

**START**

7713514.2845

BOB6VO-TMA-457

542

0046150

TMA

RECORD COPY

WESTINGHOUSE HANFORD COMPANY

Results of Analyses For:

ORGANICS & GENERAL CHEMISTRY

Case No. 03-039

(TMA/ARLI Work Order # A3-03-039)

METALS & NITRATE/NITRITE

Case No. N3-03-082

(TMA/Skinner & Sherman W.O. # S3-03-109 & S3-03-110)



April 14, 1993

TMA Master Work Order N3-03-082

1 40 8/30/90

B086V0

**OFFICE OF SAMPLE MANAGEMENT  
RECORD OF DISPOSITION**

ROD-93-00042  
Record of Disposition No.

DATE: 2/22/93

LABORATORY: TMA

PROJECT TITLE/NO.: 241-T-106/92-338

NCR NO.: N/A

**SAMPLE IDENTIFICATION NUMBERS:**

All samples for this project.

**DESCRIPTION OF EVENT:**

Analyses for Flouride and Chloride were not asked for on the SAR despite request on SAF.

**DISPOSITION OF SAMPLES:**

Include Flouride and Chloride in anions analysis.

**APPROVAL SIGNATURES:**

R.C. Smith / *R Clayton Smith*  
OSM Project Coordinator (Print/Sign Name)

2/22/93  
Date

J. Freeman-Pollard / *J Freeman-Pollard*  
Technical Representative (Print/Sign Name)

3/1/93  
Date

N/A  
Quality Assurance (Print/Sign Name)

Date

**WESTINGHOUSE HANFORD COMPANY**

**Results of Analyses For:**

**GENERAL CHEMISTRY  
CASE NO. 03-039  
(TMA/ARLI Work Order # A3-03-039)**

**ORGANICS  
CASE NO. 03-039  
(TMA/ARLI Work Order # A3-03-039)**

General Chemistry and Organics results are presented  
for the following WHC LIQUID and SOIL sample(s):

B086V0

B086X9

Norcal Work Order # N3-03-082

Thermo Analytical Inc.  
160 Taylor Street  
Monrovia, CA 91016  
(818) 357-3247

Date Submitted:

APR 1 2 1993

PAGE 1

TMA/Norcal

CHAIN OF CUSTODY

ORD # N3-03-082

43-22

RCVD: 03/11/93 DUE: 04/25/93

03/11/93 13:03:44

KEEP: 07/24/93

DISP: S

DASH SAMPLE IDENTIFICATION	STORED	TESTS for FRACTIONS with work in DEPT: SU and CATEGORY
01A-S 8086v0	ARLI	: WH014 WH016 WH217 WH232
01C-S 8086v0 MS	ARLI	: WH014 WH016 WH232
01D-S 8086v0 MSD	ARLI	: WH014 WH016
01E-S 8086v0 DUP	ARLI	: WH217 WH232
02A-W 8086x9	ARLI	: WH018
02B-W 8086x9 MS	ARLI	: WH018
02C-W 8086x9 MSD	ARLI	: WH018

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
<i>Kermit Blum</i>	<i>3-11-93</i>	<i>ARLI</i>		<i>Vandy Stul</i>	<i>3/12/93</i>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Westinghouse Hanford Company CHAIN OF CUSTODY

Custody Form Initiator Wendy S. Thompson PROJECT NUMBER: 92-336  
 Company Contact Wendy S. Thompson Telephone (509) 376-2153  
 Project Designation/Sampling Locations 241-T-106 Collection Date 3-9-93  
 Borehole Number: 299-W10-196 Time: ① 1045; ② 0800  
 Ice Chest No. SML 267 Field Logbook No. EFL-1053  
 Bill of Lading/Airbill No. 971285641 Offsite Property No. W93-0-0285#26  
 Method of Shipment AIR (EMERY) Burlington Air wst 3-10-93  
 Shipped to TMA-Norcal

Possible Sample Hazards/Remarks Keep samples chilled. All analysis per lab statement of work.  
Samples are nonhazardous with field instruments.

Sample Identification

- ① B086V0
- ✓ 1x120 ml., amber glass, soil, CLP-VOA
- ✓ 1x250 ml., amber glass, soil, CLP-Semi-VOA
- ✓ 1x250 ml., amber glass, soil, Anions-SO<sub>4</sub>, PO<sub>4</sub>, NO<sub>2</sub>-NO<sub>3</sub>, Cl, F, pH
- ✓ 1x250 ml., amber glass, soil, ICP/AA metals, Bi, CN, Hg
- ✓ 1x500 ml., amber glass, soil, gross alpha, gross beta, GFA, including Co<sup>60</sup>, Ru<sup>106</sup>, Ce<sup>144</sup>, Cs<sup>137</sup>, isotopic U, total U, Am<sup>241</sup>, Np<sup>237</sup>, Pu<sup>238/239/240</sup>, Sr<sup>90</sup>, Tc<sup>99</sup>, C<sup>14</sup>
- ② B086X9; 3x40ml. amber glass, water, CLP-VOA
- ~~1x120ml., amber glass, soil, CLP-VOA~~
- ~~1x250 ml., amber glass, soil, CLP-Semi-VOA~~
- ~~1x250 ml., amber glass, soil, Anions-SO<sub>4</sub>, PO<sub>4</sub>, NO<sub>2</sub>-NO<sub>3</sub>, Cl, F, pH~~
- ~~1x250 ml., amber glass, soil, ICP/AA metals, Bi, CN, Hg~~
- ~~1x500 ml., amber glass, soil, gross alpha, gross beta, GFA, including Co<sup>60</sup>, Ru<sup>106</sup>, Ce<sup>144</sup>, Cs<sup>137</sup>, isotopic U, total U, Am<sup>241</sup>, Np<sup>237</sup>, Pu<sup>238/239/240</sup>, Sr<sup>90</sup>, Tc<sup>99</sup>, C<sup>14</sup>~~

Field Transfer of Custody CHAIN OF POSSESSION (Sign and Print Name)

Relinquished By	Date	Time	Received By	Date	Time
<u>W.S. Thompson</u> <u>Wendy S. Thompson</u>	<u>WST 3-10-93</u> <u>3-9-93</u>	<u>1200</u>	<u>Alfonso Goba...</u>	<u>3/11/93</u>	<u>1055</u>

Final Sample Disposition

Disposal Method: \_\_\_\_\_ Disposed by: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments: \_\_\_\_\_



SAMPLE ANALYSIS REQUEST

Collector Wendy S. Thompson Date 3-9-93  
 Company Contact Wendy S. Thompson Telephone (509) 376-2153

Sample Number	*	Date Collected	Time Collected	Number and Type of Sample Containers/Analysis Requested
B086V0	S	3-9-93	1045	1x120ml., amber glass, soil, CLP-VOA
				1x250 ml., amber glass, soil, CLP-Semi-VOA
				1x250 ml., amber glass, soil, IC Anions, SO <sub>4</sub> , PO <sub>4</sub> , NO <sub>2</sub> -NO <sub>3</sub> , pH
				1x250 ml., glass, soil, ICP/AA metals, Bi, CN, Hg
				1x500 ml., glass, soil, gross alpha, gross beta, GEA, including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241, Np-237, Pu-238, -239, -240, Sr-90, Tc-99, total U, C-14
B086X9	W	3-9-93	0800	3x40ml, amber glass, water, CLP-VOA
				1x120ml., amber glass, soil, CLP-VOA
				1x250 ml., amber glass, soil, CLP-Semi-VOA
				1x250 ml., amber glass, soil, IC Anions, SO <sub>4</sub> , PO <sub>4</sub> , NO <sub>2</sub> -NO <sub>3</sub> , pH
				1x250 ml., glass, soil, ICP/AA metals, Bi, CN, Hg
				1x500 ml., glass, soil, gross alpha, gross beta, GEA, including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241, Np-237, Pu-238, -239, -240, Sr-90, Tc-99, total U, C-14
				1x120 ml., amber glass, soil, CLP-VOA
				1x250 ml., amber glass, soil, CLP-Semi-VOA
				1x250 ml., amber glass, soil, IC Anions, SO <sub>4</sub> , PO <sub>4</sub> , NO <sub>2</sub> -NO <sub>3</sub> , pH
				1x250ml., glass, soil, ICP/AA metals, Bi, CN, Hg
				1x500 ml., glass, soil, gross alpha, gross beta, GEA including Co-60, Ru-106, Ce-144, Cs-137, isotopic U, Am-241, Np-237, Pu-238, -239, -240, Sr-90, Tc-99, total U, C-14

~~WST  
3-10-93~~  
  
~~WST  
3-10-93~~

\*Type of Sample    A = Air                      L = Liquid                      SE = Sediment                      T = Tissue                      X = Other  
                                  DL = Drum Liquids                      O = Oil                      SL = Sludge                      W = Water  
                                  DS = Drum Solids                      S = Soil                      SO = Solid                      WI = Wipe

Field Information Samples support the 241-T-106 characterization (soil). All analysis per lab statement of work. Project # 92-336

Special Handling and/or Storage KEEP SAMPLES CHILLED.

