ENTERED

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

SEP 2 8 2011

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

Subject: Review of Idaho National Laboratory – Central Characterization Project Waste Steam Profile Form Number ID-LBNL-S5400 Mixed Heterogeneous Debris from the Lawrence Berkeley National Laboratory

Dear Mr. Kieling:

The Carlsbad Field Office has approved the Waste Stream Profile Form (WSPF) Number ID-LBNL-S5400, *Mixed Heterogeneous Debris from the Lawrence Berkeley National Laboratory*, for the Central Characterization Project at the Idaho National Laboratory.

Enclosed is a copy of the WSPF as required by Section C-5a of the Waste Isolation Pilot Plant, Hazardous Waste Facility Permit, No. NM4890139088-TSDF.

If you have questions, please contact Mr. J. R. Stroble, Director of the Office of the National TRU Program, at (575) 234-7313.

Sincerely,

E Ziemianski

Edward Ziemianski
Interim Manager

Enclosure

cc: w/enclosure
T. Hall, NMED *ED
J. Davis, NMED ED
S. Holmes, NMED ED

cc: w/o enclosure
J. R. Stroble, CBFO ED
N. Castaneda, CBFO ED
B. Mackie, CBFO ED
T. Morgan, CBFO ED
CBFO M&RC
*ED denotes electronic distribution

110925

CBFO:NTP:JRS:GS:11-1760:UFC 5900.00

Attachment 2 – CCP Waste Stream Profile Form

(1) Waste Stream Profile Number: ID-LBNL-S5400						
(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: CCP-PO-001, CCP Transuranic Waste Characterization Quality Assurance Project Plan, Revision 20, June 16, 2011; CCP-PO-002, CCP Transuranic Waste Certification Plan, Revision 26, July 14, 2011; CCP-PO-024, CCP/INL Interface Document, Revision 11 July 18, 2011; CCP-AK-INL-024 Central Characterization Project Acceptable Knowledge Summary Report for Idaho National Laboratory Ernest Orlando Lawrence Berkeley National Laboratory Contact-Handled TRU Waste, Waste Stream: ID-LBNL-S5400, Revision 0, June 27, 2011						
(8) Did your facility generate this waste?	YES		NO	X		
(9) If no, provide the name and EPA ID of the original generator: Lawrence Berkeley National Laboratory, Berkeley, California. CA4890008986						
Waste Stream Information						
(10) WIPP ID: LB-T002[1]					(11) Summary Category Group: S5000 – Debris Waste	
(12) Waste Matrix Code Group: Heterogeneous Debris Waste					(13) Waste Stream Name: Mixed Heterogeneous Debris from the Lawrence Berkeley National Laboratory	
(14) Description from the TWBIR:[1] Heterogeneous transuranic mixed waste.						
(15) Defense TRU Waste:	YES	X	NO			
(16) Check One:	CH	X	RH			
(17) Number of SWBs NA	(18) Number of Drums 1 55-gallon drum				(19) Number of Canisters NA	
(20) Batch Data Report numbers supporting this waste stream characterization: See Characterization Information Summary (CIS) Correlation of Container Identification Numbers to Batch Data Report Numbers.						
(21) List applicable EPA Hazardous Waste Numbers:[2] D004, D005, D006, D007, D008, D009, D010, D011, D022, D035 and F005						
(22) Applicable TRUCON Content Numbers: SQ 125/225						
(23)**Acceptable Knowledge Information**						
(For the following, enter the supporting documentation used [i.e., references and dates])						
Required Program Information						
(23A) Map of site: CCP-AK-INL-024, Revision 0, June 27, 2011, Figures 2, 3 and 7						
(23B) Facility mission description: CCP-AK-INL-024, Revision 0, June 27, 2011, Section 4.2						
(23C) Description of operations that generate waste: CCP-AK-INL-024, Revision 0, June 27, 2011, Section 4.4						
(23D) Waste identification/categorization schemes: CCP-AK-INL-024, Revision 0, June 27, 2011, Section 4.5.3						
(23E) Types and quantities of waste generated: CCP-AK-INL-024, Revision 0, June 27, 2011, Section 4.5.1						
(23F) Correlation of waste streams generated from the same building and process, as applicable: CCP-AK-INL-024, Revision 0, June 27, 2011, Section 4.5.2						
(24) Waste certification procedures: CCP-TP-030, Revision 29, April 26, 2011						

(25)Required Waste Stream Information			
(25A) Area(s) and building(s) from which the waste stream was generated: CCP-AK-INL-024, Revision 0, June 27, 2011, Section 5.1			
(25B) Waste stream volume and time period of generation: CCP-AK-INL-024, Revision 0, June 27, 2011, Section 5.2			
(25C) Waste generating process description for each building: CCP-AK-INL-024, Revision 0, June 27, 2011, Section 5.3			
(25D) Waste Process flow diagrams: NA			
(25E) Material inputs or other information identifying chemical/radionuclide content and physical waste form: CCP-AK-INL-024, Revision 0, June 27, 2011, Section 5.4			
(25F) Waste Material Parameter Weight Estimates per unit of waste: See "Waste Stream ID-LBNL-S5400 Waste Material Parameters" table in Summation of Aspects of AK Summary Report: ID-LBNL-S5400.			
(26) Which Defense Activity generated the waste:[3] (check one)			
	Weapons activities including defense inertial confinement fusion		Naval Reactors development
	Verification and control technology		Defense research and development
X	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: NA			
(27B) Standard operating procedures: See P110, P111, P112, P113, P114, P115, P116, and P501 in Summation of Aspects of AK Summary Report: ID-LBNL-S5400, Source Documents			
(27C) Safety Analysis Reports: See P098 and P108 in Summation of Aspects of AK Summary Report: ID-LBNL-S5400, Source Documents			
(27D) Waste packaging logs: See U004 in Summation of Aspects of AK Summary Report: ID-LBNL-S5400, Source Documents			
(28E) Test plans/research project reports: See DR008, I050, P031, P032, P033, P034, P035, P036, P037, P038, P040, P041, P042, P043, P044, P045, P046, P047, P048, P049, P050, P051, P052, P053, P054, P055, P057, P058, P059, P061, P062, P063, P064, P065, P066, P068, P069, P070, P071, P072, P073, P074, P075, P076, P077, P078, P079, P080, P081, P082, P083, P084, P085, P086, P087, P088, P089, P090, P091 and P092 in Summation of Aspects of AK Summary Report: ID-LBNL-S5400, Source Documents			
(27F) Site databases: See I054, P093 and U003 in Summation of Aspects of AK Summary Report: ID-LBNL-S5400, Source Documents			
(27G) Information from site personnel: See C003, C004, C005, C006, C008, C009, C010, C011, C012, C014, C015, C016, C503 and I022 in Summation of Aspects of AK Summary Report: ID-LBNL-S5400, Source Documents			
(27H) Standard industry documents: NA			
(27I) Previous analytical data: See DR008, P093 and U005 in Summation of Aspects of AK Summary Report: ID-LBNL-S5400, Source Documents			
(27J) Material safety data sheets: See P109 in Summation of Aspects of AK Summary Report: ID-LBNL-S5400, Source Documents			
(27K) Sampling and analysis data from comparable/surrogate Waste: See C017 and DR008 in Summation of Aspects of AK Summary Report: ID-LBNL-S5400, Source Documents			
(27L) Laboratory notebooks: NA			
Confirmation Information			
For the following, when applicable, enter procedure title(s), number(s) and date(s)			
(28)	Radiography: CCP-TP-053, Revision 11, July 20, 2011		
(29)	Visual Examination: NA		

