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

JUL 13 2010

JUL 2010
Hazardous Waste Bureau

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, ID-MFC-S5400-RH, Remote-Handled Transuranic Debris Waste from Materials and Fuels Complex at the Idaho National Laboratory

Dear Mr. Bearzi:

The Department of Energy Carlsbad Field Office (CBFO) has approved the Waste Stream Profile Form (WSPF), ID-MFC-S5400-RH, Remote-Handled Transuranic Debris Waste from Materials and Fuels Complex at the Idaho National Laboratory.

Enclosed is a copy of the form as required by Section B-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,

David C. Moody
Manager

Enclosure(s)

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
C. Gadbury, CBFO ED
S. McCauslin, CBFO ED
G. Sena, 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:GS:10-1442:UFC 5900.00

100715

Attachment 2 –CCP Waste Stream Profile Form

(1) Waste Stream Profile Number: ID-MFC-S5400-RH						
(2) Generator site name: Idaho National Laboratory				(4)Technical contact: Irene Quintana		
(3) Generator site EPA ID: ID4890008952				(6) Technical contact phone number: 720-982-7174		
(5) Date of audit report approval by New Mexico Environment Department (NMED): 12/20/2006, 08/06/2007, 09/22/2008, 09/11/2009						
(7) Title, version number, and date of documents used for WAP Certification: CCP-PO-001, CCP Transuranic Waste Characterization Quality Assurance Project Plan, Revision 17, June 23, 2009 CCP-PO-002, CCP Transuranic Waste Certification Plan, Revision 23, April 7, 2010 CCP-PO-501, CCP/INL RH Waste Interface Document, Rev. 4, April 30, 2010						
(8) Did your facility generate this waste?	YES	X	NO			
(9) If no, provide the name and EPA ID of the original generator: NA						
Waste Stream Information[1]						
(10) WIPP ID: IN-AW-161				(11) Summary Category Group: S5000		
(12) Waste Matrix Code Group: Heterogeneous Debris Waste				(13) Waste Stream Name: Remote-Handled Transuranic Debris Waste from Materials and Fuels Complex at the Idaho National Laboratory		
(14) Description from the TWBIR: This waste stream was generated at Argonne National Laboratory-West at the INL. The wastes consist of glassware, paper, poly, and miscellaneous hardware generated during analytical chemistry laboratory hot cell operations.						
(15) Defense TRU Waste:	YES	X	NO			
(16) Check One:	CH		RH	X		
(17) Number of SWBs: NA	(18) Number of Drums: NA			(19) Number of Canisters: 3[3]		
(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, D019, D022, D038, F002, F005						
(22) Applicable TRUCON Content Numbers: ID 321, ID 325						
(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-540, Revision 1, August 6, 2009, Attachments 1 & 2						
(23B) Facility mission description: CCP-AK-INL-540, Revision 1, August 6, 2009, Section 4.1						
(23C) Description of operations that generate waste: CCP-AK-INL-540, Revision 1, August 6, 2009, Section 4.2.1						
(23D) Waste identification/categorization schemes: CCP-AK-INL-540, Revision 1, August 6, 2009, Section 5.4						
(23E) Types and quantities of waste generated: CCP-AK-INL-540, Revision 1, August 6, 2009, Sections 4.2.2						

(23F) Correlation of waste streams generated from the same building and process, as applicable: NA			
(24) Waste certification procedures: CCP-TP-530, Rev. 9, CCP RH TRU Waste Certification and WWIS/WDS Data Entry, December 11, 2009			
(25)Required Waste Stream Information			
(25A) Area(s) and building(s) from which the waste stream was generated: CCP-AK-INL-540, Revision 1, August 6, 2009, Section 5.1			
(25B) Waste stream volume and time period of generation: CCP-AK-INL-540, Revision 1, August 6, 2009, Section 5.2			
(25C) Waste generating process description for each building: CCP-AK-INL-540, Revision 1, August 6, 2009, Sections 4.2.1 and 5.3			
(25D) Waste Process flow diagrams: See CCP-AK-INL-540, Revision 1, August 6, 2009 for equivalent information.			
(25E) Material inputs or other information identifying chemical/radionuclide content and physical waste form: CCP-AK-INL-540, Revision 1, August 6, 2009, Sections 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-MFC-S5400-RH			
(26) Which Defense Activity generated the waste: (check one)[4]			
	Weapons activities including defense inertial confinement fusion	X	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: See S1 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(27B) Standard operating procedures: See S2 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(27C) Safety Analysis Reports: See S3 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(27D) Waste packaging logs: See S4 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(28E) Test plans/research project reports: See S5 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(27F) Site databases: See S6 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(27G) Information from site personnel: See S7 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(27H) Standard industry documents: See S8 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(27I) Previous analytical data: See S9 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(27J) Material safety data sheets: See S10 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(27K) Sampling and analysis data from comparable/surrogate Waste: See S12 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(27L) Laboratory notebooks: See S11 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
Confirmation Information[2]			
For the following, when applicable, enter procedure title(s), number(s) and date(s)			
(28)	Radiography: CCP-TP-508, Rev. 3, 4/22/2009		
(29)	Visual Examination: CCP-TP-500, Rev. 8, 7/24/2008		

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

Reviewed by AK Expert:	**YES**	[X]		**Date: 6/9/2010**
Reviewed by STR (if necessary):	**YES**	[X]	**NA** [ ]	**Date: 6/24/2010**

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)	(32) Irene Quintana	(33) 7/2/2010
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) The waste stream consisted of 4 55-gallon drums that were repackaged. The repackaging effort resulted in 8 55-gallon drums that will be loaded into 3 RH canisters.
(4) This waste was also generated by the following defense activities: defense nuclear material production, defense nuclear waste and by product management, and defense research and development.

CHARACTERIZATION INFORMATION SUMMARY

WSPF # ID-MFC-S5400-RH

Lot 1

TABLE OF CONTENTS

CIS 001

CCP Characterization Information Summary Cover Page

Waste Stream # ID-MFC-S5400-RH Lot # 1

AK Expert Review: Scott Smith Date: 6/9/10

SPM Review: Irene Quintana Date: 6/9/10

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:

Headspace Gas Sampling and Analysis (HSG):

CCP-TP-093	Rev 13	03/19/07	CCP Sampling of TRU Waste Containers
CCP-TP-106	Rev 6	07/12/07	CCP Headspace Gas Sampling Batch Data Report Preparation
CCP-TP-173	Rev 1	09/30/09	CCP Analysis of Gas Samples for VOCs by GC/FID
CCP-TP-175	Rev 0	05/02/07	CCP Analysis of Gas Samples for VOCs by GC/MS

Real-Time Radiography (RTR):

CCP-TP-508	Rev 3	04/22/09	CCP RH Standard Real-Time Radiography Inspection Procedure

Visual Examination (VE):

CCP-TP-500	Rev 8	07/24/08	CCP Remote-Handled Waste Visual Examination

Project Level Data Validation / DQO Reconciliation:

CCP-TP-001	Rev 17	09/24/07	CCP Project Level Data Validation and Verification
CCP-TP-002	Rev 21	08/04/09	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 18	11/16/06	CCP Acceptable Knowledge Documentation
CCP-TP-530	Rev 9	12/11/09	CCP RH TRU Waste Certification and WWIS/WDS Data Entry

WAP Certification:

CCP-PO-001	Rev 17	06/23/09	CCP Transuranic Waste Characterization Quality Assurance Project Plan