Possible Sample Hazards Samples are nonhazardous with field instruments

9713514.2851

SAMPLE LOG-18 SHEET

000003

LAB NAME: TWA/ARL

PAGE: 1

RECEIVED BY (PRINT NAME):

DAVID WHITAKER

LOG-18-DATE:

3-12-93

RECEIVED BY (SIGNATURE):

D and E. Whitaker

CASE NUMBER:  
SAMPLE DELIVERY  
GROUP NO.:  
SAS NUMBER:

CORRESPONDING

EPA  
SAMPLE  
#

SAMPLE  
TAG  
#

ASSIGNED  
LAB  
#

REMARKS:  
CONDITION OF  
SAMPLE SHIPMENT, ETC

REMARKS:

1. Custody Seal(s)

Present/Absent\*  
Intact/Broken

B086 UC1

A3-03-037-01

B086 UC2

B084 Q5

A3-03-040-02

2. Custody Seal Nos:

B086 X9

A3-03-039-02

B086 R3

A3-03-040-01

3. Chain of Custody  
Records

Present/Absent\*

B086 Q1

B086 Q0

A3-03-040-01

B089 B5

A3-03-040-03

4. Traffic Reports  
or Packing List

Present/Absent\*

5. Airbill

Airbill/Sticker  
Present/Absent\*

6. Airbill No.:

6395590734

7. Sample Tags

Present/Absent\*

8. Sample Tags  
Numbers

Listed/Not Listed on  
Chain of Custody

9. Sample Condition:

Intact/Broken\*  
Leaking

10. Does information

Yes/No\*

on custody  
records, traffic  
reports, and  
sample tags agree

11. Date Received at Lab:

3-12-93

12. Temp of ice chest

(SMV)  
(154)

2°

13. Time Received:

0900

SAMPLE TRANSFER

Fraction:

Area #:

By:

On:

\* Contact SMO and attach record of resolution

Reviewed By:

Logbook No.:

Date:

Logbook Page No.:

FORM DC-1

F00000



QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL  
PACKAGE  
TRACKING NUMBER

6395890734

2397M

6395890734

RECIPIENT'S COPY

Date: 3-11-93

From (Your Name) Please Print: **SAMPLE CONTROL**  
 Your Phone Number (Very Important): **610-235-2633**  
 To (Recipient's Name) Please Print: **SAMPLE CONTROL ( )**  
 Recipient's Phone Number (Very Important):  
 Company: **TMA/ARL**  
 Department/Floor No.:  
 Street Address: **2030 WRIGHT AVE**  
 Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes):  
**160 TAYLOR STREET**  
 City: **RICHMOND** State: **CA** ZIP Required: **94704**  
 City: **MONROVIA** State: **CA** ZIP Required: **91016**

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice): **23406406**

PAYMENT:  Bill Sender  Bill Recipient's FedEx Acct. No.  Bill 3rd Party FedEx Acct. No.  Bill Credit Card  
 Cash  Check

4 SERVICES (Check only one box)		5 DELIVERY AND SPECIAL HANDLING (Check services required)		6 PACKAGES WEIGHT YOUR DECLARED VALUE (See page)		Emp. No. Date		Federal Express Use	
Priority Overnight (Delivery by next business morning) <input type="checkbox"/> OTHER PACKAGING <input type="checkbox"/> FEDEX LETTER <input type="checkbox"/> FEDEX PAK <input type="checkbox"/> FEDEX BOX <input type="checkbox"/> FEDEX TUBE Economy Two-Day (Delivery by second business day) <input type="checkbox"/> ECONOMY Government Overnight (Restricted for authorized users only) <input type="checkbox"/> GOVT LETTER <input type="checkbox"/> GOVT PACKAGE Freight Service (for packages over 150 lbs) <input type="checkbox"/> OVERNIGHT FREIGHT <input type="checkbox"/> TWO-DAY FREIGHT	Standard Overnight (Delivery by next business afternoon by Saturday delivery) <input type="checkbox"/> OTHER PACKAGING <input type="checkbox"/> FEDEX LETTER <input type="checkbox"/> FEDEX PAK <input type="checkbox"/> FEDEX BOX <input type="checkbox"/> FEDEX TUBE	<input type="checkbox"/> HOLD FOR PICK-UP (Fill in Box 14) <input checked="" type="checkbox"/> DELIVER WEEKDAY <input type="checkbox"/> DELIVER SATURDAY (Extra charge) (Not available to all locations) <input type="checkbox"/> DANGEROUS GOODS (Extra charge) <input type="checkbox"/> DRY ICE (Dangerous Goods Shipper's Declaration not required) <input type="checkbox"/> OTHER SPECIAL SERVICE <input type="checkbox"/> SATURDAY PICK-UP (Extra charge) <input type="checkbox"/> HOLIDAY DELIVERY (if offered) (Extra charge)	Total: <b>1.37</b> DIM SHIPMENT (Chargeable Weight) <b>L x W x H</b> <input type="checkbox"/> Regular Stop <input type="checkbox"/> Drop Box <input type="checkbox"/> On-Call Stop <input type="checkbox"/> Station	<input type="checkbox"/> Cash Received <input type="checkbox"/> Return Shipment <input type="checkbox"/> Third Party <input type="checkbox"/> Chg To Dpt <input type="checkbox"/> Chg To Hold Street Address City State Zip Received By: <b>X</b> Date/Time Received: _____ FedEx Employee Number: _____	Base Charges Declared Value Charge Other 1 Other 2 Total Charges REVISION DATE 11/92 PART #137204 FXEM 12 FORMAT #155 <b>1.55</b> © 1992 © FEDEX PRINTED IN U.S.A.				

2582-415E126



## GENERAL CHEMISTRY RESULTS

CASE NO. 03-039

Soil Sample #:

B086V0

## CASE NARRATIVE

The holding time for the pH analysis was exceeded. Careful review of the QC analysis indicates that the data is reliable.

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

Maureen Parrish 4-6-93

Maureen Parrish

9713514.2855

000007

TMA Inc.

REPORT

Work Order # A3-03-039

Received: 03/11/93

04/06/93 15:06:36

REPORT Westinghouse Hanford Company  
 TO 2355 Stevens Dr.  
Richland, WA. 99352  
MO-346/200 West/T6-08  
 ATTEN Jeanette Duncan  
 CLIENT WHC                      SAMPLES 3  
 COMPANY Westinghouse Hanford Company  
 FACILITY \_\_\_\_\_

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

*Maureen Parrish*  
 CERTIFIED BY \_\_\_\_\_  
 CONTACT EVV CIM

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 241-T-106  
 TAKEN By Westinghouse Staff  
 TRANS By Federal Express  
 TYPE Soil/Liquid  
 P.O. # N3-03-082-SU-AR  
 INVOICE under separate cover

**SAMPLE IDENTIFICATION**

- 01 B086V0
- 01 B086V0 MS
- 01 B086V0 MSD
- 01 B086V0
- 01 B086V0 MS
- 01 B086V0 MSD
- 01 B086V0
- 01 B086V0 MS
- 01 B086V0 Duplicate
- 02 B086X9
- 02 B086X9 MS
- 02 B086X9 MSD
- 03 Lab Blank

**TEST CODES and NAMES used on this workorder**

- BNCLPS CLP Semivol. Sol. - WH016
- IC AN Anions Extraction Solids
- VOCLPL CLP Volatile Org. Liq.
- VOCLPS CLP Vol. Org. Soils - WH014
- WCCLPS Anions in Solids - WH232
- WCL S Chloride in Solids - WH216
- WCQCD Quality Control Summary
- WCQCS Quality Control Summary
- WF S Fluoride in Solids
- WMOIST Moisture
- WNO2 S Nitrite (Solids)
- WNO3 S Nitrate (solids)
- WPH S pH of Solids - WH217
- WPO4 S Phosphate in Solids
- WSD4 S Sulfate (in Solids)

9713514.2856

000009

TMA Inc.

REPORT

Work Order # A3-03-039

Received: 03/11/93

Results by Sample

SAMPLE ID B086V0

FRACTION 01G TEST CODE WCCLPS NAME Anions in Solids - VN232

Date & Time Collected 03/09/93

Category \_\_\_\_\_

ANIONS AND WET CHEMISTRY - SOLIDS				
<u>ANALYSIS</u>	<u>METHOD</u>	<u>RESULT</u>	<u>UNITS</u>	<u>LIMIT</u>
Chloride	300.0	7.9	mg/Kg	0.7
Fluoride	300.0	1.4	mg/Kg	0.3
Phosphate	300.0	< 1.3	mg/Kg	1.3
pH	9045	9.5	pH	0.1
Sulfate	300.0	18	mg/Kg	3.0

FORM 1

## CASE NARRATIVE

LABORATORY : TMA/ARLI

CASE : 03-039

CONTRACT ID : WESTINGHOUSE HANFORD COMPANY

SDG RECEIPT DATE : March 11, 1993

## 1.0 DESCRIPTION OF CASE :

One soil and one water sample were analyzed for TCL Organics- Volatiles and Semivolatiles according to the USEPA Contract Laboratory Program (CLP) Statement of Work for Organic Analysis, Revision OLM01.8.

## 2.0 SAMPLE LIST

<u>WESTINGHOUSE ID</u>	<u>LAB ID</u>	<u>ANALYSIS REQUESTED</u>	<u>MATRIX</u>	<u>pH</u>
BOB6V0	A3-03-039-01A	V	SOIL	
BOB6V0 MS	A3-03-039-01B	V	SOIL	
BOB6V0 MSD	A3-03-039-01C	V	SOIL	
BOB6V0	A3-03-039-01D	SV	SOIL	
BOB6V0 MS	A3-03-039-01E	SV	SOIL	
BOB6V0 MSD	A3-03-039-01F	SV	SOIL	
BOB6X9	A3-03-039-02A	V	WATER	7
BOB6X9 MS	A3-03-039-02B	V	WATER	7
BOB6X9 MSD	A3-03-039-02C	V	WATER	7

## 3.0 COMMENTS :

## 3.1 SHIPPING AND DOCUMENTATION :

All of the samples were received and properly documented.

## 3.2 ANALYSIS

## 3.2.1 VOLATILE ANALYSIS COMMENTS :

## LOW LEVEL SOIL :

The samples were analyzed by heated purge within the CLP SOW holding times.