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

Reviewed by AK Expert: YES [X] **Date:** 8/10/2011

Reviewed by STR (if necessary): YES [X] N/A [ ] **Date:** 8/17/2011

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 of Site Project Manager	(32) Printed Name	(33) Date
Mike Ramirez for J. VERNON	MIKE RAMIREZ	8-31-11

NOTE:
(1) In addition to LB-T002 is LB-T001 – Heterogeneous transuranic non-mixed waste. The ATWIR Number for this waste stream at INL is to be developed. LB-T001 and LB-T002 correspond to the LBNL waste stream prior to shipment to the AMWTP.
(2) If, radiography, visual examination were used to confirm EPA Hazardous Waste Numbers, attach signed Characterization Information Summary documenting this determination.
(3) This waste was also generated by the following defense activity: Weapons Activities Including Defense Inertial Confinement Fusion, Defense Nuclear Material Production and Defense Research and Development.

CHARACTERIZATION INFORMATION SUMMARY

WSPF # ID-LBNL-S5400

Lot 1

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CCP Characterization Information Summary Cover Page

Waste Stream #	ID-LBNL-S5400	Lot #:	1
AK Expert Review:	N/A	Date:	N/A
SPM Review:	Jim Vernon	Date:	8/26/2011

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. 11	07/20/11	CCP Standard Real-Time Radiography (RTR) Inspection Procedure
CCP-TP-053	Rev. 10	03/04/11	CCP Standard Real-Time Radiography (RTR) Inspection Procedure

Non Destructive Assay (NDA):

CCP-TP-109	Rev. 8	08/10/11	CCP Data Reviewing, Validating, and Reporting Procedure
CCP-TP-109	Rev. 7	01/26/11	CCP Data Reviewing, Validating, and Reporting Procedure
CCP-TP-115	Rev. 4	06/24/09	CCP SWEEP Gamma-Ray Spectrometer (SGRS) Operating Procedure

Headspace Gas Analysis:

CCP-TP-093	Rev. 15	03/10/11	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. 3	08/02/11	CCP Analysis of Gas Samples for VOCs by GC/MS
CCP-TP-175	Rev. 2	12/29/10	CCP Analysis of Gas Samples for VOCs by GC/MS

Project Level Data Validation / DQO Reconciliation:

CCP-TP-001	Rev. 19	12/29/10	CCP Project Level Data Validation and Verification
CCP-TP-002	Rev. 23	12/29/10	CCP Reconciliation of DQOs and Reporting Characterization Data
CCP-TP-003	Rev. 18	12/29/10	CCP Data Analysis for S3000, S4000, and S5000 Characterization
CCP-TP-005	Rev. 23	06/30/11	CCP Acceptable Knowledge Documentation
CCP-TP-005	Rev. 22	04/21/11	CCP Acceptable Knowledge Documentation
CCP-TP-030	Rev. 29	04/26/11	CCP CH TRU Waste Certification and WWIS/WDS Data Entry

WAP Certification:

CCP-PO-001	Rev. 20	06/16/11	CCP Transuranic Waste Characterization Quality Assurance Project Plan
CCP-PO-001	Rev. 19	12/29/10	CCP Transuranic Waste Characterization Quality Assurance Project Plan
CCP-PO-002	Rev. 26	07/14/11	CCP Transuranic Waste Certification Plan
CCP-PO-002	Rev. 25	12/29/10	CCP Transuranic Waste Certification Plan

CCP Correlation of Container Identification Numbers to Batch Data Report Numbers

Waste Stream: # ID-LBNL-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			
LB-TRU-01	INNDAS110102	INRTR5110076	N/A	N/A	N/A	N/A	INHSG1107	ECL11026G	ECL11026M	N/A	N/A

Signature of Site Project Manager

Jim Vernon
Printed Name

8/26/2011
Date

CCP Headspace Gas UCL_{90} Evaluation Form

WSPF #: ID-LBNL-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	No	1	1	160.0000	160.0000	[3]	[2]	100	N/A	Yes	F003[4]
Benzene	No	1	1	4.5000	4.5000	[3]	[2]	10	N/A		
Bromoform	No	0	1	0.1950	0.1950	[3]	[2]	10	N/A		
Butanol	No	1	1	2.2000	2.2000	[3]	[2]	100	N/A		
Carbon Disulfide [a]	No	0	1	0.5000	0.5000	[3]	[2]	10	N/A		
Carbon Tetrachloride	No	0	1	0.5000	0.5000	[3]	[2]	10	N/A		
Chlorobenzene	No	0	1	0.4400	0.4400	[3]	[2]	10	N/A		
Chloroform	No	1	1	27.0000	27.0000	[3]	[2]	10	N/A	Yes	D022[5]
Chloromethane [a]	No	0	1	1.0500	1.0500	[3]	[2]	10	N/A		
Cyclohexane [a]	No	0	1	0.7500	0.7500	[3]	[2]	10	N/A		
1,1-Dichloroethane	No	0	1	1.3500	1.3500	[3]	[2]	10	N/A		
1,2-Dichloroethane	No	0	1	0.7500	0.7500	[3]	[2]	10	N/A		
1,1-Dichloroethylene	No	0	1	0.4800	0.4800	[3]	[2]	10	N/A		
cis-1,2-Dichloroethylene [a]	No	0	1	0.5500	0.5500	[3]	[2]	10	N/A		
trans-1,2-Dichloroethylene	No	0	1	0.6000	0.6000	[3]	[2]	10	N/A		
1,2-Dichloropropane [a]	No	0	1	0.6500	0.6500	[3]	[2]	10	N/A		
Ethyl benzene	No	0	1	0.5500	0.5500	[3]	[2]	10	N/A		
Ethyl Ether	No	0	1	1.2500	1.2500	[3]	[2]	100	N/A		
Methanol	No	1	1	31.0000	31.0000	[3]	[2]	100	N/A		
Methyl Ethyl Ketone	No	1	1	44.0000	44.0000	[3]	[2]	100	N/A		
Methyl Isobutyl Ketone	No	0	1	1.1000	1.1000	[3]	[2]	100	N/A		
Methylene Chloride	No	0	1	0.6000	0.6000	[3]	[2]	10	N/A		
1,1,2,2-Tetrachloroethane	No	0	1	0.3600	0.3600	[3]	[2]	10	N/A		
Tetrachloroethylene	No	0	1	0.3900	0.3900	[3]	[2]	10	N/A		
Toluene	No	1	1	39.0000	39.0000	[3]	[2]	10	N/A	Yes	F005[6]
1,1,1-Trichloroethane	No	0	1	0.5000	0.5000	[3]	[2]	10	N/A		
Trichoroethylene	No	0	1	0.5500	0.5500	[3]	[2]	10	N/A		
Trichlorofluoromethane [a]	No	0	1	0.6000	0.6000	[3]	[2]	10	N/A		
1,1,2-Trichloro-1,2,2-trifluoroethane	No	0	1	0.3100	0.3100	[3]	[2]	10	N/A		

CCS-004

CCP Headspace Gas UCL_{90} Evaluation Form

WSPF #: ID-LBNL-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]	No	0	1	0.5000	0.5000	[3]	[2]	10	N/A		
1,2,4-Trimethylbenzene [a]	No	0	1	0.4700	0.4700	[3]	[2]	10	N/A		
m/p-Xylene [b]	No	0	1	0.5000	0.5000	[3]	[2]	10	N/A		
o-Xylene	No	0	1	0.5500	0.5500	[3]	[2]	10	N/A		

[a] These compounds are from the CH-TRAMPAC or CH-TRUCON 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 C4 of the WAP, 1/2 of the MDL value is used in calculating the mean concentration.)

