

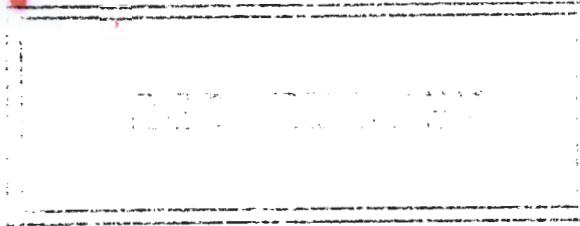
**START**

0713512.2454

0046102

B09708-TMA-601

TMA 57 X 2



**WESTINGHOUSE HANFORD COMPANY**

**Results of Analyses For:**



**GENERAL CHEMISTRY**  
Case No. 11-019  
(TMA/ARLI Work Order # A3-11-019)

**METALS & NITRATE/NITRITE**  
Case No. N3-11-019  
(TMA/Skinner & Sherman W.O. # S3-11-052 & S3-11-053)

**December 14, 1993**

**TMA Master Work Order # N3-11-019**



PAGE 1

TMA/Norcal

CHAIN OF CUSTODY

ORD # N3-11-019

RCVD: 11/03/93 DUE: 11/13/93

11/03/93 15:51:28

KEEP: 11/13/94 DISP: S

| DASH  | SAMPLE IDENTIFICATION | STORED | TESTS for FRACTIONS with work in DEPT: SU and CATEGORY |
|-------|-----------------------|--------|--|
| 01A-S | B097D6                | ARLI   | : WH232  |
| 01C-S | B097D6 MS             | ARLI   | : WH232  |
| 01D-S | B097D6 DUP            | ARLI   | : WH232  |

| <u>RELEASED BY</u> | <u>DATE</u>    | <u>TRANSFERRED TO</u> | <u>DATE</u>    | <u>RECEIVED BY</u> | <u>DATE</u>    |
|--------------------|----------------|-----------------------|----------------|--------------------|----------------|
| <u>Ryann amoto</u> | <u>11/3/93</u> | <u>ARLI</u>           | <u>11/3/93</u> | <u>C. Haeris</u>   | <u>11/4/93</u> |
| _____              | _____          | _____                 | _____          | _____              | _____          |
| _____              | _____          | _____                 | _____          | _____              | _____          |
| _____              | _____          | _____                 | _____          | _____              | _____          |

9713512.2456

DDDDDD2A

Westinghouse  
Hanford Company

**CHAIN OF CUSTODY COC# 005132  
TMA**

Custody Form Initiator J.E. Darling

Company Contact R.C. Smith / J.M. Frain

Telephone (509) 372-2537

Project Designation/Sampling Locations 100 Area Excavation  
Treatability Test; PLUTO Crib SAF 93-171

Collection Date 10-27-93

Ice Chest No. *JML 449*

Field Logbook No. EFL-1107

Bill of Lading/Airbill No. *2519010296*

Offsite Property No.

Method of Shipment AIR EXPRESS

Shipped to TMA Laboratory

Possible Sample Hazards/Remarks No hazards detected at time of sampling. Samples are **"PRIORITY TURNAROUND"**.

Sample Identification

- ✓ B097D6 (1) aG 250 ml ICP/AA Metals
- ✓ B097D6 (1) G 1000 ml Gamma Scan
- ✓ B097D6 (1) G 120 ml NO<sub>2</sub> - NO<sub>3</sub>
- ✓ B097D6 (1) G 120 ml Anions

**PRIORITY TURNAROUND**

| [ ] Field Transfer of Custody |                     | Chain of Possession |              | (Sign and Print Names) |                |
|-------------------------------|---------------------|---------------------|--------------|------------------------|----------------|
| Relinquished By               | Date                | Time                | Received By  | Date                   | Time           |
| <i>J.E. Darling</i>           | <i>J.E. Darling</i> | <i>11-02-93</i>     | <i>10930</i> | <i>Neil M. Heath</i>   | <i>11-3-93</i> |
|                               |                     |                     |              |                        |                |
|                               |                     |                     |              |                        |                |

Final Sample Disposition



SAMPLE LOG-IN SHEET

LAB NAME : TMA/ARLI

PAGE : 1 OF 1

RECEIVED BY (PRINT NAME): DAYAM SHADI

LOG-IN-DATE : 11/4/93

RECEIVED BY (SIGNATURE): *Dayam Shadi*

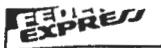
| ICE CHEST NO. <u>RUSTY DUSTY</u>  | CORRESPONDING      |                    |                      | REMARKS:<br>CONDITION OF<br>SAMPLE SHIPMENT, ETC |
|---|--------------------|--------------------|----------------------|--|
|   | EPA<br>SAMPLE<br># | SAMPLE<br>TAG<br># | ASSIGNED<br>LAB<br># |  |
| REMARKS:  |                    | B097D6             | A311019              |  |
| 1. Custody Seal(s) <input checked="" type="radio"/> Present / Absent*<br><input checked="" type="radio"/> Intact / Broken   |                    | B09DG8             | A311019              |  |
| 2. Custody Seal Nos: _____  |                    | B09D66             | A311019              |  |
|   |                    | B09DV1             | A311021              |  |
|   |                    | B09DV2             | A311021              |  |
| 3. Chain of Custody Records <input checked="" type="radio"/> Present / Absent*  |                    |                    |                      |  |
| 4. Traffic Reports or Packing List <input checked="" type="radio"/> Present / Absent*                                       |                    |                    |                      |  |
| 5. Airbill <input checked="" type="radio"/> Airbill / Sticker Present / Absent*   |                    |                    |                      |  |
| 6. Airbill No.: <u>7269153406</u>   |                    |                    |                      |  |
| 7. Sample Tags <input checked="" type="radio"/> Present / Absent*   |                    |                    |                      |  |
| 8. Sample Tag Numbers <input checked="" type="radio"/> Listed / Not Listed on Chain of Custody                              |                    |                    |                      |  |
| 9. Sample Condition: <input checked="" type="radio"/> Intact / Broken* / Leaking  |                    |                    |                      |  |
| 10. Does information on custody records, traffic reports, and sample tags agree? <input checked="" type="radio"/> Yes / No* |                    |                    |                      |  |
| 11. Date Received at Lab: <u>11/4/93</u>  |                    |                    |                      |  |
| 12. Temp of Ice chest <u>5</u> °C   |                    |                    |                      |  |
| 13. Time Received: <u>10300</u>   |                    |                    |                      |  |
| SAMPLE TRANSFER   |                    |                    |                      |  |
| Fraction: _____   |                    |                    |                      |  |
| Area #: _____   |                    |                    |                      |  |
| By: _____   |                    |                    |                      |  |
| On: _____   |                    |                    |                      |  |

\* Contact SMO and attach record of resolution

Reviewed By: \_\_\_\_\_ Logbook No.: \_\_\_\_\_

Date: \_\_\_\_\_ Logbook Page No.: \_\_\_\_\_

000004



QUESTIONS? CALL 800-238-5355 TOLL FREE.