C15002

CCP Correlation of Container Identification Numbers to Batch Data Report Numbers

Waste Stream: # ID-MFC-S5400-RH Lot # 1

Container ID Number	Historical Container ID	NDA BDR or Radiological Characterization BDR (CH only)	RTR BDR	VE BDR	Solids Sampling BDR	Solids Analytical BDR	Load Management/ Overpack Yes	Permit Required Headspace Gas BDR			Transportation BDR
								Sample	Analysis		
IDAWANL880064A	NA	NA	NA	RHINLVE090003	NA	NA		INHSGS09013	ECL09030M	ECL09030G	NA
IDAWANL880064B	NA	NA	NA	RHINLVE090003	NA	NA		INHSGS09013	ECL09030M	ECL09030G	NA
IDAWANL880065A	NA	NA	INLRHRTR09009	NA	NA	NA		INHSGS09013	ECL09030M	ECL09030G	NA
IDAWANL880065B	NA	NA	INLRHRTR09009	NA	NA	NA		INHSGS09013	ECL09030M	ECL09030G	NA
IDAWANL880134A	NA	NA	INLRHRTR09009	NA	NA	NA		INHSGS09013	ECL09030M	ECL09030G	NA
IDAWANL880134B	NA	NA	INLRHRTR09009	NA	NA	NA		INHSGS09013	ECL09030M	ECL09030G	NA
IDAWANL880068A	NA	NA	INLRHRTR09009	NA	NA	NA		INHSGS09013	ECL09030M	ECL09030G	NA
IDAWANL880068B	NA	NA	INLRHRTR09009	NA	NA	NA		INHSGS09013	ECL09030M	ECL09030G	NA

Signature of Site Project Manager

Irene Quintana 6/9/2010

Printed Name Date

A.LS 003

CCP Headspace Gas UCL_{90} Evaluation Form

WSPF #: ID-MFC-S5400-RH **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
Benzene	Log	6	8	-0.14	-2.17	1.30	-1.52	10	2.30		
Bromoform	Log	0	8	-3.38	-4.61	0.65	-4.29	10	2.30		
Carbon tetrachloride	Log	3	8	-1.71	-3.11	0.94	-2.64	10	2.30		
Chlorobenzene	Log	0	8	-2.35	-3.58	0.65	-3.26	10	2.30		
Chloroform	Log	2	8	-0.94	-2.80	1.05	-2.27	10	2.30		
Cyclohexane [a]	Log	5	8	1.19	-1.78	1.99	-0.78	10	2.30		
1,1-Dichloroethane	Log	0	8	-1.58	-2.82	0.65	-2.50	10	2.30		
1,2-Dichloroethane	Log	0	8	-2.12	-3.36	0.65	-3.03	10	2.30		
1,1-Dichloroethylene	Log	0	8	-2.00	-3.23	0.65	-2.91	10	2.30		
cis-1,2-Dichloroethylene	Log	0	8	-2.53	-3.74	0.65	-3.42	10	2.30		
trans-1,2-Dichloroethylene	Log	0	8	-2.41	-3.66	0.66	-3.33	10	2.30		
Ethyl benzene	Log	8	8	2.27	-0.26	1.53	0.50	10	2.30		
Ethyl ether	Log	0	8	-1.77	-3.02	0.65	-2.69	10	2.30		
Methylene chloride	Log	4	8	-0.62	-2.46	0.94	-1.99	10	2.30		
1,1,2,2-Tetrachloroethane	Log	0	8	-2.59	-3.85	0.66	-3.52	10	2.30		
Tetrachloroethylene	Log	0	8	-2.59	-3.81	0.64	-3.49	10	2.30		
Toluene	Log	8	8	3.04	0.20	2.03	1.21	10	2.30		
1,1,1-Trichloroethane	Log	0	8	-2.81	-4.04	0.65	-3.72	10	2.30		
Trichloroethylene	Log	0	8	-2.73	-3.94	0.64	-3.62	10	2.30		
1,1,2-Trichloro-1,2,2-trifluoroethane	Log	0	8	-2.59	-3.85	0.66	-3.52	10	2.30		
1,2,4-Trimethylbenzene [a]	Log	0	8	-2.41	-3.65	0.65	-3.32	10	2.30		
1,3,5-Trimethylbenzene [a]	Log	0	8	-2.41	-3.63	0.65	-3.31	10	2.30		
m-Xylene [b]	Log	8	8	3.71	1.28	1.39	1.98	10	2.30		
p-Xylene [b]	Log	8	8	3.71	1.28	1.39	1.98	10	2.30		
o-Xylene	Log	8	8	2.71	-0.30	1.71	0.55	10	2.30		
Acetone	Log	8	8	3.53	2.64	0.66	2.97	100	4.61		
Butanol	Log	8	8	1.22	-0.37	1.20	0.23	100	4.61		
Methanol	No	0	8	6.00	6.00	0.00	0.00	100	N/A		
Methyl ethyl ketone	No	8	8	3.10	1.81	0.92	2.27	100	N/A		

CCP Headspace Gas UCL_{90} Evaluation Form

WSPF #: ID-MFC-S5400-RH **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
Methyl isobutyl ketone	Log	8	8	0.47	-0.42	0.68	-0.08	100	4.61		
Chloromethane[c]	No	8	8	1.00	0.60	0.32	0.77	100	N/A		
Carbon Disulfide[a]	No	5	8	0.23	0.14	0.07	0.17	10	N/A		
1,2-Dichloropropane[a]	Log	1	8	-3.03	-4.13	0.68	-3.79	10	2.30		
Trichlorofluoromethane[c]	Log	0	8	-2.25	-3.48	0.65	-3.16	10	2.30		

[a] These compounds are from the TRAMPAC and or CH TRUCON Appendix B 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."

[c] Noted analytes are not required but are reported by the Environmental Chemistry Laboratory at Idaho and are included on the UCL90 for completeness.

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

Irene Quintana
Printed Name

6/9/2010
Date

CCP Headspace Gas Summary Data

Waste Stream Number ID-MFC-S5400-RH Lot Number (s) 1

Tentatively Identified Compound	Maximum Observed Estimated Concentrations (ppmv)	# Samples Containing TIC	% Detected
2-Methyl-1-propanol	0.21	1	0.00%

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 3/31/2010

15206

CCP RTR/VE Summary of Prohibited Items and AK Confirmation

Waste Stream Number: ID-MFC-S5400-RH Lot(s)#: 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 Radiography.	None of the containers in this lot had prohibited items identified during Visual Examination.

a. See Batch Data Reports
the TSDF).

Site Project Manager Signature | Irene Quintana Printed Name | 6/9/2010 Date

CCP Reconcilliation with Data Quality Objectives

WSF# ID-MFC-S5400-RH Lot # 1

Sampling Completeness

VE
Number of Valid Samples: 2 Number of Total Samples Analyzed: 2
Percent Complete: 100 (QAO is 100%)

RTR
Number of Valid Samples: 6 Number of Total Samples Analyzed: 6
Percent Complete: 100 (QAO is 100%)

HSG
Number of Valid Samples: 8 Number of Total Samples collected: 8
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%)

C13 008

CCP Reconcilliation with Data Quality Objectives

WSF# ID-MFC-S5400-RH Lot # 1

	Y/N/NA	Reconcilliation 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	NA	AK Sufficiency. Is there an approved AK sufficiency Determination for this waste stream?
6	Y	Mean concentrations, UCL90 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 Environmental Protection Agency (EPA) Hazardous Waste Numbers were assigned as required. Samples were randomly collected (when appropriate).
7a	NA	Mean concentrations, UCL90 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 Hazardous Waste Numbers were assigned as required. Samples were randomly collected.
7b	NA	Mean concentrations, UCL90 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 Hazardous Waste Numbers were assigned as required. Samples were randomly collected.
7c	NA	Mean concentrations, (UCL90) 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 Hazardous Waste Numbers were assigned as required. Samples were randomly collected.

C1S09

SUMMATION OF ASPECTS OF AK SUMMARY REPORT: ID-MFC-S5400-RH

Overview

Waste stream ID-MFC-S5400-RH consists of remote-handled (RH) heterogeneous debris waste generated during hot cell and analytical laboratory operations in Building 752 at the Materials and Fuels Complex (MFC) at the Idaho National Laboratory (INL). The MFC was formerly known as the Argonne National Laboratory – West (ANL-W). The MFC Analytical Laboratory hot cells are utilized for analysis of samples of irradiated nuclear fuels and materials. The waste is currently stored at the Idaho Nuclear Technology and Engineering Center (INTEC) at the INL. If necessary, the waste may be repackaged in either Building CPP-659 or CPP-666 at INTEC. The waste was generated from 1987 to 1988.