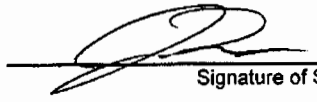
(2) Because the noted analyte had < 3 different observations and only 1 sample total in the waste stream, no meaningful covariance exists and the UCL_{90} value could not be calculated. Therefore, the PRQL was compared to the maximum for the purpose of confirming HWN.

(3) For analytes where there is no standard deviation, there is inadequate data to perform the statistical analysis.

(4) The maximum (ppmv) of Acetone exceed the PRQL, and is listed under 40CFR 261.30 as F003; however, F003 listed solvents are listed solely for ignitability, and this waste stream does not exhibit the characteristic of ignitibility because the solvent is not in liquid form. Therefore, EPA hazardous waste number F003 will not be applied to waste stream ID-LBNL-S5400.

(5) The maximum (ppmv) of Chloroform exceeded the PRQL, and is listed under 40CFR 261.24 as D022; however, D022 has already been assigned to the waste stream.

(6) The maximum (ppmv) of Toluene exceeded the PRQL, and is listed under 40CFR 261.30 as F005; however, F005 has already been assigned to the waste stream.



Signature of Site Project Manager

Jim Vernon
Printed Name

8/26/2011
Date

CCS-005

CCP Headspace Gas Summary Data

Waste Stream Number ID-LBNL-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 _____ Date 8/26/2011

CCP RTR/VE Summary of Prohibited Items and AK Confirmation

Waste Stream Number: ID-LBNL-S5400 Lot #: 1

Container Number	RTR Prohibited Items [a, b]	Visual Examination Prohibited Items [a, b]
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 container was previously packaged and RTR is an acceptable characterization method to meet all the Data Quality Objectives for NDE of waste stream ID-LBNL-S5400.

Site Project Manager Signature	Jim Vernon	8/26/2011
	Printed Name	Date

CCP Reconciliation with Data Quality Objectives

WSPF# ID-LBNL-S5400 Lot # 1

Sampling Completeness

RTR/VE

Number of Valid Samples: 1 Number of Total Samples Analyzed: 1
Percent Complete: 100 (QAO is 100%)

NDA

Number of Valid Samples: 1 Number of Total Samples Analyzed: 1
Percent Complete: 100 (QAO is 100%)

HSG

Number of Valid Samples: 1 Number of Total Samples Collected: 1
Percent Complete: 100 (QAO is ≥90%)
Number of Valid Samples: 1 Number of Total Samples Analyzed: 1
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-LBNL-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-LBNL-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 C3-1 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 C3-2 through C3-9 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	8/26/2011
	Printed Name	Date

CES-010

SUMMATION OF ASPECTS OF AK SUMMARY REPORT: ID-LBNL-S5400

Overview:

The ID-LBNL-S5400 waste stream consists of mixed Contact Handled (CH) transuranic (TRU) debris waste originally generated at the Lawrence Berkeley National Laboratory (LBNL) and shipped to the Advanced Mixed Waste Treatment Project (AMWTP) located at the Idaho National Laboratory (INL). LBNL is a multi-purpose, multi-program national laboratory that conducts scientific research in numerous areas. Primary areas of current research include advanced materials, life sciences, energy efficiency, energy sciences, general sciences, accelerators, and detectors. Certain of these research activities have resulted, and continue to result, in the generation of TRU waste. This waste was generated as part of packaging of research and development (R&D) and associated facility maintenance operations waste at LBNL. The waste will be stored and characterized at the Radioactive Waste Management Complex (RWMC) Transuranic Storage Area (TSA) at INL.

This waste stream consists of TRU mixed debris waste generated in support of Department of Energy (DOE) defense nuclear materials production, nuclear waste and materials by-products management, R&D, and weapons activities. LBNL has been involved in nuclear physics and nuclear chemistry research for DOE and its predecessor since 1947.

This Summation of the Acceptable Knowledge (AK) Summary Report includes information to support Waste Stream Profile Form (WSPF) number ID-LBNL-S5400 for mixed TRU debris waste. The primary source of information for this Summation is CCP-AK-INL-024, Central Characterization Project Acceptable Knowledge Summary Report For Idaho National Laboratory Ernest Orlando Lawrence Berkeley National Laboratory Contact-Handled TRU Waste, Waste Stream: ID-LBNL-S5400, Revision 0, dated June 27, 2011.

Waste Stream Identification Summary:

Waste Stream Name:	Mixed Heterogeneous Debris from the Lawrence Berkeley National Laboratory
Waste Stream Number:	ID-LBNL-S5400
Waste Stream Volume – Current:	1 55-gallon drum
Waste Stream Volume – Projected:	None
Dates of Waste Generation:	February 2011
Summary Category Group:	S5000
Waste Matrix Code Group:	Heterogeneous Debris Waste
Waste Matrix Code:	S5400
TRUPACT-II Content Code (TRUCON):	SQ 125/225

Annual Transuranic Waste Inventory Report
(ATWIR) Identification Numbers: LB-T001, LB-T002[1]

Waste Stream Description and Physical Form:

Waste stream ID-LBNL-S5400 consists of 26 individually packaged waste items in one 55-gallon drum. The waste consists primarily of organic and inorganic debris. Example organic debris materials include cardboard boxes, cotton swabs, filter paper, ion exchange resin, paper wipes, plastic (e.g., bags, beaker, bottles, container, pipettes, tray, tubes, vials), and Teflon capsules. Example inorganic debris materials include aluminum foils, brass tube, copper pieces, glass (e.g., cone, tubes, vials), lead (e.g., plates, rings), metal/steel (e.g., bolts, cups, discs, fittings, nuts, rods, screws, tweezers, washers), miscellaneous lab equipment (e.g., metal stand, spatula), metal pieces, and platinum pieces. The waste may also include small amounts of homogeneous solids such as absorbent material (e.g., Aquaset II, clay, diatomaceous earth) used to solidify liquids/materials (e.g., acetone, hydrochloric acid, grease, methyl ethyl ketone, toluene, water), barium fluoride salt, filter cake, oxides (e.g., aluminum, californium, manganese, neptunium, plutonium), and sludge.

The waste stream meets the definition of waste materials that have common physical form, that contain similar hazardous constituents, and that are generated from a single process or activity. This one drum waste stream was generated from R&D and associated maintenance operations.

Point of Generation:

Location

Waste stream ID-LBNL-S5400 waste generated at LBNL in Berkeley, California. The waste is currently stored RWMC TSA at the INL.

Area and/or Building of Generation

Waste stream ID-LBNL-S5400 was primarily generated at Building 70 Pitroom and Building 70A Heavy Element Research Laboratory (HERL). Waste also originated from support facilities including Buildings 2, 26, 62, 71, 75, 75A, 75D, 75P, 76, 85, and 88.

