**Department of Energy**
Carlsbad Field Office
P. O. Box 3090
Carlsbad, New Mexico 88221

DEC 23 2010



Mr. James Bearzi, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Subject: Review of CCP-INL Waste Stream Profile Form Number, ID-LL-M001-S5400, Heterogeneous Debris from LLNL R&D an R&D Laboratories

Dear Mr. Bearzi:

The Department of Energy Carlsbad Field Office (CBFO) has approved the Waste Stream Profile Form (WSPF), ID-LL-M001-S5400, Heterogeneous Debris from LLNL R&D an R&D Laboratories.

Enclosed is a copy of the form as required by Section C-5a of the WIPP Hazardous Waste Facility Permit No. NM4890139088-TSDF.

If you have questions on this matter, please contact me at (575) 234-7300.

Sincerely,

(for)
Edward Ziemianski
Acting Manager

Enclosure

cc: w/enclosure
S. Zappe, NMED *ED

cc: w/o enclosure
J. Kieling, NMED ED
G. Basabilvazo, CBFO ED
N. Castaneda, CBFO ED
C. Fesmire, CBFO ED
D. Gadbury, CBFO ED
S. McCauslin, CBFO ED
J. R. Stroble, CBFO ED
K. Watson, CBFO ED
W. Ledford, CTAC ED
P. Gilbert, LANL ED
G. Lyshik, LANL ED
C. Walker, TechLaw ED
CBFO, M&RC
*ED denotes electronic distribution

CBFO:NTP:JRS:MDA:10-2080:UFC 5900.00

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## Attachment 2 – CCP Waste Stream Profile Form

| | | | | |
|---|---|---|---|---|
| **(1) Waste Stream Profile Number:** ID-LL-M001-S5400[3] | | | | |
| (2) Generator site name: Idaho National Laboratory | | | (4)Technical contact: Jim Vernon | |
| (3) Generator site EPA ID: ID4890008952 | | | (6) Technical contact phone number: 575-234-7141 | |
| (5) Date of audit report approval by New Mexico Environment Department (NMED): September 19, 2005, June 29, 2006; August 6, 2007, September 22, 2008, September 11, 2009, October 20, 2010 | | | | |
| (7) Title, version number, and date of documents used for WAP Certification:<br>CCP-PO-001, CCP Transuranic Waste Characterization Quality Assurance Project Plan, Revison18 June 30, 2010<br>CCP-PO-002, CCP Transuranic Waste Certification Plan, Revision 24, June 30, 2010<br>CCP-PO-024, CCP/INL Interface Document, Revision 9 March 16, 2009 | | | | |
| (8) Did your facility generate this waste? | YES | | NO | X |
| (9) If no, provide the name and EPA ID of the original generator: Lawrence Livermore National Laboratory CA2890012584 | | | | |
| **Waste Stream Information**[1] | | | | |
| (10) WIPP ID: LL-M001[5] | | | (11) Summary Category Group: S5000 – Debris Waste | |
| (12) Waste Matrix Code Group: Heterogeneous Debris Waste | | | (13) Waste Stream Name: Heterogeneous Debris from LLNL R&D and R&D Laboratories | |
| (14) Description from the TWBIR: Specific waste items in this waste stream may include paper cartons, cardboard, Kimwipes, cotton swabs, tissues, cheesecloth, grinding paper, plastic (e.g., bags, sheet, tape, containers, pipette tips, and glovebox windows), Neoprene and Hypalon gloves (leaded and non-leaded), aluminum foil, tin cans, hardware (e.g., nuts, bolts, washers, fittings, gauges, fixtures, thermocouples), metal tools (e.g., screwdrivers and pliers), metal parts, equipment (with or without circuit boards), copper (wire, tubing, flanges, rods, and molds), sealed sources, aerosol cans, glass (e.g., beakers, vials, and ion exchange columns with resin), graphite molds , crucibles (magnesium oxide, tantalum), epoxy resin chunks, lead metal (e.g., bricks, foil), Kaufman cans (lead seams), lead-lined and cadmium-lined steel cans, mercury batteries, fluorescent and incandescent light bulbs, and small quantities of pyrochemical salts and solidified aqueous or organic liquids (individual drums contain less than 50 percent, by volume, solidified liquids, and/or salts). | | | | |
| (15) Defense TRU Waste: | YES | X | NO | |
| (16) Check One: | CH | X | RH | |
| (17) Number of SWBs N/A | (18) Number of Drums 1520 | | (19) Number of Canisters N/A | |
| (20) Batch Data Report numbers supporting this waste stream characterization: See Characterization Information Summary for correlation of containers identification numbers to batch data report numbers | | | | |
| (21) List applicable EPA Hazardous Waste Numbers:[2] D004, D005, D006, D007, D008, D009, D010, D011, D018, D019, D022, D028, D029, D035, D040, F001, F002, and F005. | | | | |
| (22) Applicable TRUCON Content Numbers: LL 116/216, SQ 125/225 | | | | |
| **(23)Acceptable Knowledge Information**[1] | | | | |
| **(For the following, enter the supporting documentation used [i.e., references and dates])** | | | | |
| **Required Program Information** | | | | |
| (23A) Map of site: CCP-AK-INL-018, Revision 0, June 30, 2010 Figures 1-4 | | | | |
| (23B) Facility mission description: CCP-AK-INL-018, Revision 0, June 30, 2010 Section 4.2 | | | | |
| (23C) Description of operations that generate waste: CCP-AK-INL-018 Revision 0, June 30, 2010 Section 4.4 | | | | |

| | | | |
|---|---|---|---|
| (23D) Waste identification/categorization schemes: CCP-AK-INL-018, Revision 0, June 30, 2010 Sections 4.5.1 and 4.5.2 | | | |
| (23E) Types and quantities of waste generated: CCP-AK-INL-018, Revision 0, June 30, 2010 Sections 4.5.1, 5.2 and 5.4 | | | |
| (23F) Correlation of waste streams generated from the same building and process, as applicable: CCP-AK-INL-018, Revision 0, June 30, 2010 Section 4.5.3 | | | |
| (24) Waste certification procedures: CCP-TP-030, Revision 28, May 12,2010 | | | |
| (25)Required Waste Stream Information | | | |
| (25A) Area(s) and building(s) from which the waste stream was generated : CCP-AK-INL-018, Revision 0, June 30, 2010 Section 5.1 | | | |
| (25B) Waste stream volume and time period of generation: CCP-AK-INL-018, Revision 0, June 30, 2010 Section 5.2 | | | |
| (25C) Waste generating process description for each building:CCP-AK-INL-018, Revision 0, June 30, 2010 Section 4.4 | | | |
| (25D) Waste Process flow diagrams : CCP-AK-INL-018, Revision 0, June 30, 2010 Figure 10 | | | |
| (25E) Material inputs or other information identifying chemical/radionuclide content and physical waste form : CCP-AK-INL-018, Revision 0, June 30, 2010 Section 5.4 | | | |
| (25F) Waste Material Parameter Weight Estimates per unit of waste: See Table 2 of the Summation of Aspects of AK Summary Report: ID-LL-M001-S5400. | | | |
| (26) Which Defense Activity generated the waste: (check one)[4] | | | |
| X | Weapons activities including defense inertial confinement fusion | | Naval Reactors development |
| | Verification and control technology | | Defense research and development |
| | Defense nuclear waste and material by products management | | Defense nuclear material production |
| | Defense nuclear waste and materials security and safeguards and security investigations | | |
| (27)Supplemental Documentation | | | |
| (27A) Process design documents: N/A | | | |
| (27B) Standard operating procedures: See S2 AK#s on Attachment 1 to Summation of Aspects of AK | | | |
| (27C) Safety Analysis Reports: See S3 AK#s on Attachment 1 to Summation of Aspects of AK | | | |
| (27D) Waste packaging logs: See S4 AK#s on Attachment 1 to Summation of Aspects of AK | | | |
| (27E) Test plans/research project reports: See S5 AK#s on Attachment 1 to Summation of Aspects of AK | | | |
| (27F) Site databases: See S6 AK#s on Attachment 1 to Summation of Aspects of AK | | | |
| (27G) Information from site personnel: See S7 AK#s on Attachment 1 to Summation of Aspects of AK | | | |
| (27H) Standard industry documents: See S8 AK#s on Attachment 1 to Summation of Aspects of AK | | | |
| (27I) Previous analytical data: See S9 AK#s on Attachment 1 to Summation of Aspects of AK | | | |
| (27J) Material safety data sheets: See S10 AK#s on Attachment 1 to Summation of Aspects of AK | | | |
| (27K) Sampling and analysis data from comparable/surrogate Waste: See S12 AK#s on Attachment 1 to Summation of Aspects of AK | | | |
| (27L) Laboratory notebooks: N/A | | | |
| **Confirmation Information**[2] | | | |
| *For the following, when applicable, enter procedure title(s), number(s) and date(s)* | | | |
| (28) | Radiography: See procedures listed on the attached CIS, CCP-TP-053, Revision 8, 6/30/10 | | |
| (29) | Visual Examination: N/A | | |

(30)Comments: For a list of the waste characterization procedures used and dates of the respective procedures see the list of procedures on the attached CIS

| | | | |
|---|---|---|---|
| Reviewed by AK Expert: | YES [X] | | Date: 10-28-2010 |
| Reviewed by STR (if necessary): | YES [X] | N/A [ ] | Date: 10-28-2010 |

**Waste Stream Profile Form Certification:**

I hereby certify that I have reviewed the information in this Waste Stream Profile Form, and it is complete and accurate to the best of my knowledge. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

| (31) [signature] | (32) Jim Vernon | (33) 12-13-10 |
|---|---|---|
| Signature of Site Project Manager | Printed Name | Date |

NOTE: (1) Use back of sheet or continuation sheets, if required.

(2) If, radiography, visual examination were used to confirm EPA Hazardous Waste Numbers, attach signed Characterization Information Summary documenting this determination.

(3) AK summary report CCP-AK-INL-018 has a freeze file in place to change the ID site designator on the waste stream. Reference: INL-018 Source Document C135

(4) This waste was also generated by the following defense activities: defense nuclear material production, defense nuclear waste and material by-products management, and defense research and development.

(5) This waste does not currently have an INL specific Annual Transuranic Waste Inventory Report Identification number. The number listed corresponds to the LLNL waste stream identified in DOE/TRU-10-3425, Annual Transuranic Waste Inventory Report-2010.

# CHARACTERIZATION INFORMATION SUMMARY

WSPF # ID-LL-M001-S5400

Lot 1

TABLE OF CONTENTS

# CCP Characterization Information Summary Cover Page

| | | | |
|---|---|---|---|
| Waste Stream # | ID-LL-M001-S5400 | Lot #: | 1 |
| AK Expert Review: | N/A | Date: | N/A |
| SPM Review: | Jim Vernon [signature] | Date: | 12/13/2010 |

SPM signature certifies that through Acceptable Knowledge testing and/or analysis that the waste identified in this summary is not corrosive, ignitable, reactive, or incompatible with the TSDF.

A summary of the Acceptable Knowledge regarding this waste stream containing specific information about the corrosivity, reactivity, and ignitability of the waste stream is included as an attachment to the Waste Stream Profile Form. By reference, that information is included in this lot.

## List of procedures used:

**Real-Time Radiography (RTR):**

| | | | |
|---|---|---|---|
| CCP-TP-053 | Rev. 8 | 06/30/10 | CCP Standard Real-Time Radiography (RTR) Inspection Procedure |
| CCP-TP-053 | Rev. 7 | 10/21/09 | CCP Standard Real-Time Radiography (RTR) Inspection Procedure |

**Non Destructive Assay (NDA):**

| | | | |
|---|---|---|---|
| CCP-TP-109 | Rev. 6 | 03/16/09 | CCP Data Reviewing, Validating, and Reporting Procedure |
| CCP-TP-019 | Rev. 5 | 09/16/09 | CCP Waste Assay Gamma Spectrometer (WAGS) Operating Procedure |
| CCP-TP-115 | Rev. 4 | 06/24/09 | CCP SWEPP Gamma-Ray Spectrometer (SGRS) Operating Procedure |

**Headspace Gas Analysis:**

| | | | |
|---|---|---|---|
| CCP-TP-093 | Rev. 13 | 03/19/07 | CCP Sampling of TRU Waste Containers |
| CCP-TP-173 | Rev. 1 | 09/30/09 | CCP Analysis of Gas Samples for VOCs by GC/FID |
| CCP-TP-175 | Rev. 1 | 03/29/10 | CCP Analysis of Gas Samples for VOCs by GC/MS |

**Project Level Data Validation / DQO Reconciliation:**

| | | | |
|---|---|---|---|
| CCP-TP-001 | Rev. 18 | 08/09/10 | CCP Project Level Data Validation and Verification |
| CCP-TP-002 | Rev. 22 | 06/30/10 | CCP Reconciliation of DQOs and Reporting Characterization Data |
| CCP-TP-003 | Rev. 17 | 11/09/09 | CCP Data Analysis for S3000, S4000, and S5000 Characterization |
| CCP-TP-005 | Rev. 19 | 07/06/10 | CCP Acceptable Knowledge Documentation |
| CCP-TP-030 | Rev. 28 | 05/12/10 | CCP CH TRU Waste Certification and WWIS/WDS Data Entry |

**WAP Certification:**

| | | | |
|---|---|---|---|
| CCP-PO-001 | Rev. 18 | 06/30/10 | CCP Transuranic Waste Characterization Quality Assurance Project Plan |
| CCP-PO-001 | Rev. 17 | 06/23/09 | CCP Transuranic Waste Characterization Quality Assurance Project Plan |
| CCP-PO-001 | Rev. 16 | 10/31/07 | CCP Transuranic Waste Characterization Quality Assurance Project Plan |
| CCP-PO-002 | Rev. 24 | 06/30/10 | CCP Transuranic Waste Certification Plan |
| CCP-PO-002 | Rev. 23 | 04/07/10 | CCP Transuranic Waste Certification Plan |
| CCP-PO-002 | Rev. 22 | 01/12/10 | CCP Transuranic Waste Certification Plan |
| CCP-PO-002 | Rev. 21 | 01/26/09 | CCP Transuranic Waste Certification Plan |
| CCP-PO-002 | Rev. 20 | 11/02/07 | CCP Transuranic Waste Certification Plan |

# CCP Correlation of Container Identification Numbers to Batch Data Report Numbers

Waste Stream: # ID-LL-M001-S5400 Lot # 1

| Container ID Number | NDA BDR | RTR BDR | VE BDR | Solids Sampling BDR | Solids Analytical BDR | Load Management/ Overpack Yes | Headspace Gas BDR | | | | GGT BDR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Sample | Analysis | | | |
| LL85001113TRU | INNDAS100133 | INRTR5100034 | N/A | N/A | N/A | N/A | INHSGS100006 | IN10FG6111 | ECL10024G | ECL10024M | N/A |
| LL85001744TRU | INNDAW100147 | INRTR5100036 | N/A | N/A | N/A | N/A | INHSGS100006 | IN10FG5114 | ECL10024G | ECL10024M | N/A |
| LL85001762TRU | INNDAW100145 | INRTR5100033 | N/A | N/A | N/A | N/A | INHSGS100006 | IN10FG6111 | ECL10024G | ECL10024M | N/A |
| LL85101641TRU | INNDAS100116 | INRTR5100024 | N/A | N/A | N/A | N/A | INHSGS100006 | IN10FG5104 | ECL10024G | ECL10024M | N/A |
| LL85201372TRU | INNDAW100145 | INRTR5100034 | N/A | N/A | N/A | N/A | INHSGS100006 | IN10FG6111 | ECL10024G | ECL10024M | N/A |
| LL85234284TRU | INNDAS100115 | INRTR5100024 | N/A | N/A | N/A | N/A | INHSGS100006 | IN10FG5104 | ECL10024G | ECL10024M | N/A |
| LL85234309TRU | INNDAS100137 | INRTR5100036 | N/A | N/A | N/A | N/A | INHSGS100006 | IN10FG5114 | ECL10024G | ECL10024M | N/A |
| LL85401615TRU | INNDAS100124 | INRTR5100028 | N/A | N/A | N/A | N/A | INHSGS100006 | IN10FG5107 | ECL10024G | ECL10024M | N/A |
| LL85801699TRU | INNDAS100115 | INRTR5100024 | N/A | N/A | N/A | N/A | INHSGS100006 | IN10FG5104 | ECL10024G | ECL10024M | N/A |
| R018276 | INNDAW100147 | INRTR5100036 | N/A | N/A | N/A | N/A | INHSGS100006 | IN10FG5114 | ECL10024G | ECL10024M | N/A |

