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

JAN 2 8 2011

FEB 2011

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 Central Characterization Project – Hanford Waste Stream Profile Form Number, RLMPFPDD, Hanford Plutonium Finishing Plant (PFP) Contact-Handled Transuranic Debris

Dear Mr. Bearzi:

The Department of Energy Carlsbad Field Office (CBFO) has approved the Waste Stream Profile Form, RLMPFPDD, Hanford Plutonium Finishing Plant (PFP) Contact-Handled Transuranic Debris.

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

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

Sincerely,

for Edward Ziemianski
Acting Manager

Enclosures

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

cc: w/o enclosure
J. Kieling, NMED ED
J. R. Stroble, CBFO ED
N. Castaneda, CBFO ED
C. Fesmire, CBFO ED
C. Gadbury, CBFO ED
G. Basabilvazo, CBFO ED
S. McCauslin, CBFO ED
K. Watson, CBFO ED
D. Toft, CTAC ED
*ED denotes electronic distribution

CBFO:NTP:CF:GS:11-0131:UFC 5900.00

110129

Attachment 2 – CCP Waste Stream Profile Form

(1) Waste Stream Profile Number: RLMPFPDD					
(2) Generator site name: Hanford Site			(4)Technical contact: Veronica Waldram		
(3) Generator site EPA ID: WA7890008967			(6) Technical contact phone number: (575) 234-7187		
(5) Date of audit report approval by New Mexico Environment Department (NMED): September 2, 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 19, December 29, 2010 CCP-PO-002, CCP Transuranic Waste Certification Plan, Revision 25, December 29, 2010 CCP-PO-011, CCP/CH2M HILL Plateau Remediation Company Interface Document, Revision 3, October 05, 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: RLPFP-01			(11) Summary Category Group: : S5000		
(12) Waste Matrix Code Group: Heterogeneous Debris Waste			(13) Waste Stream Name: Hanford Plutonium Finishing Plant (PFP) Contact-Handled Transuranic Debris		
(14) Description from the TWBIR: Combustible and noncombustible debris waste generated from operations, maintenance, and D&D activities at the Plutonium Finishing Plant (PFP), which includes the 234-5Z, 232-Z, 236-Z, 2736-ZB, 242-Z, and 291-Z Buildings. Combustible waste may include wood, plastics, paper, and rags. Noncombustible waste items may include metals, glass, concrete, and absorbed liquids.					
(15) Defense TRU Waste:	YES	X	NO		
(16) Check One:	CH	X	RH		
(17) Number of SWBs 2030	(18) Number of Drums 3875 (55 Gallon.) 826 (85 Gallon)			(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, D030, F001, F002, F004, and F005					
(22) Applicable TRUCON Content Numbers: RH125/225, RH130/230					
(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-RL-101, Revision 4, January 13, 2011, Figures 1, 3, 6 and 7					
(23B) Facility mission description: CCP-AK-RL-101, Revision 4, January 13, 2011, Section 4.2					
(23C) Description of operations that generate waste: CCP-AK-RL-101, Revision 4, January 13, 2011, Sections 4.4 and 5.3					
(23D) Waste identification/categorization schemes: CCP-AK-RL-101, Revision 4, January 13 2011, Section 4.5					
(23E) Types and quantities of waste generated: CCP-AK-RL-101, Revision 4, January 13, 2011, Sections 4.5.1, 5.2, and 5.4					
(23F) Correlation of waste streams generated from the same building and process, as applicable: CCP-AK-RL-101, Revision 4, January 13, 2011, Section 4.6.1					
(24) Waste certification procedures: CCP-TP-030, Rev.28, May 12, 2010					
(25)Required Waste Stream Information					

(25A) Area(s) and building(s) from which the waste stream was generated: CCP-AK-RL-101, Revision 4, January 13, 2011, Sections 4.4 and 5.1			
(25B) Waste stream volume and time period of generation: CCP-AK-RL-101, Revision 4, January 13, 2011, Section 5.2			
(25C) Waste generating process description for each building: CCP-AK-RL-101, Revision 4, January 13, 2011, Section 4.4 and 5.3			
(25D) Waste Process flow diagrams: CCP-AK-RL-101, Revision 4, January 13, 2011, Figures 4 and 5			
(25E) Material inputs or other information identifying chemical/radionuclide content and physical waste form: CCP-AK-RL-101, Revision 4, January 13, 2011, Section 5.4			
(25F) Waste Material Parameter Weight Estimates per unit of waste : See Table 2 of the Summation of Aspects of AK Summary Report: RLMPFPDD			
(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 S2 AK# on Attachment 1 to Summation of Aspects of AK Summary Report			
(27C) Safety Analysis Reports: See S3 AK# on Attachment 1 to Summation of Aspects of AK Summary Report			
(27D) Waste packaging logs: See S4 AK# on Attachment 1 to Summation of Aspects of AK Summary Report			
(27E) Test plans/research project reports: See S5 AK# on Attachment 1 to Summation of Aspects of AK Summary Report			
(27F) Site databases: See S6 AK# on Attachment 1 to Summation of Aspects of AK Summary Report			
(27G) Information from site personnel: See S7 AK# on Attachment 1 to Summation of Aspects of AK Summary Report			
(27H) Standard industry documents: See S8 AK# on Attachment 1 to Summation of Aspects of AK Summary Report			
(27I) Previous analytical data: See S9 AK# on Attachment 1 to Summation of Aspects of AK Summary Report			
(27J) Material safety data sheets: See S10 AK# on Attachment 1 to Summation of Aspects of AK Summary Report			
(27K) Sampling and analysis data from comparable/surrogate Waste: NA			
(27L) Laboratory notebooks: NA			
Confirmation Information[2]			
For the following, when applicable, enter procedure title(s), number(s) and date(s)			
(28)	Radiography: CCP-TP-053, Revision 9, September 30, 2010		
(29)	Visual Examination: NA		

(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: 1-24-2010

Reviewed by STR (if necessary): YES [X] N/A [ ] Date: 1-24-2010

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) Veronica Waldram	(32) Veronica Waldram	(33) 1-24-2010
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) This waste was also generated by the following defense activities: defense research and development, and defense nuclear materials production.