Generating Processes:

Description of Waste Generating Processes

This waste stream was generated primarily during R&D conducted at Buildings 70 and 70A and associated facility maintenance operations by the different LBNL divisions (e.g., Chemistry Division, Nuclear Chemistry Division, Nuclear Science Division). The waste stream includes waste from support Buildings 2, 26, 62, 71, 75, 75A, 75D, 75P, 76, 85, and 88.

[1]The ATWIR identification number for this waste stream at INL is to be developed. The numbers listed above correspond to the LBNL waste stream prior to shipment to the AMWTP.

R&D Operations

Various scientific techniques were applied in the actinide chemistry activities and research conducted at the LBNL site. Examples of these techniques include inorganic extraction, and cation and anion exchange chromatography to separate and purify isotopes of interest; precipitation to remove interfering actinides; bombardment of targets and dissolution of isotopes of interest; isotope excitation; simulation of groundwater conditions; complexation with chelators; electrochemistry (electrolysis); oxidation; radiopolarity; thermodynamic, optical, thermoluminescence, and magnetic field studies; and amalgamation. Instrumental techniques included infrared spectroscopy, laser spectroscopy, x-ray diffraction, and liquid scintillation counting.

The primary R&D activity conducted at Buildings 70 and 70A that generated TRU waste was isotope separation, using ion exchange techniques, followed by analysis. Analysis of a sample was accomplished using appropriate counting methods that involved either electrodeposition or direct evaporation of an aqueous acidic ion exchange solution onto a counting plate. These TRU waste generating activities were based on a standardized set of radiochemistry procedures. Of the available procedures, LBNL researchers preferred the ion exchange procedures for sample cleanup, isotope separation, and isotope concentration (for both sample cleanup and analysis by counting).

LBNL researchers have historically stored TRU isotopes and TRU contaminated equipment, solutions, material, and research products in the HERL and the Building 70 Pitroom for later use. Periodically, as part of ongoing facility operations, these TRU contaminated items are evaluated for possible future uses. If no use can be reasonably foreseen, they are declared waste. LBNL has periodically characterized and campaigned these TRU waste items out of Buildings 70 and 70A in accordance with their onsite waste certification program. During these campaigns, small amounts of homogeneous solids such as absorbent material (e.g., Aquaset II, clay, diatomaceous earth) used to solidify liquids (e.g., acetone, hydrochloric acid, grease, methyl ethyl ketone, toluene, water) were generated and disposed of with the debris waste.

Maintenance Operations

Maintenance operations typically included instrument testing and repair, cleaning, equipment inspection and replacement, and general housekeeping. Instruments were tested regularly; however, obsolete or broken instruments were usually not disposed of as TRU waste. Cleaning activities include physical wiping and the use of cleaning solutions (e.g., water or soapy water) to remove potential contamination and to restore work areas and equipment to their original condition. Equipment inspection and replacement activities generated debris waste such as lab equipment and metal debris (e.g., bolts, cups, discs, fittings, nuts, rods, screws, tweezers, washers). Debris waste generated from these activities was disposed of as TRU or low-level waste.

Support Buildings

A portion of this TRU waste was generated outside of the main facilities, Buildings 70 and 70A. Specifically waste from the Radiation Protection Group that operates out of and/or provides sources to Buildings 2, 62, 70, 70A, 71, 75, 75A, 75D, 75P, and 76, the Nuclear Science Division research conducted in Building 88 (research included basic physical, radiological, and chemical properties of the actinides), and the Hazardous Waste Handling Facility (HWHF) waste management activities conducted in Building 85 (previously Buildings 75 and 75A). All radioactive, hazardous, and mixed waste, has been, and continues to be managed and packaged by the LBNL Waste Management Group in Building 85. Waste from support buildings was generated as part of or in support of actinide chemistry research at the HERL. This is based on the similarity (i.e., physical form, hazardous constituents, radionuclides, packaging) of this waste to waste that can be tied to HERL operations and the fact that the waste was generated by the same divisions that conducted work in Buildings 70 and 70A.

The following table identifies the Resource Conservation and Recovery Act (RCRA) toxicity characteristic and listed constituents identified in this waste stream.

Toxicity Characteristic and Listed Constituents in Waste Stream ID-LBNL-S5400

Chemical/Compound	Description/Source/Use	Source Documents	EPA HWNs
Arsenic	Contaminant present in the waste.	I501, P502	D004
Barium	Reagent used in R&D operations. Contaminant present in the waste.	C011, I050, I501, P502	D005
Benzene	Contaminant present in the waste.	C503, I501, P502	F005
Cadmium	Contaminant present in the waste.	I501, P502	D006
Chloroform	Contaminant present in the waste.	I501, P502	D022
Chromium	Contaminant present in the waste.	I501, P502	D007
Lead	Reagent used in R&D operations. Contaminant present in the waste.	C011, I050, I501, P502	D008
Mercury	Contaminant present in the waste.	I501, P502	D009
Methyl ethyl ketone (2-Butanone)	Contaminant present in the waste.	C503, I501, P502	D035
Selenium	Contaminant present in the waste.	I501, P502	D010
Silver	Contaminant present in the waste.	I501, P502	D011
Toluene	Contaminant present in the waste.	I501, P502	F005

RCRA Determinations – Hazardous Waste Determinations

Historical Waste Management

Waste stream ID-LBNL-S5400 has been historically been managed in accordance with the generator site requirements and in compliance with the requirements of the California Department of Toxic Substances Control. Based on historical waste management practices, the

LBNL site managed this waste as hazardous and the original Environmental Protection Agency (EPA) hazardous waste number (HWN) assignments have been maintained with the exception of HWNs D001, D018, and F003. The waste stream will not exhibit the characteristic of ignitability because it is not liquid; therefore, D001 and F003 are not assigned. In addition, the more specific F-listed EPA HWN for benzene has been assigned and the assignment of the corresponding toxicity characteristic HWN (i.e., D018) is not necessary. Therefore, the HWNs summarized below will be assigned to the container in this waste stream (References DR501, I501, and P502).

To assign EPA HWNs, the available AK documentation including interviews with generating facility staff and standard procedures used to generate TRU waste were reviewed. In addition, information for LBNL TRU waste is available on an individual waste item basis in the Shoebox database, in accordance with the LBNL waste certification program and the related HWHF waste acceptance criteria. This program has been implemented since 1992, as indicated by the existence of early versions of program documents and procedures. The information contained in the Shoebox database is based on generator knowledge and/or sampling and analysis. It should be noted that some of the 26 individually packaged waste items were characterized by the generator as nonhazardous. However, both mixed and non-mixed waste was packaged together by the generator making the final waste drum hazardous (References DR501, I010, I020, I501, and P502).

Ignitability

This waste does not exhibit the characteristic of ignitability as defined in Title 40 Code of Federal Regulations (CFR) 261.21. LBNL used ignitable liquids including alcohol (e.g., methanol) and non-chlorinated solvents (e.g., acetone, toluene). The waste may also be contaminated with oxidizers (e.g., sodium nitrate) that were used in LBNL operations, but should be present only in residual quantities (i.e., low concentrations in solidified solutions or sludges). Therefore, the waste does not meet the definition of an oxidizer and will not cause a fire through friction, absorption of moisture, or spontaneous chemical change. Liquids, compressed gases, and pyrophorics are prohibited by LBNL waste management procedures. Prior to waste packaging, liquids were treated (e.g., solidified) and an EPA approved Paint Filter Liquids Test was performed if necessary. In addition, Central Characterization Project (CCP) personnel evaluated video tape of the LBNL waste packaging process for nonconforming items. Certified characterization activities will be performed at the AMWTP prior to shipment to WIPP. Waste packages containing prohibited items identified during these activities will be segregated, then dispositioned appropriately and/or remediated to remove the items prior to shipment. Therefore, this waste does not exhibit the characteristic of ignitability (D001) (References C501, I010, I020, I501, P098, P501, and P502).