Signature of Site Project Manager

Jim Vernon
Printed Name

12/13/2010
Date

CIS-003

# CCP Headspace Gas $UCL_{90}$ Evaluation Form

**WSPF #:** ID-LL-M001-S5400 **Waste Stream Lot Number** 1 through 1

| ANALYTE | Transform Data Used (No, Data-Log, SQRT, other) | # Samples above MDL (1) | # Samples | Maximum (ppmv) | Mean (ppmv) | SD (ppmv) | $UCL_{90}$ (ppmv) | PRQL (ppmv) | Transformed PRQL (N/A or Value) | $UCL_{90}$ > PRQL Yes | EPA Code |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetone | SQRT | 8 | 10 | 5.2915 | 2.9433 | 1.7106 | 3.6914 | 100 | 10.0000 | | |
| Benzene | Log | 6 | 10 | 0.7178 | -1.7471 | 1.2888 | -1.1834 | 10 | 2.3026 | | |
| Bromoform | Log | 0 | 10 | 0.0000 | -3.2315 | 1.2801 | -2.6717 | 10 | 2.3026 | | |
| Butanol | Log | 8 | 10 | 1.5892 | -0.1984 | 1.3556 | 0.3945 | 100 | 4.6052 | | |
| Carbon Disulfide[3] | Log | 5 | 10 | 1.3083 | -1.2744 | 1.2490 | -0.7282 | 10 | 2.3026 | | |
| Carbon Tetrachloride | Log | 2 | 10 | 0.0953 | -2.8909 | 1.1716 | -2.3785 | 10 | 2.3026 | | |
| Chlorobenzene | Log | 0 | 10 | 0.4383 | -2.8241 | 1.2891 | -2.2603 | 10 | 2.3026 | | |
| Chloroform | Log | 1 | 10 | 0.4383 | -2.5633 | 1.5612 | -1.8805 | 10 | 2.3026 | | |
| Chloromethane[3] | Log | 4 | 10 | 1.5261 | -1.2587 | 1.8231 | -0.4613 | 10 | 2.3026 | | |
| Cyclohexane[4] | Log | 1 | 10 | 1.0116 | -2.1289 | 1.3490 | -1.5389 | 10 | 2.3026 | | |
| 1,1-Dichloroethane | Log | 0 | 10 | 0.9555 | -2.2987 | 1.2843 | -1.7370 | 10 | 2.3026 | | |
| 1,2-Dichloroethane | Log | 0 | 10 | 0.8544 | -2.3982 | 1.2846 | -1.8364 | 10 | 2.3026 | | |
| 1,1-Dichloroethylene | Log | 0 | 10 | 0.9555 | -2.3015 | 1.2868 | -1.7387 | 10 | 2.3026 | | |
| cis-1,2-Dichloroethylene | Log | 0 | 10 | 0.5596 | -2.6926 | 1.2864 | -2.1300 | 10 | 2.3026 | | |
| trans-1,2-Dichloroethylene | Log | 0 | 10 | 1.2238 | -2.0299 | 1.2862 | -1.4674 | 10 | 2.3026 | | |
| 1,2-Dichloropropane[2] | Log | 0 | 10 | 0.5878 | -2.6638 | 1.2837 | -2.1021 | 10 | 2.3026 | | |
| Ethyl benzene | Log | 0 | 10 | 0.7178 | -2.5231 | 1.2834 | -1.9618 | 10 | 2.3026 | | |
| Ethyl Ether | Log | 0 | 10 | 1.2528 | -1.9902 | 1.2846 | -1.4284 | 100 | 4.6052 | | |
| Methanol | No | 0 | 10 | 8.5000 | 8.0000 | 0.2357 | 8.1031 | 100 | 100.0000 | | |
| Methyl Ethyl Ketone | SQRT | 6 | 10 | 2.4495 | 1.0777 | 0.6984 | 1.3832 | 100 | 10.0000 | | |
| Methyl Isobutyl Ketone | Log | 2 | 10 | 0.8755 | -2.1474 | 1.1731 | -1.6343 | 100 | 4.6052 | | |
| Methylene Chloride | Log | 1 | 10 | 0.8755 | -2.1852 | 1.4202 | -1.5640 | 10 | 2.3026 | | |
| 1,1,2,2-Tetrachloroethane | Log | 0 | 10 | 0.0488 | -3.2012 | 1.2833 | -2.6399 | 10 | 2.3026 | | |
| Tetrachloroethylene | Log | 0 | 10 | 0.3716 | -2.8672 | 1.2799 | -2.3075 | 10 | 2.3026 | | |
| Toluene | SQRT | 9 | 10 | 4.3589 | 2.2073 | 1.1597 | 2.7145 | 10 | 3.1623 | | |
| 1,1,1-Trichloroethane | Log | 2 | 10 | 0.0488 | -3.0210 | 1.1764 | -2.5065 | 10 | 2.3026 | | |
| Trichoroethylene | Log | 4 | 10 | 6.0403 | -1.1048 | 3.2066 | 0.2976 | 10 | 2.3026 | | |
| Trichlorofluoromethane[2] | Log | 0 | 10 | 0.5008 | -2.7346 | 1.2821 | -2.1739 | 10 | 2.3026 | | |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | Log | 0 | 10 | 0.1398 | -3.1252 | 1.2919 | -2.5602 | 10 | 2.3026 | | |

# CCP Headspace Gas $UCL_{90}$ Evaluation Form



WSPF #: ID-LL-M001-S5400 | Waste Stream Lot Number 1 through 1

| ANALYTE | Transform Data Used (No, Data-Log, SQRT, other) | # Samples above MDL (1) | # Samples | Maximum (ppmv) | Mean (ppmv) | SD (ppmv) | $UCL_{90}$ (ppmv) | PRQL (ppmv) | Transformed PRQL (N/A or Value) | $UCL_{90}$ > PRQL Yes | EPA Code |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3,5-Trimethylbenzene[a] | Log | 2 | 10 | 0.8329 | -2.1985 | 1.3869 | -1.5920 | 10 | 2.3026 | | |
| 1,2,4-Trimethylbenzene[a] | Log | 2 | 10 | 0.7655 | -2.0681 | 1.6192 | -1.3600 | 10 | 2.3026 | | |
| m/p-Xylene[b] | Log | 2 | 10 | 0.3716 | -2.6076 | 1.4542 | -1.9716 | 10 | 2.3026 | | |
| o-Xylene | Log | 0 | 10 | 0.6419 | -2.6111 | 1.2878 | -2.0479 | 10 | 2.3026 | | |

[a] These compounds are from the TRAMPAC and are flammable VOCs that do not appear in the QAPjP or the WIPP WAP. These are not part of the target analyte list, but samples may be analyzed for these compounds.

[b] These xylene isomers cannot be resolved by the analytical methods employed in the program. m-Xylene and p-Xylene will be reported as "Total m-p-Xylene."

## Comments:

(1) For analytes where there were no samples measured above the MDL value, 1/2 of the MDL value was used. (Per section B4 of the WAP, 1/2 of the MDL value is used in calculating the mean concentration.)

Signature of Site Project Manager

Jim Vernon
Printed Name

12/13/2010
Date

900-5??

# CCP Headspace Gas Summary Data

Waste Stream Number ID-LL-M001-S5400 Lot Number (s) 1 through 1

| Tentatively Identified Compound | Maximum Observed Estimated Concentrations (ppmv) | # Samples Containing TIC | % Detected |
|---|---|---|---|
| NONE | N/A | N/A | N/A |

Data Supports EPA Hazardous Waste Numbers Assigned by AK? Yes ☑ No ☐

If no, describe the basis for assigning the EPA Hazardous Waste Codes:

SPM Signature [signature] Date 12/13/2010

# CCP RTR/VE Summary of Prohibited Items and AK Confirmation

Waste Stream Number: ID-LL-M001-S5400 Lot #: 1

| Container Number | RTR Prohibited Items [a] | Visual Examination Prohibited Items [a] |
|---|---|---|
| See correlation of container ID numbers for list of remaining drum numbers in this Lot. | None of the containers in this lot had prohibited items identified during RTR. | VE was not used to certify any containers in this Lot. |

a. See Batch Data Reports

b. If AK has assigned U134 to this waste stream, then any liquids in these containers are prohibited items (not acceptable by the TSDF).

Justification for the selection of RTR and/or VE: RTR was selected as the characterization method for this lot because the waste containers were previously packaged and RTR is an acceptable characterization method to meet all the Data Quality Objectives for NDE of waste stream ID-LL-M001-S5400.

| Site Project Manager Signature | Jim Vernon<br>Printed Name | 12/13/2010<br>Date |
|---|---|---|



CIS-007

# CCP Reconciliation with Data Quality Objectives

WSPF# ID-LL-M001-S5400 | Lot # 1

## Sampling Completeness

### RTR/VE

Number of Valid Samples: 10 | Number of Total Samples Analyzed: 10

Percent Complete: 100 (QAO is 100%)

### NDA

Number of Valid Samples: 10 | Number of Total Samples Analyzed: 10

Percent Complete: 100 (QAO is 100%)

### HSG

Number of Valid Samples: 10 | Number of Total Samples Collected: 10

Percent Complete: 100 (QAO is ≥90%)

Number of Valid Samples: 10 | Number of Total Samples Analyzed: 10

Percent Complete: 100 (QAO is ≥90%)

### Total VOC

Number of Valid Samples: NA | Number of Total Samples Collected: NA

Percent Complete: NA (QAO is ≥90%)

Number of Valid Samples: NA | Number of Total Samples Analyzed: NA

Percent Complete: NA (QAO is ≥90%)

### Total SVOC

Number of Valid Samples: NA | Number of Total Samples Collected: NA

Percent Complete: NA (QAO is ≥90%)

Number of Valid Samples: NA | Number of Total Samples Analyzed: NA

Percent Complete: NA (QAO is ≥90%)

### Total Metals

Number of Valid Samples: NA | Number of Total Samples Collected: NA

Percent Complete: NA (QAO is ≥90%)

Number of Valid Samples: NA | Number of Total Samples Analyzed: NA

Percent Complete: NA (QAO is ≥90%)

# CCP Reconciliation with Data Quality Objectives

WSPF# ID-LL-M001-S5400 Lot # 1

| | Y/N/NA | Reconciliation Parameter |
|---|---|---|
| 1 | Y | Waste Matrix Code. |
| 2 | Y | Waste Material Parameter Weights. |
| 3 | Y | The waste matrix code identified is consistent with the type of sampling and analysis used to characterize the waste. |
| 4 | Y | The TRU activity reported in the BDRs for each container demonstrates with a 95% probability that the container of waste contains TRU radioactive waste. |
| 5 | N | AK Sufficiency. Is there an approved AK sufficiency Determination for this waste stream? |
| 6 | Y | Mean concentrations, $UCL_{90}$ values for the mean concentration, standard deviations, and the number of samples collected for each VOC in the HSG of each container were calculated and compared with the program required quantitation limits, as reported in CCP-TP-003 Attachment 3, and additional U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers were assigned as required. Samples were randomly collected (when appropriate). |
| 7a | NA | Mean concentrations, $UCL_{90}$ values for the mean concentration, standard deviations, and the number of samples collected for solids VOCs were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in the Characterization Information Summary, CCP-TP-003 Attachment 4, and additional EPA HWNs were assigned as required. Samples were randomly collected. |
| 7b | NA | Mean concentrations, ($UCL_{90}$) values for the mean concentration, standard deviations, and the number of samples collected for solids SVOCs were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in the Characterization Information Summary, CCP-TP-003 Attachment 5, and additional EPA HWNs were assigned as required. Samples were randomly collected. |
| 7c | NA | Mean concentrations, ($UCL_{90}$) values for the mean concentration, standard deviations, and the number of samples collected for total metals were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in the Characterization Information Summary, CCP-TP-003 Attachment 6, and additional EPA HWNs were assigned as required. Samples were randomly collected. |

## CCP Reconciliation with Data Quality Objectives

WSPF# ID-LL-M001-S5400 Lot # 1

| | | |
|---|---|---|
| 8 | Y | The data demonstrates whether the waste stream exhibits a toxicity characteristic under Title 40 Code of Federal Regulations (CFR), Part 261, Identification and Listing of Hazardous Waste, Subpart C, Characteristics of Hazardous Waste. |
| 9 | Y | Does the waste stream contain listed waste found in 20.4.1.200 NMAC incorporating 40 CFR Part 261, Subpart D, Lists of Hazardous Wastes. |
| 10 | Y | Waste stream can be classified as hazardous or nonhazardous at the 90-percent confidence level. |
| 11 | Y | Appropriate packaging configuration and Drum Age Criteria (DAC) is applied and documented in the headspace gas sampling documentation, and the drum age met prior to sampling. |
| 12 | Y | TICs were appropriately identified and reported in accordance with the requirements of Section B3-1 of the QAPjP. |
| 13 | Y | The PRQLs for headspace gas VOCs were met for all analyses as evidenced by the analytical batch data reports. |
| 14 | | The overall completeness, comparability, and representativeness QAOs were met for each of the analytical and testing procedures as specified in the WAP Sections B3-2 through B3-9 prior to submittal of a waste stream profile form for a waste steam or waste stream lot. |

| | Completeness | Comparability | Representativeness |
|---|---|---|---|
| Radiography | Y | Y | Y |
| VE | NA | NA | NA |
| Headspace Gas Analysis | Y | Y | Y |
| Solids Sampling | NA | NA | NA |
| Solids VOCs | NA | NA | NA |
| Solids SVOCs | NA | NA | NA |
| Solids Metals | NA | NA | NA |

Comments:

None

Signature of Site Project Manager | Jim Vernon (Printed Name) | 12/13/2010 (Date)



CSS-010

## SUMMATION OF ASPECTS OF AK SUMMARY REPORT: ID-LL-M001-S5400

**Overview:**

Waste stream ID-LL-M001-S5400 is contact-handled (CH) mixed transuranic (TRU) heterogeneous debris waste generated from plutonium and uranium Research and Development (R&D) activities in multiple buildings at the Lawrence Livermore National Laboratory (LLNL) between 1986 and the present. The waste was shipped to the Advanced Mixed Waste Treatment Project (AMWTP) and is currently stored at the Transuranic Storage Area (TSA) in the Radioactive Waste Management Complex (RWMC) at the Idaho National Laboratory (INL). LLNL generator buildings include: Building 151, which provides forensic radiochemical analysis and plutonium dissolution experiments primarily in support of the Building 332 Plutonium Facility; Building 235, which conducts sample preparation and analysis primarily in support of Building 332; Building 251, the Heavy Element Facility, which provided LLNL the capability to conduct basic R&D on a variety of actinides (when nuclear weapons testing was suspended in September 1992, Building 251 underwent cleanup and deactivation); Building 332, Plutonium Facility, provides the capability to safely handle and store plutonium in the quantities required for nuclear weapons R&D; Building 419, hazardous waste management facility, that conducted waste treatment operations until it ceased operation and its' Resource Conservation and Recovery Act (RCRA) units were closed under interim status; and Building 695, part of the LLNL Decontamination and Waste Treatment Facility (DWTF), used by the Radioactive and Hazardous Waste Management (RHWM) Division to store and treat regulated wastes generated at LLNL.

The WIPP-WAC requires generator sites to use AK to determine if the TRU waste streams to be disposed at WIPP meet the definition of TRU "defense" waste. Based on guidance from the DOE, a TRU waste is eligible for disposal at WIPP if it has been generated in whole or part by one of the atomic energy defense activities listed in the Public Law 102-579, The Waste Isolation Pilot Plant Land Withdrawal Act and Section 10101 (3) of the Nuclear Waste Policy Act of 1982 (NWPA). Based on the review of AK, TRU waste generated from LLNL operations are contaminated with materials from the following atomic energy defense activities conducted in Buildings 151, 235, 251, 332, 419, and 695:

- Weapons activities, including defense inertial confinement fusion
- Defense nuclear materials production
- Defense nuclear waste and materials by-products management
- Defense research and development

The original LLNL primary mission was to conduct R&D on nuclear weapons fabrication and materials R&D. Since then, other major defense research programs have been added, including laser fusion and laser isotope separation, weapons research and tracer studies for the DOD.

Building 251 was operated by the Nuclear Chemistry Division for the Defense Systems Program/Defense Sciences Department under the Deputy Associate Director (AD) for Nuclear Testing. Well over 90 percent of the radioactive waste generated in Building 251 was from diagnostic activities associated with the underground testing of nuclear devices. This process and the isotope separator were the only ongoing processes in the building. Review of Experimental Request Forms indicates that numerous other activities, many of which were short

term experiments, were conducted each year. Wastes generated by diagnostic activities were not segregated from wastes generated by other activities in the building.

Wastes generated in Building 332 were associated almost entirely with weapons activities. Although non-defense projects were conducted in the building (e.g., Plowshare program and plant uptake studies), the small amount of non-defense waste was not segregated from wastes generated by weapons activities. The Plowshare project tests were conducted from 1961 to 1973 to evaluate industrial applications of nuclear explosives. Plant uptake studies were conducted in 1976 to determine plutonium and americium concentrations collected in barley plants cultivated in contaminated soil.

TRU waste generated in Building 419 and 695 was derived from decontamination and treatment of waste and materials from Buildings 251 and 332. Buildings 151 and 235 directly supported the operations of Building 332. TRU wastes in Buildings 151 and 235 are generated from preparation and analysis of sample materials in support of nuclear weapons R&D (in support of Buildings 251 and 332), defense nuclear materials safeguards and security investigations, and defense nuclear waste management. Since TRU wastes generated in Buildings 151, 235, 251 and 332 meet the above criteria, wastes generated in Buildings 419 and 695 also meet these criteria.

Waste stream ID-LL-M001-S5400 is, therefore, defense related waste.

This Summation of the AK Summary Report includes information to support Waste Stream Profile Form (WSPF) number ID-LL-M001-S5400 for CH TRU mixed heterogeneous debris from the LLNL. The primary source of information for this report is CCP-AK-INL-018, *Central Characterization Project Acceptable Knowledge Summary Report For Idaho National Laboratory Lawrence Livermore National Laboratory Waste Streams: ID-LL-M001-S5400, ID-LL-W019-S3900, ID-LL-T004-S3141*, Revision 0, June 30, 2010. CCP-AK-INL-018 includes information obtained from numerous sources, including facility safety basis documentation, historical document archives, generator and storage facility waste records and documents including databases, and interviews with operational and waste management personnel.

**Waste Stream Identification Summary:**

| | |
|---|---|
| Waste Stream Name: | Heterogeneous Debris from LLNL R&D and R&D Laboratories |
| Waste Stream Number: | ID-LL-M001-S5400 |
| Site Where TRU Waste Was Generated: | Lawrence Livermore National Laboratory |
| Facility Where TRU Waste Was Generated: | Buildings 151, 235, 251, 332, 419, and 695 |
| Site Where TRU Waste Is Currently Stored: | Idaho National Laboratory, Radioactive Waste Management Complex |
| Waste Stream Volume - Current: | 395 55-gallon drums |
| Waste Stream Volume - Projected: | 1,125 55-gallon drums |

| | |
|---|---|
| Dates of Waste Generation: | 1986 to Present |
| TRUCON Content Numbers: | LL 116, LL 216, SQ 125, SQ 225 |
| Summary Category Group: | S5000 |
| Waste Matrix Code: | S5400 |
| Waste Matrix Code Group: | Heterogeneous Debris Waste |
| Waste Stream ATWIR Identification: | LL-M001[1] |
| Resource Conservation and Recovery Act (RCRA) Environmental Protection Agency (EPA) Hazardous Waste Numbers (HWNs): | D004, D005, D006, D007, D008, D009, D010 D011, D018, D019, D022, D028, D029, D035 D040, F001, F002, and F005 |

**Waste Stream Description and Physical Form:**

Waste stream ID-LL-M001-S5400 consists of mixed heterogeneous combustible and non-combustible debris generated during plutonium and uranium R&D and R&D laboratory processes in Buildings 151, 235, 251, 332, 419, and 695 at LLNL.

The debris consists primarily of organic and inorganic R&D and R&D laboratory debris. Specific waste items in this waste stream may include: paper cartons, cardboard, Kimwipes, cotton swabs, tissues, cheesecloth, grinding paper, plastic (e.g., bags, sheet, tape, containers, pipette tips, and glovebox windows), Neoprene and Hypalon gloves (non-leaded), aluminum foil, tin cans, hardware (e.g., nuts, bolts, washers, fittings, gauges, fixtures, thermocouples), metal tools (e.g., screwdrivers and pliers), metal parts, leaded rubber gloves, lead metal (e.g., bricks, foil, Kaufman cans [lead seams], lead-lined steel cans), cadmium-lined steel cans, mercury batteries, equipment (with and without circuit boards), copper (wire, tubing, flanges, rods, and molds), sealed sources, aerosol cans, glass (e.g., beakers, vials, and ion exchange columns with resin), graphite molds, crucibles (magnesium oxide, tantalum), and fluorescent and incandescent light bulbs.