Defense related activities conducted in the MFC analytical laboratory hot cells are associated with naval reactors development, defense nuclear material production, defense nuclear waste and material by product management, and defense research and development. Waste stream ID-MFC-S5400-RH was generated in support of these defense related activities.

This Summation of the AK Summary Report includes information to support Waste Stream Profile Form (WSPF) number ID-MFC-S5400-RH for Remote Handled (RH) TRU heterogeneous debris. The primary source of information for this Summation is CCP-AK-INL-540, *Central Characterization Project Acceptable Knowledge Summary Report For Remote-Handled Transuranic Debris Waste from Materials and Fuels Complex at the Idaho National Laboratory Waste Stream ID-MFC-S5400-RH*, Revision 1, August 6, 2009. CCP-AK-INL-540 includes information obtained from numerous sources, including facility safety basis documentation, historical document archives, operational logbooks, sample logbooks, procedures for waste generation activities, interviews with cognizant MFC personnel, results of waste characterization programs, and site mission descriptions identifying defense and non-defense operations..

Waste Stream Identification Summary

Waste Stream Name:	Remote-Handled Transuranic Debris Waste From Materials and Fuels Complex at the Idaho National Laboratory
Waste Stream Number:	ID-MFC-S5400-RH
Site Where TRU Waste Was Generated:	Idaho National Laboratory
Facility Where TRU Waste Was Generated:	Materials and Fuels Complex
Site Where TRU Waste is Currently Stored:	Idaho National Laboratory
Waste Stream Volume- Current:	3 canisters[1]
Waste Stream Volume- Projected:	0 canisters

[1]The waste stream consisted of 4 55-gallon drums that were repackaged. The repackaging effort resulted in 8 55-gallon drums that will be loaded into 3 RH canisters.

Dates of Waste Generation:	1987 - 1988
TRUCON Content Number (TRUCON):	ID 321, ID 325
Summary Category Group:	S5000 –Debris Waste
Waste Matrix Code:	S5400
Waste Matrix Code Group:	Heterogeneous Debris Waste
Waste Stream TWBIR Identification:	IN-AW-161
RCRA EPA Hazardous Waste Numbers:	D004, D005, D006, D007, D008, D009, D010, D011, D019, D022, D038, F002, and F005

Waste Stream Description and Physical Form

Waste stream ID-MFC-S5400-RH consists of RH TRU heterogeneous debris waste generated during hot cell and analytical laboratory operations conducted in the MFC Analytical Laboratory. Examples of debris include: cellulosic debris (such as blotter paper, cotton swabs, rags, sheeting, terri-towels, tissues), plastic debris (such as plastic bags, bottles/beakers, caps, pipettes), rubber debris (washers), glass debris (such as broken/crushed glass, beakers, sample bottles, pipettes, tubing, and glass items/glassware from analytical equipment/apparatus), and metal debris (such as cans/containers, bolts, clips, springs, washers, tools, tweezers and metal parts from analytical equipment/apparatus).

Waste stream ID-MFC-S5400-RH may contain lesser amounts (less than 50 volume percent in any drum) of homogeneous solids. Incidental quantities of sample material or residues contaminate the debris waste. The waste matrix also contains small quantities of absorbent material (e.g.,non-hazardous absorbents such as Aquaset, diatomaceous earth, Oil-Dri®, Petroset, Saf-T-Set, or vermiculite).

The waste material that comprises waste stream ID-MFC-S5400-RH was generated from a single process or from an activity that is similar in material, physical form, and hazardous constituents and is therefore a single waste stream.

Point of Generation

Location

The waste is currently stored at the INL Idaho Nuclear Technology and Engineering Center (INTEC) Radioactive Mixed Waste Staging Facility, Building CPP-1617 in Idaho pending characterization, certification, and canisterization activities. This waste was generated in the INL MFC Analytical Laboratory hot cells in the Laboratory and Office (L&O) Building, Building 752. RH TRU waste repackaging operations are conducted at INTEC in Building CPP-659, the New Waste Calcining Facility (NWCF) or in Building CPP-666, the Fluorinel Dissolution Process (FDP) and Fuel Storage Facility.

Area and/or Building of Generation

This waste was generated in the INL MFC Analytical Laboratory hot cells in the L&O Building, Building 752.

Generating Processes

Description of Waste Generating Processes

Waste stream ID-MFC-S5400-RH was generated in the hot cells from the chemical, radiochemical, and physical analyses of irradiated samples, primarily Integral Fast Reactor (IFR) fuel samples and materials; and waste resulting from decontamination and cleanup of the hot cells. The samples, approximately one-gram quantities of fuel sectioned at the Fuel Conditioning Facility (FCF) or the Hot Fuel Examination Facility (HFEF) at INL, were packaged in metal containers and stored in the transfer containers until they were prepared for analysis. Following is a description of the Analytical Laboratory and decontamination operations that generated this waste.

Analytical Laboratory Operations

Analytical laboratory operations conducted in support of the hot cells included axial fuel expansion, burnup and density measurements, radial drilling, fission gas analysis, sodium logging, and dissolution and radiochemical analysis. These operations are described as follows:

- Axial fuel expansion measurements consisted of physical measurements of sample dimensions before and after sodium removal in a butyl cellusolve bath, and during cladding removal, and immersion density analysis.
- Burnup measurements were radiochemical analysis conducted for technetium-99, neodymium-148, and lanthanum-139, elements selected as fission monitors.
- Density measurements included a combination of physical measurements of the sample for volume and weight, ultrasonic cleaning with water or nitric acid, lacquer coating, and immersion in a water bath.
- Radial drilling consisted of drilling holes of different sizes, depths, and at different locations along a fuel element. The materials removed from each hole were dissolved (using nitric acid, hydrofluoric acid, and/or hydrochloric acid) and analyzed to determine the fuel composition.
- Fission gas analysis consisted of dissolving the fuel sample (using nitric acid, hydrofluoric acid, and/or hydrochloric acid) in an enclosed dissolver flask purged with helium and containing xenon and krypton spikes. The gases were dried and absorbed on a charcoal trap, then analyzed by mass spectroscopy.
- Sodium logging consisted of the determination of the sodium content at specified locations of the sample. Samples of the fuel element were cleaned with water, cladding was removed, the samples were dissolved (using nitric acid, hydrofluoric acid, and/or hydrochloric acid) and the solution analyzed for sodium.
- Samples transferred to the hot cells for wet chemical analysis were dissolved. Dissolution operations were the same for all the laboratory operations. Combinations of nitric acid, hydrofluoric acid, and/or hydrochloric acid were used based on the sample materials such as metal or oxide samples. Following analysis, the remaining solution

containing the dissolved fuel was neutralized with a base such as sodium carbonate or sodium hydroxide and solidified with Aquaset or Petroset and subsequently transferred for shipment to HFEF for disposal separate from waste stream ID-MFC-S5400-RH.

- Radiochemical analyses consisted of separation, purification, and preparation of the sample solution for mass spectroscopic analysis. Separations and purifications vary depending on the element analyzed but generally consisted of a combination of ion exchange, chemical oxidation reactions, extractions, and/or precipitations. Hazardous chemicals used as reagents, solvents, and indicators in the analysis processes are:

    - Aquastar Coulomat A (contains chloroform and methanol)
    - Arsenous oxide
    - Barium chromate
    - Barium nitrate
    - Carbon tetrachloride
    - Chloroform
    - Mercuric nitrate
    - Potassium chromate
    - Potassium dichromate
    - Pyridine
    - Silver nitrate
    - Sodium dichromate
    - Thoron reagent (contains arsenic)
    - Toluene
    - Vessel Solution – Pyridine Free (contains chloroform and methanol)

Liquids generated from analytical laboratory operations, such as wash solutions including water, acetone, hydrochloric acid, or ethanol, were neutralized if acidic or basic, and then solidified in 2-gallon cans with an absorbent such as vermiculite or diatomaceous earth. The solidified material was packaged with hot cell debris and is part of waste stream ID-MFC-S5400-RH.