PACKAGE TRACKING NUMBER

100 1033 4087

7289153406

RECIPIENT'S COPY

|   |  |   |  |   |  |   |  |
|---|--|---|--|---|--|---|--|
| Date<br>11-03-93  |  | To (Recipient's Name) Please Print<br>CAROLE HARRIS   |  | Recipient's Phone Number (Very Important)<br>(818) 357-3247   |  |   |  |
| From (Your Name) Please Print<br>SAMPBEECONTROL   |  | Your Phone Number (Very Important)<br>610-235-2033  |  | Company<br>TMA/ARLI   |  |   |  |
| Company<br>NORMAL   |  | Department/Floor No.  |  | Department/Floor No.  |  |   |  |
| Street Address<br>RIGHT AVE   |  | Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.)<br>160 TAYLOR STREET  |  | City<br>MONROVIA  |  |   |  |
| City<br>FLORENCE  |  | State<br>CA   |  | ZIP Required<br>91016   |  |   |  |
| YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.)<br>2340-6406   |  |   | IF HOLD FOR PICK-UP, Print FEDEX Address Here<br>Street Address<br>City<br>State<br>ZIP Required |   |  |   |  |
| PAYMENT <input checked="" type="checkbox"/> Bill Sender <input type="checkbox"/> Bill Recipient's FedEx Acct. No. <input type="checkbox"/> Bill 3rd Party FedEx Acct. No. <input type="checkbox"/> Bill Credit Card<br><input type="checkbox"/> Cash <input type="checkbox"/> Check   |  |   | Emp. No. _____ Date _____ Federal Express Use  |   |  |   |  |
| 4 SERVICES (Check only one box)<br>Priority Overnight (Delivery by next business morning)<br>11 <input checked="" type="checkbox"/> OTHER PACKAGING<br>16 <input type="checkbox"/> FEDEX LETTER*<br>12 <input type="checkbox"/> FEDEX PAK*<br>13 <input type="checkbox"/> FEDEX BOX<br>14 <input type="checkbox"/> FEDEX TUBE<br>Economy Two-Day (Delivery by second business day)<br>30 <input type="checkbox"/> ECONOMY*<br>*Economy Letter rate not available. Minimum charge. One pound economy rate.<br>70 <input type="checkbox"/> OVERNIGHT FREIGHT**<br>(Confirmed reservation required. Delivery commitment may be later in some areas.) |  | 5 DELIVERY AND SPECIAL HANDLING (Check services required)<br>1 <input type="checkbox"/> HOLD FOR PICK-UP (Fill in Box H)<br>2 <input checked="" type="checkbox"/> DELIVER WEEKDAY<br>3 <input type="checkbox"/> DELIVER SATURDAY (Extra charge) (Not available to all locations)<br>4 <input type="checkbox"/> DANGEROUS GOODS (Extra charge)<br>5 <input type="checkbox"/><br>6 <input type="checkbox"/> DRY ICE (Dangerous Goods Shipper's Declaration not required)<br>By Fed. & UN Reg. X kg. 904 III<br>7 <input type="checkbox"/> OTHER SPECIAL SERVICE<br>8 <input type="checkbox"/><br>9 <input type="checkbox"/> SATURDAY PICK-UP (Extra charge)<br>12 <input type="checkbox"/> HOLIDAY DELIVERY (if offered) (Extra charge) |  | 6 PACKAGES: WEIGHT in Pounds Ounces<br>13 11 4<br>Total Total Total<br>DIM SHIPMENT (Chargeable Weight)<br>L x W x H<br>1 <input checked="" type="checkbox"/> Regular Size 3 <input type="checkbox"/> Drop Box<br>2 <input type="checkbox"/> Jumbo Size 4 <input type="checkbox"/> B.S.C.<br>5 <input type="checkbox"/> Station |  | Street Address<br>City<br>State<br>Zip<br>Received By:<br>X<br>Date/Time Received<br>FedEx Employee Number<br>REVISION DATE 11/92<br>PART #137204 FXEM 3/93<br>FORMAT #155<br>155<br>© 1992-93 FEDEX<br>PRINTED IN U.S.A. |  |
|   |  |   | 7 Release Signature: _____   |   |  |   |  |

9713512.2459

TMA/ARU  
The new Analytical Inc.

RADIATION DOSE RATE SURVEY FORM

Date 11/04/93 <sup>WAC</sup> COMPANY TMA/NORCAL OTHER ORD # 7289153406

Surveyor's Name MARK S. McCann

Model No. HP-210 / ESP-1 Model No. AC-27 / ESP-1

Serial No. 710289 / 02619 Serial No. 407726 / 02628

Calibration Date 4/26/93 Calibration Date 9/16/93

Instrument Calibration Factor 0.280 Instrument Calibration Factor 0.192

| Sample           | Location | HP-210<br>CPM | HP-210<br>Factor | HP-210<br>DPM | AC-27<br>CPM | AC-27<br>Factor | AC-27<br>DPM | Source of<br>Exposure? | Activity<br>in R/L or<br>B/L |
|------------------|----------|---------------|------------------|---------------|--------------|-----------------|--------------|------------------------|------------------------------|
| Background       |          | 38.0          |                  |               | 3.0          |                 |              |                        |                              |
| Consistency      |          | 7,390         | 0.2853           |               | 5,060        | 0.1860          |              |                        |                              |
| SMALL<br>SML 417 |          | 39.0          |                  |               | 0            |                 |              | NONE                   |                              |
| SML 341          |          | 43.0          |                  |               | 2.0          |                 |              | NONE                   |                              |
| RUSTY            |          | 40.0          |                  |               | 5.0          |                 |              | NONE                   |                              |
| BETA 4           |          | 49.0          |                  |               | 5.0          |                 |              | NONE                   |                              |
| 698              |          | 62.0          |                  |               | 2.0          |                 |              | NONE                   |                              |
| 125              |          | 56.0          |                  |               | 4.0          |                 |              | NONE                   |                              |
| SML<br>H06       |          | 50.0          |                  |               | 2.0          |                 |              | NONE                   |                              |
| SML<br>326       |          | 53.0          |                  |               | 9.0          |                 |              | NONE                   |                              |
| SML<br>446       |          | 55.0          |                  |               | 1.0          |                 |              | NONE                   |                              |
| SML<br>421       |          | 91.0          |                  |               | 7.0          |                 |              | NONE                   |                              |
| SML<br>420       |          | 43.0          |                  |               | 5.0          |                 |              | NONE                   |                              |