The waste also includes small amounts of homogeneous solids such as sludges, resins, pyrochemical salts, and solidified liquids (e.g., radioactively contaminated liquids, including nitric acid, hydrochloric acid, hydrofluoric acid, sodium hydroxide, trichloroethylene, acetone, carbon tetrachloride, trichloroethylene, Freon TF (1,1,2-trichloro-1,2,2-trifluoroethane), WD-40, and Radiacwash) that have been solidified in small containers using Portland cement, Absorbal (clay-based), Floor Dry (diatomaceous earth-based), Aquaset I/II [crystalline silica] for aqueous liquids [including water-based materials and some acids] and Envirostone [gypsum cement] and Petroset I/II [crystalline silica] for organic liquids [including alcohols, some acids, solvents, and oil-based liquids]). Small quantities of dirt or soil may also be included in the waste. Individual drums contain less than 50 percent, by volume, solidified liquids and sludges, and/or salts.

[1]This waste does not currently have an INL specific Annual Transuranic Waste Inventory Report identification number. The number listed corresponds to the LLNL waste stream identified in DOE/TRU-10-3425, Annual Transuranic Waste Inventory Report-2010.

Waste materials contaminated with TRU radionuclides are generated primarily from R&D operations conducted in Building 332. These operations include production, laboratory, plutonium recovery, and waste treatment activities conducted in support of nuclear weapons R&D. Additional TRU wastes are routinely generated in Buildings 151 and 235 from laboratory operations conducted in support of nuclear weapons R&D and nuclear materials security investigations. Historically, TRU waste generating operations were also conducted in Buildings 251 and 419 and included R&D, laboratory operations in support of R&D, decontamination and decommissioning, and waste treatment.

Waste Matrix Code S5400, Heterogeneous Debris, is applied to this waste stream. This category includes waste that is at least 50 percent, by volume, debris that does not meet the criteria for assignment as either an Inorganic Debris (S5100) or Organic Debris (S5300) as described in the *DOE Waste Treatability Group Guidance* document. The waste that comprises waste steam ID-LL-M001-S5400 was generated from a single process or from an activity (R&D and R&D support activities) that is similar in material, physical form, and hazardous constituents and is, therefore, a single waste stream.

**Point of Generation**

**Location**

Waste stream ID-LL-M001-S5400 was generated at LLNL which is located in Livermore, California. The waste is currently stored at the TSA in the RWMC at the INL.

**Area and/or Building of Generation**

Waste stream ID-LL-M001-S5400 was generated from various areas in the following LLNL buildings at the Livermore Main Site during plutonium and uranium R&D processes, waste treatment, and maintenance activities: Buildings 151, 235, 251, 332, 419, and 695

**Generating Process**

**Description of Waste Generating Process**

Waste materials contaminated with TRU radionuclides are generated primarily from operations conducted in Building 332. These operations include production, laboratory, plutonium recovery, and waste treatment activities conducted in support of nuclear weapons R&D. Additional TRU wastes are routinely generated in Buildings 151 and 235 from laboratory operations conducted in support of nuclear weapons R&D and nuclear materials security investigations. Historically, TRU waste generating operations were also conducted in Buildings 251, 419, and 695 and included R&D, laboratory operations, decontamination and decommissioning, and waste treatment. The following provides a brief listing of the TRU waste generating buildings, the primary operations, and their major activities and functions.

Building 151 Operations

The operations in Building 151 that generate TRU waste provide forensic radiochemical analysis and plutonium dissolution experiments. These operations are conducted primarily in support of the Building 332 Plutonium Facility.

Forensic Radiochemistry of Plutonium – Building 151

This process examines samples of plutonium for forensic signatures that define the origin of the material. Microscopic examination may be conducted followed by destructive analysis. Sample processing includes dissolution with nitric acid, hydrochloric acid with inorganic carriers such as gallium, iodine, or silver, and radionuclide tracers such as americium-243 and curium-246; anion exchange with hydrochloric, hydrofluoric, hydriodic, and/or nitric acid eluent solutions; cation exchange with hydrochloric acid eluent; solvent extractions from nitric acid solutions to tributyl phosphate/kerosene or thenoyltrilfluoroacetone/xylene; and solvent extractions from hydrochloric acid solutions into methyl isobutyl ketone (MIbK). A carbon tetrachloride trap, utilized in the glovebox to filter helium and dissolution gases, is removed and processed in Room 1143A. Hazardous wastes generated in this workstation include acetone, benzene, ethanol, ethyl acetate, ethyl ether, isobutanol, methanol, methylene chloride, and toluene used as solvents. Barium, cadmium, chloroform, chromic acid, chromium, lead, mercury, and silver were identified as constituents used in the process or present as contaminants in the materials processed.

Dissolution Experiments – Building 151

Three different types of experiments are conducted involving weapons grade plutonium. For Processes A and B, plutonium samples are prepared in a glass based material (lanthanum borosilicate) and a ceramic based material (zirconium oxide/titanium oxide) in aqueous solutions. The samples are then dissolved in varying concentrations of sodium hydroxide, hydrochloric acid, or J13 (a ground water sample from Yucca Mountain) solutions. In Process A, an aliquot from each of the samples is filtered and acidified with hydrochloric acid and the aliquot counted on a Liquid Scintillation Counter. In Process B, a liquid/liquid extraction of an aliquot from each sample is conducted using xylene or toluene. The organic and aqueous phases are separately counted on a Liquid Scintillation Counter. Process C consists of analysis of samples of plutonium oxide in conjunction with natural uranium, gadolinium, calcium, hafnium oxides, and titanium dioxide. Three solutions are created; one each with hydrochloric acid, phthalic acid, and sodium hydroxide. The solutions are analyzed by Liquid Scintillation Counter and Inductively Coupled Plasma/Mass Spectrometry (ICP/MS).

Waste generating activities include solidification of process liquids with Petroset and the removal of tools and equipment such as hand tools, pH meter, and peristaltic pump. Hazardous constituents identified for the process include acids and bases, xylenes, and toluene used in the experiments, and electronic components containing lead solder.

Cleanup of Americium-243 Gloveboxes – Building 151

Americium-243 glovebox debris is generated from cleanup of two gloveboxes utilized for separation method experimentation involving americium-243. Defense program experiments were conducted in these gloveboxes by representatives of Lawrence Berkeley National Laboratory (LBNL). Decontamination is conducted utilizing rags or towels wet with a Radiacwash/water mixture with a final wiping with dry rags or towels. Liquids generated from the process are solidified with Petroset. Hazardous constituents identified for the process include lead bricks, vial holders, and a lead pig.

Sample Preparation – Building 151

Plutonium alloy specimens are prepared for transmission electron microscopy experiments in Workstation 28 in Room 1034.

Building 235 Operations

The areas in Building 235 that generate TRU waste consist of sample preparation and analysis primarily in support of the Building 332 Plutonium Facility.

Specimen Preparation – Building 235

Specimens from plutonium and plutonium alloys are prepared for transmission electron analysis (TEM) in Room 1130. Sample preparation includes electropolishing, dicing, dimpling, lapping and polishing, and chemical and ion etching operations. Most of these techniques involve mechanical abrasion of the sample utilizing a non-hazardous oil or solvent. Mineral oil, acetone, ethanol, 2-ethoxyethanol, methanol, and dimethylformamide are identified as organic liquids potentially used in the process. Etching and dissolution operations consist of dissolving specific portions or areas of the sample utilizing acids. Nitric, perchloric, sulfuric, hydrofluoric, and acetic acids are used in the process. Liquid waste (aqueous and organic) is solidified. Samples are sent for analyses, including:

- Proton and alpha particle irradiation
- X-Ray Diffraction
- Differential scanning calorimetry
- Plutonium spectroscopy
- Thermal diffuse scattering and inelastic X-ray scattering

Building 251 Operations

Operations in Building 251 consisted of diagnostic activities associated with the underground testing of nuclear devices and research devoted to the nuclear behavior of the heavy elements. Operations included development of diagnostic tracers, research into the reaction of actinides, chemical separation in support of tracer preparation, liquid waste solidification, and operations support. This building is currently deactivated.

Diagnostic Tracers – Building 251

Tracers for identifying the performance of a nuclear explosive device were prepared in Building 251. The diagnostic tracers or "slugs" typically were a mixture of powdered aluminum oxide and an actinide oxide pressed into pellets or wafers, encased in aluminum jackets, heated, and compacted. The capsules were coated with solid film lubricant (Electrofilm Lubribond A), containing molybdenum disulfide and graphite to act as a mold release and ultrasonically cleaned with sodium hydroxide, nitric acid, and water. Several actinide oxides were used as tracer materials including americium-241, curium-244, neptunium-237, plutonium-238, plutonium-242, uranium-233, and uranium-235/236.

Post-shot diagnostic work was also performed in the building. After an underground detonation, rock/soil samples were reclaimed from the area of the explosion and dissolved to separate and identify the device fraction from its tracers. Specifically, the sample was dissolved in hydrofluoric

acid and the solution was heated. Fuming of the excess hydrofluoric acid was accomplished using perchloric acid. The material was dissolved in a hydrochloric acid solution (typically 4 Molar), which was prepared for analysis.

Dilute hydrochloric or nitric acids usually were used for cleaning within the gloveboxes. At one time, acetone was also used for cleaning. Hazardous wastes generated in these rooms include Duco cement (ignitable) and solder (contains lead and silver). Organic solvents were not used in the fabrication of tracers.

Other Research – Building 251

Building 251 housed a large isotope separator. Up to milligram quantities of ionized high-purity actinides (such as berkelium and einsteinium) were accelerated using an electromagnetic mass spectrometer that deflected the particles in relation to their mass. Various mass components were collected on different areas of the target, resulting in ultra-high isotopic purity materials which were used as accelerator targets or isotopic standards. The target substrate was typically beryllium metal. The targets were to be used in the accelerator at LBNL. Several actinides were used in target preparation including some exotic isotopes such as berkelium and einsteinium. Selenium metal was also used as a target substrate or in electron beam sputtering to plate the targets before shipment.

The reaction of actinides (primarily transcurium actinides) with halogens and their physical properties were also studied. After reaction, the radionuclides were placed in capillary tubes, x-rayed, and the x-ray patterns studied to determine the structure of the resulting compound.

Hazardous wastes generated in Room 1364 include Duco cement, Silver Goop thread compound (contains silver), C-100 Anti-Seize Lubricant (contains lead oxide), isopropanol, methanol, and Freon TF. Examples of other research activities included studying the initial steps leading to fission of nuclei, identification of new elements, and other actinide behavioral studies.

Chemical Separation – Building 251

Chemical separation processes were required to prepare actinides for use in tracer preparation as well as other activities related to understanding heavy element nuclear behavior. Processes included ion exchange, precipitation, centrifugation, liquid transfer, solution evaporation, liquid-liquid extraction, and electrodeposition.

A solution of isopropanol and dilute nitric acid was used to dissolve samples for electroplating; cyanide compounds were not used in electroplating. Benzene, toluene, and xylene were used in liquid-liquid extraction. Chloroform, carbon tetrachloride, carbon disulfide, acetone, Freon TF, xylene, and MIbK were also used in liquid-liquid extraction and are potential constituents of this waste stream. Barium nitrate, chromium chloride, chromium trioxide, sodium dichromate, mercuric nitrate, lead oxide, silver oxide, selenium, iron, and zinc were also used as carriers in the precipitation process.

Liquid Waste Solidification (aqueous and organic) – Building 251

Small quantities (usually a few liters or less) of radioactively-contaminated liquids originating in Building 251 which exceeded 150 milligrams per liter (mg/L) plutonium were solidified in this process. Radioactively contaminated liquid below this limit was sent to Building 419 for solidification. Aqueous-based liquids were neutralized (using nitric acid and sodium hydroxide),

if needed, and solidified with a mixture of Portland cement and sodium silicate, Absorbal (clay-based absorbent), Floor Dry (diatomaceous earth-based absorbent), or vermiculite. Organic and oil-based liquids were solidified using Envirostone gypsum cement. Liquids were solidified and the solidified waste was placed in drums with other glovebox trash.

Operations Support – Building 251

Building 251 had shops to repair, manufacture, or assemble mechanical or electrical equipment as well as storage areas. Although most of these operations were not in radiological areas, machining of actinide-contaminated equipment was conducted to repair or refurbish the equipment. During machining activities, degreasing solvents such as trichloroethylene (TCE) and methyl ethyl ketone (MEK) were used. Swish All-Purpose Cleaner, 611 penetrating fluid (ignitable), and WD-40 (ignitable) were also used during maintenance activities and are constituents of this waste stream.

Samples prepared in Building 251 laboratories were evaluated for their radioactive content. Radioactive content was determined by measuring the amount of heat produced by the decay of radioactive nuclides.

Decontamination and Decommissioning (D&D) Operations – Building 251

Building 251 has conducted D&D and inventory reduction operations over the last several years. D&D of gloveboxes used for Diagnostic Tracer operations includes the removal of contaminated debris from the gloveboxes, placing the debris into parcels and packaging them into 55-gallon drums. Coatings including acrylic, urethane, and epoxy paint were used to fix contamination. Hazardous wastes from this operation include lead, light bulb ballasts (containing lead), batteries (potentially containing mercury), and electrical components with lead and silver solder.

Building 251 radioactive material inventory reductions were conducted in 2003. A number of plutonium, americium, neptunium, curium, californium, and europium metal and oxide items including leaking sources, were removed from the Building 251 Underground Storage Vaults and packaged as TRU waste into 55-gallon drums or pipe overpack component (POC) containers in Room 1212. These items were utilized in support of the Diagnostic Tracer operations conducted for weapons testing. Hazardous materials were not used in these operations; however, some waste items are contained in sealed metal capsules with lead and silver solder.

Building 332 Operations

The Building 332 Plutonium Facility was constructed in 1960 primarily to support nuclear weapons R&D. Operations include testing of engineering assemblies containing plutonium or other fissile materials; development of advanced metallurgy, chemistry, and engineering techniques; and fundamental and applied plutonium research.

Operations in Building 332 vary according to programmatic requirements, but in general are dedicated to nuclear weapons R&D. The laboratories inside the radioactive materials area (RMA) are used for plutonium metallurgy in addition to chemical, x-ray, and metallographic characterization of plutonium-based metals. There are also foundry, machining, inspection, welding, and assembly facilities for fabrication of plutonium parts, as well as special facilities for laser isotope separation and chemical processing of plutonium.

Laser Isotope Separation – Building 332

Workstation 0601 (Room 1006): Weapon or fuel grade plutonium samples were vaporized and isotopes separated by lasers. Collectors containing the plutonium were sent to hydriding to recover the plutonium. Methanol, ethanol, acetone, and isopropanol were used for cleaning inside the glovebox.

Measurement of Thermochemical Properties (THETUS B Glovebox) – Building 332

Workstation 0605 (Room 1006): Operations consist of differential thermal analysis and differential scanning calorimetry. Past operations included ceramic sintering, sputtering, carbon coating, and e-beam evaporation. Hazardous wastes generated in this workstation include mercury batteries, cadmium- and lead-lined steel cans, Kaufman cans, leaded gloves, circuit boards, and other lead products.

Materials Characterization – Building 332

Workstations 0604 and 0606 (Room 1006): Operations consist of chemical digestion and sample characterization by ion exchange column chromatography and ICP/MS. This is an analytical chemistry glovebox that houses a variety of samples, primarily as 1 part per billion to 100 parts per million metal ion solutions in dilute nitric acid. Hazardous wastes generated in this workstation include ethanol, methanol, and isopropanol, acetone, acids (sulfuric, hydrochloric, nitric, oxalic, phosphoric, and hydrofluoric), bases (sodium, potassium, and calcium hydroxides), hydrogen peroxide, leaded gloves, circuit boards, Kaufman cans, and other lead products.

Equipment Storage and Maintenance – Building 332

Workstation 0601 (Room 1006): This glovebox is not currently fully operational and is utilized for equipment storage and maintenance. Hazardous wastes generated in this workstation include lubricating fluids and pump oil, Radiacwash, aqueous cleaners, electronic equipment, lead products, leaded gloves, Swish All-Purpose Cleaner, and Silver Goop thread lubricant.

Plutonium Machining – Building 332

Operations in Room 1007 consisted of plutonium machining until 1980 when machining was moved to Rooms 1345 and 1353. This room was joined with Room 1011 for the laser isotope separation engineering demonstration system which was never operated.

Furnace and Disassembly – Building 332

Workstations 1001, 1002, 1003, and 1027 (Room 1010): Operations consist of: calcining plutonium to plutonium oxide in an air furnace, and compressing samples in a hydraulic press (Workstation 1001); weapons unit pit bisection and processed plutonium metal product drill sampling until June 2000 when these operations ceased and machining operations (milling, turning, sawing, measurement, and inspection) began (Workstation 1002); processed plutonium metal product drill sampling, size reduction of plutonium metal parts for sampling and further processing and vacuum storage of Special Nuclear Material (SNM) (Workstation 1003 – this workstation was combined with 1002 and no longer functions as a separate entity); and vacuum storage of SNM (Workstation 1027). Hazardous wastes generated in this workstation include mercury batteries, chromium oxide (High Efficiency Particulate Air [HEPA] filter contaminant),

TCE contaminated wipes, cadmium- and lead-lined steel cans, Kaufman cans, leaded gloves, circuit boards, and other lead products.

Material Processing – Building 332

Workstations 1009, 1010, and 1011 (Room 1010): Former operations consisted of molten salt extraction (MSE), direct oxide reduction (DOR), and immobilization of plutonium in glass. Current operations consist of MSE, DOR, electrorefining, immobilization of plutonium in glass, part declassification, and residue cleanup. Hazardous wastes generated in these workstations include mercury batteries, cadmium- and lead-lined steel cans, Kaufman cans, circuit boards, leaded gloves, and other lead products.

Workstations 1012, 1013, 1014, 1048, and 1049 (Room 1010): Current operations consist of neutron measurements and storage associated with nuclear weapon component disassembly (bi-section). Workstations 1048 and 1049 are internal transfer stations. Hazardous wastes generated in these workstations include wipes contaminated with TCE, leaded gloves, cadmium- and lead-lined steel cans, Kaufman cans, circuit boards, and other lead products.

Workstations 1024 through 1031 (Room 1010): Past operations consisted of: glovebox bag-in and bag-out of items to and from the Material Processing Lab gloveboxes (Workstation 1024); destructive testing of plutonium parts with a hydraulic press, and plutonium melting and sampling (Workstation 1025); vacuum casting (Workstation 1026); vacuum storage of SNM (Workstations 1028 and 1029); and MSE, DOR, eletrorefining, electrowinning, pressure cycle calcination, drill sampling, salt cleanup/passivation, and vacuum sampling (Workstations 1030 and 1031). Current operations in all workstations consist of casting, calibration and operation of atmosphere monitoring station, vacuum storage, manipulation of SNMs, MSE, salt cleanup/passivation, DOR/chloride reduction, electrorefining, electrowinning, drill sampling, pressure cycled calcination, and vacuum sampling. Hazardous wastes generated in these workstations include chromium oxide, mercury batteries, leaded gloves, cadmium- and lead-lined steel cans, Kaufman cans, circuit boards, and other lead products.