All of the QC results were within the limits specified by the EPA CLP SOW.

## LOW LEVEL WATER :

The samples were analyzed within the CLP SOW holding times.

All of the GC results were within the limits specified by the EPA CLP SOW.

TUNES :

All BFB tune are injected directly into GC/MS instrument.

### 3.2.2 SEMIVOLATILE ANALYSIS COMMENTS :

LOW LEVEL SOIL :

The samples were extracted and analyzed within the CLP SOW holding times. Sample B086VOMS had a 2,4-Dinitrotoluene spike recovery slightly above the GC limits. In accordance with protocol, no further action was required.

All of the other GC results were within the limits specified by the EPA CLP SOW.

We 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 in this hardcopy data package and in the computer-readable data submitted on diskette is authorized by the Laboratory Manager or his designee, as verified by the following signatures.



Nicole Roth 4/12/93  
CLP Program Manager



Wida Ang 4/13/93  
Organics Supervisor

9713514.2859

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE No. 000071

B086V0

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03039 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A303039-01A

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 30315R04

Level: (low/med) LOW Date Received: 03/11/93

% Moisture: not dec. 3 Date Analyzed: 03/15/93

GC Column: PACK ID: 2.00 (mm) Dilution Factor: 1.0

Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

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

9713514.2860

000072

EPA SAMPLE NO.

1E  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

B086V0

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03039 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A303039-01A

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 30315R04

Level: (low/med) LOW Date Received: 03/11/93

% Moisture: not dec. 3 Date Analyzed: 03/15/93

GC Column: PACK ID: 2.00 (mm) Dilution Factor: 1.0

Soil Extract Volume: \_\_\_\_\_ (uL) Soil Aliquot Volume: \_\_\_\_\_ (uL)

Number TICs found: 3

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN HYDROCARBON	7.70	19	BJ
2.	UNKNOWN HYDROCARBON	7.95	170	BJ
3.	UNKNOWN HYDROCARBON	14.80	7	J

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B086X9

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03039 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A303039-02A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 30317B21

Level: (low/med) LOW Date Received: 03/11/93

‡ Moisture: not dec.      Date Analyzed: 03/17/93

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume:      (uL) Soil Aliquot Volume:      (uL)

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

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

9713514.2862

000074

1E  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B086X9

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03039 SAS No.: NA SDG No.: NA

Matrix: (soil/water) WATER Lab Sample ID: A303039-02A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 30317B21

Level: (low/med) LOW Date Received: 03/11/93

% Moisture: not dec.      Date Analyzed: 03/17/93

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume:      (uL) Soil Aliquot Volume:      (uL)

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

Number TICs found: 0

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

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000075

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B086V0

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03039 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A303039-01D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 30318S15

Level: (low/med) LOW Date Received: 03/11/93

% Moisture: 3 decanted: (Y/N) N Date Extracted: 03/15/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/18/93

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.5

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

CAS NO.	COMPOUND		
108-95-2	Phenol	340	U
111-44-4	bis(2-Chloroethyl) Ether	340	U
95-57-8	2-Chlorophenol	340	U
541-73-1	1,3-Dichlorobenzene	340	U
106-46-7	1,4-Dichlorobenzene	340	U
95-50-1	1,2-Dichlorobenzene	340	U
95-48-7	2-Methylphenol	340	U
108-60-1	2,2'-oxybis(1-Chloropropane)	340	U
106-44-5	4-Methylphenol	340	U
621-64-7	N-Nitroso-Di-n-Propylamine	340	U
67-72-1	Hexachloroethane	340	U
98-95-3	Nitrobenzene	340	U
78-59-1	Isophorone	340	U
88-75-5	2-Nitrophenol	340	U
105-67-9	2,4-Dimethylphenol	340	U
111-91-1	bis(2-Chloroethoxy)Methane	340	U
120-83-2	2,4-Dichlorophenol	340	U
120-82-1	1,2,4-Trichlorobenzene	340	U
91-20-3	Naphthalene	340	U
106-47-8	4-Chloroaniline	340	U
87-68-3	Hexachlorobutadiene	340	U
59-50-7	4-Chloro-3-Methylphenol	340	U
91-57-6	2-Methylnaphthalene	340	U
77-47-4	Hexachlorocyclopentadiene	340	U
88-06-2	2,4,6-Trichlorophenol	340	U
95-95-4	2,4,5-Trichlorophenol	810	U
91-58-7	2-Chloronaphthalene	340	U
88-74-4	2-Nitroaniline	810	U
131-11-3	Dimethylphthalate	340	U
208-96-8	Acenaphthylene	340	U
99-09-2	3-Nitroaniline	810	U
83-32-9	Acenaphthene	340	U
51-28-5	2,4-Dinitrophenol	810	U

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B086V0

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03039 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A303039-01D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 30318S15

Level: (low/med) LOW Date Received: 03/11/93

% Moisture: 3 decanted: (Y/N) N Date Extracted: 03/15/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/18/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.5

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/KG

Q

CAS NO.	COMPOUND		
100-02-7	4-Nitrophenol	810	U
132-64-9	Dibenzofuran	340	U
121-14-2	2,4-Dinitrotoluene	340	U
606-20-2	2,6-Dinitrotoluene	340	U
84-66-2	Diethylphthalate	340	U
7005-72-3	4-Chlorophenyl-phenylether	340	U
86-73-7	Fluorene	340	U
100-01-6	4-Nitroaniline	810	U
534-52-1	4,6-Dinitro-2-methylphenol	810	U
86-30-6	N-Nitrosodiphenylamine (1)	340	U
101-55-3	4-Bromophenyl-phenylether	340	U
118-74-1	Hexachlorobenzene	340	U
87-86-5	Pentachlorophenol	810	U
85-01-8	Phenanthrene	340	U
120-12-7	Anthracene	340	U
86-74-8	Carbazole	340	U
84-74-2	Di-n-Butylphthalate	210	BJ
206-44-0	Fluoranthene	340	U
129-00-0	Pyrene	340	U
85-68-7	Butylbenzylphthalate	340	U
91-94-1	3,3'-Dichlorobenzidine	340	U
56-55-3	Benzo(a)Anthracene	340	U
117-81-7	bis(2-Ethylhexyl) Phthalate	340	U
218-01-9	Chrysene	340	U
117-84-0	Di-n-Octyl Phthalate	340	U
205-99-2	Benzo(b)Fluoranthene	340	U
207-08-9	Benzo(k)Fluoranthene	340	U
50-32-8	Benzo(a)Pyrene	340	U
193-39-5	Indeno(1,2,3-cd)Pyrene	340	U
53-70-3	Dibenz(a,h)Anthracene	340	U
191-24-2	Benzo(g,h,i)Perylene	340	U

(1) - Cannot be separated from Diphenylamine

1F  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

B086V0

Lab Name: TMA/ARLI Contract: WHC

Lab Code: TMALA Case No.: 03039 SAS No.: NA SDG No.: NA

Matrix: (soil/water) SOIL Lab Sample ID: A303039-01D

Sample wt/vol: 30.4 (g/mL) G Lab File ID: 30318S15

Level: (low/med) LOW Date Received: 03/11/93

% Moisture: 3 decanted: (Y/N) N Date Extracted: 03/15/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/18/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 9.5

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

Number TICs found: 4

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN HYDROCARBON	5.08	2100	BJ
2.	UNKNOWN HYDROCARBON	5.55	26000	BJ
3.	UNKNOWN ALKANE	5.78	68	BJ
4.	UNKNOWN HYDROCARBON	6.87	170	J

9713514.2866

Page 1

Skinner&Sherman

REPORT

Work Order # S3-03-109

Received: 03/12/93

04/02/93 11:12:51

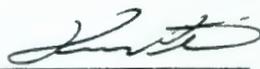
REPORT TMA/NORCAL  
 TO 2030 Wright Avenue  
Richmond, CA 94804

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 N3-03-082  
 TAKEN By Client  
 TRANS Fed Ex  
 TYPE Soil  
 P.O. # N3-03-082  
 INVOICE under separate cover

**SAMPLE IDENTIFICATION**

01 B086V0  
01 B086V0 DUPL  
01 B086V0 SPIKE  
02 LCSS

**TEST CODES and NAMES used on this workorder**

NITR S Nitrate/Nitrite in Soils



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.