Comments

All OK

Approved MSM

Date 11/04/93

TALVARI  
The new standard for

000006

RADIATION DOSE RATE SURVEY FORM

Date 11/04/93 COMPANY WHEATLAND OTHER ORD # 7289153406

Surveyor's Name MARK S. McCray

Model No. HP-210 / ESP-1 Model No. AC-27 / ESP-1

Serial No. 710289 / 02619 Serial No. 407726 / 02628

Calibration Date 4/26/93 Calibration Date 9/16/93

Instrument Calibration Factor 0.280 Instrument Calibration Factor 0.192

| Sample           | Location | HP-210<br>CPM               | HP-210<br>RPM | HP-210<br>DFM | AC-27<br>CPM | AC-27<br>RPM | AC-27<br>DFM | Source of<br>Exposure? | Activity<br>Bq/L or<br>pCi/g |
|------------------|----------|-----------------------------|---------------|---------------|--------------|--------------|--------------|------------------------|------------------------------|
| Background       |          | 38.0                        |               |               | 3.2          |              |              |                        |                              |
| Consistency      |          | 7,390                       | 0.2853        |               | 5,060        | 0.1860       |              |                        |                              |
| Sample #<br>449  |          | 30.0                        |               |               | 4.0          |              |              | None                   |                              |
| Reported         |          | WHEATLAND (52) samples each |               |               |              |              |              |                        |                              |
|                  |          | 50 pCi/grain                |               |               |              |              |              |                        |                              |
| [Large scribble] |          |                             |               |               |              |              |              |                        |                              |
| [Large scribble] |          |                             |               |               |              |              |              |                        |                              |
| [Large scribble] |          |                             |               |               |              |              |              |                        |                              |
| [Large scribble] |          |                             |               |               |              |              |              |                        |                              |
| [Large scribble] |          |                             |               |               |              |              |              |                        |                              |
| [Large scribble] |          |                             |               |               |              |              |              |                        |                              |
| [Large scribble] |          |                             |               |               |              |              |              |                        |                              |
| [Large scribble] |          |                             |               |               |              |              |              |                        |                              |

All OK [Signature] Approved [Signature] Comment [Blank]  
 Date 11/04/93

## GENERAL CHEMISTRY RESULTS

CASE NO. 11-019

Soil Sample #:

B097D6

## CASE NARRATIVE

For sample B097D6, the Fluoride and Phosphate analysis yielded a recovery of 35.0% and 76.0% respectively. A second spike was performed yielding relatively similar results. These low recoveries compared to our laboratory control sample indicates the presence of matrix interferences.

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

Maureen Parrish 12-13-93

Maureen Parrish

9713512.2463

000010

TMA Inc.

REPORT

Work Order # A3-11-019

Received: 11/03/93

Results by Sample

SAMPLE ID B097D6

FRACTION 01A

TEST CODE WCCLPS

NAME Anions in Solids

Date & Time Collected 10/27/93

Category \_\_\_\_\_

| ANIONS AND WET CHEMISTRY - SOLIDS |               |               |              |              |
|-----------------------------------|---------------|---------------|--------------|--------------|
| <u>ANALYSIS</u>                   | <u>METHOD</u> | <u>RESULT</u> | <u>UNITS</u> | <u>LIMIT</u> |
| Chloride                          | 300.0         | 51.2          | mg/kg        | 2.0          |
| Fluoride                          | 300.0         | 1.0           | mg/kg        | 1.0          |
| Phosphate                         | 300.0         | <2.0          | mg/kg        | 2.0          |
| Sulfate                           | 300.0         | 18            | mg/kg        | 5            |
|                                   |               |               |              |              |

FORM I

9713512.2464

Page 1  
Received: 11/04/93

Skinner&Sherman REPORT  
11/16/93 16:17:19

Work Order # S3-11-053

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

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

  
CERTIFIED BY \_\_\_\_\_

ATTEN Dan Steurmer

ATTEN Client Services  
PHONE (617) 890-7200

CONTACT DP

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

WORK ID N3-11-019 RUSH!!!!  
TAKEN By Client  
TRANS Fedex  
TYPE 1 Soil  
P.O. # N3-11-019  
INVOICE under separate cover

**SAMPLE IDENTIFICATION**

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

- 01 B097D6
- 01 B097D6D
- 01 B097D6S
- 02 LCSS

NITR S Nitrate/Nitrite in Soils

**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  
1-800-4LAB TEST FAX (617) 890-3883

9713512.2465

Page 2

Skinner&amp;Sherman

REPORT

Work Order # S3-11-053

Received: 11/04/93

Results by Sample

|                          |   |
|--------------------------|---|
| SAMPLE ID <u>B097D6</u>  | SAMPLE # <u>01</u> FRACTIONS: <u>A</u>                          |
|                          | Date & Time Collected <u>10/27/93</u> Category <u>SOIL</u>      |
| NITR_S <u>&lt;2.47</u>   |   |
| mg N/kg                  |   |
| SAMPLE ID <u>B097D6D</u> | SAMPLE # <u>01</u> FRACTIONS: <u>B</u>                          |
|                          | Date & Time Collected <u>10/27/93</u> Category <u>SOIL</u>      |
| NITR_S <u>2.60</u>       |   |
| mg N/kg                  |   |
| SAMPLE ID <u>B097D6S</u> | SAMPLE # <u>01</u> FRACTIONS: <u>C</u>                          |
|                          | Date & Time Collected <u>10/27/93</u> Category <u>SOIL</u>      |
| NITR_S <u>21.8</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  
1-800-4LAB TEST FAX (617) 890-3883

9713512.2466

Page 4

Skinner&Sherman

REPORT

Work Order # S3-11-053

Received: 11/04/93

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.**

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

9713512 2467 (Due 11/13)

# TMA/Skinner & Sherman Laboratories Sample Login Sheet

Workorder 5311053 Client Hanford - NOR Number/Type of Samples 1 soil  
 Protocol CLP Turnaround RUSH Cooler Temp: 9 °C or N/A Cooler Yes/No  
 Custodian: Benny Shipper & # Fedex SDG/Batch# N/A  
 Custody Seal: Present/Absent/Intact/Not Client Case# N3-11-019  
 Purchase Order/Contract# 11-019 Client Contact R. Sanchez  
 Tag#: Present/Absent/N/A (See COC) Chain of Custody: Present/Absent/N/A, # N/A

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: 11/4/93 \_\_\_\_\_  
 List any date with paperwork/shipment problems & specify the problem: \_\_\_\_\_

N/A

| Client ID       | Matrix      | Received       | pH*        | Test(s) & QC     | Holding Times |
|-----------------|-------------|----------------|------------|------------------|---------------|
| 1 <u>B09706</u> | <u>soil</u> | <u>11/4/93</u> | <u>N/A</u> | <u>DS NO3N02</u> |               |
| 2               |             |                |            |                  |               |
| 3               |             |                |            |                  |               |
| 4               |             |                |            |                  |               |
| 5               |             |                |            |                  |               |
| 6               |             |                |            |                  |               |
| 7               |             |                |            |                  |               |
| 8               |             |                |            |                  |               |
| 9               |             |                |            |                  |               |
| 10              |             |                |            |                  |               |
| 11              |             |                |            |                  |               |
| 12              |             |                |            |                  |               |
| 13              |             |                |            |                  |               |
| 14              |             |                |            |                  |               |
| 15              |             |                |            |                  |               |
| 16              |             |                |            |                  |               |
| 17              |             |                |            |                  |               |
| 18              |             |                |            |                  |               |
| 19              |             |                |            |                  |               |
| 20              |             |                |            |                  |               |

*Handwritten notes:*  
 Completed 11/4/93  
 [Signature]

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 \_\_\_\_\_

\* EPA/CLP required

022

*Handwritten mark*

**TMA**

9713512.2468

**Thermo Analytical Inc.**

Skinner &amp; Sherman Labs., Inc.