Decontamination Operations

The hot cells were periodically decontaminated. Decontamination operations included sweeping the cell debris into cans; wiping the floor, walls, and manipulators with dry rags, or sponges damp with solution such as Radiac Wash or hydrochloric acid; and/or scrubbing the cell floor with steel wool.

Waste materials from analytical and decontamination operations were accumulated in 2-gallon cans. Waste materials may include lab glassware, paper products, rags, polyethylene bottles, and small quantities of solidified wash solutions or reagents. Volume reduction was conducted on some plastic and glass debris. Empty polyethylene bottles from decontamination operations were placed in cans, heated, and melted. Glassware was crushed prior to packaging into cans.

Table 1 identifies toxicity characteristic (TC) and F-listed constituents in waste stream ID-MFC-S5400-RH.

Table 1 –TC and F-Listed Constituents in Waste Stream ID-MFC-S5400-RH

Constituent	CAS Number	EPA Hazardous Waste Numbers
Arsenic	7440-38-2	D004
Barium	7440-39-3	D005
Cadmium	7440-43-9	D006
Carbon tetrachloride	56-23-5	D019
Chloroform	67-66-3	D022
Chromium	7440-47-3	D007
Lead	7439-92-1	D008
Mercury	7439-97-6	D009
Pyridine	110-86-1	D038
Selenium	7782-49-2	D010
Silver	7440-22-4	D011
Toluene	108-88-3	F005
Trichloroethylene	79-01-6	F002

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) or VE 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

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

Flammable liquids (acetone, ethanol, ethyl acetate, methanol and xylene) were used in MFC Analytical Laboratory hot cell operations but were subsequently absorbed using Aquaset, diatomaceous earth, Oil-Dri®, Petroset, Saf-T-Set, and/or vermiculite and, therefore, do not exhibit the characteristic of ignitability.

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 stream does not exhibit the characteristic of ignitability (D001) (References C005, P006, P012, P036, P037, P039, P043, P060, P063, P075, P088, P091, U001).

Corrosivity

This waste does not meet the definition of corrosivity as defined in 40 CFR 261.22.

The waste is not liquid and liquids were not added to containers during packaging. Liquids are neutralized prior to disposal. In addition, liquids are solidified with absorbent (i.e., Aquaset, diatomaceous earth, Oil-Dri®, Petroset, Saf-T-Set, and/or vermiculite).

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 stream does not exhibit the characteristic of corrosivity (D002) (References C005, P036, P037, P039, P043, P060, P063, P075, P088, P091, U001).

Reactivity

This waste stream does not meet the definition of reactivity as defined in 40 CFR 261.23. The materials are stable and will not undergo violent chemical change. The waste will not react violently with water, form potentially explosive mixtures with water, or generate toxic gases, vapors, or fumes when mixed with water. The materials do not contain cyanides or sulfides, and are not capable of detonation or explosive reaction. The materials are not liquid and RTR and VE are performed to ensure the absence of prohibited items.

Metal powders generated from sample preparation activities are well separated and oxidized during production. Although sodium and sodium-potassium bonded fuel pins were disassembled and analyzed, the sodium and sodium-potassium were segregated or removed using a mixture of alcohol and water. Sodium was removed from waste items prior to disposal by using a 50/50 alcohol and water mixture and physical removal or wiping. Oxidation was also used followed by a water wash to ensure complete removal. The sodium or sodium saturated alcohol solutions were sent to the Sodium Components Maintenance Shop (SCMS) facility for treatment and disposal separate from waste stream ID-MFC-S5400-RH. (References C005, C019, P011, P036, P037, P039, P043, P060, P063, P070, P075, P088, P091, U001).

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).

Toxicity Characteristic

Waste stream ID-MFC-S5400-RH 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 conservatively applied to the waste stream.

Following are examples of toxicity characteristic metals potentially present in this debris from the hot cell operations. Arsenic (D004), barium (D005), cadmium (D006), chromium (D007), lead (D008), mercury (D009), selenium (D010) and silver (D011) were components in analytical laboratory samples and standards. Barium and chromium compounds (such as barium chromate) were used as reagents in the analytical laboratory. Arsenic, cadmium, chromium and lead were also contained in fuel materials processed in the hot cells or present as a component of fuel pins/cladding. Therefore, EPA HWNs for arsenic (D004), barium (D005), cadmium (D006), chromium (D007), lead (D008), mercury (D009), selenium (D010) and silver (D011) are conservatively assigned to waste stream ID-MFC-S5400-RH (Reference DR002).

The AK sources identified the use of organic toxicity characteristic compounds including carbon tetrachloride (D019), chloroform (D022), pyridine (D038) and trichloroethylene (D040). EPA HWN F002 is assigned to the waste stream for the F-listed solvent trichloroethylene (F002). Because the more specific F-listed EPA HWN is assigned for this compound, the corresponding toxicity characteristic HWN D040 is not assigned. Therefore, only HWNs D019 for carbon tetrachloride, D022 for chloroform and D038 for pyridine are conservatively assigned to waste stream ID-MFC-S5400-RH (References DR002, P036, P042, P070, U231, U232, U233).

Listed Waste

Waste stream ID-MFC-S5400-RH was mixed with or derived from F-listed hazardous waste from non-specific sources as listed in 40 CFR 261.31. Waste stream ID-MFC-S5400-RH is assigned EPA HWNs F002 and F005 because listed solvents were used in the MFC Analytical Laboratory hot cells and potentially contaminate the waste.

Although several F001-listed solvents were identified in the AK record (i.e., carbon tetrachloride and trichloroethylene), these listed solvents were not used in a "large-scale" degreasing operation such as cold cleaning or vapor degreasing. Large-scale degreasing operations were not conducted in the MFC Analytical Laboratory, and therefore, EPA HWN F001 is not assigned to this waste stream.

Debris in waste stream ID-MFC-S5400-RH contains or is contaminated with F-listed solvents from hot cell operations. For this reason, waste stream ID-MFC-S5400-RH is conservatively assigned F-listed EPA HWN F002 for trichloroethylene and HWN F005 for toluene (References DR002, P011, P019, P023, P036, P042, P070, U231, U232).

F003 constituents, including acetone, ethyl acetate, methanol and xylene are identified as potentially present in this waste stream as contaminants. However, F003-listed solvents are listed solely for ignitability, and this waste stream does not exhibit the characteristic of ignitability because the solvents are not in liquid form. Therefore, waste stream ID-MFC-S5400-RH is not an F003-listed hazardous waste.

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

(F002)
Trichloroethylene

(F005)
Toluene

U, K and P-Listed Chemicals

Waste stream ID-MFC-S5400-RH was not mixed with discarded commercial chemical product, an off-specification commercial chemical product, or a container residue or spill residue thereof (40 CFR 261.33). Based on the AK documentation reviewed, there is no evidence that unused commercial products were disposed of in TRU waste drums. (References DR002, P039, P043).

Beryllium and beryllium compounds may contaminate this waste stream. Beryllium was used as an analytical laboratory reagent and as a component of fuel pins/cladding. 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.

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 in not assigned to waste stream. (References C002, C014, DR002, P042).

Waste stream ID-MFC-S5400-RH does not include any of the manufacturing process wastes from the specific industries or sources listed in 40 CFR 261.32.

Waste stream ID-MFC-S5400-RH is not assigned any U-, K-, or P-Listed EPA HWNs.

Headspace Gas/Volatile Organic Compound Information

Headspace gas analysis was completed on the 8 containers that comprise this waste stream. No new EPA HWNs were added as a consequence of headspace gas sampling and analysis.

One tentatively identified compound (TIC) (2-methyl-1-propanol) was identified in this lot. This compound is listed in the Headspace Gas Summary Report. No TIC was found in greater than 25 percent of the containers in this lot.

