		10		U	GAM					
Ruthenium 106	U		100		U	GAM					
Tin 113	U		10		U	GAM					
Cesium 134	U		20		U	GAM					
Cesium 137	250	21		20		GAM	264	11	95	75-125	80-120
Cerium 144	U		50		U	GAM					
Europium 152	U		20	40	U	GAM					
Europium 154	U		20	40	U	GAM					
Europium 155	U		30		U	GAM					
Radium 226	U		30		U	GAM					
Radium 228	U		70		U	GAM					
Thorium 228	U		20		U	GAM					
Thorium 232	U		70		U	GAM					

Verified

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-LCS
Version 2.27
Report date 12/02/93

1/21/94

LAB CONTROL SAMPLES
Page 1
SUMMARY DATA SECTION
Page 10

N309058-02

TMA NORCAL
REPORTING GROUP 7243

LAB CONTROL SAMPLE, cont.

Lab Control Sample

SDG _____
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N309058-02
Dept sample id 7243-002

Client sample id Lab Control Sample
Material/Matrix _____ LIQUID

TEST	PLANCHET	SUF-FIX	ALIQUOT	PREP ERR 2σ %	ANALYZED	REVIEWED	BY
80A/80	7243-002		0.300 L	20.0	10/12/93	10/13/93	DPK
80B/80	7243-002		0.300 L	15.0	10/12/93	10/13/93	DPK
H	7243-002		0.0100 L	10.0	10/13/93	11/17/93	DPK
Y	7243-002		1.00 L	10.0	11/02/93	11/09/93	DPK
TC	7243-002		0.200 L	10.0	11/18/93	11/18/93	DPK
U_T	7243-002		0.0200 L	9.0	10/07/93	10/12/93	DPK
PU	7243-002		1.00 L	5.0	10/28/93	10/28/93	DPK
GAM	7243-002		0.500 L	15.0	10/12/93	10/20/93	DPK

QC-15598 - 15604

Verified
1/21/94

Lab id TMAN
Protocol WHC-HASM
Version Ver 1.0
Form DVD-LCS
Version 2.27
Report date 12/02/93

8. Holding Times

Have all samples/analyses been completed within 5 half-lives or 180 days, whichever comes first? **Yes** **No** **N/A**

If NO, qualify all associated results >LLD as estimated detects (J) and all associated results <LLD as estimated non-detects (UJ). For gross exceedances (>2X criteria) qualify all associated results as unusable (R).

Comments:

9. Method Specific and Other Quality Control

9.1 Gas Proportional Counters

Are field and QC sample preparations outside the range of the self absorption curves? Yes No N/A

If YES, qualify all associated data as estimated (J).

Are initial detector efficiencies <20%? 1/21/94 Yes No N/A

If YES, qualify all associated data as unusable (R).

Have statistical tests been performed routinely (at least weekly)? Yes No N/A

If NO, qualify all associated data as estimated (J).

Have stability verifications been performed after each gas change? Yes No N/A

If NO, qualify all associated data as estimated (J).

Comments:

9.2 Alpha Spectroscopy

Has detector system been calibrated across the energy range of interest? Yes No N/A

If NO, qualify all results as unusable (R).

Is detector resolution adequate to identify each peak centroid? Yes No N/A

If NO or if resolution cannot be determined, qualify all results as unusable (R).

Is resolution at least 20 keV FWHM? Yes No N/A

If NO, qualify all results as estimated (J).

Do check source efficiencies agree within 5% of initial calibration efficiencies or are they within the control limits or ±3S of the mean? Yes No N/A

If NO, qualify all associated results as unusable (R).

Was each sample spiked with a tracer? Yes No N/A

If NO, qualify all associated results as unusable (R).

Are tracer recoveries within the control limits of 30 to 105%? Yes No N/A

If NO, qualify all results as follows:

%R:	<30%	30-105%	>105%	>115%
Results <LLD:	R	acceptable	UJ	R
Results >LLD:	R	acceptable	J	R

Comments: Pu-242
LCS Tracer %R = 23.3%
Qual-Sy Pu-238 as unusable (UR)
Pu-239/240 as unusable (R)

9.3 Gamma Spectroscopy

Does efficiency calibration approximate a smooth semi-log curve? Yes No N/A

If NO, qualify all results as unusable (R).

Have geometry or matrix factors been accounted for in all analyses? Yes No N/A

If NO, qualify all associated results as unusable (R).

Does the detector calibration cover the energy range of interest and at least 0 to 2 MeV? Yes No N/A

If NO, qualify all results outside the energy range as unusable (R).

Is resolution of the detector system adequate and less than 5 FWHM? Yes No N/A

If NO, qualify all results as estimated (J).

Comments:

9.4 Alpha Emitting Radium Isotopes

Have single radium isotopes (Ra-223, Ra-224, Ra-226) been reported? Yes No N/A

If YES, qualify all results attributed to a single radium isotope as estimated (J) if the contribution to the total from individual isotopes is unknown.