300 Second Avenue

Post Office Box 521

Waltham, MA 02254-0521

(617) 890-7200

FAX (617) 890-3883

November 16, 1993

TMA/NORCAL

2030 Wright Avenue

Richmond, CA 94804

Attention: Dan Stuermer

RECORD COPY

Quality Control NarrativeScope

One (1) soil sample was submitted to TMA/Skinner & Sherman Laboratories, Inc. on November 4, 1993 from TMA/Norcal. The sample was analyzed for the USEPA CLP metals. The analysis were performed under TMA/Skinner and Sherman work order S311052.

Methodology

The sample was prepared, analyzed and reported in accordance with the USEPA Contract Laboratory Program Statement of Work ILM02.

Discussion

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

The matrix spike recovery for antimony exceeded the control limit requirements.

The laboratory duplicate for calcium and lead exceeded the control limit requirements.

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

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

*Steven Provencal*  
Steven R. Provencal  
Lead Chemist

9713512.2469

## WESTINGHOUSE/HANFORD

1

## INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B097D6

Lab Name: SKINNER &amp; SHERMAN LABS.

Contract: 68-D2-0039

Lab Code: SKINER

Case No.: N3-11-019SAS No.:

SDG No.: B097D6

Matrix (soil/water): SOIL

Lab Sample ID: 11052-01S

Level (low/med): LOW

Date Received: 11/04/93

% Solids: 94.1

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

| CAS No.   | Analyte   | Concentration | C | Q | M  |
|-----------|-----------|---------------|---|---|----|
| 7429-90-5 | Aluminum  | 6220          |   |   | P  |
| 7440-36-0 | Antimony  | 1.9           | U | N | P  |
| 7440-38-2 | Arsenic   | 2.5           |   |   | P  |
| 7440-39-3 | Barium    | 81.9          |   |   | P  |
| 7440-41-7 | Beryllium | 0.34          | B |   | P  |
| 7440-43-9 | Cadmium   | 0.21          | U |   | P  |
| 7440-70-2 | Calcium   | 6240          |   | * | P  |
| 7440-47-3 | Chromium  | 11.1          |   |   | P  |
| 7440-48-4 | Cobalt    | 7.2           | B |   | P  |
| 7440-50-8 | Copper    | 11.9          |   |   | P  |
| 7439-89-6 | Iron      | 13200         |   |   | P  |
| 7439-92-1 | Lead      | 4.5           |   | * | P  |
| 7439-95-4 | Magnesium | 4060          |   |   | P  |
| 7439-96-5 | Manganese | 251           |   |   | P  |
| 7439-97-6 | Mercury   | 0.10          |   |   | CV |
| 7440-02-0 | Nickel    | 9.7           |   |   | P  |
| 7440-09-7 | Potassium | 927           | B |   | P  |
| 7782-49-2 | Selenium  | 0.59          | U |   | P  |
| 7440-22-4 | Silver    | 0.95          | B |   | P  |
| 7440-23-5 | Sodium    | 224           | B |   | P  |
| 7440-28-0 | Thallium  | 0.34          | U |   | P  |
| 7440-62-2 | Vanadium  | 36.8          |   |   | P  |
| 7440-66-6 | Zinc      | 32.5          |   |   | P  |
|           | Cyanide   |               |   |   | NR |

Color Before: BROWN

Clarity Before:

Texture: FINE

Color After: BROWN

Clarity After:

Artifacts:

Comments:

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2

9713512.2470

**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

November 16, 1993

Ref: TMA/Norcal N3-11-021-7287

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



Dear Ms. Colley:

Enclosed is the data report for the three soil samples received November 3, 1993 from location 100 Area Treatability Study (Pluto Crib) SAF 93-171. Results are given for strontium-90, technetium-99, isotopic uranium, isotopic plutonium, americium-241, and gamma scan analyses. The samples were analyzed on a rush basis. The data package is paginated pages 1 through 333.

Please call if you have any questions concerning this data.

Sincerely,

A handwritten signature in cursive script, appearing to read "D. P. Kharkar".

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

DPK/ss

Enclosure: Data Package

SDG: 7287  
Contact: Dinkar Kharkar

**TMA NORCAL**  
REPORTING GROUP 7287

Client: Westinghouse Hanford  
Contract: MBH-SVV-069262

## CASE NARRATIVE

### 1.0 GENERAL

TMA/Norcal Sample Delivery Group 7287 is comprised of the samples 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 three soil samples from location 100 Area Treatability Study (Pluto Crib) SAF 93-171 delivered under Chain-of-Custody documents #005113 and 005132.

#### 1.2 Sample Volume

One thousand mL plastic bottles containing the samples were received for the analyses. This was not adequate volumes to obtain the required detection limit for the gamma scan.

#### 1.3 Missing Samples

There were no missing samples.

#### 1.4 Holding Times

The samples were collected on October 26 and 27, 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 7287-04 through 7287-06.

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.

#### 2.2 Reagent Blanks

The MDA's of the results for all analyses met the RDL's except for plutonium-238 and plutonium-239/240 due to the combination of a low detector efficiency and a higher background in the region of interest.

SDG: 7287  
Contact: Dinkar Kharkar

**TMA NORCAL**  
REPORTING GROUP 7287

Client: Westinghouse Hanford  
Contract: MBH-SVV-069262

## 2.0 QUALITY CONTROL (cont'd)

### 2.3 Duplicates

Results were satisfactory for all duplicate analyses. The MDA of the plutonium-238 results for the duplicate of sample BO97C8 was higher than the RDL due to a high counter background. The MDA's of gamma nuclides for the original and the duplicate of sample BO97C8 were higher than the RDL's due to the smaller than nominal aliquots available for analysis.

## 3.0 ANALYSIS NOTES

### 3.1 Strontium-90 Analyses

The average yield for six analyses was  $(76 \pm 20)\%$ . The lowest yield was 57% and the highest was 83%. The average MDA was  $(0.9 \pm 0.2)$  pCi/g. Strontium-90 activity above the RDL was found in samples BO97C8 and BO97D0.