CHARACTERIZATION INFORMATION SUMMARY

WSPF # RLMPFPDD

Lot 1

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CCP Characterization Information Summary Cover Page

Waste Stream # RLMPFPDD Lot #: 1

AK Expert Review: N/A Date: N/A

SPM Review: Veronica Waldram Veronica Waldram Date: 1/27/2011

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:

Radiography (RTR/NDE):

CCP-TP-053	Rev. 7	10/21/09	CCP Standard Real-Time Radiography (RTR) Inspection Procedure
CCP-TP-053	Rev. 8	06/30/10	CCP Standard Real-Time Radiography (RTR) Inspection Procedure
CCP-TP-053	Rev. 9	09/30/10	CCP Standard Real-Time Radiography (RTR) Inspection Procedure

Non Destructive Assay (NDA):

CCP-TP-070	Rev. 0	01/11/10	CCP Gamma Energy Assay (GEA) Calibration, Confirmation, and Verification Procedure
CCP-TP-071	Rev. 0	01/11/10	CCP Gamma Energy Assay (GEA) Operating Procedure
CCP-TP-072	Rev. 0	01/12/10	CCP Gamma Energy Assay (GEA) Data Review, Validation, and Reporting Procedure

Headspace Gas Sampling and Analysis (HSG):

CCP-TP-093	Rev. 13	03/19/07	CCP Sampling of TRU Waste Containers
CCP-TP-093	Rev. 14	12/29/10	CCP Sampling of TRU Waste Containers
CCP-TP-105	Rev. 6	07/12/07	CCP Headspace Gas Sampling Batch Data Report Preparation
CCP-TP-105	Rev. 7	12/29/10	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
CCP-TP-175	Rev. 1	03/29/10	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. 17	09/24/07	CCP Project Level Data Validation and Verification
CCP-TP-001	Rev. 18	08/09/10	CCP Project Level Data Validation and Verification
CCP-TP-001	Rev. 19	12/29/10	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-002	Rev. 22	06/30/10	CCP Reconciliation of DQOs and Reporting Characterization Data
CCP-TP-002	Rev. 23	12/29/10	CCP Reconciliation of DQOs and Reporting Characterization Data
CCP-TP-003	Rev. 17	11/09/09	CCP Data Analysis for S3000, S4000, and S5000 Characterization
CCP-TP-003	Rev. 18	12/29/10	CCP Data Analysis for S3000, S4000, and S5000 Characterization
CCP-TP-005	Rev. 18	11/16/06	CCP Acceptable Knowledge Documentation
CCP-TP-005	Rev. 19	07/06/10	CCP Acceptable Knowledge Documentation
CCP-TP-005	Rev. 20	11/01/10	CCP Acceptable Knowledge Documentation
CCP-TP-005	Rev. 21	12/29/10	CCP Acceptable Knowledge Documentation
CCP-TP-030	Rev. 27	12/14/09	CCP CH TRU Waste Certification and WWIS/WDS Data Entry
CCP-TP-030	Rev. 28	05/12/10	CCP CH 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
CCP-PO-001	Rev. 18	06/30/10	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. 22	01/12/10	CCP Transuranic Waste Certification Plan
CCP-PO-002	Rev. 23	04/07/10	CCP Transuranic Waste Certification Plan
CCP-PO-002	Rev. 24	06/30/10	CCP Transuranic Waste Certification Plan
CCP-PO-002	Rev. 25	12/29/10	CCP Transuranic Waste Certification Plan
CCP-PO-011	Rev. 0	07/22/09	CCP/CH2M Hill Plateau Remediation Company Interface Document
CCP-PO-011	Rev. 1	12/22/09	CCP/CH2M Hill Plateau Remediation Company Interface Document
CCP-PO-011	Rev. 2	07/27/10	CCP/CH2M Hill Plateau Remediation Company Interface Document
CCP-PO-011	Rev. 3	10/05/10	CCP/CH2M Hill Plateau Remediation Company Interface Document

CCP Correlation of Container Identification Numbers to Batch Data Report Numbers

Waste Stream: # RLMPFPDD 1

Container ID Number	NDA BDR	RTR BDR	VE BDR	Solids Sampling BDR	Solids Analytical BDR	Load Management/ Overpack Yes	Headspace Gas BDR		
							Sample	Analysis	
RL0056238	RLGEAA0001	RLRTRB0002	NA	NA	NA		NA	NA	NA
RL0056335	RLGEAA0001	RLRTRB0002	NA	NA	NA		NA	NA	NA
RL0062930	RLGEAA0001	RLRTRA0002	NA	NA	NA		RLHSGS100001	ECL10002M	ECL10002G
RL0063014	RLGEAB0001	RLRTRA0001	NA	NA	NA		RLHSGS100001	ECL10002M	ECL10002G
RL0063021	RLGEAB0001	RLRTRA0002	NA	NA	NA		RLHSGS100001	ECL10002M	ECL10002G
RL0070070	RLGEAA0044	RLRTRB0042	NA	NA	NA		NA	NA	NA
RL0063040	RLGEAB0001	RLRTRA0001	NA	NA	NA		RLHSGS100001	ECL10002M	ECL10002G
RL0063057	RLGEAA0002	RLRTRA0001	NA	NA	NA		RLHSGS100001	ECL10002M	ECL10002G
RL0063087	RLGEAB0001	RLRTRA0001	NA	NA	NA		RLHSGS100001	ECL10002M	ECL10002G
RL0066836	RLGEAB0001	RLRTRA0002	NA	NA	NA		RLHSGS100001	ECL10002M	ECL10002G
* These containers were randomly selected for headspace gas sampling and analysis and are included to resolve EPA hazardous waste number assignment only. NDE and NDA BDR numbers for these two containers are included for information purposes only. Based on NDA characterization data these containers are LLW.									
*RL0037205	RLGEAB0001	RLRTRA0001	NA	NA	NA		RLHSGS100001	ECL10002M	ECL10002G
*RL0058636	RLGEAB0001	RLRTRA0002	NA	NA	NA		RLHSGS100001	ECL10002M	ECL10002G
** This container was randomly selected for headspace gas sampling and analysis and is included to resolve EPA hazardous waste number assignment only. NDE and NDA BDR numbers for this container are included for information purposes only. Due to a current CCP Standing Order, the fill factor for this container is less than 60% and currently may not be certified.									
**RL0063034	RLGEAB0001	RLRTRA0002	NA	NA	NA		RLHSGS100001	ECL10002M	ECL10002G