Hydriding and Dehydriding of Plutonium and Plutonium-Bearing Substrates – Building 332

Workstation 1023 (Room 1010): Operations consist of hydriding and dehydriding plutonium and plutonium bearing substrates. Hazardous wastes generated in this workstation include chromium oxide, cadmium- and lead-lined steel cans, Kaufman cans, leaded gloves, circuit boards, and other lead products.

Laser Welding and Pyrochemical Operations – Building 332

Workstations 1019, 1020, and 1021 (Room 1010): Former operations consisted of cutting and laser welding storage cans for nuclear materials. More recently, pyrochemical operations and Workstation 1016 were added. Current operations consist of cutting and laser welding of storage cans (Workstations 1019 through 1021); and MSE, salt cleanup/passification, direct oxide/chloride reduction, electrorefining, electrowinning, drill sampling, calcination, and vacuum sampling (Workstation 1016). Hazardous wastes generated in these workstations include lubricating oils, grout, cement, epoxy resin, alcohol used for cleaning, Radiacwash used for contamination control, cadmium- and lead-lined steel cans, Kaufman cans, leaded gloves, lead products, and circuit boards.

Differential Scanning Calorimeter – Building 332

Workstation 1305 (Room 1313): Operations consist of plutonium sample thermal analysis in the differential scanning calorimeter.

Analytical X-Ray and Laser Characterization;
Analytical X-Ray Facility, Phillips 3100 X-Ray Generator Operation, & Sample Preparation – Building 332

Workstations 1301, 1302, and 1304 (Room 1313): Operations consist of sample preparation for x-ray diffraction (XRD) (Workstations 1301 and 1302), sample preparation for x-ray camera (Workstation 1301), XRD (Workstation 1302), x-ray analysis (Workstation 1304), and laser characterization (Workstation 1301). Leaded gloves and lead products are generated in Workstation 1301 and ethanol is used in Workstation 1304 to clean parts.

Workstations 1305 and 1306 (Room 1313): Former operations consisted of plutonium sample preparation for XRD and analysis of plutonium containing materials using XRD. Current operations consist of preparation of samples (e.g., sectioning of materials) for XRD, laser particle size analysis, and electron microscopy. Hazardous wastes generated by these operations include leaded gloves and other lead products.

Hazardous wastes generated in Room 1313 include the following: Swish All-Purpose Cleaner, Microduster (contains dichlorodifluoromethane), crystal lead nitrate, lead naphthenate, WD-40, Dag 154 (ignitable), and lithium grease (contains lead naphthenate).

Calormetric Determination of Radioactive Materials – Building 332

Workstation 1429 and Room 1314A (Rooms 1314 and 1314A): Operations consist of analyzing samples for plutonium metal and plutonium oxide quantities by calorimetry. Room 1314A was formerly used for storage.

Gamma Spectroscopy – Building 332

Gamma detectors were used to conduct plutonium isotopic analysis of plutonium-contaminated solutions and materials in Room 1314.

Analytical Laboratory – Building 332

Workstations 2101, 2105, and 2106 (Room 1321): Operations consist of analysis of plutonium alloys for impurities by emission spectroscopy (Workstation 2101), direct current plasma (DCP) spectroscopy (Workstation 2105), hood acid distillation and analytical chemistry (Workstation 2106). Acetone and methanol were used to dry tools in Workstation 2101. Hazardous wastes generated include nitric acid, hydrochloric acid, hydrofluoric acid, sodium hydroxide, electronic parts, and other lead products.

Accelerated Aging of Plutonium Using Pu-238 Enrichment – Building 332

Workstation 2108 (Room 1321): Operations consist of materials research involving physical manipulation and testing of weapons grade plutonium samples with plutonium-238. Hazardous wastes generated in this workstation include ethanol for cleaning, Radiacwash for contamination control, and electronic parts.

Hazardous wastes generated in Room 1321 include the following: – nitric acid, hydrochloric acid, hydrofluoric acid, perchloric acid, phosphoric acid, sulfuric acid, Acrylic Cleaner (contains xylene, acetone), benzene, chloroform, MEK, toluene, Swish All-Purpose Cleaner, Microduster, ammonium hydroxide, Eccostripe 93 (contains methylene chloride), Rapid Fixer Solution B Hardener (acidic), aluminum nitrate, ammonium nitrate, Ascarite (asbestos covered with sodium hydroxide), barium chloride, barium oxide, cadmium chloride, ceric ammonium nitrate, cerium(III) nitrate, chromium trioxide, cesium nitrate, ferric nitrate, hydrogen peroxide, lanthanum nitrate, lead acetate, lead oxide, magnesium nitrate, mercuric chloride, mercuric nitrate, anhydrous magnesium perchlorate, crystal potassium dichromate, potassium nitrite, potassium persulfate, silver nitrate, powder silver(I) oxide, sodium chlorate, sodium chromate, sodium nitrite, sodium sulfide, strontium nitrate, thallium nitrate, and zirconyl nitrate.

Metallography Laboratory – Building 332

Workstations 2201 and 2202 (Room 1322): Operations consist of: preparation of metallographic specimens by sectioning, size reduction, grinding, encapsulation, and occasional ultrasonic cleaning (Workstation 2201); and mechanical and electrochemical sample polishing, chemical and electroetching, ultrasonic cleaning, and visual inspection of samples, as well as pH adjustment of acidic solutions (Workstation 2202). Ethanol, glycerol, and nitric acid and were used to clean samples. Nitric acid and glycerol were used as electroetching solutions. Carbon tetrachloride was used for lubrication during sample grinding. Gleme and Swish All-Purpose Cleaner were used as cleaning agents. Hazardous waste generated in these workstations includes chromium trioxide, chrome oxide, nitric acid, and sulfuric acid.

Metallographic Sample and Recovery – Building 332

Workstation 2203 and Rooms 1322A, B, and C (Rooms 1322, 1322A, 1322B, and 1322C): Operations consist of preparation of metallographic specimens by sectioning, mounting in epoxy, grinding, polishing, ultrasonic cleaning, and encapsulation in XRD capillaries (Workstation 2203), and sample preparation and examination (Rooms 1322A, B, and C). Old samples are heated with a heat lamp to recover SNM. Samples are prepared by grinding, polishing, and etching. Samples are examined and photographed using a metallograph, macro cameras, and a micro hardness tester. Hazardous wastes generated in this workstation include Kaufman cans, ethanol, acetone, chromium trioxide, perchlorates, acetic anhydrides, peroxides, and phosphoric, acetic, citric, hydrochloric and nitric acids.

Hazardous wastes generated in Room 1322 include the following: hydrochloric acid, nitric acid, phosphoric acid, sulfuric acid, Eccostrip 93, Pliobond Industrial Adhesive (ignitable, contains MEK), Gray Heavy Duty Cement (ignitable, contains acetone, cyclohexanone, MEK), Microstop (contains MEK), F-1 Neoprene Adhesive (ignitable), chromium trioxide, potassium permanganate, Swish All-Purpose Cleaner, acetone, carbon tetrachloride, acrylonitrile butadiene styrene (ABS)/polyvinyl chloride (PVC) cleaner (contains MEK), Krylon Matte Finish Coating (ignitable and contains acetone, methylene chloride, and toluene), ethanol, 2-

ethoxyethanol, ethylene dichloride (ignitable), Microduster, Dag 154, DP-spray (ignitable), and WD-40.

Analytical Chemistry Operations – Building 332

Workstations 2901 through 2907 (Room 1329): Operations consist of sample preparation for analytical chemistry (Workstation 2901); sample dissolution by organic separation, ionic separations, precipitation, and centrifugation (Workstation 2902); chemical separation of plutonium from alloys, preparation of samples for alpha and gamma counting, and chemical analysis of solids and solutions (Workstation 2903); plutonium recovery ash distillation (Workstation 2904); sample storages (Workstation 2905); gas analysis by burning samples in graphite or silica crucibles (Workstation 2906); and heating graphite crucibles with samples in the hydrogen gas analyzer (Workstation 2907). Hazardous wastes generated in these workstations include methanol, potassium carbonate (electropolishing), nitric and hydrochloric acids, and acetone. Hazardous wastes generated during cleanup of Workstations 2901, 2903, 2906, and 2907 include electronic parts, leaded gloves, and other lead products.

Plutonium Analysis for Carbon – Building 332

Operations in Room 1329 consist of heating plutonium sample with copper accelerator and oxygen in an induction furnace.

Hazardous wastes generated in Room 1329 include the following: hydrochloric acid, nitric acid, phosphoric acid, sulfuric acid, ammonium hydroxide, arsenic, (atomic absorption standard) granular chromium lead, crystal ammonium persulfate, Arsenazo I (contains arsenic), 4-hydrate calcium nitrate, ethylene dichloride, hydrogen peroxide, lead(II) nitrate, anhydrous magnesium perchlorate, mercury thiocyanate, mercury solution, crystal potassium chromate, potassium dichromate, crystal potassium permanganate, silver nitrate, sodium dichromate, Pliobond Industrial Adhesive, Duco Cement, acetone, benzene, chloroform, isooctane, MEK, toluene, Swish All-Purpose Cleaner, methanol, MIbK, TCE, F-1 Neoprene Adhesive, Microduster, and WD-40.

Heavy metal standard solutions, including lead and chromium were used, and spill cleanup of these solutions may have been included in the waste. Heavy metal standards were in concentrations of one to ten parts per million (ppm).

Sputtering Facility and Sputtering Shield Cleaning Facility – Building 332

Workstations 3001 and 3002 (Room 1330): Operations consist of cleaning and sputter coating specimens (Workstation 3001), and physical and chemical cleaning of sputtering shields (Workstation 3002). The shields are physically cleaned with a glass bead blower then ultrasonically cleaned using Freon TF. Hazardous waste generated in this workstation includes mercury batteries and Freon TF.

Optical and Electron Metallographic Preparation Laboratories – Building 332

Operations in Room 1330A consist of polishing and etching of plutonium samples. Hazardous wastes generated include perchlorates, acetic anhydrides, and peroxides.

SEM-Microprobe Facility, Workstation 30A1 (Room 1330A): Facility utilized for x-ray microanalysis and scanning electron microscopy of plutonium and plutonium alloys. Samples

are cleaned with an ultrasonic cleaner, painted with a carbon-based paint, wrapped in aluminum foil and analyzed with the microprobe. Solvents used in maintaining the microprobe and preparing the samples include methanol, ethanol, acetone, and petroleum ether.

Hazardous wastes generated in Room 1330A include the following: Swish All-Purpose Cleaner, WD-40, and Easy Pull 11 wire lube (ignitable),

Thermal Mechanical Analyzer Test Facility – Building 332

Workstation 3708 (Room 1337): Operations consist of thermal expansion analysis of plutonium metal and plutonium alloys for temperatures ranging from -150 to 325°C. Ethanol is utilized in the workstation for cleaning.

High Pressure Testing Facility – Building 332

Workstation 3709 (Room 1337): Operations consist of low pressure testing. This process has not been conducted since approximately March, 1992.

Pumpdown/Backfill Station – Building 332

Workstation 3711 (Room 1337): Operations consist of plutonium container pumpdown and helium backfill.

Calorimetric Determination of Radioactive Materials – Building 332

Workstation 3718 (Room 1337): Operations consist of analyzing samples for plutonium metal and plutonium oxide quantities by calorimetry.

Inventory Mass Weighing of Nuclear Material – Building 332

Workstation 3708 (Room 1337): Operations consist of weighing and repackaging plutonium oxide materials. Hazardous wastes generated in this workstation include isopropanol, ethanol, and methanol used for cleaning hardware, Radiacwash for contamination control, circuit boards, leaded gloves, and Kaufman cans.

Hazardous wastes generated in Room 1337 include acetone and Freon TF.

Hopkinson Bar Test – Building 332

Workstation 3805 (Room 1338): Operations consist of heat testing a plutonium bar at high temperature.

Hazardous wastes generated in Room 1338 include spray paint (ignitable and may contain acetone, ethyl benzene, methanol, methylene chloride, toluene, xylene, barium, chromium, and lead).

Plutonium Machining Operations – Building 332

Workstations 4505, 4508, and Tent (Room 1345): Operations consist of D&D of a glovebox used for temperature testing of plutonium (Workstation 4505), milling and drilling of SNM (Workstation 4508), and waste packaging (Tent). The tent was inactive as of April 22, 1998. Hazardous wastes generated in this workstation include TCE (coolant), acetone, Dykem Marking Fluid (ignitable), leaded gloves, and other lead products.

Hazardous wastes generated in Room 1345 include Pliobond Industrial Adhesive, Swish All-Purpose Cleaner, and TCE.

Assembly Preparation and Conditioning Box – Building 332

Workstation 4509 (Room 1345): Operations currently consist of D&D of the equipment and materials used in this workstation. Up until 1995 operations consisted of assembly, disassembly, and dimensional inspection of plutonium parts. Hazardous wastes generated in this workstation include acetone and isopropanol used for parts cleaning, TLC-Free Stripcoat and Radiacwash used for D&D, lead products, leaded gloves, and electronic parts.

Plutonium Spectroscopy Experiment and Ceramic Immobilization and Sintering – Building 332

Workstations 4601 and 4602 (Room 1346): Past operations consist of plutonium, americium, uranium, or neptunium sample vaporization, ionization, and analysis. These workstations are now involved with Ceramic Immobilization and Sintering. Current operation for these workstations consist of plutonium sample pressing and drying for ceramic immobilization (Workstation 4601), and sintering material for ceramic immobilization (Workstation 4602). Hazardous wastes generated in this workstation include mercury batteries, lead products, and Swish All-Purpose Cleaner.

Hazardous wastes generated in Room 1346 include the following: Freon TF, isopropanol, and Freon T-P 35 (contains Freon TF).

Plutonium Machining Operations – Building 332

Workstations 5306, 5308, and 5309 (Room 1353): Operations consist of machining, weighing, and de-burring of plutonium metal. Hazardous wastes generated in this workstation include TCE (coolant, parts cleaning, and cutting fluid), acetone, Freon TF, leaded gloves, and other lead products.

Density Measurements – Building 332

Workstation 5307 (Room 1353): Operations consist of measuring the weight and density of plutonium parts. Hazardous wastes generated in this workstation include ethanol used for parts cleaning. Three workstations conducted machining operations, each using TCE. Two stations used TCE as a coolant during machining, and one used it for both cooling and parts degreasing.

Hazardous wastes generated in Room 1353 include the following: Swish All-Purpose Cleaner, Workable Fixative Coating (ignitable), and Dykem Steel Blue layout fluid (ignitable).

Pump-down Station – Building 332

Workstation 5412 (Room 1354): Operations consist of plutonium container pump-down and helium backfill conducted in a fume hood.

Device Assembly and Disassembly – Building 332

Workstations 5401 and 5405 (Room 1354): The downdraft table and balance box in these workstations are used for inspection, cleaning, assembly, and disassembly of plutonium parts. Isopropanol is used for parts and general cleaning. Toluene and hydrochloric acid were also used in these workstations. In 2001, the downdraft facility glovebox and ductwork were reconfigured. Decontamination and removal activities used nonhazardous strippable coating, fixative, and encapsulating material.

Hazardous wastes generated in Room 1354 include the following: Swish All-Purpose Cleaner, WD-40, and toluene.

Plutonium Laser Welding Facility – Building 332

Workstation 6109 (Room 1361): Operations consist of encapsulating radioactive sources by welding. Hazardous wastes generated in this workstation include acetone and isopropanol, used for cleaning before and after welding.

Plutonium Hydride Conversion to Plutonium Chloride – Building 332

Workstation 6101 (Room 1361): Operations consist of conversion of plutonium hydride to plutonium chloride, screening plutonium dispersibles, and computer inventory. Hazardous wastes generated in this workstation include mercury batteries, circuit boards, leaded gloves, and Kaufman cans.

Plutonium Laser Welding Facility – Building 332

Workstation 6108 (Room 1361): Operations consist of laser welding. Hazardous wastes generated in this workstation include acetone used for sample cleaning and electronic products.

Hazardous wastes generated in Room 1361 include the following: PVC Cement (contains MEK), and Glass Cleaner.

Inspection Facilities – Building 332

Workstations 6202, 6207, 6209, and 6210 (Room 1362): Operations consist of the physical inspection and contour gauging of parts (Workstations 6202 and 6207), parts cleaning and inspection (Workstation 6209), and assembly and weighing of plutonium parts (Workstation 6210). Hazardous wastes generated in this workstation include leaded gloves, TCE (finished parts cleaning), isopropanol (pre-clean), acetone (cleaning), and Freon TF (for loosening stuck probes and parts cleaning), and other lead products.

Thin Film Deposition Inspection – Building 332

Workstation 6208 (Room 1362): Operations consist of vacuum-based sputtering of metals onto plutonium targets and inspection of samples for coating thickness. Hazardous wastes generated in this workstation include ethanol used for parts cleaning.

Hazardous wastes generated in Room 1362 include the following: Swish All-Purpose Cleaner, ethanol, M1 All-Purpose Lubricant (ignitable), and WD-40.

Mechanical Properties Testing Facility – Building 332

Workstation 6908 (Room 1369): Operations consist of tension, torsion, and compression testing plutonium based materials at ambient and elevated temperatures. Only non-flammable liquids are permitted in this workstation.

Compatibility Testing – Building 332

Workstation 6907 (Room 1369): Operations consist of testing the resistance of various materials to attack by molten plutonium, plutonium alloys, or uranium.

Precision Density Glovebox – Building 332

Workstation 6904 (Room 1369): Operations consist of plutonium sample specific gravity determination. Hazardous wastes generated in this workstation include mercury thermometers and lead shielding. In the event that a thermometer breaks, the mercury is collected and sent to Room 1378 for disposal.

Sample Preparation Facility and Rolling Mill – Building 332

Workstation 6909 (Room 1369): Past operations consisted of sample preparation, photo documentation, sample surface investigation, and vacuum storage. Hazardous wastes generated in this workstation included isopropanol. Present operations consist of roll milling plutonium disks and gold vapor coating. Hazardous wastes generated in this workstation included ethanol.

Tensile Testing Facility – Building 332

Workstation 6901 (Room 1369): Past operations consisted of heat treating and quenching of plutonium-based materials, immersion of samples in molten plutonium, and compatibility testing of plutonium. Current operations consist of tensile strength testing for the evaluation of thin film coatings. An ultrasonic cleaner and a small vacuum chamber used to pump, purge, and backfill containers with inert gas for storage of plutonium samples is also present. Hazardous wastes generated in this workstation include ethanol, Kaufman cans, leaded gloves, and other lead products.

Storage and Testing of Dispersible Plutonium Spheres – Building 332

Workstation 6906 (Room 1369): Operations consist of long-term storage of plutonium dispersibles.

Hazardous wastes generated in Room 1369 include the following: Swish All-Purpose Cleaner, Glass Cleaner, and Freon TF.