### 3.2 Technetium-99 Analyses

The average yield for six analyses was  $(48 \pm 16)\%$ . The lowest yield was 38% and the highest was 60%. The average MDA was  $(0.4 \pm 0.1)$  pCi/g. Technetium-99 activity above the RDL was not found in any of the samples.

### 3.3 Isotopic Uranium Analyses

The average yield for six analyses was  $(67 \pm 21)\%$ . The lowest yield was 51% and the highest was 79%. The average MDA was  $(0.2 \pm 0.2)$  pCi/g. Uranium-233/234 and uranium-238 activity above the RDL was found in all of the samples.

### 3.4 Isotopic Plutonium Analyses

The average yield for six analyses was  $(56 \pm 20)\%$ . The lowest yield was 48% and the highest was 72%. The average MDA was  $(0.05 \pm 0.04)$  pCi/g. Plutonium-239/240 activity above the RDL was found in samples BO97C8 and BO97D0.

SDG: 7287  
Contact: Dinkar Kharkar

**TMA NORCAL**  
REPORTING GROUP 7287

Client: Westinghouse Hanford  
Contract: MBH-SVV-069262

### 3.0 ANALYSIS NOTES (cont'd)

#### 3.5 Americium-241 Analyses

The average yield for six analyses was  $(66 \pm 11)\%$ . The lowest yield was 59% and the highest yield was 74%. The average MDA was  $(0.04 \pm 0.02)$  pCi/g. Americium-241 activity above the RDL was found in sample BO97C8.

Samples BO97C8, BO97DO, and the reagent blank initially had low yields. The planchets were stripped, re-combined with the supernate, and replated. Satisfactory yields were obtained indicating that the initial low yields were the result of a plating difficulty.

#### 3.6 Gamma Scan Analyses

Gamma scan analysis found cesium-137 activity in all of the samples. Europium-152 was found in sample BO97C8. Natural potassium-40, radium-226, radium-228, thorium-228 and thorium-232 activity was found in all of the samples. The MDA of the results for iron-59 for all of the samples were higher than the RDL due to the short half-life of iron-59. The MDA of the results for europium-154 for sample BO97C8 and the MDA of the result for europium-154 for sample BO97DO were higher than the RDL's due to the small aliquot available for analysis.

9713512.2474

**TMA NORCAL**  
**REPORTING GROUP 7287**

N311021-01

B097C8

**DATA SHEET**

SDG 7287  
Contact Dinkar Kharkar

Client Westinghouse Hanford  
Contract MBH-SVV-069262

Lab sample id N311021-01  
Dept sample id 7287-001  
Received 11/03/93  
% moisture 5.9

Client sample id B097C8  
Location/Matrix 100 Area Treat. SOLID  
Collected 10/26/93  
Chain of Custody/SAS no 005113 RUSH

| ANALYTE             | CAS NO     | RESULT<br>pCi/g | 2 $\sigma$ ERR<br>(COUNT) | MDA<br>pCi/g | RDL<br>pCi/g | QUALI-<br>FIERS | TEST |
|---------------------|------------|-----------------|---------------------------|--------------|--------------|-----------------|------|
| Strontium 90        | 10098-97-2 | 22              | 3.0                       | 0.9          | 2            |                 | Y    |
| Technetium 99       | 14133-76-7 | -0.077          | 0.12                      | 0.3          | 0.5          | U               | TC   |
| Uranium 233/234     |            | 0.51            | 0.20                      | 0.2          | 0.3          |                 | U    |
| Uranium 235         | 15117-96-1 | 0.039           | 0.039                     | 0.1          | 0.3          | U               | U    |
| Uranium 238         |            | 0.48            | 0.17                      | 0.1          | 0.3          |                 | U    |
| Plutonium 238       | 13981-16-3 | 0.035           | 0.024                     | 0.03         | 0.05         | J               | PU   |
| Plutonium 239/240   |            | 1.6             | 0.16                      | 0.02         | 0.05         |                 | PU   |
| Americium 241       | 14596-10-2 | 0.16            | 0.055                     | 0.05         | 0.05         |                 | AM   |
| GAMMA SCAN ANALYTES |            |                 |                           |              |              |                 |      |
| Sodium 22           | 13966-32-0 | U               |                           | 0.06         |              | U               | GAM  |
| Potassium 40        | 13966-00-2 | 16              | 0.96                      |              |              |                 | GAM  |
| Manganese 54        | 13966-31-9 | U               |                           | 0.04         |              | U               | GAM  |
| Iron 59             | 14596-12-4 | U               |                           | <u>0.09</u>  | 0.05         | U               | GAM  |
| Cobalt 58           | 13981-38-9 | U               |                           | 0.04         |              | U               | GAM  |
| Cobalt 60           | 10198-40-0 | U               |                           | 0.05         | 0.05         | U               | GAM  |
| Niobium 94          | 14681-63-1 | U               |                           | 0.04         |              | U               | GAM  |
| Ruthenium 103       | 13968-53-1 | U               |                           | 0.1          |              | U               | GAM  |
| Ruthenium 106       | 13967-48-1 | U               |                           | 0.7          |              | U               | GAM  |
| Tin 113             | 13966-06-8 | U               |                           | 0.1          |              | U               | GAM  |
| Cesium 134          | 13967-70-9 | U               |                           | 0.07         |              | U               | GAM  |
| Cesium 137          | 10045-97-3 | 31              | 0.31                      |              | 0.05         |                 | GAM  |
| Cerium 144          | 14762-78-8 | U               |                           | 0.5          |              | U               | GAM  |
| Europium 152        | 14683-23-9 | 0.48            | 0.17                      |              | 0.1          |                 | GAM  |
| Europium 154        | 15585-10-1 | U               |                           | <u>0.2</u>   | 0.1          | U               | GAM  |
| Europium 155        | 14391-16-3 | U               |                           | 0.3          |              | U               | GAM  |
| Radium 226          | 13982-63-3 | 0.52            | 0.15                      |              |              |                 | GAM  |
| Radium 228          | 15262-20-1 | 0.61            | 0.17                      |              |              |                 | GAM  |
| Thorium 228         | 14274-82-9 | 0.50            | 0.085                     |              |              |                 | GAM  |

**DATA SHEETS**

Page 1

**SUMMARY DATA SECTION**

Page 14

Lab id TMAN  
Protocol WHC-HASM  
Version Ver 1.0  
Form DVD-DS  
Version 2.27  
Report date 11/15/93