Veronica Waldram
Signature of Site Project Manager

Veronica Waldram
Printed Name

1/27/2011
Date

CTS 003

CCP Headspace Gas UCL_{90} Evaluation Form

WSPF #: RLMPFPDD **Waste Stream Headspace Gas 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 Hazardous Waste Number
Benzene	Log	2	10	4.13	-1.72	2.30	-0.71	10	2.30		
Bromoform	Log	0	10	-1.97	-3.69	0.98	-3.26	10	2.30		
Carbon tetrachloride	Log	6	10	3.91	-0.95	3.17	0.44	10	2.30		
Chlorobenzene	Log	1	10	0.34	-2.49	1.35	-1.90	10	2.30		
Chloroform	Log	5	10	1.06	-1.81	1.76	-1.04	10	2.30		
Cyclohexane[a]	Log	2	10	3.22	-1.49	1.90	-0.66	10	2.30		
1,1-Dichloroethane	Log	0	10	-0.74	-2.46	0.99	-2.03	10	2.30		
1,2-Dichloroethane	Log	0	10	-1.14	-2.86	0.98	-2.44	10	2.30		
1,1-Dichloroethylene	Log	0	10	-1.11	-2.82	0.98	-2.40	10	2.30		
cis-1,2-Dichloroethylene	Log	0	10	-0.60	-2.29	0.98	-1.87	10	2.30		
trans-1,2-Dichloroethylene	Log	0	10	-0.60	-2.30	0.98	-1.87	10	2.30		
Ethyl benzene	Log	0	10	-0.84	-2.56	0.98	-2.14	10	2.30		
Ethyl ether	Log	0	10	-0.16	-1.90	0.98	-1.47	10	2.30		
Methylene chloride	Log	2	10	1.50	-1.81	1.47	-1.17	10	2.30		
1,1,2,2-Tetrachloroethane	Log	0	10	-1.41	-3.13	0.98	-2.70	10	2.30		
Tetrachloroethylene	Log	4	10	-0.89	-2.35	1.12	-1.86	10	2.30		
Toluene	Log	6	10	2.09	-0.98	1.51	-0.32	10	2.30		
1,1,1-Trichloroethane	Log	0	10	-2.12	-3.84	0.99	-3.41	10	2.30		
Trichloroethylene	Log	0	10	-1.47	-3.19	0.98	-2.76	10	2.30		
Trichlorofluoromethane[(2)]	Log	0	10	-1.58	-3.32	0.99	-2.89	10	2.30		
1,1,2-Trichloro-1,2,2-trifluoroethane	Log	0	10	-2.04	-3.75	0.98	-3.32	10	2.30		
1,2,4-Trimethylbenzene[a]	Log	0	10	-1.04	-2.76	0.98	-2.33	10	2.30		
1,3,5-Trimethylbenzene[a]	Log	0	10	-0.95	-2.68	0.98	-2.25	10	2.30		
m,p-Xylene[b]	Log	0	10	-1.02	-2.74	0.98	-2.31	10	2.30		
o-Xylene	Log	0	10	-0.71	-2.44	0.98	-2.01	10	2.30		
Acetone	Log	9	10	4.06	2.04	1.53	2.71	100	4.61		
Butanol	SQRT	3	10	1.82	0.72	0.50	0.94	100	10.00		
Methanol	Log	0	10	1.55	1.51	0.02	1.52	100	4.61		
Methyl ethyl ketone	Log	3	10	2.03	-1.11	1.40	-0.50	100	4.61		

CTS004

CCP Headspace Gas UCL_{90} Evaluation Form

WSPF #: RLMPFPDD **Waste Stream Headspace Gas 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 Hazardous Waste Number
Methyl isobutyl ketone	Log	2	10	-1.71	-3.14	0.86	-2.77	100	4.61		
Chloromethane[(2)]	Log	2	10	2.89	-1.05	1.73	-0.29	10	2.30		
Carbon Disulfide[(2)]	Log	1	10	1.81	-1.96	1.65	-1.24	10	2.30		
1,2-Dichloropropane[(2)]	Log	0	10	-0.97	-2.70	0.98	-2.27	10	2.30		
Formaldehyde[c]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hydrazine[d]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

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

[c] Required only for homogenous solids and soil/gravel waste from Savannah River Site.

[d] Required only for homogenous solids and soil/gravel waste from Oak Ridge National Laboratory and Savannah River Site.

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) The noted analytes are not included in the target analyte list Table C3-2 of HWFP Attachment C3. The analytes are reported in the analysis Batch Data Report provided by the Idaho lab and included on the UCL_{90} for completeness.

Veronica Waldram
Signature of Site Project Manager

Veronica Waldram
Printed Name

1/27/2011
Date

CTS005

CCP Headspace Gas Summary Data

Waste Stream Number RLMPFPDD Lot Number (s) 1

Tentatively Identified Compound	Maximum Observed Estimated Concentrations (ppmv)	# Samples Containing TIC	% Detected
None	NA	NA	NA

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 Veronica Waldham Date 1/27/2011

CCP RTR/VE Summary of Prohibited Items and AK Confirmation

Waste Stream Number: RLMPFPDD 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.	RTR Data confirm that none of the containers in this lot contain any prohibited items.	None of the containers in this lot were processed through VE.

a. See Batch Data Reports

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

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

Veronica Waldram — Veronica Waldram — 1/27/2011

Site Project Manager Signature — Printed Name — Date

CIS007

CCP Reconciliation with Data Quality Objectives

WSF# RLMPFPDD Lot # 1

Sampling Completeness

RTR:

Number of Valid Samples: 10 Number of Total Samples Analyzed: 10
Percent Complete: 100 (QAO is 100%)

NDA

Number of Valid Samples: 10 Number of Total Samples Analyzed: 10
Percent Complete: 100 (QAO is 100%)

HSG

Number of Valid Samples: 10 Number of Total Samples Collected: 10
Percent Complete: 100 (QAO is ≥90%)
Number of Valid Samples: 10 Number of Total Samples Analyzed: 10
Percent Complete: 100 (QAO is ≥90%)

Total VOC

Number of Valid Samples: NA Number of Total Samples Collected: NA
Percent Complete: NA (QAO is ≥90%)
Number of Valid Samples: NA Number of Total Samples Analyzed: NA
Percent Complete: NA (QAO is ≥90%)

Total SVOC

Number of Valid Samples: NA Number of Total Samples Collected: NA
Percent Complete: NA (QAO is ≥90%)
Number of Valid Samples: NA Number of Total Samples Analyzed: NA
Percent Complete: NA (QAO is ≥90%)

Total Metals

Number of Valid Samples: NA Number of Total Samples Collected: NA
Percent Complete: NA (QAO is ≥90%)
Number of Valid Samples: NA Number of Total Samples Analyzed: NA
Percent Complete: NA (QAO is ≥90%)

CCP Reconciliation with Data Quality Objectives

WSF# RLMPFPDD 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

WSF# RLMPFPDD 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

Veronica Waldram — Signature of Site Project Manager

Veronica Waldram — Printed Name

1/27/2011 — Date

SUMMATION OF ASPECTS OF AK SUMMARY REPORT: RLMPFPDD

Overview:

The RLMPFPDD waste stream consists of TRU contact-handled (CH) mixed heterogeneous debris resulting from production, maintenance, cleanout, stabilization, and decontamination and decommissioning (D&D) at the Plutonium Finishing Plant (PFP) at the Hanford Site, located north of Richland, WA. The PFP Complex processed plutonium and fabricated weapons parts. Operations included supporting plutonium metal production for national defense. Since 1991, the mission of the PFP changed from plutonium material processing to preparation for deactivation, decommissioning, and continued safe storage of plutonium. Waste stream RLMPFPDD was generated from 1972 to present.

TRU waste generated by PFP operations is contaminated with radiological materials generated from atomic energy defense activities as follows: defense nuclear materials production, defense nuclear waste and material by-products management and defense research and development. Therefore, this waste is defense related.

This Summation of the Acceptable Knowledge Summary Report includes information to support Waste Stream Profile Form (WSPF) RLMPFPDD for CH TRU heterogeneous debris waste. The primary source of information for this report is CCP-AK-RL-101, *Central Characterization Project Acceptable Knowledge Summary Report for Hanford Plutonium Finishing Plant (PFP) Contact-Handled Transuranic Debris Waste, Waste Stream: RLMPFPDD,* Revision 4, dated January 13, 2011. CCP-AK-RL-101 includes information obtained from numerous sources, including facility safety basis documentation, historical document archives, generator and storage facility waste records and documents including databases, and interviews with operational and waste management personnel.