Corrosivity

This waste does not exhibit the characteristic of corrosivity as defined in 40 CFR 261.22. LBNL used corrosives (e.g., hydrochloric acid). However, corrosive liquids were neutralized and solidified with absorbent (e.g., diatomaceous earth) in accordance with LBNL waste management procedures. Prior to waste packaging, liquids were treated (e.g., solidified) and an

EPA approved Paint Filter Liquids Test was performed if necessary. In addition, CCP personnel evaluated video tape of the LBNL waste packaging process for nonconforming items. Certified characterization activities will be performed at the AMWTP prior to shipment to WIPP. Waste packages containing prohibited items identified during these activities will be segregated, then dispositioned appropriately and/or remediated to remove the items prior to shipment. Therefore, this waste does not exhibit the characteristic of corrosivity (D002) (References C501, I010, I014, I020, I501, P098, P501, and P502).

Reactivity

This waste 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. When reactive materials, such as sodium and potassium metal, were used in the LBNL, the material was reacted/treated prior to disposal. Other reactive materials, including cyanides, sulfides, and explosives, were not identified in LBNL R&D and associated maintenance operations. Therefore, this waste stream does not exhibit the characteristic of reactivity (D003) (References I010, I016, I020, I501, P098, P501, and P502.

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 or limited quantitative data available to demonstrate that the concentration of a constituent is below the regulatory threshold level, the applicable EPA HWN is applied to the waste stream.

Based on the evaluation of the AK source documentation, this waste stream contains or is contaminated with toxicity characteristic metals. Characteristic metals are present as components of debris items (e.g., brass with lead, lead shielding), as contaminants of solidified liquid and sludge, and as ingredients in chemicals. Therefore, EPA HWNs D004, D005, D006, D007, D008, D009, D010, and D011 are assigned to the waste stream (References C011, DR501, I050, I501, and P502).

Based on the evaluation of the AK source documentation, this waste stream may contain or be contaminated with toxicity characteristic organic compounds including benzene (D018), chloroform (D022), and methyl ethyl ketone (D035). Characteristic organic compounds are present as contaminants of solidified liquid and sludge. LBNL identified benzene as being used for its solvent properties and non-solvent use was also suspected. Therefore, LBNL assigned both D018 and F005 to the same waste items. However, the more specific F-listed EPA HWN has been assigned for this constituent and the assignment of the corresponding toxicity characteristic HWN (i.e., D018) is not necessary. Although identified as a contaminant, no specific use for chloroform was identified. Methyl ethyl ketone, which has a corresponding F-listed EPA HWN, was identified in small quantities in several liquid solutions prior to solidification. However, there was no indication that the methyl ethyl ketone was used for its

solvent properties. Therefore, EPA HWNs D022 and D035 are assigned to the waste stream (References C503, DR501, I501, and P502).

F-Listed Waste

This waste stream may contain or be mixed with F-listed hazardous wastes from non-specific sources as listed in 40 CFR 261.31. F002, F003, and F005 listed constituents were used and are present in the waste. F002 constituent methylene chloride was identified as a trace contaminant. However, the LBNL waste generators determined that the methylene chloride was not used for its solvent properties; therefore, F002 is not assigned. F003 constituents, including acetone, methanol, and xylene are listed solely because these solvents are ignitable in liquid form. The waste stream will not exhibit the characteristic of ignitability because it is not liquid; therefore, F003 is not assigned. F005 constituents, including benzene and toluene were used for their solvent properties and are present in the waste. F005 constituent methyl ethyl ketone was also identified in the waste but it was not used for its solvent properties (see above toxicity characteristic discussion). Therefore, F-listed EPA HWN F005 for the presence of benzene and toluene is assigned to the waste stream (References C503, DR501, I501, P025, P026, and P502).

K-, P-, and U-Listed Chemicals

This waste stream does not include any of the manufacturing process wastes from the specific industries or sources listed in 40 CFR 261.32.

This waste stream was not mixed with a discarded commercial chemical product, an off-specification commercial chemical product, or a container residue or spill residue thereof as defined in 40 CFR 261.33. P- and U-listed reagents were used in LBNL R&D operations; however, no pure product or unused chemicals would have been disposed of in TRU waste (e.g., hydrofluoric acid, U134). No listed chemicals were identified in the container-specific documentation and no record of a significant spill of listed chemicals was located (e.g., incident report). Beryllium is identified as a contaminant of sludge/filter cake; however, there is no information present that indicates this beryllium contamination meets the definition of P015 listed waste (i.e., discarded commercial chemical product beryllium powder) (References DR501, I501, P501, and P502).

Therefore, this waste stream is not assigned K-, P-, or U-Listed EPA HWNs.

Headspace Gas/Volatile Organic Compound Information

Headspace gas analysis was completed on the container in Lot 1 of this waste stream. Since only one container was headspace gas sampled, UCL_{90} values could not be calculated. Therefore, the Program Required Quantitation Limit (PRQL) for each analyte was compared to the maximum for the purposes of confirming the HWN. There were three instances in which the maximum value exceeded the PRQL; however, no new EPA HWNs were assigned as a consequence of headspace gas sampling and analysis. No tentatively identified compounds

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

LBNL has historically generated several other CCP approved waste streams from R&D and associated maintenance operations (i.e., BLCHDN.001, ID-NTLBL-S3900, and ID-NTLBL-S5400). All of these waste streams have been characterized as RCRA hazardous waste and include similar but not exact characterization. The reasons for the differences include numerous dates of generation, improved characterization practices (e.g., HWN F003 is no longer assigned to waste that is not ignitable), and HWN assignments applied on a waste stream basis. This report describes one drum with known characterization. Consequently, the characterization included above only applies to waste stream ID-LBNL-S5400.

Conclusion

The EPA HWNs that apply to this waste stream are D004, D005, D006, D007, D008, D009, D010, D011, D022, D035, and F005.

Polychlorinated Biphenyls (PCBs)

Based on the review of AK documentation, there are no PCB compounds (e.g., hydraulic oils, fluids) or other PCB containing equipment (e.g., transformers, ballasts, capacitors) present in this waste. Therefore, this waste stream is not regulated as a Toxic Substance Control Act waste under 40 CFR 761 (References I501 and P502).

Prohibited Items

Prohibited items are not expected to be present in this waste stream. CCP personnel evaluated video tape of the LBNL waste packaging process for nonconforming items. However, this waste stream includes solidified aqueous/organic waste and the presence of liquids due to dewatering is possible. Certified characterization activities will be performed at the AMWTP. Waste packages containing prohibited items identified during these activities will be segregated, then dispositioned appropriately and/or remediated to remove the items prior to shipment to Waste Isolation Pilot Plant (WIPP).

Justification for the Selection of Radiography or Visual Examination

Real-time Radiography (RTR) was selected as a characterization method for this Lot because the waste was already packaged and RTR meets all the Data Quality Objectives for Nondestructive Examination for the waste stream.