9713512.2475

**TMA NORCAL**  
REPORTING GROUP 7287

N311021-01

B097C8

**DATA SHEET, cont**

|                                 |   |
|---------------------------------|---|
| SDG <u>7287</u>                 | Client <u>Westinghouse Hanford</u>                |
| Contact <u>Dinkar Kharkar</u>   | Contract <u>MBH-SVV-069262</u>                    |
| Lab sample id <u>N311021-01</u> | Client sample id <u>B097C8</u>                    |
| Dept sample id <u>7287-001</u>  | Location/Matrix <u>100 Area Treat. SOLID</u>      |
| Received <u>11/03/93</u>        | Collected <u>10/26/93</u>                         |
| % moisture <u>5.9</u>           | Chain of Custody/SAS no <u>005113</u> <u>RUSH</u> |

| ANALYTE     | CAS NO    | RESULT<br>pCi/g | 2 $\sigma$ ERR<br>(COUNT) | MDA<br>pCi/g | RDL<br>pCi/g | QUALI-<br>FIERS | TEST |
|-------------|-----------|-----------------|---------------------------|--------------|--------------|-----------------|------|
| Thorium 232 | 7440-29-1 | 0.61            | 0.17                      |              |              |                 | GAM  |

| LAB SAMPLE | TEST | PLANCHET | SUFFIX | ALIQUOT      | ANALYZED | REVIEWED | BY  |
|------------|------|----------|--------|--------------|----------|----------|-----|
| N311021-01 | Y    | 7287-001 |        | 1.00 g       | 11/11/93 | 11/12/93 | DPK |
| N311021-01 | TC   | 7287-001 |        | 2.02 g       | 11/09/93 | 11/11/93 | DPK |
| N311021-01 | U    | 7287-001 |        | 1.00 g       | 11/10/93 | 11/11/93 | DPK |
| N311021-01 | PU   | 7287-001 |        | 1.00 g       | 11/10/93 | 11/11/93 | DPK |
| N311021-01 | AM   | 7287-001 | R1     | 1.00 g       | 11/11/93 | 11/12/93 | DPK |
| N311021-01 | GAM  | 7287-001 |        | <u>728</u> g | 11/05/93 | 11/08/93 | DPK |

9713512.2476

**TMA NORCAL**  
**REPORTING GROUP 7287**

N311021-02

B097D0

**DATA SHEET**

SDG 7287  
 Contact Dinkar Kharkar

Client Westinghouse Hanford  
 Contract MBH-SVV-069262

Lab sample id N311021-02  
 Dept sample id 7287-002  
 Received 11/03/93  
 % moisture 5.5

Client sample id B097D0  
 Location/Matrix 100 Area Excav. SOLID  
 Collected 10/26/93  
 Chain of Custody/SAS no 005113 RUSH

| ANALYTE             | CAS NO     | RESULT<br>pCi/g | 2 $\sigma$ ERR<br>(COUNT) | MDA<br>pCi/g | RDL<br>pCi/g | QUALI-<br>FIERS | TEST |
|---------------------|------------|-----------------|---------------------------|--------------|--------------|-----------------|------|
| Strontium 90        | 10098-97-2 | 4.1             | 0.55                      | 0.8          | 2            |                 | Y    |
| Technetium 99       | 14133-76-7 | 0.024           | 0.10                      | 0.3          | 0.5          | U               | TC   |
| Uranium 233/234     |            | 0.68            | 0.23                      | 0.2          | 0.3          |                 | U    |
| Uranium 235         | 15117-96-1 | 0.057           | 0.076                     | 0.1          | 0.3          | U               | U    |
| Uranium 238         |            | 0.54            | 0.20                      | 0.1          | 0.3          |                 | U    |
| Plutonium 238       | 13981-16-3 | 0               | 0.018                     | 0.04         | 0.05         | U               | PU   |
| Plutonium 239/240   |            | 0.24            | 0.058                     | 0.02         | 0.05         |                 | PU   |
| Americium 241       | 14596-10-2 | 0.039           | 0.040                     | 0.05         | 0.05         | U               | AM   |
| GAMMA SCAN ANALYTES |            |                 |                           |              |              |                 |      |
| Sodium 22           | 13966-32-0 | U               |                           | 0.06         |              | U               | GAM  |
| Potassium 40        | 13966-00-2 | 17              | 1.0                       |              |              |                 | GAM  |
| Manganese 54        | 13966-31-9 | U               |                           | 0.04         |              | U               | GAM  |
| Iron 59             | 14596-12-4 | U               |                           | 0.1          | 0.05         | U               | GAM  |
| Cobalt 58           | 13981-38-9 | U               |                           | 0.04         |              | U               | GAM  |
| Cobalt 60           | 10198-40-0 | U               |                           | 0.05         | 0.05         | U               | GAM  |
| Niobium 94          | 14681-63-1 | U               |                           | 0.05         |              | U               | GAM  |
| Ruthenium 103       | 13968-53-1 | U               |                           | 0.08         |              | U               | GAM  |
| Ruthenium 106       | 13967-48-1 | U               |                           | 0.6          |              | U               | GAM  |
| Tin 113             | 13966-06-8 | U               |                           | 0.09         |              | U               | GAM  |
| Cesium 134          | 13967-70-9 | U               |                           | 0.05         |              | U               | GAM  |
| Cesium 137          | 10045-97-3 | 9.5             | 0.18                      |              | 0.05         |                 | GAM  |
| Cerium 144          | 14762-78-8 | U               |                           | 0.3          |              | U               | GAM  |
| Europium 152        | 14683-23-9 | U               |                           | 0.2          | 0.1          | U               | GAM  |
| Europium 154        | 15585-10-1 | U               |                           | 0.1          | 0.1          | U               | GAM  |
| Europium 155        | 14391-16-3 | U               |                           | 0.2          |              | U               | GAM  |
| Radium 226          | 13982-63-3 | 0.46            | 0.10                      |              |              |                 | GAM  |
| Radium 228          | 15262-20-1 | 0.65            | 0.17                      |              |              |                 | GAM  |
| Thorium 228         | 14274-82-9 | 0.63            | 0.068                     |              |              |                 | GAM  |

**DATA SHEETS**

Page 3

**SUMMARY DATA SECTION**

Page 16

Lab id TMAN  
 Protocol WHC-HASM  
 Version Ver 1.0  
 Form DVD-DS  
 Version 2.27  
 Report date 11/15/93