Waste Stream Identification Summary:

Waste Stream Name:	Hanford Plutonium Finishing Plant (PFP) Contact-Handled Transuranic Debris
Waste Stream Number:	RLMPFPDD
Site Where TRU Waste Was Generated:	Hanford
Facility Where TRU Waste was generated:	PFP Complex
Site Where TRU Waste is Currently Stored:	Hanford
Waste Stream Volume - Current:	43 SWBs, 2217 55-gallon drums, and 826 85-gallon drums
Waste Stream Volume – Projected:	1658 55-gallon drums and 1987 SWBs
Dates of Waste Generation:	1972 – Present
TRUCON Content Numbers:	RH125, RH130, RH225, RH230
Summary Category Group:	S5000

Waste Matrix Code:	S5400
Waste Matrix Code Group:	Heterogeneous Debris Waste
ATWIR Identification Number:	RLPFP-01
RCRA EPA Hazardous Waste Numbers:	D004, D005, D006, D007, D008, D009, D010 D011, D022, D030, F001, F002, F004, F005

Waste Stream Description and Physical Form:

The RLMPFPDD waste stream consists of TRU mixed heterogeneous debris resulting from production, maintenance, cleanout, stabilization, and D&D at the PFP Complex. Examples of potential waste items in the RLMPFPDD waste stream include the following materials:

- Iron-based metal items including cans (slip lid, lard cans, etc.), lids, tools (scissors, levels, and grease guns), pipes, valves, fittings, pumps, angle iron, staples, tanks, hot plates, sample racks, light fixtures, stirrers, burners;
- Aluminum-based metal items including foil, mask filters, racks, containers, and structural components;
- Other metals items including lead items (shielding, aprons, seals, tape, and leaded-gloves), brass balance weights, and pewter containers;
- Other inorganic materials including glass (glovebox panels, laboratory equipment, light bulbs, bottles, vials, petre dishes), ceramic (laboratory tools and equipment), asbestos (pot liners, insulation), and SS&C;
- Cellulosic items including cloth and paper items (rags, filter media, PPE, cardboard cartons, canvas gloves); wood items (ladders, brush handles, and filter frames), and leather gloves;
- Plastic items including glovebox panels, bags, jars, bottles, vials, tape, pens, and absorbent pads (polypropylene) used in the packaging of waste drums;
- Rubber items including PPE (masks and gloves), plungers, stoppers, and tubing;
- Organic matrix including absorbed organic liquids (e.g., laboratory chemicals and organic process solvents);
- Inorganic matrix including absorbed inorganic liquids contaminated with process residues (Diatomaceous earth, kitty litter, vermiculite).

Legacy holdup is another type of waste potentially present in the RLMPFPDD waste stream. Hold-up nuclear material consist of the residues remaining in building systems such as gloveboxes, piping, process exhaust ducts, filters, sumps, pumps and other equipment. Waste stream RLMPFPDD drums contain lesser amounts of organic and inorganic homogenous solids; however, no drum will exceed 50 percent by volume of these homogeneous solids.

The Waste Matrix Code S5400, Heterogeneous Debris, is assigned to the waste stream. The material that comprises waste stream RLMPFPDD has common physical form, contains similar hazardous constituents, and was generated from a single process or activity (plutonium conversion, fabrication, and recovery), and therefore assigned to a single waste stream based on the following rationale.

- Waste streams MPFPD and RLMPFPCD, generated by the previous Hanford TRU Waste Certification Program, were combined into a single mixed CH debris waste stream based on the fact that the activity that generated the waste was the same for all the facilities conducting PFP process operations.

- Debris waste in waste stream RLMPFPDD was generated by ongoing PFP process operations that have common physical waste items and contain similar hazardous constituents.

- Not only were the chemicals and materials used in the PFP facilities similar, the flow of materials and wastes between the PFP facilities would have resulted in the chemical contamination between the PFP operation areas.

- The majority of the historical drum records do not specifically identify the point of waste generation within the PFP Complex. Due to the flow of materials between the PFP facilities the waste may contain waste items and chemical contamination from any of the PFP process operations, making further delineation of the waste stream unfeasible.

Point of Generation

Location

Waste stream RLMPFPDD was generated at the Hanford site. The waste is currently stored at the Hanford site in both underground and above ground storage. Some of the waste will be newly generated during the D&D of the PFP Complex facilities.

Area and/or Building of Generation

Waste stream RLMPFPDD was generated from the PFP Complex operations conducted in buildings 232-Z, 234-5Z, 236-Z, 242-Z, Emergency Decontamination Facility (EDF), 291-Z, and 2736-ZB. The waste was shipped to either the Central Waste Complex or the Burial Grounds at the Hanford Site for storage. Some of the waste is being repackaged at the Waste Receiving and Processing Plant and at T Plant.

Generating Process

Description of Waste Generating Process

The PFP Complex is a collection of facilities that have primarily been used to process plutonium metals and oxides from the conversion of plutonium nitrate and oxalate feed materials. TRU waste generating activities were conducted in the following PFP buildings; 232-Z, 234-5Z, 236-Z, 242-Z, EDF, 291-Z, and 2736-ZB. This waste stream may also include TRU debris waste generated in the PFP ancillary facilities (e.g., PFP effluent infrastructure). Table 1 identifies the primary PFP processes that generated TRU waste described below.

Table 1 – Plutonium Finishing Plant Complex Facilities

Building Number	Facility Name	Transuranic (TRU) Waste Generating Processes/Equipment
232-Z	Waste Incinerator Facility	Incinerator (e.g., Contaminated Waste Recovery)
234-5Z	Plutonium Finishing Plant (e.g., Z Plant, Plutonium Process and Storage Facility, 234-5 Building)	Rubber Glove (RG) Line Remote Mechanical A Line Remote Mechanical C Line Recovery of Uranium and Plutonium by Extraction (RECUPLEX) Operations Analytical Laboratory (rooms 131-157A) Plutonium Process Support Laboratories (rooms 179-191, and room 202) Radiochemical Standards Laboratory (rooms 221-B, 221-C, 221-D, and 221-E) Scrap stabilization gloveboxes Plutonium nitrate feed load-in/load-out for RMC Line (room 227) Radioactive Acid Digestion Test Unit (room 235D) Thermal Stabilization (rooms 228C, 230, 230A, 230B) NDA Counting (room 172)
236-Z	Plutonium Reclamation Facility	Process Cell East and West gloveboxes on 1st, 2nd, 4th, 5th, and 6th floors Miscellaneous Treatment (MT)
242-Z	Waste Treatment Facility	Waste Treatment Facility Americium Facility
EDF	Emergency Decontamination Facility	Personnel decontamination facility , Room 748 under direction of Hanford Environmental Health Foundation (HEHF)
2736-ZB	Product Shipping and Receiving Facility	Room 636 Repackaging Glovebox, Shipping and receiving areas, and NDA
291-Z	Ventilation/Exhaust Air Stack Building	Exhaust fans Mechanical service equipment Substation (auxiliary to the 291-Z Stack)
PFP Effluent Infrastructure and Ancillary Facilities	PFP Effluent Infrastructure • 241-Z Treatment and Storage Tanks • 241-Z-361 Settling Tank • 241-Z-8 Silica Slurry Tank • 216-Z-9 Crib • 216-Z-1A Crib/Tile Field Ancillary Facilities • 216-Z-12 Process Crib • 2904-ZA Monitoring Station	Piping Agitator motor Gearbox Hose **NOTE:** This waste stream does not currently include waste that may be generated from cribs or trenches. TRU waste is not expected from the cribs and trenches. However, if TRU waste is generated in the future from the cribs and trenches, the waste will be evaluated separately.