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Page 2  
Received: 03/12/93Skinner&Sherman  
REPORT  
Results by Sample

Work Order # S3-03-109

SAMPLE ID <u>B086V0</u>	SAMPLE # <u>01</u> FRACTIONS: <u>A</u>
	Date & Time Collected <u>03/09/93</u> Category <u>SOIL</u>
NITR_S <u>4.22</u> mg N/kg	
SAMPLE ID <u>B086V0 DUPL</u>	SAMPLE # <u>01</u> FRACTIONS: <u>B</u>
	Date & Time Collected <u>03/09/93</u> Category <u>SOIL</u>
NITR_S <u>3.71</u> mg N/kg	
SAMPLE ID <u>B086V0 SPIKE</u>	SAMPLE # <u>01</u> FRACTIONS: <u>C</u>
	Date & Time Collected <u>03/09/93</u> Category <u>SOIL</u>
NITR_S <u>23.9</u> mg N/kg	
SAMPLE ID <u>LCSS</u>	SAMPLE # <u>02</u> FRACTIONS: <u>A</u>
	Date & Time Collected <u>not specified</u> Category <u>SOIL</u>
NITR_S <u>2.04</u> mg N/L	

**TMA****Thermo Analytical Inc.****Skinner & Sherman Laboratories Inc.**

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

Page 3  
Received: 03/12/93

Skinner&Sherman REPORT  
04/02/93 11:12:51

Work Order # S3-03-109

TMA/MORCAL Hanford

QUALITY CONTROL

MATRIX SPIKE

Sample ID	Sample Result	Spike Added	Spike Result	% Recovery
S303109-01	4.22 mg/kg	19.7 mg/kg	23.9 mg/kg	99.9

DUPLICATE

Sample ID	Sample result	Duplicate Result	Relative % Difference
S303109-01	4.22 mg/kg	3.71 mg/kg	12.9

QUALITY CONTROL SAMPLES

Sample ID	True Value	Found Value	Percent Recovery
LCS	2.00 mg/L	2.04 mg/L	102.0
Prep blank	--	<0.25 mg/L	--

**TMA**

**Thermo Analytical Inc.**

**Skinner & Sherman Laboratories Inc.**

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

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Page 4

Skinner&Sherman

REPORT

Work Order # S3-03-109

Received: 03/12/93

Test Methodology

TEST CODE NITR S NAME Nitrate/Nitrite in Soils

The sample was extracted with deionized water and analyzed in accordance with Method for Chemical Analysis of Water and Wastes EPA-600/4-79-020, March 1979, Method 353.2 (modified)

**TMA**

**Thermo Analytical Inc.**

**Skinner & Sherman Laboratories Inc.**

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

9713514.2870

Sampled 3/9/93

TMA/Skinner & Sherman Labs SAMPLE LOG-IN  
 WORKORDER 5303109 CLIENT Hanford Nar No. SAMPLES:  
 PROTCL CLP TURNARND 33 Days 21  
 COOLER TEMP: 3 °C, or NA Soil (Water) (Specify Other)  
 CUSTODIAN B. Peovk SDG/BATCH N/A  
 CUSTODY SEAL: PRESENT/ABSENT/INTACT/NOT CLIENT CASE N303082  
 SHIPER & # Fed Ex PO/CONTRACT# J  
 TAGS: PRESENT/ABSENT/NA/SEE COC CONTACT D Sanchez  
 CHAIN OF CUSTODY: PRESENT/ABSENT/NA, # NA COMMENTS: amo

SAMPLE CONTAINERS INTACT/BROKEN COMMENTS \_\_\_\_\_

CLIENT COMMENT? YES/NO \_\_\_\_\_

SAMPLE LABELS AGREE WITH CHAIN OF CUSTODY INFO? YES/NO (COMMENT) \_\_\_\_\_

CLIENT PAPERWORK AGREES WITH SAMPLES & COC? YES/NO (COMMENT) \_\_\_\_\_

SHIPMENT DATES 3/12/93 \_\_\_\_\_

LIST ANY DATE WITH PAPERWORK/SHIPMENT PROBLEMS & SPECIFY THE PROBLEM: \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

CLIENT ID	MATRIX	RECEIVED	PH*	TEST(S) & QC	HOLD TIME UP
1 <u>B086V0</u>	<u>Soil</u>	<u>3/12/93</u>	<u>N/A</u>	<u>DS N3N2-S</u>	
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					

Samples are from site known to have Rad-Contamination: YES  NO   
 Samples have detectable amounts of Radioactive Material: YES  NO

SUBCONTRACT: YES/NO, TO: \_\_\_\_\_ DATE: \_\_\_\_\_

REVIEWED \_\_\_\_\_

Comp ute 3/12/93  
BB 31

9713514.2871

**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

April 6, 1993

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

RECORD COPY



Quality Control Narrative

Scope

One (1) soil sample was submitted to TMA/Skinner & Sherman Laboratories, Inc. on March 12, 1993 from TMA/Norcal. The sample was analyzed for the USEPA CLP Target Analyte List metals, cyanide and bismuth. The analysis were performed under TMA/Skinner and Sherman work order S303110.

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 the following exceptions;

The antimony and cyanide digestion spike recoveries exceeded the control limit requirements.

The chromium laboratory duplicate exceeded the control limit requirement.

The zinc ICP serial dilution exceeded the control limit requirement.

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

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

David N. Peterson  
Assistant Laboratory Manager

i sw 8/30/96



9710514.2873

WESTINGHOUSE/HANFORD

1

SAMPLE NUMBER:

## INORGANIC ANALYSIS DATA SHEET

B086V0

Lab Name: SKINNER &amp; SHERMAN LABS.

Contract: 68-D0-0108

Lab Code: SKINER

Case No.: N3-03-082SAS No.:

SDG No.: B086V0

Matrix (soil/water): SOIL

Lab Sample ID: 03110-01S

Level (low/med): LOW

Date Received: 03/12/93

% Solids:

96.4

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5310			P
7440-36-0	Antimony	3.9	U	N	P
7440-38-2	Arsenic	1.4	B		F
7440-39-3	Barium	80.9			P
7440-41-7	Beryllium	0.18	U		P
7440-43-9	Cadmium	0.28	U		P
7440-70-2	Calcium	2790			P
7440-47-3	Chromium	11.9		*	P
7440-48-4	Cobalt	7.4	B		P
7440-50-8	Copper	13.7			P
7439-89-6	Iron	13200			P
7439-92-1	Lead	3.0			F
7439-95-4	Magnesium	3230			P
7439-96-5	Manganese	221			P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	11.6			P
7440-09-7	Potassium	1140			P
7782-49-2	Selenium	0.72	U	W	F
7440-22-4	Silver	0.94	U		P
7440-23-5	Sodium	392	B		P
7440-28-0	Thallium	0.49	U		F
7440-62-2	Vanadium	39.8			P
7440-66-6	Zinc	38.4		E	P
	Cyanide	0.51	U	N	CA
7440-69-9	Bismuth	102	U		A

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: BROWN

Clarity After:

Artifacts: YES

Comments:

ROCKS

-002

9713514.2874

TMA/Skinner & Sherman Labs SAMPLE LOG-IN  
 WORKORDER 5303110 CLIENT Hanford Nar No. SAMPLES:  
 PROTCL CLP TURNARND 33 Day  
 COOLER TEMP: 3 °C, or NA (Soil) (Water) (Specify Other)  
 CUSTODIAN B. Pank SDG/BATCH N/A  
 CUSTODY SEAL: PRESENT/ABSENT/INTACT/NOT CLIENT CASE N303082  
 SHIPER & # Fed Ex PO/CONTRACT# J  
 TAGS: PRESENT/ABSENT/NA/SEE COC CONTACT D. Sanchez  
 CHAIN OF CUSTODY: PRESENT/ABSENT/NA, # N/A COMMENTS:

SAMPLE CONTAINERS-INTACT/BROKEN COMMENTS

CLIENT COMMENT? YES/NO

SAMPLE LABELS AGREE WITH CHAIN OF CUSTODY INFO? YES/NO (COMMENT)

CLIENT PAPERWORK AGREES WITH SAMPLES & COC? YES/NO (COMMENT)

SHIPMENT DATES 3-12-93

LIST ANY DATE WITH PAPERWORK/SHIPMENT PROBLEMS & SPECIFY THE PROBLEM:

N/A

CLIENT ID	MATRIX	RECEIVED	PH*	TEST(S) & QC	HOLD TIME UP
1 <u>B0860</u>	<u>Soil</u>	<u>3-12-93</u>	<u>N/A</u>	<u>DS Tm/CN + Bismuth</u>	
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					

159

Samples are from site known to have Rad-Contamination: YES NO  
 Samples have detectable amounts of Radioactive Material: YES NO

SUBCONTRACT: YES/NO, TO: \_\_\_\_\_ DATE: \_\_\_\_\_  
 REVIEWED \_\_\_\_\_ complete BT  
 3/12/93

9713514.2875

**TMA**  
Thermo Analytical Inc.

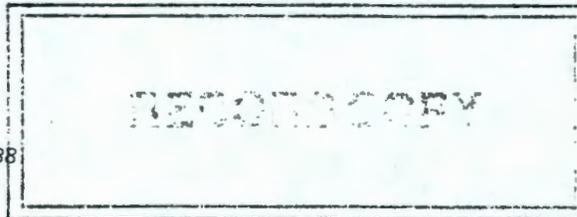
TMA/Norcal

2030 Wright Avenue

P. O. Box 4040

Richmond, CA 94804-0040

(510) 235-2633 Fax No. (510) 235-0438



June 7, 1993

SENT BY FEDERAL EXPRESS

Ref. TMA/Norcal N3-03-095-7169

Ms. Briana Colley  
Westinghouse Hanford Company  
2355 Stevens Drive  
MSIN H4-23  
345 Hills Street/3000 Area  
Richland, WA 99352

Dear Ms. Colley:

Enclosed in the Summary Data Section, are the gross alpha, gross beta,  $^{14}\text{C}$ ,  $^{90}\text{Sr}$ ,  $^{99}\text{Tc}$ , isotopic uranium, isotopic plutonium,  $^{241}\text{Am}$ , and gamma scan results for the soil samples from 241-T-106 Location we received 11 March 1993. The QA/QC results are also given in the Summary Data Section. The Summary Data Section is numbered pages 1 to 43, and the appendices are numbered pages 44 to 266.

The  $^{237}\text{Np}$  results are not included in this report. They will be reported to you as soon as available.

Please call if you have any questions concerning this data.

Sincerely,

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

DPK/ss

Enclosures: Section 1 and 2  
Appendices

1 row 8/20/96

SDG	<u>7169</u>
Contact	<u>Dinkar P. Kharkar</u>

Client	<u>Westinghouse Hanford</u>
Contract	<u>MBH-SVV-069262</u>

### CASE NARRATIVE

#### 1.0 GENERAL

Soil sample results from 241-T-106 Location (TMA/Norcal Group 7169) are provided in this report. TMA/Norcal Group 7169 is comprised of the one sample listed on the Chain-of-Custody documents below which is identified as sample 1.