9713512.2477

**TMA NORCAL**  
REPORTING GROUP 7287

N311021-02

B097D0

**DATA SHEET, cont**

|                                 |   |
|---------------------------------|---|
| SDG <u>7287</u>                 | Client <u>Westinghouse Hanford</u>                |
| Contact <u>Dinkar Kharkar</u>   | Contract <u>MBH-SVV-069262</u>                    |
| Lab sample id <u>N311021-02</u> | Client sample id <u>B097D0</u>                    |
| Dept sample id <u>7287-002</u>  | Location/Matrix <u>100 Area Excav. SOLID</u>      |
| Received <u>11/03/93</u>        | Collected <u>10/26/93</u>                         |
| % moisture <u>5.5</u>           | Chain of Custody/SAS no <u>005113</u> <u>RUSH</u> |

| ANALYTE     | CAS NO    | RESULT<br>pCi/g | 2σ ERR<br>(COUNT) | MDA<br>pCi/g | RDL<br>pCi/g | QUALI-<br>FIERS | TEST |
|-------------|-----------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Thorium 232 | 7440-29-1 | 0.65            | 0.17              |              |              |                 | GAM  |

| LAB SAMPLE | TEST | PLANCHET | SUFFIX | ALIQOT | ANALYZED | REVIEWED | BY  |
|------------|------|----------|--------|--------|----------|----------|-----|
| N311021-02 | Y    | 7287-002 |        | 1.00 g | 11/11/93 | 11/12/93 | DPK |
| N311021-02 | TC   | 7287-002 |        | 2.00 g | 11/09/93 | 11/11/93 | DPK |
| N311021-02 | U    | 7287-002 |        | 1.00 g | 11/11/93 | 11/12/93 | DPK |
| N311021-02 | PU   | 7287-002 |        | 1.00 g | 11/10/93 | 11/11/93 | DPK |
| N311021-02 | AM   | 7287-002 | R1     | 1.00 g | 11/12/93 | 11/12/93 | DPK |
| N311021-02 | GAM  | 7287-002 |        | 640 g  | 11/05/93 | 11/08/93 | DPK |

9713512.2478

**TMA NORCAL**  
**REPORTING GROUP 7287**

N311021-03

B097D6

**DATA SHEET**

SDG 7287  
Contact Dinkar Kharkar

Client Westinghouse Hanford  
Contract MBH-SVV-069262

Lab sample id N311021-03  
Dept sample id 7287-003  
Received 11/03/93  
% moisture 3.9

Client sample id B097D6  
Location/Matrix 100 Area Excav. SOLID  
Collected 10/27/93  
Chain of Custody/SAS no 005132 RUSH

| ANALYTE                    | CAS NO     | RESULT<br>pCi/g | 2σ ERR<br>(COUNT) | MDA<br>pCi/g | RDL<br>pCi/g | QUALI-<br>FIERS | TEST |
|----------------------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Strontium 90               | 10098-97-2 | 0.17            | 0.39              | 1            | 2            | U               | Y    |
| Technetium 99              | 14133-76-7 | 0.073           | 0.18              | 0.4          | 0.5          | U               | TC   |
| Uranium 233/234            |            | 0.66            | 0.19              | 0.09         | 0.3          |                 | U    |
| Uranium 235                | 15117-96-1 | 0.055           | 0.055             | 0.1          | 0.3          | U               | U    |
| Uranium 238                |            | 0.47            | 0.14              | 0.09         | 0.3          |                 | U    |
| Plutonium 238              | 13981-16-3 | -0.006          | 0.017             | 0.03         | 0.05         | U               | PU   |
| Plutonium 239/240          |            | 0.004           | 0.008             | 0.02         | 0.05         | U               | PU   |
| Americium 241              | 14596-10-2 | 0.019           | 0.023             | 0.04         | 0.05         | U               | AM   |
| <b>GAMMA SCAN ANALYTES</b> |            |                 |                   |              |              |                 |      |
| Sodium 22                  | 13966-32-0 | U               |                   | 0.04         |              | U               | GAM  |
| Potassium 40               | 13966-00-2 | 14              | 0.82              |              |              |                 | GAM  |
| Manganese 54               | 13966-31-9 | U               |                   | 0.03         |              | U               | GAM  |
| Iron 59                    | 14596-12-4 | U               |                   | 0.1          | 0.05         | U               | GAM  |
| Cobalt 58                  | 13981-38-9 | U               |                   | 0.03         |              | U               | GAM  |
| Cobalt 60                  | 10198-40-0 | U               |                   | 0.04         | 0.05         | U               | GAM  |
| Niobium 94                 | 14681-63-1 | U               |                   | 0.04         |              | U               | GAM  |
| Ruthenium 103              | 13968-53-1 | U               |                   | 0.03         |              | U               | GAM  |
| Ruthenium 106              | 13967-48-1 | U               |                   | 0.3          |              | U               | GAM  |
| Tin 113                    | 13966-06-8 | U               |                   | 0.04         |              | U               | GAM  |
| Cesium 134                 | 13967-70-9 | U               |                   | 0.04         |              | U               | GAM  |
| Cesium 137                 | 10045-97-3 | 0.052           | 0.038             |              | 0.05         |                 | GAM  |
| Cerium 144                 | 14762-78-8 | U               |                   | 0.2          |              | U               | GAM  |
| Europium 152               | 14683-23-9 | U               |                   | 0.08         | 0.1          | U               | GAM  |
| Europium 154               | 15585-10-1 | U               |                   | 0.05         | 0.1          | U               | GAM  |
| Europium 155               | 14391-16-3 | U               |                   | 0.1          |              | U               | GAM  |
| Radium 226                 | 13982-63-3 | 0.42            | 0.075             |              |              |                 | GAM  |
| Radium 228                 | 15262-20-1 | 0.72            | 0.17              |              |              |                 | GAM  |
| Thorium 228                | 14274-82-9 | 0.81            | 0.073             |              |              |                 | GAM  |

**DATA SHEETS**

Page 5

**SUMMARY DATA SECTION**

Page 18

Lab id TMAN  
Protocol WHC-HASM  
Version Ver 1.0  
Form DVD-DS  
Version 2.27  
Report date 11/15/93

9713512.2479

**TMA NORCAL**  
REPORTING GROUP 7287

N311021-03

B097D6

**DATA SHEET, cont**

SDG 7287  
Contact Dinkar Kharkar

Client Westinghouse Hanford  
Contract MBH-SVV-069262

Lab sample id N311021-03  
Dept sample id 7287-003  
Received 11/03/93  
% moisture 3.9

Client sample id B097D6  
Location/Matrix 100 Area Excav. SOLID  
Collected 10/27/93  
Chain of Custody/SAS no 005132 RUSH

| ANALYTE     | CAS NO    | RESULT<br>pCi/g | 2 $\sigma$ ERR<br>(COUNT) | MDA<br>pCi/g | RDL<br>pCi/g | QUALIFIERS | TEST |
|-------------|-----------|-----------------|---------------------------|--------------|--------------|------------|------|
| Thorium 232 | 7440-29-1 | 0.72            | 0.17                      |              |              |            | GAM  |

| LAB SAMPLE | TEST | PLANCHET | SUFFIX | ALIQOT | ANALYZED | REVIEWED | BY  |
|------------|------|----------|--------|--------|----------|----------|-----|
| N311021-03 | Y    | 7287-003 |        | 1.00 g | 11/11/93 | 11/11/93 | DPK |
| N311021-03 | TC   | 7287-003 |        | 2.00 g | 11/10/93 | 11/11/93 | DPK |
| N311021-03 | U    | 7287-003 |        | 1.00 g | 11/10/93 | 11/11/93 | DPK |
| N311021-03 | PU   | 7287-003 |        | 1.00 g | 11/10/93 | 11/11/93 | DPK |
| N311021-03 | AM   | 7287-003 |        | 1.00 g | 11/10/93 | 11/11/93 | DPK |
| N311021-03 | GAM  | 7287-003 |        | 766 g  | 11/05/93 | 11/08/93 | DPK |