234-5Z Building Plutonium Conversion and Fabrication

The main PFP Complex facility, 234-5Z Building, was designed to be a self contained and independent plutonium fabrication plant with all necessary support services and facilities. The 234-5Z Building began operations in July 1949 to convert plutonium nitrate and plutonium oxalate into plutonium metal and plutonium products. Fuel from the Hanford production reactors

was processed in the separations plants (T Plant, B Plant, REDOX [S Plant], and PUREX [A Plant]) to produce the plutonium feed materials for the facility.

Initially, plutonium production operations were conducted in a manually operated glovebox line, known as the rubber glove (RG), installed in the building to accelerate the production schedule until the more mechanized, remote line came on line. The remote mechanical A (RMA) plutonium processing line began operation in March 1952. This line performed all of the processes associated with plutonium reduction and fabrications except for the precipitation of plutonium nitrate feed, still performed in the 231-Z Building. The remote mechanical C (RMC) Line was installed in the building in 1960 where the RG Line once operated. The RMA and RMC Lines operated in tandem fabricating components, until 1965 when machining operations were transferred to the Rocky Flats Plant

The basic plutonium finishing operations carried out in the RG, RMA, and RMC Lines consisted of several standard steps known as "tasks." Table 2 identifies the conversion and fabrication tasks performed in the process lines. Task I involved the precipitation of plutonium nitrate feed solution with oxalic acid and other agents. In Task II, hydrogen fluoride gas was diffused through the precipitate in a furnace at a very high temperature, producing plutonium tetrafluoride. In Task III, the plutonium tetrafluoride was combined with calcium and other agents, and then fired at high temperatures to "reduce" the plutonium salt to a metal button. During Task IV, the buttons were melted then cast in a mold to produce the weapon component shape called a "pit." In Task V, the pit was machined to precise dimensions and configuration. In Task VI, the machined pit was chemically degreased. Task VII involved the application of a coating. During Task VIII, final inspection, the pit was measured for uniformity of neutron energy, isotopic content, dimensional precision, and cracking.

Table 2 – PFP Production Task Number Designations

Task Number	Task Description
I	Oxalate Precipitation (Purification or Wet Chemistry)
II	Hydrofluorination (Dry Chemistry)
III	Reduction (to metal)
IV	Ingoting and Casting
V	Machining (Shaping)
VI	Cleaning
VII	Coating
VIII	Final Inspection

The RG and RMA Lines received plutonium oxalates from the 231-Z or 233-S Buildings at Hanford. The plutonium oxalate in a cake-like form was transported to PFP in a filter boat. Later the RMA and RMC Lines received plutonium nitrate solutions as feed from PUREX, REDOX, RECUPLEX, Plutonium Reclamation Facility (PRF), and T Plant. The plutonium metal was stored and later cast and machined into weapons parts. The weapons parts were machined using lard oil as a lubricant and subsequently degreased with carbon tetrachloride. When mixed, the lard oil and carbon tetrachloride were called fabrication oil ("fab oil"). At times, isopropyl alcohol and carbon tetrachloride were used to degrease the weapons parts.

The RMA Line converted plutonium oxalate from the 231-Z Building until 1956 when the RMA Line began processing plutonium nitrate into plutonium metal for weapons parts. The RMA Line

closed for several years beginning in 1964. In 1968, the RMA Line process operated to produce plutonium oxide materials for the early experiments associated with the development of the Hanford Fast Flux Test Facility reactor.

Beginning in 1960, the RMC Line began processing plutonium nitrate into weapons parts. RMC Line fabrication operations were terminated at PFP in December 1965 when these operations were transitioned to the Rocky Flats Plant. From 1963 through mid-1973, the RMC Line continued to operate on a mixed schedule producing some weapons grade metal (approximately 6 percent Pu-240), and an increasing amount of fuels grade metal (approximately 12 percent Pu-240) and oxides. Because the RMA Line produced only oxides and the RMC Line produced plutonium metal, Hanford Site personnel referred to the RMA Line as the "oxide line" and to the RMC Line as the "metal line." The final RMC Line campaign took place from July 1988 through June 1989, making weapons grade metal.

234-5Z Building Thermal Stabilization Operations

Thermal stabilization of reactive plutonium-bearing material (PBM) has been conducted in the remote mechanical lines in one form or another since 1979. Stabilized sand, slag, & crucibles (SS&C) from the remote mechanical lines were sent to the PRF for dissolution, purification, and extraction to obtain recoverable plutonium for recycle to plutonium production. Stabilizing reactive scrap was performed in Glovebox HA-21I in Room 235 in the RMA area in the 1980s. Thermal stabilization was moved to and performed in Room 230 beginning in the 1980s. Chloride washing of reactive materials was performed prior to thermal treatment in Room 230C, if required. The reactive PBMs were heated to oxidize and drive off all volatile components. The source of the materials included sludge from PRF, RMC oxalate and oxides, and scrap from the last production runs. The plutonium-bearing materials were placed in a container called a boat then transferred via the HC-2 conveyer glovebox to the HC-21C glovebox. The boat was placed into a muffle furnace. A pre-programmed controller was used to ramp up and hold the furnace temperature at rates and temperature levels specific to the material being processed. A conveyor was used to transport the boat for product sieving, sampling, and canning.

Building processes also included stabilization of non-organic plutonium-bearing solutions using the magnesium hydroxide and oxalic precipitation process in the RMC line area; packaging of plutonium metals and oxides in the Bagless Transfer System glovebox; plutonium nitrate feed load-in/load-out; and interim storage operations.

234-5Z Building Laboratory Operations

Throughout the operation of the PFP, several laboratories contributed to process improvements that enhanced both the quality of the product and the productivity of the plant, improvements in product measurement techniques, plutonium recovery and recycling techniques and support to PUREX and the uranium oxide ($U0_3$) Plant. The Plutonium Process Support Laboratories (PPSL), Analytical Laboratory, and Radiochemical Standards Laboratory were support laboratories located in the 234-5Z Building.

The PPSL supported numerous activities to improve operations, minimize waste, increase production, improve product quality, reduce occupational exposure, troubleshoot process operations, and develop successive generations of production technology. The PPSL was also known as the developmental laboratory, the plutonium chemistry laboratory, process improvement laboratory, research and development laboratory, and the chemical technology

laboratory. The PPSL opened in 1949 in the southwest corner of the 234-5Z Buidling. A Metallurgy Laboratory occupied Room 179 of the PPSL from 1952 until 1956 when it was relocated to the 231-Z Building. In 1958 the developmental laboratory expanded in an annex of the building and operated until PPSL operations ceased in 2004.