Can time from sample precipitation to counting be verified? Yes No N/A

If NO, qualify all associated results >MDA as estimated (J).

Have barium interferences been identified and accounted for? Yes No N/A

If NO, qualify all associated results with elevated barium levels as estimated (J).

Has counting efficiency for Ra-226 been determined for each SDG? Yes No N/A

If NO, qualify all associated results as unusable (R).

Have blanks been analyzed with each group to check for possible radium contamination in the reagents? Yes No N/A

If NO, qualify all associated results as estimated (J).

If sample was preserved at collection has analysis been completed within 180 days or 5 half-lives? Yes No N/A

If NO, qualify results >LLD as estimated detects (J) and results < LLD as estimated non-detects (UJ).

If samples were not preserved, were samples received within 5 days of sampling? Yes No N/A

- Were samples preserved at the laboratory upon receipt? Yes No N/A
- Were samples held after preservation for at least 16 days? Yes No N/A

If NO, to any of the above, qualify associated sample results as estimated (J).

Comments: This analysis was not performed.

RADIOCHEMISTRY DATA VALIDATION CHECKLIST

9.5 Radium 226 Analysis using Scintillation (Lucas) Cell Counting

Is calibration data present and can it be associated with the samples? Yes No N/A

If NO, qualify associated sample results as unusable (R).

Was the counting system calibrated each day that samples were analyzed? Yes No N/A

If NO, qualify associated results as estimated (J).

Was the counting system calibrated after replacing the scintillation cell? Yes No N/A

If NO, qualify associated results as estimated (J) if the cell has a previously determined calibration constant and unusable (R) if no constant is available for the replacement cell.

Were blanks analyzed with each sample group to check for radium contamination in reagents? Yes No N/A

If NO, qualify associated results as estimated (J).

If sample was preserved at collection has analysis been completed within 180 days or 5 half-lives? Yes No N/A

If NO, qualify results >LLD as estimated detects (J) and results < LLD as estimated non-detects (UJ).

If samples were not preserved, were samples received within 5 days of sampling? Yes No N/A

- Were samples preserved at the laboratory upon receipt? Yes No N/A
- Were samples held after preservation for at least 16 days? Yes No N/A

If NO, to any of the above, qualify associated sample results as estimated (J).

Comments: This analysis was not performed.

9.6 Tritium Analysis by Liquid Scintillation Counting

Do calibration standard matrices match the sample matrices? Yes No N/A

If NO, qualify associated results as estimated (J).

Has at least one calibration standard been processed with the samples? Yes No N/A

If NO, qualify results associated with runs lacking calibration standards as unusable (R).

Have results for counting efficiency determination been provided? Yes No N/A

If NO, qualify all associated results as unusable (R).

Do tritium levels in the blanks exceed the MDA? Yes No N/A

If YES, qualify associated results less than 10X the background tritium level (blanks) as estimated (J).

Have blanks been analyzed with each sample run to check for potential contamination in the chemical reagents? Yes No N/A

If NO, qualify associated results as estimated (J).

Comments:

9.7 Fluorometric Analysis of Uranium

Has the laboratory provided evidence that cation and anion interferences are negligible for the matrix or that matrix interferences have been accounted for? Yes No N/A

If NO, qualify associated results as estimated (J).

Has the laboratory provided a description of the method of fusion standardization or provided data supporting fusion standardization? Yes No N/A

If NO, qualify associated results as estimated (J).

Was calibration performed immediately prior to sample analysis? Yes No N/A

If NO, qualify associated results as estimated (J).

Comments:

FILENAME: 8QTMAPU.WK1

SDG	HEIS No.	Lab No.	Det.	Spl Amt	Detector Eff.	Sample Count Time (min)	Bkgd Count Time (min)	Tracer Gross Counts	Tracer Bkgd Counts	Spike Act.	Tracer Recovery	PU-239 Gr-Cnts	PU-239 Bkgd Cnts	Pu-239 Lambda
B09555	B09555	7243-001	SS-42	1	0.4011	922.58	2736.17	1056	1	4.86	0.5871	4	3	7.78E-08
	LCS	7243-002	SS-41	1	0.4151	771.33	2736.17	364	1	4.86	0.2335	215	1	7.78E-08
	BLANK	7243-003	SS-65	1	0.4136	1088.47	2739.25	934	2	4.86	0.4263	5	0	7.78E-08
	B09555 DUP	7243-004	SS-66	1	0.4107	1088.47	2739.25	814	0	4.86	0.375	1	0	7.78E-08