The UCL90 calculated values, using either the transformed or untransformed value, of all of the Target Analytes are below the program required quantification limits (PRQLs). Specific information about the maximum, mean, standard deviation and UCL90 are contained in the Headspace Gas Summary Report.

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

Conclusion

The EPA hazardous waste numbers that apply to this waste stream are: D004, D005, D006, D007, D008, D009, D010, D011, D019, D022, D038, F002, and F005.

Polychlorinated Biphenyls (PCBs)

This waste stream does not contain PCBs, and therefore is not regulated as Toxic Substances Control Act waste under 40 CFR 761.

No sources of PCBs were identified for waste stream ID-MFC-S5400-RH. PCB items such as light ballasts are not identified in MFC RH TRU debris waste. Therefore, waste stream ID-MFC-S5400-RH is not regulated as a Toxic Substances Control Act (TSCA) waste under 40 CFR 761 (References C019, P039, P043, U006, U007, U008, U009, U010, U034, U035, U036, U037).

Prohibited Items

The absence of prohibited items is determined and documented through acceptable knowledge and characterization activities. Real-time radiography (RTR) or VE 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 wastes 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.
- Any waste container from a waste stream (or waste stream lot) which has not undergone either radiographic or visual examination of a statistically representative subpopulation of the waste stream in each shipment, as described in WIPP HWFP Attachment B7.

Each container of waste is certified and shipped only after radiography or VE either:

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

Justification for the Selection of Radiography or VE

Containers in Lot 1 of this waste stream were characterized using real time radiography (RTR) and visual examination (VE). RTR and VE are the characterization methods utilized because they are acceptable methods of Nondestructive Examination (NDE) for S5000 waste. RTR and VE meet all the Data Quality Objectives for NDE of S5000 waste.

Method for Determining Waste Material Parameter Weights per Unit of Waste

The waste material parameters (WMPs) for waste stream ID-MFC-S5400-RH were estimated by reviewing the waste container logs and real-time radiography (RTR) prescreen examinations for the eight 55-gallon drums in the current inventory.

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

Table 2. Waste Stream ID-MFC-S5400-RH Waste Material Parameter Estimates

Waste Material Parameter	Average Weight Percent	Weight Percent Range
Iron-based Metals/Alloys	16.0 %	11.7 –18.8 %
Aluminum-based Metals/Alloys	<1.0 %	0.0 –<1.0 %
Other Metals	<1.0 %	0.0 – <1.0 %
Other Inorganic Materials	38.1 %	34.0 – 44.3 %
Cellulosics	11.8 %	10.2 – 14.5 %

Rubber	<1.0 %	0.0 – <1.0 %
Plastic (waste materials)	23.0 %	16.9 – 33.9 %
Organic Matrix	5.5 %	0.0 – 24.1 %
Inorganic Matrix	5.5 %	0.0 – 24.1 %
Soils/Gravel	0.0 %	0.0 – 0.0 %

List of AK Sufficiency Determinations

No AK Sufficiency Determinations were requested for this waste stream.

Transportation

The waste stream and 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

Containers in this waste stream have surface dose rates exceeding 200 mrem/h, but less than 1000 rem/h, and contain more than 100 nanocuries per gram (nCi/g) of waste of alpha-emitting TRU isotopes with half lives greater than 20 years. The waste is contaminated primarily with Pu-239 and U-235.

The 10 WIPP tracked radionuclides are presented in Table 3 in addition to other radionuclides that, in aggregate, constitute 95% of the total radiological hazard.

Table 3. Summary of Radionuclides in Waste Stream ID-MFC-S5400-RH

WIPP Tracked Radionuclides	Additional Reported Radionuclides
Am-241	Nb-95
Pu-238	Zr-95
Pu-239	Ce-144
Pu-240	U-235
Pu-242	
U-233	
U-234	
U-238	
Cs-137	
Sr-90	

Payload management will not be utilized for this waste stream.

Attachment 1

AK SOURCE DOCUMENTS, SUPPLEMENTAL DOCUMENTATION

Source Document Tracking Number	AK #	Title	Document Number	Revision	Date
C001	S7	Interview of Jim Stuart, Materials Engineer, Casting Lab Group Leader, re.: Process and Operations Conducted in the Casting Laboratory	NA	NA	08/10/2005
C002	S7	Interview of Pam Crane, Analytical Laboratory, re.: Analytical Laboratory Mission and Objectives	NA	NA	08/31/2005
C003	S7	Interview of Roger Haga, MFC Safeguards, re.: Traceability of Defense Materials to Casting Laboratory and Analytical Laboratory	NA	NA	08/31/2005
C004	S7	Interview of Steve Hayes, Materials and Fuel Complex Project Manager, Advanced Fuel Cycle Initiative, re.: Advanced Fuel Cycle Initiative Program Related to Casting Laboratory Operations	NA	NA	08/22/2005
C005	S7	Interview of Jennifer Tournage, former Waste Specialist, Nancy Stewart, Waste Specialist, and Roy Grant, Waste Specialist, re.: MFC Analytical and Casting Laboratories Waste Management and Waste Characterization	NA	NA	09/01/2005
C014	S8	Intra-Laboratory Memorandum To W.P. Keeney, "Procurement of Uranium Feedstock for FMF Production"	N/A	N/A	9/15/1989
C019	S9	Letter to M.J. Holzemer, re: TRU Waste Profile Sheet for Content Code 161 Approval	JDW-20-88	NA	03/23/1988
C028	S5	Argonne National Laboratory Intra-Laboratory Memo to W.N. Beck, re: Technical Feasibility of Lead IFR Experiments in EBR-II	NA	NA	04/27/1984
C030	S5	Argonne National Laboratory Intra-Laboratory Memo to D.W. Cissel, re: EBR-II Division Approval to Irradiate Three IFR Subassemblies	NA	NA	05/17/1984
C033	S5	Argonne National Laboratory Intra- Laboratory Memo to R.G. Pahl, re: Assignment of Identification Numbers for Three Lead IFR Experimental Subassemblies	NA	NA	06/04/1984
C034	S1, S5	Argonne National Laboratory Intra-Laboratory memo to Distribution, re: Design Review of Lead IFR Fuel Elements	NA	NA	06/14/1984
C037	S2, S5	Argonne National Laboratory Intra-Laboratory Memo to J.L. Welker, re: Xenon Tag Gas for X419, X420, and X421	NA	NA	09/17/1984
C050	S2	Argonne National Laboratory Intra-Laboratory Memo to E.M. Franklin, re: Inspection of Subassembly X419	NA	NA	07/22/1985
C067	S5	Argonne National Laboratory Intra-Laboratory Memo to L.C. Walters, re: Fuel Elements from X421 Needed by TREAT Program	NA	NA	02/18/1987
C069	S9	Argonne National Laboratory Intra-Laboratory Memo to R.G. Pahl, re: Post Examination of IFR Elements form S/A X419 with included document	NA	NA	04/08/1986