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

To estimate the WMPs for waste stream ID-LBNL-S5400, data were obtained from the CCP RTR batch data report for the original eight drums assigned to LBNL debris waste stream

BLCHDN.001. The debris waste described in this report was generated by the same R&D and associated maintenance operations. Therefore, it is expected that the WMP data for the eight drums would be the same or similar to the drum assigned to this waste stream. The evaluation concluded that the average weight percentages for inorganic and organic waste materials for the waste stream are 68.07 percent and 31.93 percent, respectively.

Waste Stream ID-LBNL-S5400 Waste Material Parameters

Waste Material Parameter	Average Weight Percent	Weight Percent Range
Iron-based Metals/Alloys	46.61%	4.95 - 93.33%
Aluminum-based Metals/Alloys	<1.00%	0.00 - <1.00%
Other Metals	<1.00%	0.00 - <1.00%
Other Inorganic Materials	10.32%	3.70 - 24.39%
Cellulosics	3.64%	0.00 - 15.54%
Rubber	0.46%	0.00 - 4.57%
Plastics (waste materials)	27.83%	2.96 - 54.46%
Organic Matrix	<1.00%	0.00 - <1.00%
Inorganic Matrix	11.14%	0.00 - 38.63%
Soils/gravel	0.00%	0.00 - 0.00%

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 listed TRUCON codes and they are consistent.

Beryllium

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

Radionuclide Information

The LBNL activities that generated TRU waste consisted of numerous R&D experiments that, in general, used small quantities of relatively pure isotopic materials. This waste did not originate from a production facility where a constant isotopic ratio was maintained; therefore, a level of variability in the isotopic ratios is expected. In Situ Object Counting System (ISOCS) radioassay was performed on the drum in this waste stream to establish the specific relative radionuclide weight and activity for the waste stream. Based on the ISOCS radioassay data for the drum in this waste stream, the two predominant radionuclides by weight percent are Np-237 at 99.55 percent and Am-243 at 0.38 percent, while the two predominant isotopes by activity are Am-241 and Cf-249.

Radiological Distribution for Waste Stream ID-LBNL-S5400

Radionuclide	Total Radionuclide Weight%[1,3]	Total Radionuclide Curie%[2,3]	Suspected Present (Yes/No)
WIPP Required Radionuclides			
Am-241	0.05%	43.92%	Yes
Pu-238	Not Reported		Yes
Pu-239	Not Reported		Yes
Pu-240	Not Reported		Yes
Pu-242	Not Reported		Yes
U-233	Not Reported		Yes
U-234	Not Reported		Yes[5]
U-238	Not Reported		Yes
Sr-90	Not Reported		Yes[4]
Cs-137	Not Reported		Yes
Additional Radionuclides			
Am-243	0.38%	17.85%	Yes
Cf-249	0.02%	21.39%	Yes
Np-237	99.55%	16.71%	Yes
Pu-241	Trace	Trace	Yes
Ra-226	Trace	0.14%	Yes
U-235	Trace	Trace	Yes

[1] This listing indicates the total weight% of each radionuclide over the entire waste stream (i.e., one drum).
[2] This listing indicates the total activity curie% of each radionuclide over the entire waste stream (i.e., one drum).
[3] "Trace" indicates <0.01 weight% or curie% for that radionuclide.
[4] Sr-90 cannot be quantified by gamma spectroscopy and was not identified by the LBNL generators. However, it is an expected fission product of U-235.
[5] U-234 was not reported or identified by the generator; however, it is expected to be present as a daughter product of Pu-238.

Payload management will not be utilized for this waste stream.

AK Source Documents Used

Source Document Tracking Number	Title	Document Number	Date
C001	Letter to Mr. William Burk of the USGS	NA	August 26, 1975
C002	LBL Forecast of Transplutonium Elements, FY 72, FY 73, FY 74, and FY 75	NA	October 18, 1972
C003	Use of Sealed Sources at LBNL	NA	July 25, 2001
C004	Researchers Associated with Actinide Chemistry and TRU Waste	NA	July 27, 2001
C005	Actinide Chemistry Group History	NA	July 20, 2001
C006	Application of Spent Solvent RCRA Codes for Waste With Organics of Unknown Origin	NA	August 1, 2001
C008	History of Buildings 70 and 70A	NA	September 3, 2001
C009	Revision of CA waste codes assigned to waste items in the Shoebox Database	NA	September 17, 2001
C010	Contents of Drum RT0000390	NA	September 17, 2001
C011	Historic operations and chemical usage at Buildings 70 and 70A	NA	August 7, 2003
C012	LBNL use of Np Procedure # 15, found in "Radiochemistry of Neptunium"	NA	August 19, 2003
C013	Lawrence Berkeley Laboratory Defense Determination	CBOFOGC: JTP: KJB: 03-0922: UFC2000	July 8, 2003
C014	Solvent Use at HERL	NA	March 24, 2004
C015	Solvent Use at HERL	NA	March 24, 2004
C016	Solvent use and reporting at HERL	NA	March 22, 2004
C017	Letter to SPM-Evaluation of LBNL Drums Containing Tin Cans with Soldered Seams	JLH-021-2004	September 9, 2004
C501	Email from Nancy Rothermich to Michael Papp, Re: New Database	NA	December 1, 2010
C502	Evaluation of Volume, Period Generation, and Calculation of Individual and Total Radionuclide Masses and Activities for Waste Stream LBNL-S5400	NA	February 28, 2011
C503	Interview with Waste Management Group Leader Nancy Rothermich	NA	February 28, 2011
C504	Calculation of Individual and Total Radionuclide Masses and Activities for Waste Stream ID-LBNL-S5400	NA	May 24, 2011
DR007	Discrepancy Resolution for Aquaset/Petraset	NA	May 21, 2004
DR008	Discrepancy Resolution for the Radionuclide Re-evaluation	NA	January 5, 2005
DR501	Discrepancy Resolution – EPA Hazardous Waste Number Discrepancy Resolution for Waste Stream LBNL-S5400	NA	March 1, 2011
I001	Contract History; Contract #W-7405-eng-048 and DE-AC03-76SF00098	NA	various
I002	SDI/DOD Support at LBL and DOD Support in the University of California	NA	August 26, 1986
I003	Miscellaneous Budget Documents 1957-1970	NA	various
I004	Miscellaneous Budget Documents 1973-1978	NA	various
I005	Miscellaneous Budget Documents 1980-1986	NA	various
I006	Update on SDI Research and Activities at LBL	NA	August 1986
I007	LBL DOE Field Task Proposals (FTP/As) for the Strategic Defense Initiatives (SDI) Program	1267B: bbs	June 25, 1986
I009	Waste Management Quality Assurance Plan	PUB-5352	April 1, 2002