High Temperature Research – Building 332

Workstation 7004 (Room 1370): This glovebox was utilized for high temperature research and was decommissioned in 1999. Hazardous wastes generated in this workstation included lead products.

Casting Facility – Building 332

Workstations 7006 and 7009 (Room 1370): Operations consist of casting of plutonium-based alloys. Hazardous wastes generated in this workstation include circuit boards, leaded gloves, and Swish All-Purpose Cleaner.

Heat Treating Facility – Building 332

Workstations 7002 and 7003 (Room 1370): Operations consist of tube furnace for heating plutonium samples (Workstation 7002) and heat treating of plutonium based alloys (Workstation 7003). Leaded gloves and Swish All-Purpose Cleaner was used to clean glovebox windows in Workstation 7003.

Workstations 7002, 7003, and 7004 (Room 1370): These heat treating furnace and mill gloveboxes contaminated with Pu-238 are undergoing D&D.

Thermocycling – Building 332

Workstation 7001 (Room 1370): Former operations consisted of thermocycling plutonium alloys. Leaded gloves were used in this workstation and Swish All-Purpose Cleaner was used to clean glovebox windows. This workstation is now used for characterization of items from the D&D of Workstations 7002, 7003, and 7004. This process generates a solid mixture containing mercury, nickel, and/or zinc.

Casting Facility – Building 332

Workstations 7007 and 7008 (Room 1370): Former operations in Workstation 7007 consisted of plutonium casting; this workstation has been removed. Operations in Workstation 7008 consist of plutonium casting. Hazardous wastes generated in this workstation include leaded gloves, circuit boards, and Swish All-Purpose Cleaner.

Compatibility Testing – Building 332

Workstation 7703 (Room 1377): Operations consist of melting plutonium in a containment vessel to determine the resistance of the vessel to molten plutonium.

Balance Calibration Glovebox – Building 332

Workstation 7706 (Room 1377): Operations consist of balance calibration. Hazardous wastes generated in this workstation include lead products.

Preparation of Pellets for Sintering by Cold Pressing in a Hydraulic Press – Building 332

Workstation 7705 (Room 1377): Operations consist of pressing ceramic oxide or glass pellets. Hazardous wastes generated in this workstation include mercury batteries, acetone, ethanol, Kaufman cans, and other lead products. Barium titanium oxide powder is also used in this workstation; however, the waste contaminated with barium titanium oxide powder is below the regulatory level for barium.

Molten Actinide Containment Studies – Building 332

Molten actinide containment studies were conducted in Room 1377. Hazardous wastes generated in this workstation consist of Swish All-Purpose Cleaner.

Hazardous wastes generated in Room 1377 include the following: Swish All-Purpose Cleaner, glass cleaner, and Krylon Upside Down paint (ignitable, contains acetone, ethyl benzene, methanol, methylene chloride, toluene, xylene, barium, chromium, and lead).

Plutonium Recovery, Waste Packaging and Mass Weighing – Building 332

Workstations 7801, 7802, 7803, 7805, 7806, 7807, 7810, 7811, 7812 (Room 1378): Operations consist of oxidation of dispersible plutonium or metal plutonium parts and sieving (Workstation 7801); oxidation of dispersible plutonium or metal plutonium parts (Workstation 7802); crushing, pulverizing, blending, sampling, and packaging plutonium ash (Workstation 7803); liquid and fine powder solidification (Workstation 7805); plutonium blending and weighing (Workstation 7806); plutonium blending, weighing, and dry and wet grinding (Workstation 7807); plutonium sample blending, weighing, acid leaching, and neutralization of acids and bases (Workstation 7810); plutonium sample blending, weighing, and cleaning (Workstation 7811); and plutonium sample weighing and calcining (Workstation 7812). Liquid wastes solidified in Workstation 7805 are generated primarily from plutonium machining and recovery operations. Acidic or basic liquids are first neutralized using sodium hydroxide or sulfuric acid. Prior to solidification of contaminated oil, chloroform is added to facilitate filtering. The liquids are bulked and neutralized in plastic containers and the appropriate solidification agent added. Aqueous liquid solidification agents include Portland cement, sodium silicate, and Aquaset I/II. Organic liquid solidification agents include Envirostone gypsum cement, and Petroset I/II. Ethanol, propanol, isopropanol are added to organic liquids to aid in solidification. Hazardous wastes generated in this workstation include oil, nitric, hydrochloric, and sulfuric acids, sodium hydroxide, TCE (used as a solvent and coolant in other processes), chromium oxide, chromium oxide products, Swish All-Purpose Cleaner, cadmium- and lead-lined steel cans, Kaufman cans, leaded gloves, electronic equipment, and other lead products.

Workstation 7804 (Room 1378): This workstation consisted of three connected gloveboxes. Sorting was conducted in the first glovebox to group like materials for recovery operations. Precipitation and filtration operations were conducted in the second glovebox to recover plutonium from organic and acid solutions. The third glovebox included a furnace for oxidation of contaminated combustible materials. Hazardous wastes generated in this workstation include nitric and hydrochloric acids and sodium hydroxide.

Inspection, Package, and Repackage Station – Building 332

Workstation 7808 (Room 1378): Operations consist of parts inspection. Hazardous wastes generated in this workstation include chromium oxide, ethanol, methanol, acetone, and lead products.

Aerosol Can Puncturing Facility – Building 332

Aerosol cans of Swish All-Purpose Cleaner, Gleme, varnish, and paint were punctured in Room 1378. The contents were drained onto Kimwipes. Because this material was assumed to be radioactively contaminated, the Kimwipes were disposed as part of this waste stream.

Hazardous wastes generated in this facility include the following: hydrochloric, nitric, phosphoric, and sulfuric acids, sodium hydroxide (10 Normal solution), F-1 Neoprene Adhesive, Swish All-Purpose Cleaner, Glass Cleaner, Krylon Matte Finish Coating, and Silver Goop lubricant.

Plutonium Fission/Avalanche Chamber Experiment – Building 332

This experiment used oxygen or acetone as the working gas in a plutonium fission/avalanche chamber. Acetone is the only hazardous waste identified.

Hot Spot Exercise – 1975 (HSX-75) – Building 332

Soil samples were created in Building 332 for use in a field survey exercise conducted at Site 300. Less than one gram of weapons-grade plutonium and enriched uranium were mixed with soil to make the samples. The samples were double encapsulated in plastic and placed in metal containers at specific locations on the ground as part of the exercise. Upon completion of the exercise, the samples were stored by Hazards Control in Building 253 until they were packaged in a 55-gallon drum for disposal. Since the soils are packaged in small cans, the actual volume percent of soil in the waste container is less than 50 percent.

Building 419

Building 419 received TRU waste from Buildings 251 and 332, and was used by LLNL for equipment decontamination and hazardous and mixed waste treatment (size reduction and solidification), activities. Solidification activities in Building 419 generate Waste Form #2 waste which is packaged as waste steam ID-LL-W019-S3900; this waste process is not discussed in this WSP.

Decontamination – Building 419

Building 419 was used primarily for radioactive decontamination of material and personnel. Contaminated equipment was received at Building 419, decontaminated, and released back to LLNL generators, if possible. Equipment that could not be decontaminated to appropriate levels was declared waste, size-reduced as necessary, and packaged for disposal. Items that were only slightly contaminated were steam cleaned or sprayed with an all-purpose cleaner. Kimwipes were used to remove contamination. More highly contaminated items were decontaminated in a walk-in hood and walk-in shot blast unit in Room 124, in gloveboxes in Room 155, and in a walk-in hood in Room 167. Large contaminated items were moved to the

center of the room by a forklift. Also, a 900-kg crane was available for moving materials. Other equipment in the facility, including the vapor degreaser, hydro-finisher, electro-polisher, tritium/mercury oven, and the chemical fume hoods, were not authorized for TRU waste operations.

The walk-in hoods in Rooms 124 and 167 were used for decontamination and size reduction of gloveboxes and other equipment. These hoods were equipped with blowers to exhaust air through HEPA filters connected to stacks on the roof. The walk in hood in Room 124 had two additional HEPA filters that could be connected to the exhaust of a glovebox being decontaminated to collect particulate contaminants exhausted from the glovebox. Soap and water, all-purpose cleaners, acid solutions, or permanganate solutions may have been used to remove contamination. The spent solutions were collected in carboy containers. If an acid was used for decontamination, a caustic was sprayed on the item to neutralize the acid. If the item was not decontaminated successfully, the contamination was affixed in place with spray paint. The decontamination and size reduction activities generated waste sludge and spent cleaning fluids that were either properly managed at the associated waste accumulation area (in carboy containers) or placed in the Building 419 retention tanks.

The walk-in shot blast unit in Room 124 propelled metal beads against the surfaces of the item being decontaminated. This rapidly removed the material surface and was used where deep penetration of contamination had occurred. The shot blast unit was equipped with HEPA filtration. Ultrasonic tanks used high frequency sound waves to remove contaminants from items like wrenches, screwdrivers, etc. In Room 155, three adjacent gloveboxes were used to decontaminate various items. These gloveboxes were equipped with parallel-connected HEPA filters on the exhaust trap.

Decontamination was performed in Buildings 251 and 332 on an as-needed basis, usually related to decommissioning projects, and decontamination wastes were sent to Building 419. In Buildings 251 and 332, the inside of the gloveboxes and any equipment was wiped down using an all-purpose cleaner. Spray paint or mineral oil was applied to affix surface contamination. The following are examples of some of the decommissioning projects in Building 332:

- Removal of gloveboxes and equipment from Rooms 1007 and 1011.
- Removal of the centrifuge program conducted in Room 1377.
- Removal of the surface plate analysis glovebox in Room 1377. This glovebox was used for plutonium parts measurement.
- Removal of gloveboxes and associated equipment from Rooms 1006, 1329, and 1354.

Building 695

Building 695 is part of the LLNL DWTF. The facilities known collectively as the DWTF are used by LLNL's RHWM Division to store and treat regulated wastes generated at LLNL. The mission of Building 695 includes container storage, lab-packing, repacking, overpacking, bulking, sampling, waste transfer, and waste treatment. Building 695 is used for storage of radioactive waste (including transuranic and low-level), hazardous, nonhazardous, mixed, and other waste. The CCP MOVER unit was located in the 695 yard in 2004 and 2005 during the last TRU shipping campaign. The decontamination of the MOVER created five drums of TRU waste which was the result of repackaging TRU waste generated from Buildings 151, 235, 251, 332, and 419.

Table 1 identifies the toxicity characteristic (TC) and F-listed chemicals in waste stream ID-LL-M001-S5400.

**Table 1 – TC and F-Listed Constituents in Waste Stream ID-LL-M001-S5400**

| Constituent | CAS # | EPA Hazardous Waste Number |
|---|---|---|
| Arsenic | 7440-38-2 | D004 |
| Barium | 7440-39-3 | D005 |
| Cadmium | 7440-43-9 | D006 |
| Chromium | 7440-47-3 | D007 |
| Lead | 7439-92-1 | D008 |
| Mercury | 7439-97-6 | D009 |
| Selenium | 7782-49-2 | D010 |
| Silver | 7440-22-4 | D011 |
| Benzene | 71-43-2 | D018, F005 |
| Carbon tetrachloride | 56-23-5 | D019 |
| Chloroform | 67-66-3 | D022 |
| 1,2-Dichloroethane | 107-06-2 | D028 |
| 1,1-Dichloroethylene | 75-35-4 | D029 |
| Methyl ethyl ketone (MEK) | 78-93-3 | D035, F005 |
| Trichloroethylene (TCE) | 79-01-6 | D040, F001, F002 |
| 1,1,1-Trichloroethane | 71-55-6 | F001, F002 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon TF) | 76-13-1 | F001, F002 |
| Methylene chloride | 75-09-2 | F002 |
| Tetrachloroethylene | 127-18-4 | F002 |
| Chlorobenzene | 108-90-7 | F002 |
| Trichlorofluoromethane | 75-69-4 | F002 |
| Carbon disulfide | 75-15-0 | F005 |
| 2-Ethoxyethanol | 110-80-5 | F005 |
| Isbutanol | 78-83-1 | F005 |
| Pyridine | 110-86-1 | F005 |
| Toluene | 108-88-3 | F005 |

## RCRA Determinations - Hazardous Waste Determinations

### Ignitability, Corrosivity, Reactivity

Waste generated in this waste stream does not qualify for any of the exclusions outlined in 40 CFR 260 or 261. Real Time Radiography (RTR) is used to verify that the waste stream is not a liquid waste and does not contain explosives, non-radioactive pyrophoric materials, compressed gases or reactive waste. Therefore, this waste stream does not exhibit the characteristic for ignitability (D001), corrosivity (D002), or reactivity (D003).

### Ignitability

This waste does exhibit the characteristic of ignitability as defined in 40 CFR 261.21. The waste is not a liquid, an ignitable compressed gas, or an oxidizer, and is not capable of causing fire through friction, absorption of moisture, or spontaneous chemical change.

The addition of liquids, compressed gases, and pyrophoric materials to containers is prohibited by procedure (References C026, P009, P010, P013, P021, P067, and P068). In addition, these materials were not identified on the Waste Parcel Cards (References U002 and U009). Pyrophoric metals are calcined or solidified before they are discarded and, therefore, only residual amounts of metals (e.g., aluminum powder, magnesium powder, plutonium hydride, lithium metal) contaminate the waste. Because debris waste is packaged in air atmosphere gloveboxes, any reaction of the residual pyrophoric metals would occur before being bagged out (References C005, C015, C026, C030, C037, C038, C042, C071, C072, C087, C089, P013, P067, and P068). Several acids were used in the waste generating buildings but because only trace quantities of acids will be present on wipes and exist as dilute solutions, nitrocellulose would not have formed on Kimwipes or other cellulose-based materials (References C021, C027, C045, C071, and P002). A hydrogen peroxide solution was used in Building 251 as an oxidizing or reducing agent but used only one drop at a time (References C024 and P002). Oxidizers (e.g., nitrates, perchlorates, chromic acid) are only present as trace contaminants in glovebox trash. Chemicals and contaminated wipes were kept to a minimum. Wipes were dried before removal from the glovebox. Visibly soiled wipes were removed and sent for plutonium recovery (calcination) (References C017, C041, C045, C055, C068, C070, P005, and P044). Other oxidizers (e.g., nitrates, perchlorates, chromic acid) are used in the waste generating buildings but are only present as trace contaminants in glovebox trash. Numerous products containing ignitable constituents were used in the facilities that generated this waste. These products include Duco cement, 611 Penetrating Fluid, WD-40, Dag 154, Eccostrip 93, Gray Heavy Duty Cement, Pliobond Industrial Adhesive, F-1 Neoprene Adhesive, Krylon Matte Finish Coating, DP-Spray, Easy Pull-11 wire lube, Dykem Marking Fluid, Workable Fixative Coating, Dykem Steel Blue Layout Fluid, M1 All-Purpose Lubricant, Carboline Neoprene Adhesive, and Krylon Upside Down Paint. These materials are ignitable in the liquid form. However, the waste is not liquid; liquids are solidified prior to disposal and the solidified waste is placed in drums with other glovebox trash (References C015, C020, P002, P034, P035, and U004). Therefore, the waste is not ignitable.

To ensure the waste does not exhibit the characteristic of ignitability, liquid in excess of TSDF-WAC limits will be removed or immobilized, and compressed gases (e.g., aerosol cans) will be removed or vented prior to WIPP disposal. Therefore, this waste does not exhibit the characteristic of ignitability (D001) (References C005, C015, C026, C030, C037, C038, C042, C071, C072, C087, C089, P013, P067, and P068).

**Corrosivity**

The waste does not exhibit the characteristic of corrosivity as defined in 40 CFR 261.22.

The addition of liquids to containers is prohibited by procedure (References C026, P009, P010, P013, P021, P067, and P068). In addition, these materials were not identified on the Waste Parcel Cards (References U002 and U009). Acids and bases were neutralized and liquids were solidified before disposal (References P004, P017, P034, P035, U005, U006, and U018). Acid-contaminated wipes were sprinkled with a base for neutralization (References C029 and C045). Therefore, the waste is not corrosive.

To ensure the waste does not exhibit the characteristic of corrosivity, liquid in excess of TSDF-WAC limits will be removed or immobilized prior to WIPP disposal. Therefore, this waste does not exhibit the characteristic of corrosivity (D002) (References C005, C015, C026, C030, C037, C038, C042, C071, C072, C087, C089, P013, P067, and P068).

**Reactivity**

This waste stream does not exhibit the characteristic of reactivity as defined in 40 CFR 261.23. The materials are stable and will not undergo violent chemical change. The materials will not react violently with water, form potentially explosive mixtures with water, or generate toxic gases, vapors, or fumes when mixed with water. The waste does not contain cyanides and is not capable of detonation or explosive reaction

The addition of explosives and other reactive materials to containers is prohibited by procedure (References P009, P010, P013, P021, P067, and P068). In addition, these materials were not identified on the Waste Parcel Cards (References U002 and U009). Although very small amounts of perchloric acid were used in Building 251 to destroy organics in samples, the material was taken to dryness (References C015 and P002). Hydrogen peroxide was also used in Building 251 as an oxidizing or reducing agent but used only one drop at a time (References C024 and P002). Water was run through ion exchange columns prior to disposal (References C015 and C030). Reactive metals are calcined or solidified before they are discarded and, therefore, only residual amounts of metals (e.g., calcium, magnesium) may contaminate the waste (References C005, C024, C030, C037, C038, C042, C071, C072, C087, C089, C090, and P067). Instapak Component A and B, a flame-retardant organic foam used to affix loose material in place inside gloveboxes during D&D, is reactive when in liquid form; however, this material is not in liquid form when outside the original containers (References C003, C015, C024, C030, C060, C091, D006). The mold release (Electrofilm Lubribond A) used in Building 251 tracer fabrication contains molybdenum disulfide (Reference P034). Carbon disulfide and sodium sulfide were used in various processes that contribute to waste generation. The waste is not liquid; liquids are solidified prior to disposal (References C015, C020, P002, P034, P035, and U004). The waste does not contain sulfides in concentrations sufficient to generate toxic gases, vapors, or fumes in quantities sufficient to present a danger to human health or the environment. Explosive use is authorized on a case-by-case basis only (Reference C024). The limited amount of explosives used was sent to LLNL Site 300 for disposal and will not be in the waste (Reference C092). Waste with incompatible chemical properties that could react with each other (e.g., oxidizers and organic solvents), are not combined (References P014, P023, P034, P036, P039, P044, P052, and P054). Therefore, the waste is not reactive.

To ensure the waste does not exhibit the characteristic of reactivity, liquid in excess of TSDF-WAC limits will be removed or immobilized, and compressed gases (e.g., aerosol cans) will be

removed or vented prior to WIPP disposal. Therefore, this waste stream does not exhibit the characteristic of reactivity (D003) (References C005, C015, C026, C030, C037, C038, C042, C071, C072, C087, C089, P013, P067, and P068).