Typical activities conducted in the PPSL included dissolution, precipitation, chemical mixture preparation, chemical alteration reactions (e.g., hydrolysis of organic chemicals), calcination or similar decomposition, ion exchange studies, archive sample storage, particle size analyses, and equipment analysis, troubleshooting, and process control. Aqueous waste from the PPSL was sent for processing at the 241-Z Facility. One glovebox was dedicated to the PPSL radioactive thermal analysis system. Table 3 identifies some of the functions and equipment for the PPSL. The activities and equipment in the laboratories changed continuously over time, therefore this table is not all-inclusive.

Table 3 –PPSL Room Functions

Room	Function	Equipment Used
179	Plutonium and TRU analysis	Particle counter and thermo-gravimetric analysis instrument in one glovebox. Five other gloveboxes and three hoods for general alpha-radioactive chemistry projects. Glovebox contained electrically heated furnaces, hot plates, and small rotary mixers.
180	Rapid determination of isotopes	Inductively coupled plasma spectrometer
182	Examining minute quantities of solids	Scanning electron microscope
183/185	Scintillation counting and drummed waste storage	Scintillation counter
187	Smaller-scale and general plutonium support. Dissolution; precipitation; chemical mixture preparations; chemical reactions; calcination or similar decompositions; ion exchange studies; sample preparation and storage; and equipment analysis, trouble shooting, and process control.	Five open-faced hoods. Equipment included hot plates, other heating devices, and centrifuges.
188	De-nitration of feed material to a stable, storable solid. Test materials of construction to contain those processes.	One glovebox, designated 188-1
189	Chromatography	Cold ion chromatograph
190	Stable SNM storage	Vault-type storage room
191	Non-radioactive analysis	Non-radioactive chemistry laboratory
202	Engineering Development Laboratory	Ceramics laboratory for fabricating crucibles for casting weapons shapes

The PPSL performed analytical and physical tests on samples from the RMA and RMC lines and PRF production activities, conducted experiments, and provided laboratory and engineering support for numerous defense and non-defense related programs across the Hanford Site and, on occasion, other DOE Sites. The following provides a history of PPSL operations and brief descriptions of the types of activities performed in the laboratory:

- In 1949, the PPSL began operations in the 234-5Z Building. During the 1950s, studies and tests conducted include: recycle techniques, cerium halide reduction operations in filter boats using Hastelloy "C" with platinum liners, precipitation of plutonium (IV) oxalate from solutions, photometric determinations, metal and alloy

transformations, corrosion of steel alloys, remote operations, tensile tests of plutonium-gallium alloys, examinations of alloys, and stress rupture trials and thermal cycling tests on reduction vessels. An explosion occurred in Room 179 in a hood during plutonium machining. Use of trichloroethane instead of trichloroethylene as a coolant resulted in the explosion.

- During the 1960s, PPSL operations focused on supporting the commercial nuclear industry and the development of experimental reactor technology. Efforts were made to improve casting operations and continuous dissolution of slag and crucible residues. Extractant studies and investigation of plutonium removal from sump water were conducted. Also during the 1960s, methods of recovering plutonium from fabrication oil (a combination of lard oil and carbon tetrachloride) were investigated. Other studies include: the conversion of U-233 in nitrate form to oxide and metallic form, the reduction of plutonium trichloride to plutonium metal, "single contact" method for dissolving plutonium-bearing ash, alpha energy analysis to measure plutonium content of aqueous waste, and molten salt reduction of plutonium dioxide to plutonium metal.

- During 1977 to 1979, the PPSL supported research to optimize plutonium oxide conversion. The new method used a horizontal bed screw calciner and co-calcined plutonium nitrate with calcium nitrate.

- In 1985, support of three PRF and RMC Line campaigns began that lasted into the early 1990s.

- In the 1990s, the PPSL studied ways to analyze, verify, and stabilize the nearly 8,000 containers of plutonium-bearing scrap stored at PFP.

The PFP Analytical Laboratory began operating at the onset of 234-5Z Building operations in 1949. The primary mission of the laboratory included the radiochemical, chemical, and physical property characterization of process samples. The Analytical Laboratory analyzed samples from the RG, RMA and RMC Lines; PUREX; REDOX; PRF; and 232-Z. The Analytical Laboratory was located in Rooms 131 through 157. Laboratory supplies were stored at a small metal ancillary building (2727-Z) outside of the 234-5Z Building. Testing was performed to support process control, process analysis, and assessing product quality with respect to required specifications. Table 4 provides a functional description of the laboratory rooms.

Table 4 – Analytical Laboratory Room Functions

Room	Function	Equipment Used
131	Dissolution and sample analysis for plutonium concentration and product quality.	One three-sectioned glovebox
132	Mass Spectrometer Laboratory for isotopic analysis of extremely small samples of Plutonium and uranium.	Three thermal ionization spectrometers
133	Emission spectrometry and photographic development. No radioactive materials are allowed in this room.	Grating and camera portions of a 2-m emission spectrograph and film development equipment
134	Sample preparation for mass spectrometer analysis.	Three open-face hoods and one glovebox

Room	Function	Equipment Used
134-A	Weighing room for mass spectrometer analysis.	Balance and a storage cabinet containing emission spectrometer standards, including natural uranium
135	Sample and equipment storage.	A 26-inch mercury vacuum, methane for an alpha counter, and a 120 VAC
136	Trace element analyses of Plutonium and uranium product.	Spectrophotometer
137	Instrumentation for trace element analyses of Plutonium and uranium product.	2-m film spectrograph stand
139	Plutonium metal and oxide process and storage.	Six interconnected gloveboxes
141	Cold sample analysis. No radioactive material is allowed in the room.	Cold (nonradioactive material) hood, sink, water purifier, hot plate and muffle furnaces
142	Storage of radiochemical and analytical standards.	Four vented storage cabinets
143	Decontamination of equipment for the Radiochemical Standards Laboratory and Analytical Laboratory, handling of liquid waste not compatible with the waste recovery system, precipitation of low concentration Plutonium nitrate and oxalate, and disposal of low-level radioactive waste to the D-4 sump in the Waste Treatment Facility.	Four open-faced hoods and one glovebox
144	Analysis of Plutonium concentration, visual percent solids, americium concentration, and acid/base determination in support of PFP, Plutonium Reclamation Facility, and Research and Engineering samples. Used xylene in sample extraction hood.	Eight hoods and one glovebox
145	Analysis of sinterability and bulk and tap density on Plutonium oxide, and preparation of Plutonium oxide standards for the emission spectrometer.	One glovebox
145-A, 147, 148, 150, 151	Supply and office facilities.	Not applicable
146	Analysis of Plutonium solution, Plutonium nitrate, and oxide materials and repackaging of waste from other Analytical Laboratory rooms.	One glovebox and four hoods
149	Dissolution of relatively large amounts of Plutonium compounds and packing and unpacking of shipping containers.	Open-faced hood and a hood converted into a glovebox
152	Reprocessing liquid laboratory waste.	Load-in hood and a glovebox
153	Surface area analysis of Plutonium oxide.	Four open-faced hoods and one glovebox
154	Carbon, sulfur, and nitrogen analysis.	One glovebox
155	Support of PRF, Remote Mechanical A, and Plutonium-Uranium Extraction (PUREX) Plant sample schedules.	Four hoods and associated equipment
156	Uranium analyses in support of Uranium Trioxide Plant operations.	One two-sectioned glovebox and two hoods
157	Support of Plutonium oxide work.	Two gloveboxes with furnaces and a sample cell