##### 1.1 CHAINS-OF-CUSTODY

This report includes data from samples delivered under Chain-of-Custody documents Field Logbook No. EFL-1053.

##### 1.2 SAMPLE VOLUME

A 500 mL glass bottle containing the sample was received for analyses.

##### 1.3 MISSING SAMPLES

The sample was accounted for in an undamaged condition.

##### 1.4 HOLDING TIMES

Sample was collected on 9 March 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, a blank, and a replicate. All original analyses were performed with QC samples 7169-2 through 7169-4.

The QC samples were prepared and labelled by the quality control officer. Copies of The QC notebook pages are included in the data package.

##### 2.1 LABORATORY CONTROL SAMPLES

LSC recoveries for all the nuclides were satisfactory.

The MDA's of the results for the plutonium isotopes were higher than the RDL due to relatively low chemical yield on the planchet.

##### 2.2 BLANKS

The MDA of the results for  $^{238}\text{Pu}$  was higher than the RDL due to low chemical yield and higher background. The  $^{90}\text{Sr}$  error was underlined because the counting error 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.

SDG	<u>7169</u>
Contact	<u>Dinkar P. Kharkar</u>

Client	<u>Westinghouse Hanford</u>
Contract	<u>MBH-SVV-069262</u>

### CASE NARRATIVE

#### 2.0 QUALITY CONTROL (cont'd)

##### 2.3 REPLICATES

Results were satisfactory for all replicate analyses. The MDA for  $^{238}\text{Pu}$  of the original sample (BO86VO) was higher than the RDL due to low chemical recovery. The  $2\sigma$  error of  $^{90}\text{Sr}$  for the original sample (BO86VO) was underlined because the counting error 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. The negative result of  $^{14}\text{C}$  for the replicate of sample BO86VO was underlined because it was less than the negative of its  $2\sigma$  counting error.

#### 3.0 ANALYTICAL NOTES

- 3.1 Gross Alpha Analyses: The average MDA for gross alpha was  $(6 \pm 2)$  pCi/g. Gross alpha activity above the RDL was not found in the sample.
- 3.2 Gross Beta Analyses: The average MDA for gross beta was  $(5 \pm 0)$  pCi/g. Gross beta activity above the RDL was found in the sample.
- 3.3 Carbon-14 Analyses: The average MDA for four analyses was  $(6 \pm 1)$  pCi/g. Carbon-14 activity above the RDL was not found in the sample.
- 3.4 Strontium-90 Analyses: The average yield for four analyses was  $(75 \pm 8)\%$ . The lowest yield was 70% and the highest was 80%. The average MDA was  $(0.8 \pm 0.2)$  pCi/g. Strontium-90 activity above the RDL was not found in the sample. The  $^{90}\text{Sr}$  error was underlined because the counting error 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.
- 3.5 Technetium-99 Analyses: The average yield for four analyses was  $(65 \pm 16)\%$ . The lowest yield was 55% and the highest was 73%. The average MDA was  $(0.4 \pm 0.1)$  pCi/g. Technetium-99 activity above the RDL was found in the sample.
- 3.6 Uranium-233, 234, 238 Analyses: The average yield for four analyses was  $(69 \pm 12)\%$ . The lowest yield was 60% and the highest was 73%. The average MDA was  $(0.2 \pm 0.1)$  pCi/g. Uranium-233,234 and  $^{238}\text{U}$  activity above the RDL was found in the sample.

SDG	<u>7169</u>
Contact	<u>Dinkar P. Kharkar</u>

Client	<u>Westinghouse Hanford</u>
Contract	<u>MBH-SVV-069262</u>

### CASE NARRATIVE

- 3.7 Neptunium-237: We have had problems getting consistently acceptable yields on neptunium analysis. To avoid further futile analysis, a decision was made to stop analyzing for this isotope until such time as the problem was identified and solved. To date research has indicated that the element did not absorb onto an anion resin or alternately, did not desorb properly. This one column step was losing up to 80% of the neptunium. Research has been in process to isolate this problem and to create a mechanism for replacing or fixing this column step. We have final tests in process and results should be available next Tuesday. These tests will, of course, only be on test samples under controlled conditions. Should these tests prove acceptable we propose to process Np samples starting next Wednesday using this modified procedure. The backlog of samples should be completed in about two weeks. A draft procedure will be used until it is proven that the procedure gives correct yields and purity on real samples. If this procedure proves effective it will become an approved standard procedure.
- 3.8 Plutonium-238, 239/240 Analyses: The average yield for four analyses was (35 ± 42%). The lowest yield was 12% and the highest was 58%. The average MDA was (0.10 ± 0.1) pCi/g. Plutonium activity above the RDL was not found in the sample.
- 3.9 Americium-241 Analyses: The average yield for four analyses was (64 ± 21)%. The lowest yield was 50% and the highest yield was 72%. The average MDA was (0.03 ± 0.02) pCi/g. Americium activity above the RDL was not found in the sample. The americium sample was counted for less than the nominal count time of 700 minutes.
- 3.10 Gamma Scan Analyses: Gamma scan analysis did not find positive concentration of gamma nuclides in the samples except for natural radioactivity such as <sup>40</sup>K, <sup>226</sup>Ra, <sup>228</sup>Ra, and <sup>232</sup>Th. The MDA's of some of the gamma nuclides were higher than the RDL due to the smaller aliquot available for analysis.

9713514.2879

TMA

TMA NORCAL  
REPORTING GROUP 7169

N303095-04

B086V0

REPLICATE

SDG <u>7169</u>	Client <u>Westinghouse Hanford</u>
Contact <u>Dinkar Kharkar</u>	Contract <u>MBH-SVV-069262</u>
REPLICATE	ORIGINAL
Lab sample id <u>N303095-04</u>	Lab sample id <u>N303095-01</u>
Dept sample id <u>7169-004</u>	Dept sample id <u>7169-001</u>
	Received <u>03/11/93</u>
	% moisture <u>2.6</u>
	Client sample id <u>B086V0</u>
	Matrix <u>SOLID</u>
	Collected <u>03/09/93</u>
	Chain of custody id <u>EFL-1053</u>

PARAMETER	REPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Gross Alpha	4.2	3.8	5	10	U	80A	2.5	4.0	6	U	-		
Gross Beta	17	4.0	5	10		80B	12	3.7	5		34	65	
Uranium 233/234	0.43	0.19	0.1	0.3		U	0.40	0.16	0.1		7	90	
Uranium 235	0.022	0.044	0.2	0.3	U	U	-0.019	0.038	0.1	U	-		
Uranium 238	0.56	0.23	0.1	0.3		U	0.40	0.16	0.1		33	88	
Plutonium 238	0.003	0.017	0.03	0.05	U	PU	0.004	0.029	0.06	U	-		
Plutonium 239/240	0.003	0.011	0.02	0.05	U	PU	0	0.007	0.03	U	-		
Americium 241	0	0.022	0.04	0.05	U	AM	-0.003	0.016	0.03	U	-		
Strontium 90	0.007	0.18	0.8	2	U	Y	0	1.3	1	U	-		
Technetium 99	5.8	0.36	0.3	0.5		TC	5.3	0.37	0.4		9	25	
Carbon 14	-4.4	4.3	5	50	U	C	0.20	4.5	5	U	-		
GAMMA SCAN ANALYTES													
Potassium 40	9.1	0.93				GAM	8.0	1.5			13	44	
Iron 59	U		0.1	0.05	U	GAM	U		0.3	U	-		
Chromium 51	U		0.4		U	GAM	U		0.9	U	-		
Cobalt 60	U		0.05	0.05	U	GAM	U		0.08	U	-		
Zinc 65	U		0.1		U	GAM	U		0.1	U	-		
Ruthenium 106	U		0.4		U	GAM	U		0.7	U	-		
Cesium 134	U		0.05		U	GAM	U		0.09	U	-		
Cesium 137	U		0.04	0.05	U	GAM	U		0.1	U	-		
Cerium 144	U		0.2		U	GAM	U		0.4	U	-		
Europium 152	U		0.06	0.1	U	GAM	U		0.1	U	-		
Europium 154	U		0.04	0.1	U	GAM	U		0.1	U	-		
Radium 226	0.29	0.082				GAM	0.26	0.16			11	103	
Thorium 228	0.39	0.048				GAM	0.36	0.090			8	52	
Thorium 232	0.50	0.21				GAM	0.97	0.39			64	96	

9713514.2880

TMA

N303095-01

TMA NORCAL  
REPORTING GROUP 7169

B086V0

## DATA SHEET

SDG 7169  
Contact Dinkar KharkarClient Westinghouse Hanford  
Contract MBH-SVV-069262Lab sample id N303095-01  
Dept sample id 7169-001  
Received 03/11/93  
% moisture 2.6Client sample id B086V0  
Matrix SOLID  
Collected 03/09/93  
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	Alpha	2.5	4.0	6	10	U	80A
Gross Beta	Beta	12	3.7	5	10		80B
Uranium 233/234		0.40	0.16	0.1	0.3		U
Uranium 235	15117-96-1	-0.019	0.038	0.1	0.3	U	U
Uranium 238	7440-61-1	0.40	0.16	0.1	0.3		U
Plutonium 238	13981-16-3	0.004	0.029	<u>0.06</u>	0.05	U	PU
Plutonium 239/240		0	0.007	0.03	0.05	U	PU
Americium 241	14596-10-2	-0.003	0.016	0.03	0.05	U	AM
Strontium 90	10098-97-2	0	<u>1.3</u>	1	2	U	Y
Technetium 99	14133-76-7	5.3	0.37	0.4	0.5		TC
Carbon 14	14762-75-5	0.20	4.5	5	50	U	C
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	8.0	1.5				GAM
Iron 59	14596-12-4	U		<u>0.3</u>	0.05	U	GAM
Chromium 51	14392-02-0	U		<u>0.9</u>		U	GAM
Cobalt 60	10198-40-0	U		<u>0.08</u>	0.05	U	GAM
Zinc 65	13982-39-3	U		<u>0.1</u>		U	GAM
Ruthenium 106	13967-48-1	U		<u>0.7</u>		U	GAM
Cesium 134	13967-70-9	U		<u>0.09</u>		U	GAM
Cesium 137	10045-97-3	U		<u>0.1</u>	0.05	U	GAM
Cerium 144	14762-78-8	U		<u>0.4</u>		U	GAM
Europium 152	14683-23-9	U		<u>0.1</u>	0.1	U	GAM
Europium 154	15585-10-1	U		<u>0.1</u>	0.1	U	GAM
Radium 226	13982-63-3	0.26	0.16				GAM
Thorium 228	14274-82-9	0.36	0.090				GAM
Thorium 232	7440-29-1	0.97	0.39				GAM