**Toxicity Characteristic**

This waste stream exhibits the characteristic of toxicity per 40 CFR 261.24. The toxicity characteristic contaminants fall into two categories; metals and organics. Where a constituent has been identified and there is no quantitative data available to demonstrate that the concentration is below regulatory threshold, the applicable EPA HWN is applied to the waste stream.

The waste stream contains or is contaminated with toxicity characteristic metals. Based on the evaluation of the AK source documentation, several compounds or materials may contaminate this waste. For example, arsenic (used an absorption standard and as a reagent [component of Arsenazo 1]), cadmium, chromium, lead, mercury, selenium, and silver were used in laboratory operations. Barium, along with barium chloride and barium oxide, was used in Building 332. Cadmium is a component of silver solder and cadmium-lined steel cans were used for shielding. Chromium was used in pyroredox refining and is an ingredient in paint. Chromium chloride was used in chemical separations. Lead is present in glovebox windows and other shielding, leaded gloves, and solder in electronic parts. Mercury is present in fluorescent light bulbs, thermometers, and batteries and was used in diffusion pumps. Selenium was used as target substrates and to overplate sputtering targets in Building 251. Silver is a component in silver solder and Silver Goop thread lubricant. Therefore, EPA HWNs for arsenic (D004), barium (D005), cadmium (D006), chromium (D007), lead (D008), mercury (D009), selenium (D010), and silver (D011) are assigned to this waste stream (References C001, C003, C005, C007, C015, C017, C018, C020, C022, C024, C025, C027, C030, C033, C037, C038, C042, C048, C051, C057, C058, C059, C060, C069, C074, C084, C085, C094, C102, C106, C116, P002, P003, P016, P034, P036, U001, U002, U003, U004, U005, U007, U010, U011, U012, U019, U021, and U029).

Waste stream ID-LL-M001-S5400 is contaminated with toxicity characteristic organic compounds. Based on the evaluation of the AK source documentation, including analytical data from previous sampling activities at the NTS, benzene (D018), carbon tetrachloride (D019), and chloroform (D022) were used in the laboratories at LLNL. Benzene was used in liquid-liquid extraction and in solvent extraction. Carbon tetrachloride was used in the laboratories, for cleaning, and as a lubricant/coolant. Chloroform was used to aid in filtration in liquid waste treatment.

Chlorobenzene was used in the UV-Vis Spectrometer. MEK (D035) was used in casting/sputtering operations in Building 332 and is an ingredient in several commercial chemical products. Pyridine is an historical contaminant in Building 419 and was used in Building 332. Tetrachloroethylene was used as a solvent in Buildings 251 and 332 and in Building 419 size reduction. TCE (D040) was used as a machining coolant in Building 332 and is an ingredient in commercial chemical products (References C017, C019, C024, C027, C029, C030, C032, C033, C036, C048, C051, C055, C056, C057, C058, C059, C067, C071, C072, C074, C075, C076, C077, C080, C085, C086, C087, C094, C098, C107, P002, P003, P008, P014, P015, P016, P020, P034, P040, P058, U001, U002, U004, U005, U007, U010, U018, and U024).

EPA HWN D027 was assigned to LLNL waste based on a 1968 chemical inventory that listed 1,4-dichlorobenzene. Additional AK collected for the TRU waste inventory generated during the timeframe that covers waste stream ID-LL-M001-S5400 did not identify the use of 1,4 dichlorobenzene in the TRU waste generating process and 1,4-dichlorobenzene was not detected during headspace gas sampling (HSGS) of waste from the same sources as this waste stream performed at NTS; therefore, D027 is not assigned to waste stream ID-LL-M001-S5400 (References D005, D008, and P066).

Although not identified in the waste stream by AK, 1,2-dichloroethane (D028) and 1,1-dichloroethylene (D029) were detected in NTS HSGS of waste from the same sources as waste from this waste stream (Reference P066). In the absence of quantitative data on their concentration in the waste, the D028 and D029 EPA HWNs are applied to the waste stream.

Benzene (D018), MEK (D035), and TCE (D040) were identified for both solvent and non-solvent use in several buildings and are assigned both the toxicity characteristic HWNs and F-listed HWNs.

Since the more specific F-listed EPA HWNs have been assigned for chlorobenzene (F002), pyridine (F005), and tetrachloroethylene (F002), the corresponding toxicity characteristic HWNs D021 (chlorobenzene), D038 (pyridine), and D039 (tetrachloroethylene) are not applied (References P002, P008, P016, and P020)

**Listed Waste**

**F-Listed Waste**

Waste stream ID-LL-M001-S5400 was mixed with or derived from F-listed hazardous wastes from non-specific sources as listed in 40 CFR 261.31. EPA HWNs F001, F002, and F005 listed solvents were used in LLNL buildings 151, 235, 251, 332, 419, and 695 and contaminate the waste (References C017, C019, C024, C027, C029, C030, C032, C033, C036, C037, C038, C055, C057, C059, C065, C071, C072, C086, C087, C107; P002, P003, P008, P014, P016, P020, P034, P040, P058, U001, U002, U005, U007, and U010).

In most cases, specific information relating to the use of these compounds for their solvent properties was identified. In the absence of information relating to the specific use of these compounds (e.g., analytical reagents typically used to dissolve or mobilize other constituents), the F-listed HWN was assigned for these solvents.

F-listed solvents that were identified for LLNL waste include 1,1,1 trichloroethane, 2-ethoxyethanol, benzene, carbon disulfide, carbon tetrachloride, chlorobenzene, dichlorodifluoromethane, Freon TF, isobutanol, MEK, methylene chloride, pyridine, tetrachloroethylene, TCE, trichlorofluoromethane, and toluene.

EPA HWN F001 is applied for 1,1,1-trichloroethane (used as a replacement for TCE, including in vapor degreasing, for about one year), Freon TF (used for degreasing in the Sputtering Shield Cleaning facility and is the primary component in trade name degreasers used in Building 332), and TCE (used as a degreaser in the machine shop, in vapor and other degreasing and parts cleaning in Building 332). Carbon tetrachloride, dichlorodifluoromethane, methylene chloride, and tetrachloroethylene were not used in large scale degreasing; therefore, EPA HWN F001 is not applied for these chemicals. EPA HWN F002 is applied for 1,1,1-trichloroethane (component of Rapid Tap cutting fluid and was used straight as a cutting fluid), chlorobenzene

(used as a solvent in Buildings 332 and 419 and in the UV-Vis Spectrometer), Freon TF (used for cleaning and/or drying parts), methylene chloride (used as an extractant in the Forensic Radiochemistry of Plutonium, as a solvent in size reduction, and is an ingredient in commercial chemical products), tetrachloroethylene (used as a solvent in Buildings 251, 332, and 419), TCE (used for parts cleaning and as a machining coolant), and trichlorofluoromethane (used as a solvent in Building 332) (References C017, C024, C027, C029, C030, C032, C033, C036, C037, C038, C048, C051, C055, C056, C057, C058, C059, C065, C071, C072, C074, C075, C076, C077, C080, C085, C086, C087, C094, D021, P002, P003, P008, P014, P015, P016, P020, P034, P058, U001, U002, U004, U005, and U024).

EPA HWN F003 constituents, including acetone, n-butanol, cyclohexanone, ethyl acetate, ethyl benzene, ethyl ether, methanol, MIbK, and xylene are used in LLNL Buildings 151, 235, 251, 332, 419, and 695. These solvents are listed solely as ignitable in the liquid form. The waste does not exhibit the characteristic of ignitibility because it is not liquid; therefore, F003 is not assigned (References C108 and U005).

EPA HWN F004 was assigned to LLNL waste based on a 1968 chemical inventory that listed nitrobenzene. Additional AK collected for the TRU waste generated during the timeframe that covers waste stream ID-LL-M001-S5400 did not identify the use of nitrobenzene in the waste generating process; therefore, F004 is not assigned to waste stream ID-LL-M001-S5400 (References D008 and P066).

EPA HWN F005 is applied for 2-ethoxyethanol (used in metallographic operations, in sample preparation including electropolishing, and in chemical and ion-etching operations), benzene (used in liquid-liquid extraction and solvent extraction), carbon disulfide (used in liquid-liquid extraction), isobutanol (used to extract organic residue from samples in the Forensic Radiochemistry of Plutonium), MEK (used as a degreaser in the machine shop), pyridine (used as a reagent in Building 332 and is an historical Building 419 contaminant) and toluene (used in liquid-liquid extraction, solvent extraction, and is a component of paints) (References C017, C019, C024, C029, C030, C032, C107, P002, P003, P008, P014, P016, P020, P034, P040, U005, U007, and U010).

The following F-listed constituents contaminate the waste and are applied:

(F001)
1,1,1-trichloroethane, Freon TF (1,1,2-trichloro-1,2,2-trifluoroethane), and TCE (trichloroethylene)

(F002)
1,1,1-trichloroethane, chlorobenzene, Freon TF, methylene chloride, tetrachloroethylene, TCE, and trichlorofluoromethane

(F005)
2-ethoxyethanol, benzene, carbon disulfide, isobutanol, MEK (methyl ethyl ketone), pyridine, and toluene

## U, K, and P-Listed Chemicals

Waste stream ID-LL-M001-S5400 was not mixed with a discarded commercial chemical product, an off-specification commercial chemical product, or a container residue or spill residue thereof (40 CFR 261.33).

Beryllium and beryllium compounds may contaminate this waste stream. Beryllium metal was used in Building 251 as a substrate for accelerator targets (Reference C015). Beryllium metal was also used in Building 332 machining, metallography, and coatings development, and could be present in the waste as turnings, grindings, and flakes (References C033, C067, C071, and C072).

Based on the AK documentation reviewed, the form of beryllium used does not meet the definition of commercial chemical product beryllium powder (40 CFR 261.33). Therefore, the waste stream does not meet the definition of P015 waste (References C110, C112, C118, U002, and U005).

The review of the AK source documentation did not identify the disposal of unused hydrofluoric acid (U134) or disposal of materials contaminated with spills of this acid; therefore the EPA HWN U134 is not assigned to waste stream ID-LL-M001-S5400 (References C020, C027, C104, P010, P013, U008, and U013).

Waste stream ID-LL-M001-S5400 does not include any of the manufacturing process wastes from the specific industries or sources listed in 40 CFR 261.32.
Waste Stream ID-LL-M001-S5400 is not assigned any U-, K-, or P-listed EPA HWNs.

## Headspace Gas/Volatile Organic Compound Information

Headspace gas analysis was completed on 10 randomly selected containers in Lot 1 of this waste stream. No new EPA HWNs were added as a consequence of headspace gas sampling and analysis. No target analyte $UCL_{90}$ data exceeded the respective PRQLs and no TICs were identified.

The specifics of this information are included in the attached Characterization Information Summary report.

## Other Waste Streams Generated From the Same Buildings and Processes

Waste stream ID-LL-M001-S5400 was previously shipped to WIPP directly from the LLNL site under the CCP TRU Waste Certification Program (waste stream profile LL-M001-S5400). This waste stream is the same as the debris waste stream described in this Summation of Aspects of AK: ID-LL-M001-S5400. There are no differences in the toxicity characteristic organic EPA HWNs assigned to waste streams LL-M001-S5400 and ID-LL-M001-S5400. EPA HWN F001 was assigned to waste stream LL-M001-S5400 for carbon tetrachloride, dichlorodifluoromethane, methylene chloride, and tetrachloroethylene; however, further clarification from EPA concerning the assignment of EPA HWN F001 indicated that F001 not be applied to waste stream ID-LL-M001-S5400 for these constituents because there is insufficient AK that they were used in large-scale degreasing.

Similar debris waste streams were also previously shipped to WIPP under the CCP TRU Waste Characterization Program at NTS (waste stream profiles NTS54COMR0 [for Buildings 251, 332,

and 419], NTS54332R0 [for Building 332], and NTS54MIX1R0 [for Buildings 251 and 332]). The toxicity characteristic organic EPA HWNs assigned to waste stream ID-LL-M001-S5400 that were not assigned to waste stream profiles NTS54COMR0, NTS54332R0, and NTS54MIX1R0 are benzene (D018) and methyl ethyl ketone (D035). For waste stream profiles NTS54COMR0, NTS54332R0, and NTS54MIX1R0, benzene and methyl ethyl ketone were assigned their corresponding F-listed EPA HWNs for solvent use only; additional AK collected for waste stream ID-LL-M001-S5400 indicates that these compounds also had non-solvent uses, as discussed above. The toxicity characteristic organic EPA HWN assigned to waste stream profiles NTS54COMR0, NTS54332R0, and NTS54MIX1R0 that is not included in waste stream ID-LL-M001-S5400 is 1,4-dichlorobenzene (D027). EPA HWN D027 was assigned to LLNL waste based on a 1968 chemical inventory that listed 1,4-dichlorobenzene. Additional AK collected for the TRU waste generated during the timeframe that covers waste stream ID-LL-M001-S5400 did not identify the use of 1,4-dichlorobenzene in the waste generating processes for waste stream ID-LL-M001-S5400 and 1,4-dichlorobenzene was not detected during HSGS of waste from the same sources as this waste stream performed at NTS; therefore, D027 is not assigned. EPA HWN F001 was assigned to waste stream profiles NTS54COMR0, NTS54332R0, and NTS54MIX1R0 for carbon tetrachloride, dichlorodifluoromethane, methylene chloride, and tetrachloroethylene; however, further clarification from EPA concerning the assignment of EPA HWN F001 indicated that F001 not be applied to waste stream ID-LL-M001-S5400 for these constituents because there is insufficient AK that they were used in large-scale degreasing.

A similar waste stream was also previously shipped to WIPP under the CCP TRU Waste Characterization Program at INL (waste stream ID-NTLLNL-S5400, AK Summary Report CCP-AK-INL-009 [Buildings 251, 332, and 419]). The toxicity characteristic organic EPA HWNs assigned to waste stream ID-LL-M001-S5400 that were not assigned to waste stream ID-NTLLNL-S5400 are benzene (D018), carbon tetrachloride (D019), methyl ethyl ketone (D035), and trichloroethylene (D040). For waste stream ID-NTLLNL-S5400, benzene, carbon tetrachloride, methyl ethyl ketone, and trichloroethylene were assigned their corresponding F-listed EPA HWNs for solvent use only; additional AK collected for waste stream ID-LL-M001-S5400 indicate that these compounds also had non-solvent uses, as discussed above. The toxicity characteristic organic compound contaminating waste stream ID-NTLLNL-S5400 that is not included in waste stream ID-LL-M001-S5400 is 1,4-dichlorobenzene (D027). EPA HWN D027 was assigned to LLNL waste based on a 1968 chemical inventory that listed 1,4-dichlorobenzene. Additional AK collected for the TRU waste generated during the timeframe that covers waste stream ID-LL-M001-S5400 did not identify the use of 1,4-dichlorobenzene in the waste generating processes and 1,4-dichlorobenzene was not detected during HSGS of waste from the same sources as this waste stream performed at NTS; therefore, D027 is not assigned to waste stream ID-LL-M001-S5400. EPA HWN F001 was assigned to waste stream profiles ID-NTLLNL-S5400 for carbon tetrachloride, dichlorodifluoromethane, methylene chloride, and tetrachloroethylene; however, further clarification from EPA concerning the assignment of EPA HWN F001 indicated that F001 not be applied to waste stream ID-LL-M001-S5400 for these constituents because there is insufficient AK that they were used in large-scale degreasing.

**Conclusion**

The EPA HWNs that apply to waste stream ID-LL-M001-S5400 are: D004, D005, D006, D007, D008, D009, D010, D011, D018, D019, D022, D028, D029, D035, D040, F001, F002, and F005.

**Polychlorinated Biphenyls (PCBs)**

No sources of PCBs have been identified in this waste stream. PCB waste not authorized under an EPA PCB waste disposal authorization is not in this TRU waste stream.

**Prohibited Items**

The absence of prohibited items is determined and documented through acceptable knowledge and confirmation activities. Radiography is performed on each container to verify the absence of prohibited items. The following items have been determined as not present in the waste:

- Liquid waste
- Non-radioactive pyrophoric materials
- Hazardous waste not occurring as co-contaminants with TRU mixed wastes (non-mixed hazardous waste)
- Waste incompatible with backfill, seal and panel closure materials, container and packaging materials, or other wastes
- Explosives or compressed gases
- Waste with PCBs not authorized under an EPA PCB waste disposal authorization
- Waste exhibiting the characteristics of ignitability, corrosivity, or reactivity
- Waste that has ever been managed as high-level waste and waste from tanks specified in Table B-8 of the WIPP HWFP, unless specifically approved through a Class 3 permit modification

Each container of waste is certified and shipped only after RTR either:

- Did not identify any prohibited items in the waste container, or
- All prohibited items found in a waste container by radiography are identified and corrected (i.e., eliminated or removed) through the site non-conformance reporting system.

**Justification for the Selection of RTR**

RTR was selected as the characterization method for this lot because the waste containers were previously packaged and RTR is an acceptable characterization method to meet all the Data Quality Objectives for NDE of waste stream ID-LL-M001-S5400.

**Method for Determining Waste Material Parameters (WMPs) Weights Per Unit of Waste**

The waste material parameters (WMPs) for waste stream ID-LL-M001-S5400 were estimated by VE or radiography. The VE data was documented on Parcel Cards and the radiography data on data sheets (References C103, C113, U002, and U003). If waste parameter estimates were not documented in the container records, estimates were made based on the waste description.

The WMP weight percentage estimates are documented in a memorandum (as required by CCP-TP-005, Acceptable Knowledge Documentation)

The WMPs, average weight percent and weight percent range are presented in Table 2.

**Table 2. Waste Stream ID-LL-M001-S5400 Waste Material Parameters**

| Waste Material Parameter | Weight Percent | Weight Percent Range |
|---|---|---|
| Iron-based Metals/Alloys | 33.6% | 0.0% - 98.9% |
| Aluminum-based Metals/Alloys | 4.9% | 0.0% - 45.0% |
| Other Metals | 5.8% | 0.0% - 61.0% |
| Other Inorganic Materials | 5.2% | 0.0% - 95.0% |
| Cellulosics | 17.9% | 0.0% - 75.0% |
| Rubber | 10.4% | 0.0% - 32.8% |
| Plastics (waste materials) | 19.4% | 0.0% - 73.5% |
| Organic Matrix | <1.0% | 0.0% - 59.5% |
| Inorganic Matrix | 2.7% | 0.0% - 8.2% |
| Soils/Gravel | <1.0% | 0.0% - 46.0% |

**List of AK Sufficiency Determinations**

No AK Sufficiency Determinations were requested for this waste stream.

**Transportation**

This waste stream and its chemical constituents have been reviewed for consistency with the listed TRUCON codes and they are consistent.

**Beryllium**

Beryllium will not be present in amounts greater than 1% by weight of the waste in each container.