Analytical measurements included isotopic analysis for plutonium, uranium, and americium, fissile material content, impurity content, and particle size determinations. Analytical results were used for criticality safety and to ensure that plutonium feeds and products were within

specification. Over the years, research and metallurgical analytical activities were added. The following provides a brief summary of the evolving mission of the Analytical Laboratory:

- In the 1950s, the Analytical Laboratory supported plutonium processing by performing as many as 3,550 determinations per month.
- Fuels and reactor grade metal work was added during the 1960s. To support this work, the laboratory installed new equipment, including an oxygen gas analyzer, a new induction furnace, and master-slave manipulators.
- In 1971, waste management practices were upgraded when a plutonium waste concentrator was installed. The unit concentrated laboratory waste and drove off chloride ions for feed to PRF recovery systems.
- In 1979 and 1980, the Analytical Laboratory was isolated from other PFP operations undergoing deactivation so that its continuing operation would not be affected.
- In 1984, the laboratory was upgraded pending restart of the RMC Line and to meet the high demand from PUREX, which performed irradiated fuel dissolution for uranium and plutonium extraction and recovery. Eight new gloveboxes were installed in the laboratory.
- PUREX and UO_3 stopped sending samples to the laboratory in 1985. The laboratory supported stabilization efforts at the PFP beginning in the late 1980s.
- In the 1990s, the laboratories studied ways to analyze, verify, and stabilize containers of plutonium-bearing scrap stored at the PFP.

The Radiochemical Standards Laboratory (Rooms 221-B, 221-C, 221-D, and 221-E) was located on the northeast end of the PFP. The Radiochemical Standards Laboratory provided formulation, verification, packaging, and distribution of the plutonium-containing standards needed throughout the PFP laboratories. The mission of this laboratory was to support the activities of the Analytical Laboratory and the PPSL.

Handling of PFP Laboratory Waste

Beginning in 1973, all cribs, ditches, and tile fields were removed from service and PFP effluents were routed from the 241-Z Treatment and Storage Tanks to the 242-T Evaporator at the tank farms. Prior to 1973, the same types of organics were discharged through the tank as were generated from process activities, because all of the laboratory waste was discharged into the 241-Z-361 settling tank and the laboratories tested the individual PFP processes (finishing and reclamation) on a bench-scale. Waste from some of the PFP processes went through transfer lines to the Sump Tanks (241-Z-D4, 241-Z-D5, 241-Z-D7, and 241-Z-D8) in 241-Z Building. Waste from Sump Tank 241-Z-D6 went to Tank 241-Z-361, while waste streams from the other sump tanks were directly discharged to the appropriate cribs, trenches, and ditches,

Final sorting, segregation, and repackaging activities for the Analytical Laboratory waste was performed in the Repackaging Room 146. PFP laboratory waste containers were not packaged with the intent to segregate wastes based on specific activities or isotopic distribution. Also, containers were not packaged with the intent to segregate specific waste materials (e.g., plastic,

paper, and metal). The containers are made up of a composite of materials. Segregation was based on whether the materials were debris, homogeneous solid, or soil. Wastes were further segregated based on TRU, TRU mixed, low level, or mixed waste determinations. Laboratory organic wastes were packaged as 20-year retrievable TRU waste during the 1970s and 1980s.

234-5Z Building D&D and Maintenance Operations

The United States (U.S.) Department of Military Application (DMA) decommissioning of portions of the RMA and RMC Lines began in May 1974 and was essentially complete by May 1976. During the DMA decommissioning, gloveboxes, associated equipment, and contaminated flooring were removed from the 234-5Z Building. Lead is present in the DMA waste in the form of lead metal contained in gloveboxes, lead sheeting placed on gloveboxes for shielding, leaded gloves, and leaded glass. During the DMA decommissioning, plastic containment tents (or greenhouses) and sleeves were used extensively. Sleeves placed around gloveboxes were sealed by "horsetailing."

After the *Toxic Substances Control Act* (TSCA) requirements for Polychlorinated Biphenyl (PCB) were imposed in 1976, the RMA/RMC Line hydraulic oil was identified as exceeding the PCB limits. The requirement resulted in flushing of the RMA/RMC Line hydraulic systems. These flushed oils were slightly contaminated with plutonium and disposed as TRU waste. The majority of this waste is considered S3000 and is not part of the TRU debris waste stream. However, some absorbed hydraulic oils are packaged with other debris as S5000 waste.

During operation of the RMA and RMC Lines, numerous maintenance problems and failed equipment generated waste. This waste included failed or unusable equipment such as pumps, ducting, piping, electrical equipment, light fixtures, tools, glass, and metal scrap. During 1995, other projects were initiated to remove plutonium contaminated ductwork; stabilize low plutonium-bearing process residues with cement; and remediate nearby, soils, trenches, and sumps. Waste was also generated from maintenance and operation of the thermal stabilization process and various repackaging projects.

The Radioactive Acid Digestion Test Unit was a demonstration waste treatment testing unit aimed at reducing the volume of contaminated solid waste. Testing of the unit began in 1978. Combustible waste was shredded and fed into a digester vessel where it was mixed with nitric and sulfuric acids. After dissolution, the solids were separated and the solution dried and packaged for disposal. The facility was closed in 1981 and most of the gloveboxes were removed in June 1983.

Ongoing decontamination of gloveboxes, hoods, and equipment inside gloveboxes, primarily contaminated with plutonium, are performed using RadPro process decontamination agents. RadPro is a decontamination solution used to reduce contamination levels on glovebox surfaces. One of three formulations of RadPro is sprayed onto the surface of the item to be decontaminated. The item is scrubbed (using steel wool, paint scrapers, wire brushes, or other similar items) and allowed to soak. The liquid is then wiped up with cotton towels. The towel is then saturated with sodium carbonate to neutralize the RadPro solution. The decon materials are then placed into a sealed noncombustible container so that they remain moist. Absorbent is added to ensure there are no visible free liquids.

Another decontamination agent used at the PFP facility to decontaminate surfaces is Aspigel. Aspigel is a strong decontamination agent consisting of Cerium nitrate in nitric acid to form a gel. When applied to steel surface with ingrained contamination, the ceric ions in combination

with the acids etch away the top several micrometers of the steel surface and incorporate them into the drying gel. When dry, the residue is brushed or scraped away, leaving the surface cleaner, with a reduced amount of ingrained radioactive materials. The dried flakes are neutralized with sodium carbonate and absorbed with diatomaceous earth.

PFP Plutonium Reclamation Facilities

In 1955, plant-scale recovery of RECUPLEX process equipment was installed in Room 221 of the 234-5Z Building (where the RG Line had been). The RECUPLEX facility was the first consolidated scrap recovery and purification process at PFP. Prior to RECUPLEX, scrap recovery was performed in equipment located in the RG Line gloveboxes. This consolidated system included numerous dissolvers for the dissolution of solids and a solvent extraction process for plutonium nitrate purification of dissolver product, filtrate solutions, and infrequently provided final purification of feed from the separation plants.