Source Document Tracking Number	AK #	Title	Document Number	Revision	Date
C072	S2, S9	Packet of letters including: Argonne National Laboratory Intra-Laboratory Memo to D.C. Wade, re: Response to MC&A Questions in Support of HFEF-S Fuel Reprocessing Operations	NA	NA	01/24/1989
C073	S5	Argonne National Laboratory Intra-Laboratory Memo to J.E. Cahalan/D.J. Hill, re: Analysis of Fission Gas Release from IFR Subassembly X421	NA	NA	03/06/1989
C074	S5	Two letters concerning: Metallography of X420B Element T084	NA	NA	08/02/1989 08/18/1989
C078	S9	Argonne Nation Laboratory Intra-Laboratory Memo to E.K. Hemsley and W.N. Beck, re: HFEF Data Transmittal for S/A X421	NA	NA	04/06/1987
C079	S5	Argonne National Laboratory Intra-Laboratory Memo to E.M. Franklin, re: Inspection of Subassembly X421, Addendum 2	NA	NA	05/18/1987
C081	S9	Letter to Bob Pahl, re: Density of Cladding on X421 Fuel	NA	NA	12/11/1987
C082	S5	Argonne National Laboratory Intra-Laboratory Memo to E.M. Franklin, re: Destructive Examination of Element T-108 from S/A X421	NA	NA	07/08/1987
C083	S2, S9	Letter to Bob Pahl, re: Sodium Logging Analysis on X421, T108	NA	NA	10/01/1987
C084	S9	Letter to Bob Pahl, re: Burnup Measurements on X421/T108, T128, T225	NA	NA	11/24/1987
C085	S9	Letter to Bob Pahl, re: Retained Fission Gas Analysis on X421@ 9.3 a/o BU	NA	NA	12/10/1987
C087	S2, S9	Letter to Bob Pahl, re: Sodium Logging Analysis on X421, T108	NA	NA	NA
C089	S2	Letter to Idaho Division Chem. Group Personnel, re: Transfer of Waste from the Junior Cave Facility by the Pneumatic Transfer System	NA	NA	03/20/1969
C099	S9, S11	Letter to R. Villarreal, re: X-421 T-225 Immersion Density Experience	NA	NA	11/30/1987
C105	S5	Argonne National Laboratory Intra-Laboratory Memo to G.R. Hocker and E.M. Franklin, re: Removal of Subassembly X423B	NA	NA	04/24/1986
C106	S9	Letter to E.K. Hemsley, re: Plenum Gas Analysis – X423B Elements	NA	NA	11/05/1986
C107	S5	Argonne National Laboratory Intra-Laboratory Memo to G.R. Hocker and C.E. Lahm, re: Removal Subassembly X423C	NA	NA	08/11/1987
C108	S5	Argonne National Laboratory Intra-Laboratory Memo to E.M. Franklin, re: Destructive Examinations Requested for X423C	NA	NA	12/11/1987
C109	S5	Argonne National Laboratory Intra-Laboratory Memo to R. Villarreal, re: Radial Chemistry Analyses Requested for X423C	NA	NA	12/14/1987
C110	S5	Argonne National Laboratory Intra-Laboratory Memo to Backup Radial Chemistry Samples Requested for X423C	NA	NA	05/02/1988

Source Document Tracking Number	AK #	Title	Document Number	Revision	Date
C115	S2, S9	Letter to Bob Pahl, re: Radial Drilling Results for X421	NA	NA	12/18/1987
C127	S5, S9	Argonne National Laboratory Intra-Laboratory Memo to W.N. Beck, re: NDT Review of Sixty-one (61) IFR Fuel Elements from ANL Scheduled for Experimental S/A X419	NA	NA	02/11/1985
C131	S9	Argonne National Laboratory Intra-Laboratory Memo to J. R. Krsul Re: SEM/EDAX Examination of Cadmium Soaked Steels	NA	NA	04/06/1988
C142	S9	Argonne National Laboratory Intra-Laboratory Memo to T. P. Zahn, re: Waste Characterization Report	KPsG92-20	NA	09/16/1992
C145	S5	Argonne National Laboratory Intra-Laboratory Memo to E. M. Franklin, re: Destructive Examinations Requested for X423B	NA	NA	01/15/1987
C147	S2, S9	Letter to Bob Pahl, re: Sodium Logging Analysis on X421, T128 (U-8Pu-Zr)	NA	NA	10/1987
C148	S2, S5	Letter to Bob Pahl, re: Axial Fuel Expansion Measurements, X421, T128, U-8Pu/Zr @ ≈ 10 a/o BU	NA	NA	12/01/1987
C150	S1	Argonne National Laboratory Intra-Laboratory Memo to E.M. Franklin, re: Final Loading Diagram for Subassembly X421A	NA	NA	03/09/1987
C154	S5, S9	Letter to R.S. Wisner, re: Destructive Examinations of X421A Elements	NA	NA	03/27/1989
C160	S5	Argonne National Laboratory Intra-Laboratory Memo to G. Hofman, re: Fission Product Iodine Retention in IFR Fuel Experiment	FP-AL-(RV)-90-066	NA	11/16/1990
C162	S9	Letter to Art Wright, re: Addendum to Isotopic Analyses of Irradiated IFR Fuels	NA	NA	12/23/1987
C173	S5	Argonne National Laboratory Intra-Laboratory Memo to E.M. Franklin, re: Inspection of Subassembly X423B	NA	NA	07/07/1986
C176	S1	Argonne National Laboratory Intra-Laboratory Memo to J.L. Welker, re: Changed Loading Diagram for X423C	NA	NA	07/02/1986
C178	S1	Argonne National Laboratory Intra-Laboratory Memo to E.M. Franklin, re: Final Loading Diagram for Subassembly X423C	NA	NA	08/12/1986
C179	S5	Argonne National Laboratory Intra-Laboratory Memo to E.M. Franklin, re: Inspection of Subassembly X423C	NA	NA	09/10/1987
C180	S5	Argonne National Laboratory Intra-Laboratory Memo to E.M. Franklin, re: Characterization of X421 Element T225 by Scanning Electron Microscopy	NA	NA	12/15/1987
C185	S9	Letter to T.A. Carlson, re: Plenum Gas Analyses – X423C Elements	NA	NA	12/11/1987
C191	S9	Argonne National Laboratory Intra-Laboratory Memo to E.M. Franklin, re: Subassembly X421, Element T108 Samples	NA	NA	2/16/1988

Source Document Tracking Number	AK #	Title	Document Number	Revision	Date
C206	S5, S9	Letter to A.E. Wright, re: Isotopic Analyses of Irradiated IFR Fuels	NA	NA	12/14/1987
C212	S9	EDF for the Review of ILTSF Mixed Waste	SMB-02-91	NA	01/17/1991
DR002	NA	Waste Stream ID-MFC-S5400-RH, Historical and Current RCRA Characterization and Assignment of EPA Hazardous Waste Numbers	NA	NA	09/23/2008
P004	S2	Casting Laboratory Operating Procedure, Fabrication and Characterization of Pu, Np, and Am-Bearing Metallic Alloy Specimens	W0650-0070-OP	Rev. 0	08/02/2005
P006	S10	Packet of Material Safety Data Sheets	NA	NA	Various
P008	S2	Nuclear Technology Division, Analytical Laboratory Procedure: Casting Laboratory AAA Cladding Tube Loading/Welding	W0650-0059-OP	Rev. 3	04/23/2003
P009	S2	Fuel Cycle Programs, Nuclear Materials Characterization Operating Procedure: Glovebox Glove, Bagout Sleeve and Gloveport Blank Replacement	W0650-0030-OP	Rev. 2	05/05/2005
P011	S2	Nuclear Technology Division, Casting Laboratory Experimental Plan and Hazard Analysis: Accelerator Transmutation of Waste Project Diffusion Couple FCCI Studies on ATW	W0660-0076-AP	Rev. 0	07/18/2002
P012	S2	Nuclear Technology Division, Casting Laboratory Experimental Plan and Hazard Analysis: Accelerator Transmutation of Waste Project Arc-Melting Activities	W0650-0049-EP	Rev. 0	06/08/2001
P013	S2	Nuclear Technology Division, Analytical Laboratory Procedure: Operating Procedure for Decontaminating Glovebox	W0650-0043-OP	Rev. 2	06/24/2003
P015	S2	Fuel Cycle Programs, Nuclear Materials Characterization Department Casting Laboratory Operating Procedure: Fabrication and Characterization of Futurix Pu, Np and Am-Bearing Metallic Alloy Fuel Slugs	W0650-0054-OP	Rev. 1	08/09/2005
P017	S2	Nuclear Technology Division, Analytical Laboratory Procedure: Determination of Gallium in Plutonium Oxide by Inductively-Coupled-Plasma Mass Spectrometer	W0650-0064-KP	Rev. 0	03/26/2003
P019	S2	Nuclear Technology Division, Analytical Laboratory Administrative Procedure: Dissolution of Plutonium Metal Samples for Silicon Analysis	W0650-0062-KP	Rev. 0	11/05/2002
P020	S2	Nuclear Technology Division, Analytical Laboratory Procedure: Dissolution of Plutonium Oxide Samples for Trace Metal Analysis	W0650-0063-KP	Rev. 1	03/31/2004
P021	S2	Nuclear Technology Division, Analytical Laboratory Procedure: Determination of Boron in Plutonium Oxide by Inductively-Coupled-Plasma Atomic Emission Spectrometry	W0650-0065-KP	Rev. 0	03/26/2003
P023	S2	Analytical Laboratory Procedure: Dissolution of Pu Metal	W0630-0026-KP	Rev. 1	05/17/2001