**Radionuclide Information**

The two most prevalent radionuclides in this waste stream, by weight, based on the un-decayed data reported in AK are Pu-239 and U-238. The isotopes expected to be present in this waste stream are listed in Table 3.

The 10 WIPP tracked radionuclides are present in Table 3 in addition to other radionuclides that are expected to be present in the waste stream.

**Table 3 – Radionuclides in Waste Stream ID-LL-M001-S5400**

| WIPP Tracked Radionuclides | Other Radionuclides | | | |
|---|---|---|---|---|
| Am-241 | Ac-227 | Cm-243 | Eu-154 | Th-229 |
| Pu-238 | Am-242 | Cm-244 | Gd-148 | Th-230 |
| Pu-239 | Am-242m | Cm-245 | K-40 | Th-232 |
| Pu-240 | Am-243 | Cm-247 | Na-22 | Th-234 |
| Pu-242 | Bi-212 | Cm-248 | Nb-94 | Tl-208 |
| U-233 | Bk-249 | Co-60 | Pa-231 | U-232 |
| U-234 | Cd-109 | Es-253 | Pu-236 | U-235 |
| U-238 | Cf-249 | Es-254 | Pu-241 | U-236 |
| Cs-137 | Cf-251 | Es-255 | Pu-244 | |
| Sr-90 | Cf-252 | Eu-152 | Th-228 | |

Payload management will not be applied to this waste stream.

Attachment 1, AK Source Documents – Supplemental Documentation

| Source Document Number | AK# | Title | Document Number | Rev. | Date |
|---|---|---|---|---|---|
| C001 | S7 | TRU Waste Generator Interview Sheet No. 91-3-27-2. Interview of John Loy conducted by Kem Hainebach and Dan Hoyt, LLNL. | 91-3-27-2 | NA | 3/27/1991 |
| C002 | S7 | TRU Waste Generator Interview Sheet No. 91-4-8-1. Interview of Sharon Schumacher and Dave Parks conducted by Kem Hainebach, Dan Hoyt, and Bob Fischer. | NA | NA | 4/8/1991 |
| C003 | S7 | TRU Waste Generator Interview Sheet No. 91-3-29-1. Interview of Kenton Moody conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 3/29/1991 |
| C004 | S7 | Telecon between Jeff Harrison and Bob Fischer, LLNL. Three Drums of TRU Sealed Sources from Building 331. | NA | NA | 9/29/2000 |
| C005 | S7 | Acceptable Knowledge Interview Notes of Terry Ludlow, LLNL, by Jeff Harrison. | NA | NA | 2/26/1998 |
| C006 | S7 | Telecon between Jeff Harrison and Doug McAvoy, LLNL. Building 332 Materials Process Lab (MPL) Operations. | NA | NA | 2/27/1998 |
| C007 | S7 | Acceptable Knowledge Interview Notes of Frank Beckett and Dick Dickinson, LLNL, by Jeff Harrison. | NA | NA | 2/25/1998 |
| C008 | S7 | Electronic mail from Tim Andrews, Deputy Facilities Manager, Building 331, to Tom Coburn, LLNL. B331 AK Input. | NA | NA | 9/1/2000 |
| C010 | S7 | Miscellaneous Correspondence prepared by Jeff Harrison, WASTREN, Inc.; Scott Smith, WASTREN, Inc.; Mike Griffin, Bechtel Nevada; Bruce Foster, Bechtel Nevada; Martin Horsman, Consultant; Richard Blauvelt, Carlsbad; Al Celoni, LLNL. | NA | NA | 11/19/1999 |
| C011 | S7 | Miscellaneous Correspondence regarding remedial actions at LLNL following Shipment of Mixed Waste to NTS in 1990 | NA | NA | 6/28/2000 |
| C012 | S7 | Telecon between Jeff Harrison and Ted Midtaune, LLNL. Radioactive Sources. | NA · | NA | 10/12/1998 |
| C013 | S7 | Telecon between Jeff Harrison and Doug McAvoy, LLNL. Hydriding/Dehydriding Operations. | NA | NA | 4/15/1998 |
| C014 | S7 | Telephone Interview between Jeff Harrison and Kem Hainebach, LLNL. General Discussion of TRU Wastes Generated at LLNL and Stored at NTS. | NA | NA | 11/19/1997 |
| C015 | S7 | Acceptable Knowledge Interview Notes of Jerry Landrum, LLNL, by Jeff Harrison. | NA | NA | 2/26/1998 |
| C017 | S7 | Telecon between Jeff Harrison and Jerry Landrum, LLNL. Chemical Usage in Building 251. | NA | NA | 3/26/1998 |
| C018 | S7 | Telecon between Jeff Harrison and Wes Hayes, LLNL. General Discussion of Operations in Building 251 at LLNL. | NA | NA | 11/23/1997 |
| C019 | S7 | Telecon between Jeff Harrison and Jerry Landrum, LLNL. Building 251 Process Information. | NA | NA | 10/13/1998 |
| C020 | S7 | TRU Waste Generator Interview Sheet No. 91-3-14-1. Interview of Robert Wikkerink and Jerry Landrum conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 5/14/1991 |
| C021 | S7 | TRU Waste Generator Interview Sheet No. 91-3-29-3. Interview of Austin Prindle conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 3/29/1991 |

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|---|---|---|---|---|---|
| C022 | NA | TRU Waste Generator Interview Sheet No. 91-4-5-4. Interview of Jerry Landrum conducted by Kem Hainebach, LLNL | NA | NA | 04/05/1991 |
| C023 | S7, S9 | Record of Communication Between Rod Arbon and Jeff Harrison. INEEL FTIR Headspace Gas Unit | NA | NA | 5/23/2003 |
| C024 | S7 | Telecon between Jeff Harrison and Jerry Landrum, LLNL. Follow-up to March 26, 1998 Conversation with Mr. Landrum (see C017). | NA | NA | 4/3/1998 |
| C025 | S7 | Internal correspondence from D. L. Kidd to A. A. Church. Status of TCLP Analysis on Leaded Gloves and Leaded Glovebox Windows. | NA | NA | 3/13/1991 |
| C026 | NA | Letter from Kem Hainebach, LLNL to Bruce Foster, NTS. Pyrophoric materials shipped to NTS by LLNL 1974-1990. | NA | NA | 05/23/1997 |
| C027 | S7 | Internal correspondence from Kem Hainebach to Susi Jackson. Confirmation of TRU Waste Characterization. | NA | NA | 7/17/1996 |
| C028 | S7 | Memorandum from James T. Davis, DOE Oakland Operations Office, to Jill E. Lytle, DOE Headquarters. Designation of Ann Arbor ICF Facility Waste as Defense Waste for Disposal at the Nevada Test Site." | 94-W 052/5482.a.3 | NA | 3/29/1994 |
| C029 | S7 | Interview between Jeff Harrison and Joe Schmitz, Dan Hanson, Jim Harter, and Joseph Magana, LLNL. Discussion of TRU Operations and Waste Generated in Building 332. | NA | NA | 11/20/1997 |
| C030 | S7 | Acceptable Knowledge Interview Notes of Joe Magana, LLNL, by Jeff Harrison. | NA | NA | 2/27/1998 |
| C031 | S7 | Memorandum from Joseph Magana to Gary Tompkins, LLNL. "Preparation of Pu-239 Chloride and Nitrate Stock Solutions for Soil/Plant Uptake Studies." | NA | NA | 11/7/1974 |
| C032 | S9 | Memorandum from Jeff Harrison to CCP Central Records. Evaluation of Headspace Gas Supplemental Acceptable Knowledge for Post-October 1993 Generated TRU Waste | JLH-002-2003 | NA | 10/28/2003 |
| C033 | NA | TRU Waste Generator Interview Sheet No. 91-4-3-5. Interview of Willis Haugen conducted by Kem Hainebach and Dan Hoyt, LLNL | NA | NA | 04/03/1991 |
| C034 | S7 | Electronic mail from Doug McAvoy, Building 332, to Tom Coburn, LLNL. MPL Workstations. | NA | NA | 8/7/2000 |
| C036 | S7 | TRU Waste Generator Interview Sheet No. 91-3-28-2. Interview of Tom Crawford conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 3/28/1991 |
| C037 | S7 | TRU Waste Generator Interview Sheet No. 91-3-29-4. Interview of Terry Ludlow conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 9/29/1991 |
| C038 | S7 | TRU Waste Generator Interview Sheet No. 91-4-5-3. Interview of Doug McAvoy conducted by Kem Hainebach, LLNL. | NA | NA | 4/5/1991 |
| C039 | S7, S8 | TRU Waste Generator Interview Sheet No. 91-3-27-1. Interview of Dennis Barrett conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 3/27/1991 |
| C040 | S7 | TRU Waste Generator Interview Sheet No. 91-4-3-2. Interview of Susan Lombard conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 4/3/1991 |
| C041 | S7 | TRU Waste Generator Interview Sheet No. 91-4-3-6. Interview of Bill Morris conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 4/3/1991 |
| C042 | S7 | TRU Waste Generator Interview Sheet No. 91-4-4-6. Interview of Gerald Roberts conducted by Kem | NA | NA | 4/4/1991 |

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| | | Hainebach, LLNL. | | | |
| C043 | S7 | TRU Waste Generator Interview Sheet of 91-4-3-3. Interview of Mark Thoet conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 4/3/1991 |
| C044 | S7 | TRU Waste Generator Interview Sheet No. 91-4-4-3. Interview of Bobby Vallier conducted by Kem Hainebach, LLNL. | NA | NA | 4/4/1991 |
| C045 | S7 | TRU Waste Generator Interview Sheet No. 91-3-22-1. Interview of Joe Magana conducted by Kem Hainebach, LLNL. | NA | NA | 3/22/1991 |
| C046 | S7 | TRU Waste Generator Interview Sheet No. 91-4-3-1. Interview of Joe Magana conducted by Kem Hainebach, LLNL. | NA | NA | 4/3/1991 |
| C047 | S7 | TRU Waste Generator Interview Sheet No. 91-4-4-5. Interview of Sharon Torres conducted by Kem Hainebach, LLNL. | NA | NA | 4/4/1991 |
| C048 | S7 | TRU Waste Generator Interview Sheet No. 91-3-18-3. Interview of Charles M. Peters conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 3/18/1991 |
| C050 | S7 | TRU Waste Generator Interview Sheet No. 91-4-4-4. Interview of Jim Harter conducted by Kem Hainebach, LLNL. | NA | NA | 4/4/1991 |
| C051 | S7 | TRU Waste Generator Interview Sheet No. 91-4-2-5. Interview of Ted Midtaune conducted by Kem Hainebach, LLNL. | NA | NA | 4/2/1991 |
| C052 | S7 | TRU Waste Generator Interview Sheet No. 91-3-28-1. Interview of Guy Armantrout conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 3/28/1991 |
| C053 | S7, S8 | TRU Waste Generator Interview Sheet No. 91-3-20-1. Interview of Walter Wien conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 3/20/1991 |
| C054 | S7 | TRU Waste Generator Interview Sheet No. 91-3-28-3. Interview of Dave Fix conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 3/28/1991 |
| C055 | S7 | TRU Waste Generator Interview Sheet No. 91-4-2-2. Interview of Jim Furr conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 4/2/1991 |
| C056 | S7 | TRU Waste Generator Interview Sheet No. 91-4-16-2. Interview of Ted Midtaune conducted by Kem Hainebach, LLNL. | NA | NA | 4/16/1991 |
| C057 | S7 | Acceptable Knowledge Interview Notes of Rich Burns, LLNL, by Jeff Harrison. | NA | NA | 2/24/1998 |
| C058 | S7 | Acceptable Knowledge Interview Notes of Ted Midtaune, LLNL, by Jeff Harrison. | NA | NA | 2/25/1998 |
| C059 | S7 | Acceptable Knowledge Interview Notes of Charles M. (Skip) Peters, LLNL, by Jeff Harrison. | NA | NA | 2/25/1998 |
| C060 | S7 | Acceptable Knowledge Interview Notes of Jim Harter and Bob Gomez, LLNL, by Jeff Harrison. | NA | NA | 2/26/1998 |
| C062 | S7 | TRU Waste Generator Interview Sheet No. 91-4-1-5. Interview of W. E. Dickinson conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 4/1/1991 |
| C063 | S7 | TRU Waste Generator Interview Sheet No. 91-4-2-4. Interview of Trung Le conducted Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 4/2/1991 |
| C064 | S7 | TRU Waste Generator Interview Sheet No. 91-4-2-1. Interview of Jon Cunningham conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 4/2/1991 |

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|---|---|---|---|---|---|
| C065 | S7 | TRU Waste Generator Interview Sheet No. 91-4-1-2. Interview of Tony Echeverria conducted by Kem Hainebach, LLNL. | NA | NA | 4/1/1991 |
| C066 | S7 | TRU Waste Generator Interview Sheet No. 91-4-2-3. Interview of Walter Wien conducted by Kem Hainebach, LLNL. | NA | NA | 4/2/1991 |
| C067 | S7 | TRU Waste Generator Interview Sheet No. 91-3-26-1. Interview of Domenico Del Giudice conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 3/26/1991 |
| C068 | S7 | TRU Waste Generator Interview Sheet No. 91-3-22-2. Interview of Alice Conover conducted by Kem Hainebach, LLNL. | NA | NA | 3/22/1991 |
| C069 | S7 | TRU Waste Generator Interview Sheet No. 91-3-15-1. Interview of Jean Lindsey conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 3/15/1991 |
| C070 | S7 | TRU Waste Generator Interview Sheet No. 91-3-14-2. Interview of Richard Bums conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 3/14/1991 |
| C071 | S7 | TRU Waste Generator Interview Sheet No. 91-3-15-2. Interview of Harold Clark conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 3/15/1991 |
| C072 | S7 | TRU Waste Generator Interview Sheet No. 91-3-28-4. Interview of Bobby Vallier conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 3/28/1991 |
| C073 | S7 | TRU Waste Generator Interview Sheet No. 91-4-1-1. Interview of Tony Echeverria conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 4/1/1991 |
| C074 | S7 | TRU Waste Generator Interview Sheet 9 No. 1-4-18-1. Interview of Bill Poulos conducted by Kem Hainebach, LLNL. | NA | NA | 4/18/1991 |
| C075 | S7 | TRU Waste Generator Interview Sheet No. 91-3-22-3. Interview of Bill Poulos conducted by Kem Hainebach, LLNL. | NA | NA | 3/22/1991 |
| C076 | S7 | TRU Waste Generator Interview Sheet No. 91-4-1-4. Interview of Sam Torres conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 4/1/1991 |
| C077 | S7 | TRU Waste Generator Interview Sheet No. 91-4-5-1. Interview of W. D. Barrowman conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 4/5/1991 |
| C078 | S7 | TRU Waste Generator Interview Sheet No. 91-3-29-2. Interview of R. Gus Grogan conducted by Kem Hainebach, LLNL. | NA | NA | 3/29/1991 |
| C079 | S7 | TRU Waste Generator Interview Sheet No. 91-4-1-3. Interview of Jim Lewis conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 4/1/1991 |
| C080 | S7 | TRU Waste Generator Interview Sheet No. 91-4-4-1. Interview of Bill Kuhl conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 4/4/1991 |
| C081 | S7 | TRU Waste Generator Interview Sheet No. 91-3-18-2. Interview of Peter Biltoft conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 3/18/1991 |
| C082 | S7 | TRU Waste Generator Interview Sheet No. 91-4-1-6. Interview of Bob Gomez conducted by Kem Hainebach, LLNL. | NA | NA | 4/1/1991 |
| C083 | S7 | TRU Waste Generator Interview Sheet No. 91-3-18-1. Interview of Bob Gomez conducted by Kem Hainebach and Bob Fischer, LLNL. | NA | NA | 3/18/1991 |

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|---|---|---|---|---|---|
| C084 | S7 | TRU Waste Generator Interview Sheet No. 91-4-8-4. Interview of Roger Krueger by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 4/8/1991 |
| C085 | S7 | Internal correspondence to Dennis K. Fisher from Richard C. Ragaini, EPD. TRU Drums. | NA | NA | 4/17/1990 |
| C086 | S7 | Acceptable Knowledge Interview Notes of Bill Poulos, LLNL, by Jeff Harrison. | NA | NA | 2/25/1998 |
| C087 | S7 | TRU Waste Generator Interview Sheet No. 91-4-16-1. Interview of Irene Meisel conducted by Kem Hainebach, LLNL. | NA | NA | 4/16/1991 |
| C088 | S7, S10 | TRU Waste Generator Interview Sheet No. 91-4-16-1. Interview of Irene Meisel conducted by Kem Hainebach, LLNL. | NA | NA | 4/16/1991 |
| C089 | S7 | TRU Waste Generator Interview Sheet No. 91-4-8-5. Interview of Allen Lingenfelter conducted by Kem Hainebach, LLNL. | NA | NA | 4/8/1991 |
| C090 | S7 | TRU Waste Generator Interview Sheet No. 91-4-10-1. Interview of Mel Coops conducted by Kem Hainebach, LLNL. | NA | NA | 4/10/1991 |
| C091 | S7 | Acceptable Knowledge Interview Notes of Jean Lindsey, LLNL, by Jeff Harrison. | NA | NA | 2/24/2998 |
| C092 | S7 | Telecon between Jeff Harrison and Tom Schroeder, LLNL. Building 332 Process Information. | NA | NA | 10/13/1998 |
| C093 | S7 | Acceptable Knowledge Interview Notes. Interview of Joe Magana, LLNL, conducted by Mike Griffin, Bechtel Nevada. | NA | NA | 5/26/1999 |
| C094 | S7 | TRU Waste Generator Interview Sheet No. 91-4-4-2. Interview of Tom Schroeder conducted by Kem Hainebach, LLNL. | NA | NA | 4/4/1991 |
| C095 | S7 | Telecon between Jeff Harrison and Lyle Kems, LLNL. TRU Operations in Buildings 419 and 612 at LLNL. | NA | NA | 12/5/1997 |
| C097 | S7 | TRU Waste Generator Interview Sheet No. 91-3-20-2. Interview of Vic Elliott conducted by Kem Hainebach and Dan Hoyt, LLNL. | NA | NA | 3/20/1991 |
| C098 | S7 | TRU Waste Generator Interview Sheet No. 91-4-8-3. Interview of Vic Elliot conducted by Kem Hainebach, LLNL. | NA | NA | 4/8/1991 |
| C099 | S7 | TRU Waste Generator Interview Sheet No. 91-4-5-2. Interview of Chris Carlson conducted by Kem Hainebach, LLNL. | NA | NA | 4/5/1991 |
| C100 | S7 | Interview of Howard Hall by Jeff Harrison and Scott Smith, WASTREN, Inc. Overview of Building 151 Mission and Operations Relative to TRU Waste. | NA | NA | 10/16/2002 |
| C101 | S7 | Interview of Kenton Moody by Jeff Harrison and Scott Smith, WASTREN, Inc. Building 151 TRU Waste Generating Operations. | NA | NA | 10/16/2002 |
| C102 | S7 | Interview of Mark Wall by Jeff Harrison and Scott Smith, WASTREN, Inc. Building 235 TRU Waste Generating Operations. | NA | NA | 10/17/2003 |
| C103 | S9, S10 | Memorandum to file from Jeff Harrison. Waste Matrix Code and Waste Material Parameter Determination for Lawrence Livermore National Laboratory Transuranic Waste. | JLH-001-2003 | NA | 10/27/2003 |
| C104 | S4 | E-mail from Tom Coburn to Dave Guerin. Hazardous Chemicals from B332 at LLNL and associated Disposal Requests, Numbers W201262 and W201926. | NA | NA | 12/12/2002 |
| C105 | S7 | Acceptable Knowledge Interview Notes of Joe Schmitz, LLNL, by Jeff Harrison. | NA | NA | 2/26/2998 |
| C106 | S7 | TRU Waste Generator Interview Sheet No. 91-4-3-4. Interview of Richard Sands conducted by Kem Hainebach, LLNL. | NA | NA | 4/3/1991 |
| C107 | S8, | Possible Bisonite Paint Constituents | WCP03-144 | NA | 11/17/2003 |