9713512.2480

Westinghouse  
Hanford Company

CHAIN OF CUSTODY

COC#005113

TMA / NORCAL

Custody Form Initiator J.E. Darling

Company Contact R.C. Smith/J.M. Frain

Telephone (509) 372-2537

Project Designation/Sampling Locations 100 Area Treatability  
Test. (PLUTO CRIB). SAF 93-171

Collection Date 10-26-93

Ice Chest No. 5ML 444

Field Logbook No. EFL-1107

Bill of Lading/Airbill No. 251 901 0296

Offsite Property No.

Method of Shipment Air Express

Shipped to TMA/NORCAL Labs

Possible Sample Hazards/Remarks **SAMPLES ARE "PRIORITY TURNAROUND" AND POSSIBLY CONTAIN RADIOACTIVITY.** Sampling done to RCRA / CERCLA Analytical Protocols.

Sample Identification

- ✓ B097C8 (1) 1000 ml G
- ✓ B097D0 (1) 1000 ml G

**PRIORITY TURNAROUND**

Field Transfer of Custody

Chain of Possession

(Sign and Print Names)

| Relinquished By                  | Date     | Time | Received By                  | Date    | Time |
|----------------------------------|----------|------|------------------------------|---------|------|
| J.E. Darling <i>J.E. Darling</i> | 11-02-93 | 0930 | <i>Neil M. ... M. ELRATH</i> | 11-3-93 | 1410 |
|                                  |          |      |                              |         |      |
|                                  |          |      |                              |         |      |

Final Sample Disposition

Disposal Method:

Disposed by:

Date/Time:

Comments:



AIR OVERNIGHT

|   |                                      |   |
|---|--------------------------------------|---|
| Contractor<br><b>WESTINGHOUSE HANFORD</b> | <b>OFF-SITE<br/>PROPERTY CONTROL</b> | CONTROL NUMBER<br>(To be obtained from PROPERTY MANAGEMENT)<br><b>W94-0-0009-34</b> |
|---|--------------------------------------|---|

PART I - TO BE COMPLETED BY ORIGINATOR

|  |         |                                       |
|--|---------|---------------------------------------|
| Department<br><b>Processing &amp; Analytical Lab</b> | Section | Unit <b>Sampling &amp; Mobile Lab</b> |
|--|---------|---------------------------------------|

The following items are to be shipped from  Contractor  Vendor

Routing **EMERY**  Contractor  Vendor

|  |  |
|--|--|
| Shipped to<br><b>TMA/NORCAL<br/>2030 Wright Av<br/>Richmond CA 94804</b> | Off-site Custodian<br><b>Delores Sanchez</b> |
|  | Full Title                                   |

| Quantity | Description (Include Serial and any Government Tag Numbers)  | Original Cost |
|----------|--|---------------|
| 1        | <b>POLYCOOLER. SAMPLES PACKED IN PLASTIC BAGS AND SOURED ON WET ICE</b><br><br><b>SAMPLE #B09706, B097C8, B097D0</b><br><br><b>WEIGHT 55 COOLER # 5441 449</b> |               |

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

Necessity for the Off-Site Use of this Property  
**Samples require analysis that are not presently available at this site.**

SAF #93-171  
COC #005113, 005132

**BILL OF LADING 251-901 0296**

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

|  |   |   |
|--|---|---|
| RM Clearance for Public Release<br><i>[Signature]</i>          | RM Survey No.<br><i>10111</i>                 | Date<br><i>11-2-93</i>  |
| Location of Property (Area & Bldg.)<br><b>200 WEST / 202-S</b> | Contact<br><b>C. D. Hayes</b>                 | Phone<br><b>373-2891</b>                                      |
| Date Ready for Shipment<br><b>11/2/93</b>                      | Cost Code to be Charged<br><b>PE7HNM12911</b> | Approximate Date This Property will be Returned<br><b>N/A</b> |
| Relinquished By:<br><b>J. E. Darling</b> <i>[Signature]</i>    | Date<br><b>11/2/93</b>                        | Authorized By<br><b>Jeannette E. Hyatt</b> <i>[Signature]</i> |
| Signature and Name of Property Control                         | Custodian Date<br><i>[Signature]</i>          | Property Management Approval<br><i>[Signature]</i>            |
|  |   | Date<br><b>11/2/93</b>  |

PART II - TO BE COMPLETED BY SHIPPING

|  |                               |             |                    |             |
|--|-------------------------------|-------------|--------------------|-------------|
| Signature of Recipient<br><i>[Signature]</i> | Return Order No.<br><b>53</b> | Date Issued | Purchase Order No. | Date Issued |
| Date<br><b>11-2-93</b>                       |                               |             |                    |             |

DISTRIBUTION

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

9713512.2483

FORM OF PAYMENT

Check  GBL  FCCOD

Bill to Shipper  Bill to Consignee  Third Party Billing

Shipper's Account Number

850281585

**EMERY  
WORLDWIDE**



SERVICES \*\*

UNITED STATES / CANADA

Same Day (Extra Charges)  
 AM  
 Second Day

PM  
 Saturday Delivery

Express   
Standard Plus   
Preferred   
Standard

INTERNATIONAL

Business Documents  
Customs Clearance  
Delivery

Date

11-02-93

Origin

PSC

Shipment Number

251901029

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

To: TMA/NORCAL  
TMA/NORCAL DELORES SANCHEZ  
2030 WRIGHT AVENUE

Tariff Dest. Gateway  
Check to Shipper \$

RICHLAND WA  
Customer's Reference Numbers  
12911 PE7HN W94-0-0009 #34  
99352

RICHMOND CA USA  
Consignee's Account Number  
E 94804

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

| Description           | Pcs | Dimensions |    |    | Total Pieces | Total Weight (In Lbs.) |
|-----------------------|-----|------------|----|----|--------------|------------------------|
|                       |     | L          | W  | H  |              |                        |
| COOLER SML 449 AMPLES | 1   | 24         | 16 | 13 | 1            | 55                     |

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

Declared Value \$

2519010296



Remarks: VERNIGHT DELIVERY  
Zip Ship   
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  
International Customs Value  
International Insurance  
Total Transportation Charges  
Other Charges/Advance at Origin: \$

1-OAK-A  
Terms and Conditions on Back