Source Document Tracking Number	AK #	Title	Document Number	Revision	Date
P024	S2	Analytical Laboratory Procedure: Sample Preparation for Analysis of Boron and Gallium in Plutonium Oxide	W0630-0128-KP	Rev. 0	03/26/2003
P025	S2	Analytical Laboratory Operating Procedure:Glovebox Bagout Bag Replacement and Waste/Material Bagout	W0650-0008-OP	Rev. 14	07/19/2005
P026	S2	Analytical Laboratory Operating Procedure: Special Projects Glovebox Operations	W0650-0025-OP	Rev. 3	07/11/2005
P027	S2	Analytical Laboratory Operating Procedure: Waste Form Testing Glovebox	W0650-0016-OP	Rev. 3	08/12/2005
P028	S2	Analytical Laboratory Operating Procedure: Rusnok Milling Machine for Waste Form Testing Glovebox	W0650-0019-OP	Rev. 2	09/01/2005
P029	S2	Nuclear Technology Division, Analytical Laboratory Operating Procedure: Standard Test Method for Determining Chemical Durability of Nuclear Waste Glasses and Ceramics - Product Consistency Test	W0630-0059-OP	Rev. 1	12/16/2003
P030	S2	Engineering Division, Analytical Laboratory Procedure: Uranium and Plutonium Separation from Electrorefined Salt for Mass Spectrometer Analysis	W0630-0057-KP	Rev. 2	06/18/1996
P031	S2	Nuclear Technology Division, Analytical Laboratory Procedure: Dissolution of SRM-B Eutectic Salt Reference Material	W0630-0102-KP	Rev. 1	05/07/2001
P036	NA	Pollution Prevention/Waste Minimization Plan	NA	Rev. 10	01/2004
P037	S2	Nuclear Fuel Cycle Division, Idaho Operations Office: INEL Transuranic Waste Acceptance Criteria	DOE/ID-10074	Rev. 5	07/1993
P039	S6, S9	Integrated Waste Tracking System Material and Waste Characterization Profile, 3657P: Analytical Laboraotry (including Casting Laboratory) Mixed Transuranic Waste	3657P	NA	12/03/2002
P042	S3	Analytical Laboratory Safety Analysis Report	W0660-0055-KH	Rev. 4	04/06/2006
P043	S6, S9	Integrated Waste Tracking System Material and Waste Characterization Profile, ANL142T: Analytical Laboratory (including Casting Laboratory) Mixed Transuranic Waste	ANL142T	N/A	8/17/2001
P051	S2	A Survey of NRTS Waste Management Practices, Volume II	ICP-1042-II	NA	09/1971
P055	S2, S3	Argonne-West Criticality Hazards Control Statement	ID-CHCS-A11	Rev. 7	05/07/1984
P060	S2	ANL-West Remote-Handled Transuranic Waste Certification Plan	W0001-0898-ES-00	Rev. 0	07/05/1988
P063	S2	ANL-West Remote-Handled Transuranic Waste Certification Plan	W0001-0898-ES-01	Rev. 1	08/02/1991
P066	S2	Analytical Laboratory Glassware Cleaning Procedure	W0660-0029-OP	Rev. 0	03/05/1991
P067	S5	Safeguards and Security Plan for IFR - EFL	NA	NA	05/1984

Source Document Tracking Number	AK #	Title	Document Number	Revision	Date
P070	S2	Waste Preparation Procedure for Analytical Laboratory Waste Disposal	W0660-0035-OP	Rev. 0	08/19/1991
P075	S2	Waste Preparation Procedure for Analytical Laboratory Waste Disposal	AW-AL-WM-002	NA	06/1988
P076	S2	Argonne West Analytical Laboratory Waste Reduction Plan for Low Level Waste	NA	NA	11/08/1988
P083	S4, S9	Engineering Design File, Radiological Properties of Remote-Handled Transuranic Waste Inventory at the Radioactive Waste Management Complex	EDF-4687	Rev. 1	05/20/2005
P084	S4, S8	Characterization and Shipping Records for Remote Handled (RH) Transuranic (TRU) Waste Stored at the Radioactive Waste Management Complex (RWMC)	3460-94-084	NA	09/1994
P085	S1, S5	Test Description for the Integral Fast Reactor Subassemblies X419, X420, and X421	ANL-IFR-19	NA	07/1985
P086	S2	ANL-W Division, Nuclear Materials Control Procedures, Appendix C, Analytical Chemistry Laboratory	NA	Revised 08/87	08/26/1987
P088	NA	TRU-RH Waste Handling Plan for waste Management Operations	AW-AL-WM-001	NA	03/30/1988
P091	S4	INEL Transuranic Waste Acceptance Criteria; Criteria for Packaging Transuranic Waste for Receipt at the Idaho National Engineering Laboratory Radioactive Waste Management Complex, Offsite Generated Waste	IDO-10074	Rev. 4, Rev. 3, Rev. 2, Rev. 1	07/1987, 03/1986, 02/1984, 04/1980
P093	S5	Design Description and Safety Analysis for X-447	NA	NA	11/01/1987
P094	S5	Determination of Temperature and Phase Distributions in Irradiated U-Pu-Zr Fuel	NA	NA	05/06/1988
P100	S3	Engineering Design File, CPP-1617 Fire Area Evaluation	EDF-4684	Rev. 1	04/26/2004
P101	S2	Technical Procedure, CPP-1617 Waste Handling and Operations	TPR-7318	Rev. 8	02/01/2007
P103	S3	Safety Analysis Report for the INTEC Waste Management Facility (IWMF)	SAR-103 Addendum A	Rev. 1	12/20/2006
P115	S2	Decontamination Cell Operation in CPP-659	TPR-7298	Revs. 7, 14	06/04/2008 06/16/2009
P116	S5, S9	Dissolution and Clarification of RERTR Silicide Fuels	DP-MS-82-98	NA	11/08/1982
U001	S2	Various Sections of the ANL-W Waste Handling Manual, Waste Management Information Bulletins	WMIB-8 through WMIB-9	Various	Various
U002	S4, S6, S9	Waste Container Data Packages	N/A	N/A	Various
U006	NA	Radioactive Waste Disposal Request and associated paperwork, HFEF-9 cask	NA	NA	04/04/1988
U007	NA	RH-TRU RTR Prescreen for Repackaging/AK Worksheet – four ANL-W containers	NA	NA	08/13/2007
U008	NA	Radioactive Waste Disposal Request and	N	NA	03/11/1988