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|---|---|---|---|---|---|
| | S10 | | | | |
| C108 | S8 | Faxback 11220. Correspondence from Matthew A. Straus, Chief Waste Characterization Branch. | 9441.1987(09) | NA | 2/19/1987 |
| C110 | NA | Memorandum from Jeff Harrison to CCP Central Records. Review of Parcel Cards for Beryllium Metal | JLH-004-2003 | NA | 12/08/2003 |
| C112 | NA | Evaluation of Additional Containers for CCP-AK-LLNL-001 | JLH-007-2004 | NA | 05/12/2004 |
| C113 | NA | Evaluation of Waste Material Parameter Data and Radioassay Data for Revision 1 to CCP-AK-LLNL-001 | JLH-010-2004 | NA | 05/27/2004 |
| C116 | NA | Evaluation of Drums Containing Soldered Electrical Components | JLH-014-2004 | NA | 07/06/2004 |
| C117 | S12 | Memorandum form Jeff Harrison to Kirk Kirkes, Evaluation of Drums Containing Friction-Lid Cans with Soldered Seams | JLH–15-2004 | NA | 7/8/2004 |
| C118 | NA | Memorandum from Jeff Harrison to Kirk Kirkes. Evaluation of Additional Containers to CCP-AK-LLNL-001 Revision 1 | JLH-016-2004 | NA | 07/14/2004 |
| C119 | S12 | Calculation of U-234 Ingrowth in Heat-Grade Plutonium | JLH-017-2004 | NA | 7/15/2004 |
| C125 | S7 | Email from Chris Steffani to Jeff harrison re: Building 231 OSP | NA | NA | 07/30/2004 |
| C128 | S6 | Memorandum to Larry Porter re: Final Evaluation of AK Radioassay Data for CCP-AK-LLNL-001, Rev. 2 | JLH-022-2004 | NA | 11/29/2004 |
| D005 | NA | Acceptable Knowledge Source Document Discrepancy Resolution – Organics | NA | NA | 10/29/2003 |
| D006 | NA | Acceptable Knowledge Source Document Discrepancy Resolution – F007 and F009 on Building 419 Waste | NA | NA | 10/29/2003 |
| D008 | NA | Acceptable Knowledge Source Document Discrepancy Resolution – Differences in EPA Hazardous Waste Codes Between NTS AK and LLNL AK Summary Reports | NA | NA | 05/06/2004 |
| D021 | NA | Acceptable Knowledge Source Document Discrepancy Resolution – EPA Hazardous Waste Number F001 Assignment | NA | NA | TBD |
| P002 | S3 | Safety Analysis Report for the Heavy Element Facility (Building 251). | UCRL-AR-113377 | NA | 9/30/1994 |
| P003 | S2, S3 | Safety Analysis Report for building 332. | UCRL-51590 | NA | 6/20/1974 |
| P004 | S2 | Bldg. 419 TRU Waste Processing. | HWM Procedure 212 | NA | 12/17/1987 |
| P005 | S2 | Operational Safety Procedure for Analytical Laboratory Room 1321, 1321A; Workstations #2101, #2105 and #2106. | Operational Safety Procedure 332.39 | NA | 11/1/1996 |
| P006 | S7 | Part B Permit Application for Hazardous Waste Treatment and Storage Facilities Livermore Site. | UCAR-10275-96 DR | NA | 6/28/1996 |
| P007 | S5 | Molten Salt Extraction Salt Cleanup. | UCRL-LR-107105 | NA | 4/1/1991 |
| P008 | NA | LLNL Radioactive Waste Management Plan as per DOE Order 5820.2 | UCID-20276 | NA | 12/10/1984 |
| P009 | NA | Quality Assurance Manual. LLNL TRU Waste Certification Program: TRU Waste Certification Plan | M-078 | Rev. 1 | 02/01/1987 |
| P010 | NA | TRU Waste Program Certification and Quality Assurance Plan | M-078-121 | NA | 12/01/1991 |
| P011 | S2 | Central Vault and Material Balance Area Buildings 231, 232 Fenced Compound, 233, and 234. | Operational Safety Procedure 231.1 | NA | 10/27/1982 |
| P012 | S3 | Facility Training Program Heavy Element Facility, Building 251. Nuclear Chemistry Division. | M-158. | NA | 3/1/1985 |
| P013 | NA | Heavy Element Facility (Building 251) Handbook. Nuclear Chemistry Division | M-158 | Rev. 1 | 03/01/1986 |
| P014 | S2, S7 | Facility Safety Procedure, Plutonium Facility – Building 332. | FSP-332. | Rev. 3 | 6/1/1989 |

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|---|---|---|---|---|---|
| P015 | S2 | Plutonium Waste Recovery and Packaging, Room 1378. | Operational Safety Procedure 332.5 | NA | 12/1/1981 |
| P016 | NA | Closure Plan for the Building 419 Size Reduction Unit and Solidification Unit | UCRL-AR-118071 | NA | Undated |
| P017 | S2 | Bldg. 419 TRU Waste Processing Operating Procedure. | HWM Procedure 212 | NA | 10/14/1986 |
| P020 | NA | Closure Plan for the Building 419 Solidification Unit | UCRL-AR-109412 | Rev. 1 | 06/12/1992 |
| P021 | | TRU Waste Data Collection | Procedure 6 | Rev. 1 | 10/08/1991 |
| P022 | S2 | Process Knowledge Evaluations | WCP-14; DCR 04-006 | Rev. 4; Rev. 6 | 7/17/2001; 06/28/2004 |
| P023 | | Waste Acceptance Criteria | URCL-MA-115877 | NA | 03/01/1995 |
| P024 | S2 | Management of TRU Waste by TRU Waste Generators WCP-20 | LLNL-TM-415118; WCP-20 | Rev. 2; Rev. 4; Rev. 7 | 3/8/2002; 06/24/2005; 07/28/2009 |
| P025 | S2 | Certification of Transuranic Waste Packages, WCP-21 | WCP-21; LLNL-TM-415117 | Rev. 5; Rev. 6; Rev. 8 | 12/23/2002; 06/24/2005; 07/28/2009 |
| P026 | S2 | Procedure for TRU Waste Solidification. | MM-03. | NA | 11/2/1986 |
| P027 | S2 | Procedure for TRU Waste Solidification. | MM-03. | NA | 2/19/1987 |
| P028 | S6 | Hazardous Materials Business Plan for Alameda County. | N/A | NA | 2/28/1990 |
| P029 | S5 | Formation of Pu Amorphous Alloys or Metastable Structures in Pu-Fe, Pu-Ta, and Pu-Si Alloys. | UCRL-92693. | NA | 8/20/1985 |
| P030 | S5 | Loss of Ga in Sputtered Deposits made from a Pu at.% Alloy. | URCL-92692. | NA | 11/15/1985 |
| P031 | S5 | Technology Review Report, Pyrochemical Processing of Plutonium. | UCRL-88116. | NA | 9/8/1982 |
| P032 | S5 | Glovebox Enclosed D. C. Plasma Source for the Determination of Metals in Plutonium. | UCRL-93272. | NA | 1/15/1986 |
| P034 | S10 | Material Safety Data Sheets (MSDSs) and Technical Data. | NA | NA | Various |
| P035 | S2 | Heavy Element Facility (Building 251) Handbook Appendix F, Procedure 5.1, Liquid Waste Solidification. | M-158. | Rev. 1 | 12/9/1986 |
| P036 | S2 | Facility Safety Procedure, Heavy Element Facility Building 251. | FSP-251. | NA | 7/1/1997 |
| P037 | S2 | Facility for Processing of Hazardous Wastes. | Facility Safety Procedure 612 | NA | 7/18/1983 |
| P038 | S2 | Heavy Element Facility (Building 251) Handbook Appendix F, Procedures 1.0 and 1.1, Air Transfers of Radioactive Materials. | M-158. | Rev. 1.1 | 6/5/1987 |
| P039 | S2 | Operational Safety Procedures. Plutonium Metallurgy and Engineering Facility, Building 332. | Operational Safety Procedure 332 | NA | 6/30/1980 |
| P040 | S3 | Final Safety Analysis Report (FSAR) for Building 332, Increment III. | UCID-17565 | NA | 8/31/1977 |
| P042 | S7 | Uptake of Plutonium and Americium by Barley from Two Contaminated Nevada Test Site Soils. | UCB-34P211-2 | NA | 6/16/1975 |
| P043 | S2 | Metallography Laboratory, Rooms 1322, 1322A & | Operational | NA | 6/1/1993 |

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| | | 1322B; Workstations #2201 and #2202. | Safety Procedure 332.17 | | |
| P044 | S2 | Analytical Chemistry Operations, Room 1329. | Operational Safety Procedure 332.11 | NA | 10/1/1981 |
| P045 | S9 | TRU Waste from the Superblock. | UCRL-ID-127458 | NA | 5/27/1997 |
| P046 | S5 | Tensile Testing at High Temperatures in a Glovebox. | UCRL-ID-104929 | NA | 10/1/1990 |
| P047 | S2 | Bldg. 419 TRU Waste Verification Operating Procedure. | HWM Procedure 216 | NA | 12/10/1986 |
| P048 | S2 | TRU Container Procurement Operating Procedure. | HWM Procedure 201 | NA | 6/25/1986 |
| P051 | S3 | Hazards Analysis Report (HAR) B151 Complex Chemistry and Materials Science (CMS). | UCRL-AR-140406 | Rev. 0 | 9/8/2000 |
| P052 | S3 | Facility 151 Complex Facility Safety Plan. | CMS Doc. No. B4151 | Rev. 1 | 9/1/2003 |
| P053 | S3 | Hazards Analysis Report for Building 235 Laboratories, Offices, and Yard Chemistry and Materials Science (CMS) Directorate. | UCRL-AR-143858 | NA | 4/1/2001 |
| P054 | S3 | Facility Safety Plan 235/241 Complex. | CMS Doc. No. B4235. | Rev. 1 | 9/1/2003 |
| P055 | S3 | Facility Safey Plan Building 231 Vault General Operations. | FSP-231V. | NA | 5/1/2000 |
| P056 | S3 | Defense and Nuclear Technologies Directorate Plutonium Facility - Building 332 Facility Safety Plan. | FSP-332-00. | Rev. 1a | 3/1/2002 |
| P057 | S2 | Laser Spectroscopy. | Operational Safety Procedure 151.35 | NA | 1/1/1998 |
| P058 | S2 | Forensic Radiochemistry of Plutonium. | Operational Safety Procedure 151.39 | NA | 4/1/2000 |
| P059 | S2 | Transmission Electron Microscopy (TEM) and Sample Preparation for Irradiation Studies of Plutonium and Plutonium Alloys. | Operational Safety Procedure 235.29 | NA | 4/1/1999 |
| P060 | S2 | Pu and Pu Alloy Proton and Alpha Particle Irradiation at Liquid Helium Temperature Followed by Iso-Chronal Annealing and Related Experiments. | Operational Safety Procedure 235.30 | NA | 7/2/2003 |
| P061 | S2 | X-Ray Diffraction Characterization of Materials. | Operational Safety Procedure 235.31 | NA | 9/2/2003 |
| P062 | S2 | Differential Scanning Calorimetry Experiments with Pu and Pu Alloys. | Operational Safety Procedure 235.37 | NA | 3/2/2002 |
| P063 | S2 | Pu Spectroscopy at the Advanced Light Source. | Operational Safety Procedure O-237 | NA | 1/2/2003 |
| P064 | S2 | Operations Using Actinides at Stanford Synchrotron Radiation Laboratory (SSRL), at the Advanced Proton Source (APS), Argonne and at the European Synchrotron Radiation Facility (ESRF), Grenoble, France for X-ray Diffraction, Thermal Diffuse Scattering and | Operational Safety Procedure O-267 | NA | 6/2/2003 |
| P065 | S2 | TRU Waste Inventory Assessment. | FWC-016. | NA | 2/28/1991 |

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|---|---|---|---|---|---|
| P066 | NA | Central Characterization Project Acceptable Knowledge Summary Report for Nevada Test Site Lawrence Livermore Laboratory Waste | CCP-AK-NTS-001 | NA | 01/06/2003 |
| P067 | S2 | Waste Acceptance Criteria (WAC) Procedures. Technical Implementing Procedure. | TIP-HEF-008. | NA | 7/28/1993 |
| P068 | S2 | Transuranic Waste Handling and Packaging Procedures | TRU-99-01 | NA | Undated |
| P069 | S2 | Gamma Ray Spectrometry of Waste Parcels Procedure. Technical Implementing Procedure. | TIP-HEF-010. | NA | 6/8/1993 |
| P070 | S2 | Gamma Ray Spectrometry of Waste Parcels Procedure. Technical Implementing Procedure. | TIP-HEF-024. | NA | 6/5/1995 |
| P071 | S2 | Procedure for Removal of Waste from Glove Box | TIP WP-1.0 | Rev. 0.0 | 10/29/1999 |
| P073 | S2 | Expert Review of SGS Data WIC 132, Rev. 3 | WCP-41; WIC-132; LLNL-TM-415120 | Rev. 1; Rev. 3 | 3/13/2001; 07/28/2009 |
| P074 | S2 | Processing IGSs for Waste with a Radioactive Component WIC 142 | LLNL-TM-415122; WIC-142 | Rev. 2; Rev. 4 | 06/28/2005; 07/28/2009 |
| P075 | S2 | Waste Disposal Requisition Comlpletion; WIC 116 | WIC 116 | Rev. 6 | 06/28/2005 |
| P076 | S3 | Documented Safety Analysis for the B695 Segment | LLNL-TR-407067 | NA | 09/17/2008 |
| U001 | S5, S6 | Total Waste Management System (TWMS) Database Information. TRU Container Inventory Query in Excel Spreadsheets. | NA | NA | 8/1999 and 6/2003 |
| U002 | S4 | LLNL TRU Container Data Packages | NA | NA | 8/19/1986 - 4/21/2009 |
| U003 | NA | Real-Time Radiography | NA | NA | Various |
| U004 | S3 | Safety Analysis Report for The Heavy Element Facility (Building 251), Lawrence Livermore National Laboratory. | UCID-19579. | NA | 10/11/1982 |
| U005 | NA | Process Knowledge Evaluation | NA | NA | Various |
| U006 | S2 | Bldg. 332 TRU Waste Solidification Procedure. | MM-03. | NA | 4/8/1992 |
| U007 | S6 | ChemTrac Database. Building 251, 332, 419 Chemical Inventory Queries Output to Excel Spreadsheets. | NA | NA | 8/31/1999 |
| U008 | S2 | Building 251 Documentation Notes. | UCRL-MI-138020. | NA | 6/1/1980 |
| U009 | S4 | LLW-TRU Waste Disposal Requisitions. | NA | NA | 7/19/1985 |
| U010 | S5 | Waste Characterization Summaries of Heavy Element Facility Experiment Request Forms, 1974-1990. | UCRL-MI-136581 | NA | 12/27/1999 |
| U011 | NA | Room Logbook Spreadsheets | NA | NA | 07/29/1981 |
| U012 | NA | Federal Facility Compliance Act Draft Site Treatment Plan for Lawrence Livermore National Laboratory | DOE/OAK Doc. No. 94-W 278/5400.2.a .3.1 | NA | 08/01/1994 |
| U013 | NA | Miscellaneous Building 612 LLNL Waste Management Procedures. | Various | NA | Various |
| U016 | S7 | Draft KMS Fusion Energy Project. | NA | NA | Undated |
| U018 | S2 | Instructions for Solidification of Hydrocarbons, Oil and Plutonium Mixed, and Solidification of Acid. | NA | NA | Undated |
| U019 | S2 | Building 419 and 612 Documentation Notes. | UCRL-MI-138022. | NA | 9/1/1979 - 3/25/1997 |
| U020 | S2 | Bldg. 419 TRU Waste Packaging Procedure. | HWM Procedure 213 | NA | 10/20/1986 |
| U021 | S4 | Room Logbooks. | NA | NA | 7/29/1981 - 10/24/1993 |
| U022 | S5 | TRU Waste Generation, B151 Radioanalytical Assay Process, Room 1034B | NA | NA | 12/27/1999 |
| U023 | S6 | NTS Inventory Assessment Database/Spreadsheets and Supporting Documentation. | NA | NA | 4/17/1991 |
| U024 | S6 | TRU90 Spreadsheet and Supporting Documentation. | NA | NA | 4/19/1991 |
| U025 | S6 | Databases used for the Inventory Assessments of the | NA | NA | 3/13/1991 |

| Source Document Number | AK# | Title | Document Number | Rev. | Date |
|---|---|---|---|---|---|
| | | TRU Drums Stored at DOE's Nevada Test Site (1974 - 1990). | | | |
| U026 | S2 | Building 332 Documentation Notes. | UCRL-MI-138566. | NA | 1/25/2000 |
| U027 | S6 | HazTrack Database Query transmitted by email from Diane Spencer | NA | NA | 02/20/2004 |
| U029 | NA | Information Gathering Document | NA | NA | Various |
| U030 | S6 | HazTrack Database Query | NA | NA | 09/06/2005 |
| U033 | S6 | Collection of Database Queries Provided by LLNL | NA | NA | 2009 |
| U035 | S9 | Corrections made to LLNL NDA Data and NDA Batches | NA | NA | 2004-2010 |

Alphanumeric Designations

C Correspondence
P Published Documents
U Unpublished Documents

AK Numbers

S1 Process Design Documents
S2 Standard Operating Procedure
S3 Safety Analysis Reports
S4 Waste Packaging Logs
S5 Test plans/research project reports
S6 Site databases
S7 Information from site personnel
S8 Standard industry documents
S9 Previous analytical data
S10 Material safety data sheets
S11 Laboratory Notebooks
S12 Comparable or surrogate sampling and analysis data