## DATA SHEETS

Page 1

## SUMMARY DATA SECTION

Page 11

Lab id TMAN  
Protocol WHC-HASM  
Version Ver 1.0  
Form DVD-DS  
Version 2.23  
Report date 06/07/93

9713514.2881

WST 3-10-93

Overnight Delivery

~~Signature Security Services~~

Contractor Westinghouse Hanford Company	OFF-SITE PROPERTY CONTROL	CONTROL NUMBER (To be obtained from PROPERTY MANAGEMENT) W93-0-0285 #26
--	------------------------------	---

PART I - TO BE COMPLETED BY ORIGINATOR

Department: <b>Environmental</b>	Section: <b>Env Field Services</b>	Unit: <b>Env Charac &amp; Sampling</b>
----------------------------------	------------------------------------	--

The following items are to be shipped from  Contractor  Vendor

Routing **Air**  Contractor  Vendor

Shipped to <b>TMA/NORCAL 2030 Wright Ave. Richmond, CA 94804</b>	Off-site Custodian
	Full Title

Quantity	Description (Include Serial and any Government Tag Numbers)	Original Cost
1 48#	<b>SML 267</b> poly cooler. Contains soil <sup>+ water</sup> samples that are double-bagged and packed in wet ice and vermiculite. Samples are nonhazardous.  Sample #: <b>B086V0 + B086X9</b>	N/A

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

Necessity for the Off-Site Use of this Property

To support drilling and sampling of the 241-T-106 soil investigation

Bill of Lading 971285641

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

RM Clearance for Public Release <i>None</i>	RM Survey No. # <b>110232</b>	Date <b>3-10-93</b>
Location of Property (Area & Bldg.) <b>200W/241-T</b>	Contact <b>W. S. Thompson</b>	Phone <b>(509) 376-2153</b>
Date Ready for Shipment <b>3-10-93</b>	Cost Code to be Charged <b>81710 PF5AG</b>	Approximate Date This Property will be Returned <b>N/A</b>
Originated By: <b>Relinquished by:</b> <i>Wendy Thompson</i>	Date <b>3-10-93</b>	Authorized By: <i>Wendy Thompson</i>
Signature and Name of Property Control	Custodian Date <i>Wendy Thompson</i>	Property Management Approval <i>Wendy Thompson</i>
		Date <b>3/10/93</b>

PART II - TO BE COMPLETED BY SHIPPING

Signature of Recipient <i>C.R. Keaton</i>	Return Order No.	Date Issued	Purchase Order No.	Date Issued
Date <b>3-10-93</b>				

DISTRIBUTION

By Originator White, Green, Yellow, Pink - Property Management Goldenrod - Retain	Shipping Operation - Sign all Copies and Forward to: White - Property Management Green - Property Control Custodian (Issuing Office) Yellow - Retain Pink - Originator
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2882 415216

48

<b>BURLINGTON AIR EXPRESS</b> CORPORATE SUPPORT GROUP 18200 VON KARMAN AVE. IRVINE, CA 92715		<b>001001</b>																			
DATE	ORIGIN	DEST. SORT CODE	AIRBILL NUMBER																		
3-10-93	PSC		971 285 641																		
SHIPPER'S REFERENCE NO.		SHIPPER'S ACCOUNT NO.																			
1 493-0-0285426		781134194																			
COMPANY		DEPT./FLOOR																			
WESTINGHOUSE MANUFACT																					
FROM (YOUR NAME)		PHONE NO.																			
WESTINGHOUSE SHIPPING DEPT. (509) 376-6668																					
STREET ADDRESS																					
2355 STEVENS DR																					
CITY		STATE	ZIP (REQUIRED)																		
RICHMOND		WA	94934																		
CONSIGNEE'S REFERENCE NO.		CONSIGNEE'S ACCOUNT NO.																			
2 TMA/NORCAL																					
COMPANY		DEPT./FLOOR																			
TMA/NORCAL																					
TO (CONSIGNEE NAME)		PHONE NO.																			
TMA/NORCAL																					
ACCURATE STREET ADDRESS (BURLINGTON CANNOT DELIVER TO A P.O. BOX)																					
2030 WRIGHT AVENUE																					
CITY		STATE	ZIP (REQUIRED)																		
RICHMOND		CA	94804																		
<b>4 BILLING INFORMATION</b> <input checked="" type="checkbox"/> PREPAID (SHIPPER) \$ _____ CASH RECEIVED (PAID IN ADVANCE) <input type="checkbox"/> COLLECT (CONSIGNEE) <input type="checkbox"/> 3RD PARTY (ACCT. NO. OR BILLING ADDRESS REQ'D.) ACCOUNT NO. COMPANY/NAME STREET ADDRESS CITY STATE ZIP		<b>5 SERVICE REQUESTED</b> <input checked="" type="checkbox"/> OVERNIGHT (NEXT BUSINESS DAY) <input type="checkbox"/> SECOND DAY <input type="checkbox"/> NEXT FLIGHT OUT <input type="checkbox"/> _____ CHECK BELOW IF PACKAGE IS: <input type="checkbox"/> LETTER <input type="checkbox"/> G.O.H. (GARMENT ON HANGER)																			
<b>6 HANDLING INFORMATION (*SPECIAL RATE MAY APPLY)</b> <input type="checkbox"/> HOLD AT BAX <input type="checkbox"/> *DANGEROUS GOODS <input type="checkbox"/> *SATURDAY DELIVERY <input type="checkbox"/> *SPECIAL DELIVERY <input type="checkbox"/> *CONVENTION <input type="checkbox"/> *GOVERNMENT SHIPMENT SPECIAL INSTRUCTIONS / ADDITIONAL REFERENCE INFORMATION: <b>SAMPLES # B086V0, B086X9</b>		<table border="1"> <thead> <tr> <th>NO. OF PCS</th> <th>WEIGHT</th> <th>LENGTH</th> <th>WIDTH</th> <th>HEIGHT</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>48 LB</td> <td></td> <td></td> <td></td> <td>COOLER SML 267 SOIL &amp; WATER SAMPLES</td> </tr> <tr> <td>TOTAL PCS</td> <td>TOTAL WT.</td> <td colspan="3"></td> <td>SKID(S) SAID TO CONTAIN _____ NO. OF PIECES _____</td> </tr> </tbody> </table>		NO. OF PCS	WEIGHT	LENGTH	WIDTH	HEIGHT	DESCRIPTION	1	48 LB				COOLER SML 267 SOIL & WATER SAMPLES	TOTAL PCS	TOTAL WT.				SKID(S) SAID TO CONTAIN _____ NO. OF PIECES _____
NO. OF PCS	WEIGHT	LENGTH	WIDTH	HEIGHT	DESCRIPTION																
1	48 LB				COOLER SML 267 SOIL & WATER SAMPLES																
TOTAL PCS	TOTAL WT.				SKID(S) SAID TO CONTAIN _____ NO. OF PIECES _____																
<b>7 SIGNATURE OF SHIPPER</b> X [Signature] RELEASE SIGNATURE (SHIPPER AUTHORIZES BAX TO DELIVER SHIPMENT WITHOUT A DELIVERY SIGNATURE AS PER CONDITIONS ON REVERSE OF THIS PAGE.) X		RECEIVED BY BAX AT <input checked="" type="checkbox"/> SHIPPER'S DOOR <input type="checkbox"/> BAX TERMINAL TIME/DATE OF PICK-UP _____ DRIVER NO. _____ SIGNED FOR BAX X [Signature] <b>OUTSIDE CARRIER:</b> CHARGES ADVANCED \$ _____ PRO NUMBER _____ CARRIER NAME _____																			
<b>971 285 641</b> AIRBILL NUMBER		<b>3 C.O.D.</b> \$ _____ CONSIGNEE'S CHECK O.K. MARK IF APPLICABLE <input type="checkbox"/> <small>BURLINGTON AIR EXPRESS WILL COLLECT CONSIGNEE'S CHECK. MAKE PAYABLE ONLY TO THE SHIPPER FOR THE VALUE OF THE GOODS IN THE AMOUNT SHOWN ABOVE.</small> DECLARED VALUE \$ _____ LIMIT OF LIABILITY LIABILITY IS AGREED AND UNDERSTOOD TO BE \$50.00 OR \$5.00 PER POUND, WHICHEVER IS GREATER, UNLESS A HIGHER VALUE IS DECLARED AND APPLICABLE CHARGES PAID. SEE REVERSE SIDE OF AIRBILL, PARAGRAPH 8, FOR DECLARED VALUE LIMITATIONS. <b>1-800-CALL-BAX FOR INFORMATION OR THE BAX OFFICE NEAREST YOU</b>																			

OP 100 (11-92)

NON-NEGOTIABLE AIRBILL SUBJECT TO TERMS AND CONDITIONS OF CONTRACT ON REVERSE SIDE.