Source Document Tracking Number	AK #	Title	Document Number	Revision	Date
		associated paperwork, HFEF-9 cask			
U009	NA	Radioactive Waste Disposal Request and associated paperwork, HFEF-10 cask	NA	NA	04/04/1988
U010	S9	Radioactive Waste Disposal Request and associated paperwork, HFEF-10 cask	NA	NA	03/11/1988
U025	S12	DRAFT Facility Waste Descriptions Argonne – West	NA	NA	12/14/1973
U029	S6	Integrated Waste Tracking System (RWMIS) Disposed, Treated, Stored, Containerized Shipment Detail Listing within Dates Received for 01-Jan-88 through 31-Dec-88	ST127B12	NA	10/31/2000
U034	S8	Integrated Waste Tracking System Container Profile, IDAWANL880064: ANL-W Glassware, Paper, Poly, and Miscellaneous Hardware	IDAWANL 880064	NA	11/28/2007
U035	S8	Integrated Waste Tracking System Container Profile, IDAWANL880065: ANL-W Glassware, Paper, Poly, and Miscellaneous Hardware	IDAWANL 880065	NA	11/28/2007
U036	S8	Integrated Waste Tracking System Container Profile, IDAWANL880068: ANL-W Glassware, Paper, Poly, and Miscellaneous Hardware	IDAWANL 880068	NA	11/28/2007
U037	S8	Integrated Waste Tracking System Container Profile, IDAWANL880134: ANL-W Glassware, Paper, Poly, and Miscellaneous Hardware	IDAWANL 880134	NA	11/28/2007
U041	S5, S9	Miscellaneous pages including: Logsheet showing before and after radioisotope weights for different batches, Experimental Subassembly Transfer for X-421, and Subassembly Transfer from Reactor Plant for X-421	NA	NA	Not dated, 02/12/1985 03/24/1987
U042	S2, S8	HFEF Procedure Change Notice, Examination of X423A	2-1869	NA	12/11/1985
U043	S2	Hot Cell Contamination Control Plan and Procedures	NA	NA	11/1989
U064	S8	Sample Accountability Log for X-421, Element # T-225	NA	NA	09/02/1987
U080	S2, S9	Density on Porous Samples, Sample – X423C T-330, #61176	NA	NA	05/16/1988
U081	S2, S9, S11	Dipping Experiment for Density, Sample B X423C T-330 #61176	NA	NA	05/16/1988
U085	S5, S9	Accuracy of Immersion Density Measurement	NA	NA	05/05/1988
U086	S5, S9	Transfer of SS Materials - Between Areas	0864	NA	11/05/1986
U104	S5, S9	Argonne National Laboratory Analytical Sample Record for X-421 T128	60754, 60755, 60756	NA	11/19/1987
U105	S9, S11	Axial Fuel Expansion for X-421 T-128	NA	NA	11/16/1987

Source Document Tracking Number	AK #	Title	Document Number	Revision	Date
U108	S8	Inspection/Disposition Report for .290 Jackets for Fat Slug (X423 S/A)	21073	NA	04/24/1985
U115	S5, S9	Sample Accountability Log for X423B	PWS No. 2-1951, Work Order No. 11-U	NA	1/1987, 2/1987, 12/1987
U116	S9	HFEF Procedure Change Notice, Examination of X423B	PCN No. 3, PWS No. 2-1951	NA	01/28/1987
U122	S9	Argonne National Laboratory Analytical Sample Record, S/A X423C T-344	61313-B	NA	08/02/1988
U130	S9	Sodium Logging Analyses on X421, T225 (U-10Zr)	NA	NA	01/1988
U132	S2	Immersion Density Procedures for U-10Zr and U-Pu-10Zr Fuel and Cladding in Hot Cell	NA	NA	NA
U133	S9	Transfer Of SS Materials - Between Areas	0873	NA	10/15/1986
U138	S9	Argonne National Laboratory Analytical Sample Record for X421 (T128) Pu	60486	NA	09/08/1987
U140	S9	X421 Radiochemistry	NA	NA	01/12/1988
U145	S9	Argonne National Laboratory Analytical Sample Record for X423C T302	61104	NA	02/18/1988
U146	S9	Argonne National Laboratory Analytical Sample Record for X423C T325	61173	NA	03/03/1988
U151	S9	Radial Drilling Notes X421 T108 U-10-Pu-Zr	NA	NA	06/24/1987
U153	S9	ANL Analytical Sample Record, S/A X421 (T108)	60485	NA	09/08/1987
U154	S9	ANL Analytical Sample Record, S/A X421 (T108)	60652A	NA	10/22/1987
U155	S9	ANL Analytical Sample Record, S/A X421 (T108), U-19Pu-10Zr	61137	NA	02/24/1988
U162	S9	X421 Surveillance Analyses at ~10 a/o BU Hot Cell Analyses	NA	NA	NA
U170	S9	Total Characterization of Hot Cell Waste ANL-W Analytical Laboratory	NA	NA	NA
U176	S9	Argonne National Laboratory Analytical Sample Record for X423C T302	61105	NA	02/18/1988
U177	S9	Argonne National Laboratory Analytical Sample Record for X423C T325	61174	NA	03/03/1988
U178	S9	Argonne National Laboratory Analytical Sample Record for X423C T330	61175	NA	03/03/1988
U184	S9	ANL-W Analytical Laboratory IFCF Support Activities	NA	NA	10/01/1987
U189	S9	HFEF Terminal Examination of IFR S/A X423C	PWS 2-2142	NA	10/30/1987
U191	S9	Na Logging Expt. 60487 X421 T-225	NA	NA	NA
U194	S9	Sample Accountability Log for X423C	PWS No. 2-2142, PCN No.	NA	02/11/1988

Source Document Tracking Number	AK #	Title	Document Number	Revision	Date
			4		
U196	S5	Design Description and Safety Analysis for X-419, X-420, and X-421	NA	NA	12/1984
U205	S5, S9	Procedure Change - Examination of IFR S/A X423B	PWS No. 2-1951	NA	01/30/1987
U213	S9	Argonne National Laboratory Analytical Sample Record for X423B	60819	NA	12/07/1987
U219	S11	AL Sample Logbook No. 20 Re: June 5, 1984 - January 9, 1986	NA	NA	7/1/1984
U220	S11	AL Sample Logbook No. 21 Re: Feb 1986 - May 1987	NA	NA	2/1/1986
U221	S11	AL Sample Logbook No. 22 Re: May 22, 1987 - May 12, 1988	NA	NA	05/01/1987
U222	S8	Index of Material of Analytical Methods for Laboratory Use	NA	NA	NA
U223	S2, S8	The Radiochemical Determination of Americium	Am-LaF3-α	NA	07/24/1959
U224	S2, S8	The Spectrophotometric Determination of Cerium in Ammonium Tartrate	NA	NA	01/13/1961
U225	S2, S8	Radiochemical Determination of Cerium by Liquid-Liquid Extraction	Ce-FP	NA	07/1960
U226	S2, S8	Volumetric Determination of Cerium with EDTA	Ce-Vol	NA	07/02/1959
U227	S2, S8	Volumetric Determination of Lanthanum with EDTA	NA	NA	02/26/1959
U228	S2, S8	Separation of Neptunium from Fission Products	NP-γ	NA	02/26/1963
U229	S2, S8	Fission Product Cesium	Cs	NA	01/1959
U230	S2, S8	Determination of Plutonium by Hexone Extraction and Alpha Counting	NA	NA	2/25/1963
U231	S2, S8	Separation of Plutonium by Ferric Hydroxide – Lanthanum Fluoride Precipitation	Pu-Fe(OH)3-LaF3-α	NA	01/1958
U232	S2, S8	Plutonium by Lanthanum Fluoride	Pu-A	NA	NA
U233	S2, S8	Procedure Manual: A Summary of Uranium Analyses	U-Sum	NA	03/1963
U234	S2, S8	Water Soluble Uranium Determination	NA	NA	07/15/1956
U235	S2, S8	Spectrophotometric Determination of Thorium	Th-C	NA	10/1959
U236	S2, S8	Colorimetric Determination of Zirconium with Alizarin-Red-S	Zr-C	Rev. 0, Rev. 1	10/1958, 7/6/1960
U237	S2, S8	Volumetric Determination of Thorium with EDTA	Th-V	NA	07/1960
U238	S2, S8	Volumetric Determination of Zirconium with EDTA	Zr-Vol	NA	05/20/1959
U239	S2, S8	Fission Product Zirconium	Zr-F.P	NA	02/23/1959

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U240	S2, S8	Fission Product Strontium (and Barium)	Sr-Ba-FP	NA	01/1959
U241	S5	Counting Methods: Radioactive Decay Chains for Various Elements	NA	NA	NA

Alphanumeric Designations

C Correspondence
D Documents (e.g. published reports)
DR AK Discrepancy Reports
M Miscellaneous (e.g. unpublished data)
P Procedures
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
NA Not a supplemental source document, but cited in the AK Summation