Source Document Tracking Number	Title	Document Number	Date
I010	Hazardous, Radioactive, and Mixed Waste Acceptance Criteria: Characterization and Compliance	EH&S Procedure 820	April 7, 2003
I012	Transfer of Radioactive and Mixed Waste from the Site of Generation to the HWHF	EH&S Procedure 827	March 4, 2003
I013	Tracking of Hazardous, Radioactive, Mixed, and Combined Waste	EH&S Procedure 824	March 18, 2002
I014	Neutralization of Acid and Base Mixed Wastes	EH&S Procedure 849	August 29, 2002
I015	Consolidation of Radioactive and Mixed Liquid and Semisolid Wastes	EH&S Procedure 850	March 2, 1999
I016	Onsite Transportation and Desensitization of Reactive Hazardous and Mixed Wastes	EH&S Procedure 852	April 21, 2001
I018	Guidance in Assigning a Part B Waste Stream	NA	NA
I019	Waste Management Training Plan	NA	March 29, 2002
I020	Guidelines for Generators to Meet HWHF Acceptance Requirements for Hazardous, Radioactive, and Mixed Wastes at Berkeley Lab	PUB-3092	September 1999
I022	Worksheet to identify original owners and dates for TRU items currently in Pitroom	NA	NA
I023	Field Work Proposal - Actinide Chemistry	4030	April 1, 1999
I024	Field Work Proposal - Actinide Chemistry	CH030203	April 1, 2000
I025	Draft Executive Summary (FWP 2002); Actinide and Heavy Element Chemistry	NA	2001
I026	Heavy Elements Research Laboratory	NA	June 22, 2001
I027	TRU Inventory Waste Summary Worksheets	NA	May 21, 2004
I028	Liquid Treatment Worksheet	NA	May 21, 2003
I031	Actinide Chemistry (FTP /Agreement) for 1990	NA	April 1, 1990
I032	Actinide Chemistry (FTP /Agreement) for 1991	NA	April 1, 1991
I033	Actinide Chemistry (FTP /Agreement) for 1992	NA	April 1, 1992
I034	Actinide Chemistry (FTP /Agreement) for 1993	NA	April 1, 1993
I035	Actinide Chemistry (FTP /Agreement) for 1994	NA	April 1, 1994
I036	Actinide Chemistry (FTP /Agreement) for 1995	NA	April 1, 1995
I037	Actinide Chemistry Program Executive Summary for 1996	NA	April 1, 1996
I038	Actinide Chemistry Program Executive Summary for 1997	NA	January 1997
I039	Actinide Chemistry FTP (FY 1998 Budget Request)	NA	1996
I040	Actinide Chemistry FTP (FY 1999 Budget Request)	NA	1997
I041	Actinide Chemistry FTP (FY 2000 Budget Request)	NA	1998
I042	Actinide Chemistry FTP (FY 2001 Budget Request)	NA	1999
I043	Actinide Chemistry FTP (FY 2002 Budget Request)	NA	2000
I044	Actinide Chemistry FTP (FY 2003 Budget Request)	NA	2001
I045	Actinide Chemistry FTP (FY 2004 Budget Request)	NA	2002
I046	Actinide Chemistry FTP (FY 2005 Budget Request)	NA	2003
I047	Physical Form Worksheets	NA	May 21, 2004
I048	Radiological Parameters Worksheets	NA	May 21, 2004
I050	EPR-Studies of Trivalent Plutonium in CaF_2, SrF_2 and BaF_2	UCRL-18922	June 1969
I051	Regulatory Status of Radioactive Dilute Aqueous Perchlorate Solutions	WM-3-051	June 12, 2003

Source Document Tracking Number	Title	Document Number	Date
I052	Radiological Work Permits for Visual Inspection and Repackaging of TRU Waste at LBNL	NA	various
I053	Memorandum of Agreement Regarding the Transfer of Transuranic Waste from Lawrence Berkeley National Laboratory to Lawrence Livermore National Laboratory	NA	November 2003
I054	Background Information for Physical Form Determination	NA	various
I055	Disposal Requisition Completion	WIC 116	December 15, 2003
I056	Management of TRU Waste by TRU Waste Generators	WCP-20	March 8, 2002
I057	Certification of Transuranic Waste Packages	WCP-21	December 23, 2002
I501	Waste Stream LBNL-S5400 Container Paperwork	NA	May 2011
I502	Batch Data Report for Waste Stream BLCHDN.001 Containers	NA	October 29, 2004
I503	Lawrence Berkeley National Laboratory Defense Correlation for Current TRU Waste Inventory	NA	September 30, 2010
P001	LBL News Magazine; A Historian's View of the Lawrence Years	NA	1981
P002	Discovery and Synthesis of the Chemical Elements	Pub. No. 44	1969
P003	A Brief History of Element Discovery, Synthesis, and Analysis	NA	September 1963
P004	Program for the Radiation Laboratory	NA	April 1, 1946
P005	The Lawrence Berkeley Laboratory and its Relation to the Department of Energy Mission	NA	November 2, 1977
P006	Long Range Plan of the University of California Radiation Laboratory Berkeley Hill Area	NA	October 1953
P007	Historical Records of the Atomic Energy Commission	NA	August 1, 2001
P008	Glenn Seaborg's Greatest Hits	NA	July 18, 2001
P009	Glenn T. Seaborg and Heavy Ion Nuclear Science	NA	July 18, 2001
P010	A Tutorial on Heavy-Ion Fusion Energy	NA	July 18, 2001
P011	Waste Transmutation	NA	July 18, 2001
P012	Status Annual Report Fiscal Year 1959	NA	1959
P013	Status Report Fiscal Year 1963	NA	1963
P014	Status Report Fiscal Year 1965	NA	1965
P015	Lawrence Radiation Laboratory Berkeley/1966	NA	1966
P016	Lawrence Radiation Laboratory Berkeley 1967	NA	1967
P017	Lawrence Radiation Laboratory Berkeley/1968	NA	1968
P018	A Report on the Lawrence Berkeley Laboratory	NA	1977
P019	LBL Institutional Plan 1978 (FY 78-84)	Pub 241	March 15, 1979
P020	1980 LBL Overview	NA	1980
P021	LBL Institutional Plan FY 1981-1986	NA	July 1980
P022	LBL Institutional Plan FY 1982-1987	NA	October 1981
P023	LBL Institutional Plan FY 1983-1988	NA	November 1982
P024	LBL Institutional Plan FY 1985-1990	Pub-5120	November 1984
P025	Institutional Plan FY 1987-1992	NA	December 1986
P026	Institutional Plan FY 1988-1993	NA	1988
P027	Institutional Plan FY 1990-1995	Pub-5236	November 1989
P028	Institutional Plan FY 1991-1996	NA	1991
P029	Institutional Plan FY 1994-1999	NA	1994
P030	The Yucca Mountain Project	NA	August 1, 2001