CONSIGNEE COPY

9713514.2883

**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



June 14, 1993

SENT BY FEDERAL EXPRESS

Ref. TMA/Norcal N3-03-095-7169

Ms. Briana Colley  
Westinghouse Hanford Company  
2355 Stevens Drive  
MSIN H4-23  
345 Hills Street/3000 Area  
Richland, WA 99352

Dear Ms. Colley:

Enclosed in the Summary Data Section, are the total uranium results which were omitted from the report sent to you on 3 June, 1993, for the soil samples from 241-T-106 Location we received 11 March 1993. The QA/QC results are also given in the Summary Data Section. The Summary Data Section is numbered pages 1 to 28, and the appendices are numbered pages 29 to 68.

The <sup>237</sup>Np results are not included in this report, however, they will be reported to you as soon as available.

Please call if you have any questions concerning this data.

Sincerely,

A handwritten signature in cursive script that reads "Dinkar P. Kharkar".

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

DPK/ss

Enclosures: Section 1 and 2  
Appendices

i 2008/30/96

SDG	<u>7169</u>
Contact	<u>Dinkar P. Kharkar</u>

Client	<u>Westinghouse Hanford</u>
Contract	<u>MBH-SVV-069262</u>

## CASE NARRATIVE

### 1.0 GENERAL

The total uranium results of the soil sample from the 241-T-106 Location (TMA/Norcal Group 7169) are provided in this report. TMA/Norcal Group 7169 is comprised of the one sample listed on the Chain-of-Custody documents below which are identified as sample 1.

#### 1.1 CHAINS-OF-CUSTODY

This report includes data from the sample delivered under Chain-of-Custody documents Field Logbook No. EFL-1053.

#### 1.2 SAMPLE VOLUME

Five hundred mL plastic bottles containing the sample were received for the analyses.

#### 1.3 MISSING SAMPLES

The sample were accounted for in an undamaged condition.

#### 1.4 HOLDING TIMES

Samples were collected on 3/09/93 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, a blank, and a replicate. The sample analyses were performed with QC samples 7169-2 through 7169-4.

The QC samples were prepared and labelled by the quality control officer. Copies of The QC notebook pages are included in the data package.

#### 2.1 LABORATORY CONTROL SAMPLES

LCS recovery for total uranium analysis was satisfactory and the MDA of the result were satisfactory.

#### 2.2 BLANKS

The MDA of the result for total uranium was satisfactory.

SDG	<u>7169</u>
Contact	<u>Dinkar P. Kharkar</u>

Client	<u>Westinghouse Hanford</u>
Contract	<u>MBH-SVV-069262</u>

### CASE NARRATIVE

#### 2.3 REPLICATES

Results and the MDA were satisfactory for the replicate analyses.

#### 3.0 ANALYTICAL NOTES

- 3.1 Total Uranium Analyses: The average MDA for four analyses was  $(0.05 \pm 0.06) \mu\text{g/g}$ . Uranium was found in the sample.

9713514.2886

TMA

TMA NORCAL  
REPORTING GROUP 7169

N303095-04

8086V0

REPLICATE

SDG <u>7169</u>	Client <u>Westinghouse Hanford</u>
Contact <u>Dinkar Kharkar</u>	Contract <u>MBH-SVV-069262</u>
REPLICATE	ORIGINAL
Lab sample id <u>N303095-04</u>	Lab sample id <u>N303095-01</u>
Dept sample id <u>7169-004</u>	Dept sample id <u>7169-001</u>
	Received <u>03/11/93</u>
% moisture <u>2.6</u>	Client sample id <u>8086V0</u>
	Matrix <u>SOLID</u>
	Collected <u>03/09/93</u>
	Chain of custody id <u>EFL-1053</u>

PARAMETER	REPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ PROT TOT LIMIT
Gross Alpha	N.R.			10		80A	N.R.					
Gross Beta	N.R.			10		80B	N.R.					
Uranium 233/234	N.R.			0.3		U	N.R.					
Uranium 235	N.R.			0.3		U	N.R.					
Uranium 238	N.R.			0.3		U	N.R.					
Total Uranium (ug/g)	1.2	0.21	0.07		X	U_T	1.2	0.20	0.07	X	0	42
Plutonium 238	N.R.			0.05		PU	N.R.					
Plutonium 239/240	N.R.			0.05		PU	N.R.					
Americium 241	N.R.			0.05		AM	N.R.					
Strontium 90	N.R.			2		Y	N.R.					
Technetium 99	N.R.			0.5		TC	N.R.					
Carbon 14	N.R.			50		C	N.R.					
Neptunium 237	N.R.			0.2		NP	N.R.					
GAMMA SCAN ANALYTES												
Potassium 40	N.R.					GAM	N.R.					
Iron 59	N.R.			0.05		GAM	N.R.					
Chromium 51	N.R.					GAM	N.R.					
Cobalt 60	N.R.			0.05		GAM	N.R.					
Zinc 65	N.R.					GAM	N.R.					
Ruthenium 106	N.R.					GAM	N.R.					
Cesium 134	N.R.					GAM	N.R.					
Cesium 137	N.R.			0.05		GAM	N.R.					
Cerium 144	N.R.					GAM	N.R.					
Europium 152	N.R.			0.1		GAM	N.R.					
Europium 154	N.R.			0.1		GAM	N.R.					
Radium 226	N.R.					GAM	N.R.					
Thorium 228	N.R.					GAM	N.R.					

Lab id TMAN  
Protocol WHC-HASM  
Version Ver 1.0  
Form DVD-REP  
Version 2.23  
Report date 06/14/93

9713514.2887

TMA

TMA NORCAL  
REPORTING GROUP 7169

N303095-04

8086V0

REPLICATE, cont.

SDG <u>7169</u>	Client <u>Westinghouse Hanford</u>
Contact <u>Dinkar Kharkar</u>	Contract <u>MBH-SVV-069262</u>
REPLICATE	ORIGINAL
Lab sample id <u>N303095-04</u>	Lab sample id <u>N303095-01</u>
Dept sample id <u>7169-004</u>	Dept sample id <u>7169-001</u>
	Received <u>03/11/93</u>
	% moisture <u>2.6</u>
	Client sample id <u>8086V0</u>
	Matrix <u>SOLID</u>
	Collected <u>03/09/93</u>
	Chain of custody id <u>EFL-1053</u>

PARAMETER	REPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ PROT TOT LIMIT
Thorium 232	N.R.					GAM	N.R.					

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TMA

N303095-01

TMA NORCAL  
REPORTING GROUP 7169

B086V0

DATA SHEET

SDG 7169  
Contact Dinkar KharkarClient Westinghouse Hanford  
Contract MBH-SVV-069262Lab sample id N303095-01  
Dept sample id 7169-001  
Received 03/11/93  
% moisture 2.6Client sample id B086V0  
Matrix SOLID  
Collected 03/09/93  
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/g	2 $\sigma$ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	Alpha	N.R.			10		80A
Gross Beta	Beta	N.R.			10		80B
Uranium 233/234		N.R.			0.3		U
Uranium 235	15117-96-1	N.R.			0.3		U
Uranium 238	7440-61-1	N.R.			0.3		U
Total Uranium (ug/g)	7440-61-1	1.2	0.20	0.07		X	U_T
Plutonium 238	13981-16-3	N.R.			0.05		PU
Plutonium 239/240		N.R.			0.05		PU
Americium 241	14596-10-2	N.R.			0.05		AM
Strontium 90	10098-97-2	N.R.			2		Y
Technetium 99	14133-76-7	N.R.			0.5		TC
Carbon 14	14762-75-5	N.R.			50		C
Neptunium 237	13994-20-2	N.R.			0.2		NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	N.R.					GAM
Iron 59	14596-12-4	N.R.			0.05		GAM
Chromium 51	14392-02-0	N.R.					GAM
Cobalt 60	10198-40-0	N.R.			0.05		GAM
Zinc 65	13982-39-3	N.R.					GAM
Ruthenium 106	13967-48-1	N.R.					GAM
Cesium 134	13967-70-9	N.R.					GAM
Cesium 137	10045-97-3	N.R.			0.05		GAM
Cerium 144	14762-78-8	N.R.					GAM
Europium 152	14683-23-9	N.R.			0.1		GAM
Europium 154	15585-10-1	N.R.			0.1		GAM
Radium 226	13982-63-3	N.R.					GAM
Thorium 228	14274-82-9	N.R.					GAM

## DATA SHEETS

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## SUMMARY DATA SECTION

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Lab id TMAN  
Protocol WHC-HASM  
Version Ver 1.0  
Form DVD-DS  
Version 2.23  
Report date 06/14/93

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TMA

TMA NORCAL  
REPORTING GROUP 7169

N303095-01

B086V0

## DATA SHEET, cont

SDG <u>7169</u>	Client <u>Westinghouse Hanford</u>
Contact <u>Dinkar Kharkar</u>	Contract <u>MBH-SVV-069262</u>
Lab sample id <u>N303095-01</u>	Client sample id <u>B086V0</u>
Dept sample id <u>7169-001</u>	Matrix <u>SOLID</u>
Received <u>03/11/93</u>	Collected <u>03/09/93</u>
% moisture <u>2.6</u>	Chain of custody id <u>EFL-1053</u>

PARAMETER	CAS NO	RESULT pCi/g	2 $\sigma$ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Thorium 232	7440-29-1	N.R.					GAM



SDG	<u>7169</u>
Contact	<u>Dinkar P. Kharkar</u>

Client	<u>Westinghouse Hanford</u>
Contract	<u>MBH-SVV-069262</u>

### CASE NARRATIVE

#### 1.0 GENERAL

Soil sample results from 241-T-106 location (TMA/Norcal Group 7169) are reported herein. TMA/Norcal Group 7169 is comprised of the one sample listed on the Chain-of-Custody documents and is identified as sample 1.