FILENAME: 8QTMAPU.WK1

SDG	HEIS No.	Lab No.	Pu-239 Decay Factor	Pu-238 Gr-Cnts	Pu-238 Bkgd Cnts	Pu-238 Lambda	Pu-238 Decay Factor	Pu239 Calc.	Pu239 Rptd	Pu239 MDA Calc	MDA Rptd	Pu238 Calc.	Pu238 Rptd.	Pu238 MDA Calc	MDA Rptd
B09555	B09555	7243-001	0.9999	10	10	2.20E-05	0.9990	0.002	0.002	0.01	0.02	0.000	0.000	0.02	0.04
	LCS	7243-002	0.9999	8	4	2.20E-05	1.0000	1.289	1.290	0.01	0.05	0.024	0.024	0.03	0.07
	BLANK	7243-003	0.9999	0	1	2.20E-05	1.0000	0.012	0.012	0.00	0.02	-0.002	-0.001	0.01	0.02
	B09555 DUP	7243-004	0.9999	0	1	2.20E-05	0.9991	0.003	0.003	0.00	0.02	-0.003	0.003	0.01	0.02

9713505.2659

FILENAME: 8QTMA-TC.WK1

SDG	HEIS	Lab No.	Spl Amt.	P-Factor	Yield	Elapsed time (days)	Lambda	Decay	TC-99 Net CPM	Count Time	Bkg. cpm	TC-99 Result Calc.	Result Rptd	MDA Calc.	MDA Rptd.
B09555	B09555	7243-001	0.2	2.34	0.587	68.519	8.9E-09	1.00	0.39	104.1	0.64	3.5	3.5	3	4
	LCS	7243-002	0.2	2.34	0.2355	0	8.9E-09	1.00	10.82	104.1	0.56	242.1	240.0	8	8
	BLANK	7243-003	0.2	2.34	0.4241	0	8.9E-09	1.00	1.33	125.9	0.48	16.5	17.0	4	4
	B09555 DUP	7243-004	0.2	2.34	0.5521	68.519	8.9E-09	1.00	0.52	104.1	0.5	5.0	5.0	3	3

9713505.2660

FILENAME: 8QTMA-SR.WK1

SDG	HEIS	Lab No.	Spl Amt.	P-Factor	Yield	Elapsed time (days)	Lambda	Ingrowth	Decay	Y-90 Net CPM	Count Time	Bkg. cpm	Sr90 Result Calc.	Result Rptd	MDA Calc.	MDA Rptd.
B09555	B09555	7243-001	1	1.859	0.8071	51.498	6.86E-05	0.00352	0.9965	-0.082	33	0.3844	-0.09	-0.09	0.5	0.8
	SPIKE	7243-002	1	1.859	0.8112	0	6.86E-05	0	1.0000	14.95	33	0.469	15.43	15.43	0.6	0.9
	BLANK	7243-003	1	1.859	0.8447	0	6.86E-05	0	1.0000	0	33	0.4394	0.00	0.00	0.5	0.8
	B09555 DUP	7243-004	1	1.859	0.8246	51.498	6.86E-05	0.00352	0.9965	-0.059	33	0.5392	-0.06	-0.06	0.6	0.9

9713505.2661

FILENAME: 8QTMA-H3.WK1

SDG	HEIS#	Lab No.	Det ID	Gross Counts	Count Time	Sample Amount	Bkgnd cpm	Decay Factor	Detect Eff.	Tritium Result Calc.	Result Rptd	MDA Calc	MDA Rptd
B09555	B09555	7243-001	4	206	50	0.01	3.82	0.99505	0.256	53	54	228	241
	SPIKE	7243-002	4	1625	50	0.01	3.82	1	0.256	5046	5000	227	200
	BLANK	7243-003	4	199	50	0.01	3.82	1	0.256	28.2	20.0	227	200
	B09555 DUP	7243-004	4	198	50	0.01	3.82	0.99503	0.256	25	25	228	243

9713505.2662

FILENAME: 8QTMA-AB.WK1

SDG	HEIS#	Lab No.	Detector GAW/GRB	Spl. Amt.	Count Time	Gr-Alpha Counts	Alpha Bkgd cpm	Alpha Eff.	Alpha X-talk	Gr-Beta Counts	Beta Bkgd cpm	Beta Eff.	Beta X-Talk
B09555	B09555	7243-001	113	0.3	100	9	0.079	0.107	0.006	308	1.008	0.414	0.29
	LCS	7243-002	114	0.3	100	503	0.049	0.104	0.006	3844	0.936	0.413	0.295
	BLANK	7243-003	115	0.3	100	8	0.084	0.105	0.006	87	1.005	0.413	0.294
	B09555 DUP	7243-004	116	0.3	100	17	0.043	0.116	0.006	345	0.985	0.416	0.28

9713505.2663

FILENAME: 8QTMA-AB.WK1

SDG	HEIS#	Lab No.	Alpha Rslt Calc	Alpha Rslt Rptd	Beta Rslt Calc	Beta Rslt Rptd	Alpha MDA Calc	Alpha MDA Rptd	Beta MDA Calc	Beta MDA Rptd
B09555	B09555	7243-001	-0.02	-0.02	7.5	7.5	2	2	2	2
	LCS	7243-002	68.8	69.0	131.2	130	1	1	2	2
	BLANK	7243-003	-0.05	-0.05	-0.5	-0.5	2	2	2	2
	B09555 DUP	7243-004	1.5	1.5	8.8	8.8	1	1	2	2

9713505.2664