Source Document Tracking Number	Title	Document Number	Date
P031	Nuclear Science Annual Report for the period July 1, 1976 - June 30, 1977	LBL-6575	1977
P032	Nuclear Science Division Annual Report for the Period October 1, 1983 - September 30, 1984	LBL-18635	1984
P033	Nuclear Science Division Annual Report for the Period October 1, 1984 - September 30, 1985	LBL-21570	1985
P034	Nuclear Science Division Annual Report for the Period October 1, 1986 - September 30, 1987	LBL-25295	1987
P035	Nuclear Science Division Annual Report for the Period October 1, 1987 - September 30, 1988	LBL-27840	1988
P036	Nuclear Science Division Annual Report for 1991	LBL-31855	1991
P037	Nuclear Science Division 1992 Annual Report	LBL-33333	April 1993
P038	Nuclear Science Division 1994 Annual Report	LBL-37384	June 1995
P040	Nuclear Science Division 1995-1996 Annual Report	LBNL-39764	February 1997
P041	Earth Sciences Division Annual Report 1977	LBL-7028	1977
P042	Earth Sciences Division Annual Report 1978	LBL-8648	1978
P043	Earth Sciences Division Annual Report 1979	LBL-10686	1979
P044	Earth Sciences Division Annual Report 1983	NA	July 1984
P045	Earth Sciences Division Annual Report 1985	NA	July 1986
P046	Earth Sciences Division Annual Report 1986	NA	August 1987
P047	Earth Sciences Division Annual Report 1987	NA	September 1988
P048	Earth Sciences Division Annual Report 1989	NA	June 1990
P049	Earth Sciences Division Annual Report 1991	NA	June 1992
P050	Earth Sciences Division Annual Report 1992	NA	September 1993
P051	Long Term Plutonium Solubility and Speciation Studies in a Synthetic Brine	NA	1994
P052	Neptunium (V) and Neptunium (VI) Solubilities in Synthetic Brines of Interest to the Waste Isolation Pilot Plant (WIPP)	NA	1996
P053	Plutonium Solubility and Speciation Studies in a Simulant of Air Intake Shaft Water from the Culebra Dolomite at the Waste Isolation Pilot Plant	SAND92-0659/ UC-721	July 1992
P054	Thermodynamic Properties of Chemical Species in Nuclear Waste	ONWI-399	January 1983
P055	Temperature Effects on the Solubility and Speciation of Selected Actinides	NUREG/CR-4582	June 1986
P056	Measurement and Thermodynamic modeling of Np (V) solubility in Dilute Through Concentrated K_2CO_3 Media	SAND96-1604J	July 1997
P057	The Experimental Determination of Solubility Product for NpO_2OH in NaCl Solutions	NA	February 6, 1996
P058	Measured Solubilities and Speciations of Neptunium, Plutonium, and Americium in a Typical Groundwater (J-13) from the Yucca Mountain Region	LA-12562-MS	July 1993
P059	Measured Solubilities and Speciations from Oversaturation Experiments of Neptunium, Plutonium, and Americium in UE-25p#1 Well Water from the Yucca Mountain Region	LA-12563-MS	April 1994
P061	Chemical Sciences Division Annual Report 1990	LBL-30460	August 1991
P062	Chemical Sciences Division Annual Report 1991	LBL-32387	September 1992
P063	Chemical Sciences Division Annual Report 1992	LBL-34259	September 1993
P064	Chemical Sciences Division Annual Report 1993	LBL-35769	September 1994
P065	Chemical Sciences Division Annual Report 1994	LBL-37033	June 1995

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P066	Materials and Chemical Sciences Division Annual Report 1987	LBL-24242	July 1988
P068	Materials and Chemical Sciences Division Annual Report 1988	LBL-26455	July 1989
P069	Materials and Chemical Sciences Division Annual Report 1989	LBL-28100	July 1990
P070	Materials and Molecular Research Division Annual Report 1975	LBL-4550	1975
P071	Materials and Molecular Research Division Annual Report 1976	LBL-6016	1976
P072	Materials and Molecular Research Division Annual Report 1977	LBL-7355	1977
P073	Materials and Molecular Research Division Annual Report 1978	LBL-8580	1978
P074	Materials and Molecular Research Division Annual Report 1981	LBL-13840	August 1982
P075	Materials and Molecular Research Division Annual Report 1982	LBL-15150	May 1983
P076	Materials and Molecular Research Division Annual Report 1983	LBL-16680	July 1984
P077	Materials and Molecular Research Division Annual Report 1984	LBL-18570	June 1985
P078	Materials and Molecular Research Division Annual Report 1985	LBL-20230	June 1986
P079	Materials and Molecular Research Division Annual Report 1986	LBL-22010	July 1987
P080	Nuclear Chemistry Division Annual Report, 1964	UCRL-11828	January 1965
P081	Nuclear Chemistry Division Annual Report, 1965	UCRL-16580	January 1966
P082	Nuclear Chemistry Division Annual Report, 1966	UCRL-17299	January 1967
P083	Nuclear Chemistry Division Annual Report, 1967	UCRL-17989	January 1968
P084	Nuclear Chemistry Division Annual Report, 1968	UCRL-18667	January 1969
P085	Nuclear Chemistry Division Annual Report, 1969	UCRL-19530	January 1970
P086	Nuclear Chemistry Annual Report 1970	UCRL-20426	1970
P087	Nuclear Chemistry Annual Report 1971	LBL-666	1971
P088	Nuclear Chemistry Annual Report 1973	LBL-2366	1973
P089	Nuclear Chemistry Annual Report 1974	LBL-4000	1974
P090	Chemistry Division Annual Report, 1961	UCRL-10023	January 1962
P091	Chemistry Division Annual Report, 1962	UCRL-10624	January 1963
P092	Chemistry Division Annual Report, 1963	UCRL-11213	February 1964
P093	Waste Management Group Shoebox Database	NA	April 13, 2004
P096	RCRA Permit Application	NA	January 1996
P097	Hazardous Waste Facility Permit for Lawrence Berkeley National Laboratory	CA4890008986	May 20, 1999
P098	Final Safety Analysis Document for the Hazardous Waste Handling Facility at Lawrence Berkeley National Laboratory	NA	April 10, 2001
P099	Telephone Directory, July 1962	NA	July 1962
P100	Telephone Directory, April 65	NA	April 1965
P101	Telephone Directory, March 1975	NA	March 1975
P102	Telephone Directory, October 1986	NA	October 1986
P103	Telephone Directory, July 1993	NA	July 1993
P104	Actinide and Heavy Element Chemistry	NA	2000
P105	Directions to the Lab	NA	August 20, 2001
P106	About Berkeley Lab	NA	August 24, 2001
P107	Lead Shielding for Radioactive Waste is a RCRA Solid Waste	Faxback 13468	April 30, 1991
P108	Lawrence Berkeley National Laboratory Building 75C Radiation Detection Instrument Calibration Facility Safety Analysis	NA	January 30, 2002
P109	MSDSs for Aquaset and Petroset	NA	various

Source Document Tracking Number	Title	Document Number	Date
P110	The Radiochemistry of Plutonium	NAS-NS 3058	September 1, 1965
P111	The Radiochemistry of Americium and Curium	NAS-NS-3006	January 1960
P112	The Radiochemistry of Neptunium	NAS-NS-3060	December 1974
P113	The Radiochemistry of the Transcurium Elements	NAS-NS-3031	October 25, 1960
P114	The Radiochemistry of Uranium, Neptunium, and Plutonium - An Updating	NAS-NS-3063	February 1986
P115	Determination of Radioisotopes of Cerium, Barium, Lanthanum, and Neptunium after Separation by Barium Sulfate	NA	January 1966
P116	Separation and Radiochemical Determination of Uranium and the Transuranium Elements using Barium Sulfate	NA	1969
P117	USEPA RCRA Hotline (selected records)	NA	various
P118	CCP Waste Specific Data Package TRAMPAC for Lawrence Berkeley National Laboratory	CCP-PO-022	April 26, 2004
P501	Packaging Description of Contact-Handled Transuranic Waste	Revision 0	August 1, 2010
P502	Waste Management Group Shoebox Database Shipping Container Contents Report	NA	February 25, 2011
U001	Military Application	NA	December 18, 1953
U003	Correlation of Waste Items to LBNL Generating Divisions	NA	September 2001
U004	Rad Tag and Packaging Log for Drum RT0000290	NA	January 24, 1990
U005	Preliminary Headspace Gas Results for Drum LLNL-TRU-007	NA	April 14, 2004