##### 1.1 CHAINS-OF-CUSTODY

This report includes data from samples delivered under Chain-of-Custody documents Field Logbook No. EFL-1053.

##### 1.2 SAMPLE VOLUME

A 500 mL glass bottle was received for the analyses.

##### 1.3 MISSING SAMPLES

The sample was accounted for in an undamaged condition.

##### 1.4 HOLDING TIMES

The sample was collected on 03/09/93 and sample processing was initiated within 180 days of collection.

#### 2.0 QUALITY CONTROL

The  $^{237}\text{Np}$  analysis was performed with QC samples 7169-4A2, 7169-7, and 7169-8.

The QC samples were prepared and labelled by the quality control department. Copies of The QC notebook pages are included in the data package.

##### 2.1 LABORATORY CONTROL SAMPLES

The LCS recovery for  $^{237}\text{Np}$  was good, and met the  $3\sigma$  total limit. The MDA for the analysis met the RDL.

##### 2.2 BLANKS

The MDA for the analysis met the RDL. The reagent blank showed alpha contamination on the plate but the activity of the contamination was below the RDL.

SDG	<u>7169</u>
Contact	<u>Dinkar P. Kharkar</u>

Client	<u>Westinghouse Hanford</u>
Contract	<u>MBH-SVV-069262</u>

### CASE NARRATIVE

#### 2.3 REPLICATES

Results were satisfactory for the replicate analysis. The MDA's for  $^{237}\text{Np}$  met the RDL.

#### 3.0 ANALYTICAL NOTES

- 3.1 Neptunium-237: The average yield for four analyses was  $(34 \pm 13)\%$ . The lowest yield was 26% and the highest was 40%. The average MDA was  $(0.01 \pm 0.01)$  pCi/g. Neptunium-237 activity above the RDL was not found in the sample.

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**TMA NORCAL**  
REPORTING GROUP 7169

N303095-04

B086V0

**REPLICATE**

SDG <u>7169</u>	Client <u>Westinghouse Hanford</u>
Contact <u>Dinkar Kharkar</u>	Contract <u>MBH-SVV-069262</u>
<b>REPLICATE</b>	<b>ORIGINAL</b>
Lab sample id <u>N303095-04</u>	Lab sample id <u>N303095-01</u>
Dept sample id <u>7169-004</u>	Dept sample id <u>7169-001</u>
	Received <u>03/11/93</u>
	% moisture <u>2.6</u>
	Client sample id <u>B086V0</u>
	Matrix <u>SOLID</u>
	Collected <u>03/09/93</u>
	Chain of custody id <u>EFL-1053</u>

PARAMETER	REPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Gross Alpha	4.2	3.8	5	10	U	80A	2.5	4.0	6	U	-	-	-
Gross Beta	17	4.0	5	10		80B	12	3.7	5		34	65	
Uranium 233/234	0.43	0.19	0.1	0.3		U	0.40	0.16	0.1		7	90	
Uranium 235	0.022	0.044	0.2	0.3	U	U	-0.019	0.038	0.1	U	-	-	
Uranium 238	0.56	0.23	0.1	0.3		U	0.40	0.16	0.1		33	88	
Total Uranium (ug/g)	1.2	0.21	0.07		X	U_T	1.2	0.20	0.07	X	0	42	
Plutonium 238	0.003	0.017	0.03	0.05	U	PU	0.004	0.029	0.06	U	-	-	
Plutonium 239/240	0.003	0.011	0.02	0.05	U	PU	0	0.007	0.03	U	-	-	
Americium 241	0	0.022	0.04	0.05	U	AM	-0.003	0.016	0.03	U	-	-	
Strontium 90	0.007	0.18	0.8	2	U	Y	0	1.3	1	U	-	-	
Technetium 99	5.8	0.36	0.3	0.5		TC	5.3	0.37	0.4		9	25	
Carbon 14	-4.4	4.3	5	50	U	C	0.20	4.5	5	U	-	-	
Neptunium 237	0.006	0.006	0.008	0.2	UN	NP	0.013	0.013	0.02	UN	-	-	
<b>GAMMA SCAN ANALYTES</b>													
Potassium 40	9.1	0.93				GAM	8.0	1.5			13	44	
Iron 59	U		0.1	0.05	U	GAM	U		0.3	U	-	-	
Chromium 51	U		0.4		U	GAM	U		0.9	U	-	-	
Cobalt 60	U		0.05	0.05	U	GAM	U		0.08	U	-	-	
Zinc 65	U		0.1		U	GAM	U		0.1	U	-	-	
Ruthenium 106	U		0.4		U	GAM	U		0.7	U	-	-	
Cesium 134	U		0.05		U	GAM	U		0.09	U	-	-	
Cesium 137	U		0.04	0.05	U	GAM	U		0.1	U	-	-	
Cerium 144	U		0.2		U	GAM	U		0.4	U	-	-	
Europium 152	U		0.06	0.1	U	GAM	U		0.1	U	-	-	
Europium 154	U		0.04	0.1	U	GAM	U		0.1	U	-	-	
Radium 226	0.29	0.082				GAM	0.26	0.16			11	103	
Thorium 228	0.39	0.048				GAM	0.36	0.090			8	52	

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**TMA NORCAL**  
REPORTING GROUP 7169

N303095-04

B086V0

**REPLICATE, cont.**

SDG <u>7169</u>	Client <u>Westinghouse Hanford</u>
Contact <u>Dinkar Kharkar</u>	Contract <u>MBH-SVV-069262</u>
REPLICATE	ORIGINAL
Lab sample id <u>N303095-04</u>	Lab sample id <u>N303095-01</u>
Dept sample id <u>7169-004</u>	Dept sample id <u>7169-001</u>
	Received <u>03/11/93</u>
	% moisture <u>2.6</u>
	Client sample id <u>B086V0</u>
	Matrix <u>SOLID</u>
	Collected <u>03/09/93</u>
	Chain of custody id <u>EFL-1053</u>

PARAMETER	REPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Thorium 232	0.50	0.21				GAM	0.97	0.39			64	96	

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TMA NORCAL  
REPORTING GROUP 7169

N303095-01

## DATA SHEET

B086V0

SDG 7169  
Contact Dinkar KharkarClient Westinghouse Hanford  
Contract MBH-SVV-069262Lab sample id N303095-01  
Dept sample id 7169-001  
Received 03/11/93  
% moisture 2.6Client sample id B086V0  
Matrix SOLID  
Collected 03/09/93  
Chain of custody id EFL-1053

PARAMETER	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Gross Alpha	Alpha	2.5	4.0	6	10	U	80A
Gross Beta	Beta	12	3.7	5	10		80B
Uranium 233/234		0.40	0.16	0.1	0.3		U
Uranium 235	15117-96-1	-0.019	0.038	0.1	0.3	U	U
Uranium 238	7440-61-1	0.40	0.16	0.1	0.3		U
Total Uranium (ug/g)	7440-61-1	1.2	0.20	0.07		X	U_T
Plutonium 238	13981-16-3	0.004	0.029	0.06	0.05	U	PU
Plutonium 239/240		0	0.007	0.03	0.05	U	PU
Americium 241	14596-10-2	-0.003	0.016	0.03	0.05	U	AM
Strontium 90	10098-97-2	0	1.3	1	2	U	Y
Technetium 99	14133-76-7	5.3	0.37	0.4	0.5		TC
Carbon 14	14762-75-5	0.20	4.5	5	50	U	C
Neptunium 237	13994-20-2	0.013	0.013	0.02	0.2	UN	NP
GAMMA SCAN ANALYTES							
Potassium 40	13966-00-2	8.0	1.5				GAM
Iron 59	14596-12-4	U		0.3	0.05	U	GAM
Chromium 51	14392-02-0	U		0.9		U	GAM
Cobalt 60	10198-40-0	U		0.08	0.05	U	GAM
Zinc 65	13982-39-3	U		0.1		U	GAM
Ruthenium 106	13967-48-1	U		0.7		U	GAM
Cesium 134	13967-70-9	U		0.09		U	GAM
Cesium 137	10045-97-3	U		0.1	0.05	U	GAM
Cerium 144	14762-78-8	U		0.4		U	GAM
Europium 152	14683-23-9	U		0.1	0.1	U	GAM
Europium 154	15585-10-1	U		0.1	0.1	U	GAM
Radium 226	13982-63-3	0.26	0.16				GAM
Thorium 228	14274-82-9	0.36	0.090				GAM

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SUMMARY DATA SECTION  
Page 14Lab id TMAN  
Protocol WHC-HASM  
Version Ver 1.0  
Form DVD-DS  
Version 2.24  
Report date 06/29/93

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TMA NORCAL  
REPORTING GROUP 7169

N303095-01

B086V0

DATA SHEET, cont

SDG <u>7169</u>	Client <u>Westinghouse Hanford</u>
Contact <u>Dinkar Kharkar</u>	Contract <u>MBH-SVV-069262</u>
Lab sample id <u>N303095-01</u>	Client sample id <u>B086V0</u>
Dept sample id <u>7169-001</u>	Matrix <u>SOLID</u>
Received <u>03/11/93</u>	Collected <u>03/09/93</u>
% moisture <u>2.6</u>	Chain of custody id <u>EFL-1053</u>

PARAMETER	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Thorium 232	7440-29-1	0.97	0.39				GAM

Lab id <u>TMAN</u>
Protocol <u>WHC-HASM</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>2.24</u>
Report date <u>06/29/93</u>