Originally, the facility consisted of three large gloveboxes with plastic panels. Some feed was solid scrap in the form of slag and crucible fragments, magnesium oxide sand used as line material in the reduction crucibles, scrap powders from RMC-A Line operations, plutonium dross from Task IV, oxidized turnings from Task V, and remnants from metal samples.

The RECUPLEX process was a solvent extraction system (TBP and carbon tetrachloride) that recovered plutonium from many different types of scraps, wastes or residues such as ingot and casting skulls, slag and crucibles, button line supernatant, and fabrication oil. The purified concentrated product was returned as feed material and waste solutions were discharged to the 216-Z-9 crib. The aqueous waste stream was discharged to one of three waste tanks. After determining the plutonium content, the liquid waste was drained by gravity through the stainless steel inlet pipe to the 216-Z-9 crib.

The RECUPLEX facility operated until 1962 when a criticality accident occurred. Designs were already in process for an improved scrap recovery process in the planned 236-Z Building, which then replaced the RECUPLEX activities. The 216-Z-9 crib received an estimated 1,000,000 gallon of aqueous and organic waste from July 1955 through June 1962. Following termination of activities, the facility was cleaned out and the equipment and gloveboxes were removed in 1967.

The Plutonium Reclamation Facility (PRF) in the 236-Z Building housed the scrap recovery process system, which replaced the RECUPLEX operation originally conducted in 234-5Z. The PRF has conducted plutonium reclamation as well as solid and liquid waste treatment, collection, and disposal of equipment since 1964. The PRF was designed to concentrate liquid feeds, dissolve or otherwise process solid material, and to perform solvent extraction recovery of plutonium from aqueous streams. Some of the plutonium received from offsite (e.g., from another government site, the commercial industry, or another country) required purification prior to conversion to an oxide of metal product. The purification was accomplished through scrap dissolution and solvent extraction. The PRF process systems are inactive and are being prepared for D&D. The following is a brief history of the PRF operations:

- During 1965, the PRF recovered and returned plutonium nitrate feed to the RMC Line.
- From the mid-1960s to the early 1970s, fuels and reactor grade plutonium production work was conducted in the PRF.

- In 1972, plutonium/uranium partitioning was added to the plutonium recovery operation.
- In 1976, the PRF was shut down for 19 months to plan upgrades and plan hazards reviews.
- In 1978 through 1979, a cleanup campaign took place.
- From 1980 to 1981, the PRF was in standby. During this time, plans were made to process reactive scrap using PRF equipment and the RMA Line for calcination into oxide form, but a decision was made not to start up the RMA.
- In 1982, Glovebox 5 in room 41 in 236-Z was used to stabilize reactive scrap.
- In 1988 through 1989, the filtrate evaporator and some storage tanks at the PRF were utilized to support the RMC Line.
- In mid-1994, a training run was conducted to demonstrate operator proficiency utilizing a prototype air-pulsed liquid-liquid extractor.

The PRF presently houses the inactive process equipment, including miscellaneous treatment, filtrate concentration, feed preparation, plutonium solvent extraction, product concentration and waste treatment process equipment. The PRF received feed from the 232-Z Incinerator, SS&C from the RMA and RMC Lines and other areas of PFP. The plutonium nitrate feed was direct transferred from 234-5Z to PRF though a pipeline. Waste materials were generated during the operations and maintenance activities that reclaimed plutonium from feed products. The PRF was also used for storing in-process residues and solids that were waiting to be processed by thermal stabilization into vault-storable form. The PRF placed plutonium nitrate feed into containers, such as PR cans, for use in the RMA and RMC Lines.

The plutonium recovery process converted various plutonium-bearing solid materials and aqueous feeds to a purified plutonium nitrate product suitable for conversion to plutonium metal or plutonium oxide. The process included recoverable material dissolution, scrap stabilization, and plutonium nitrate purification. Recoverable material dissolution and scrap stabilization included hydrolysis, clarification, and calcination. Plutonium purification involved feed preparation, solvent extraction using carbon tetrachloride and TBP, stripping, and organic cleanup. The process also involved concentration and clarification of the aqueous product and waste streams. Some of the processing steps took place within the 234-5Z Building.

Feed preparation, solvent extraction and stripping, and organic cleanup were steps used for plutonium recovery and purification. The activities performed in the PRF and the rooms they were performed in are identified in Table 5.

Table 5 – PRF Room Functions

Room	Function	Equipment Used
43	Dissolving crushed SS&C from the PFP RMC Line	1st East Glovebox, 1st West Glovebox, and 2nd West Glovebox (feed chutes, charging tubes, dissolvers)
27	Supported maintenance, product handling, and storage shelving for packaged Plutonium containers.	Maintenance Glovebox (centrifuges, small tanks, motors, pumps, valves, filters, rotometers)

Room	Function	Equipment Used
41	Chemical preparation and MT (inspecting, weighing, sampling, splitting, burning, repackaging, dissolving, precipitating, stabilizing, and storing operations).	Gloveboxes MT-1 through MT-6 (operating control room, SS&C dissolver equipment, and a column room)

Polycubes were handled at PRF in the miscellaneous treatment recovery process conducted in the 1970s and 1980s. The polycubes were a mixture of plutonium and/or uranium and polystyrene, cast into the shape of cubes (approximately 1/2 in. x 2 in. x 2 in. up to 2 in. x 2 in. x 2 in. in size), and sealed with a coating of aluminum paint and/or tape. Polycube operations occurred in the pyrolysis furnace located in glovebox MT-4.

The cubes were prepared for processing by cutting or scraping the paint and tape coating and size-reducing the large cubes. The cube pieces were then loaded into small boats and charged into the furnace. The first step was destructive distillation in a furnace operating in a nitrogen atmosphere. The off-gas was collected, cooled and scrubbed with a solution of carbon tetrachloride. After distillation, the boats were transferred and charged into the de-carbonization furnace. Oxygen was added to remove excess carbon. The resulting product was a free-flowing plutonium oxide powder.

Prior to 1973, contaminated oils from the PRF were either incinerated or cribbed. Cribbing of the oil was performed as part of the earlier PRF operations. The 232-Z Incinerator was permanently shut down in June 1973, and cribbing of liquid wastes was discontinued at the same time. Process organic solvent extraction chemicals from the PRF were packaged as 20 year retrievable TRU waste during the 1970s and 1980s. Operations in the PRF were restarted in the mid 1980s to support cold war plutonium production missions. These process activities resulted in maintenance debris waste, including hydraulic oils, laboratory waste, and process solvent extraction organic waste. An effort to download solutions from the PRF to eliminate the risk of tank leaks was completed by 1995. Organic chemical solutions used for training PRF facility operators, that were no longer needed, were drained from the tanks in the PRF, put in glass bottles with absorbent pads, and packaged in steel drums.

232-Z Waste Incinerator Facility

The 232-Z Waste Incinerator was designed to recover plutonium from PFP Complex process wastes items by incinerating the combustible items. The incinerator operated from December 1961 until May 1973. Candidate feed materials for the incinerator included combustible items such as cartons, filters, rags, paper, gloves, and work clothing components. Non-combustible feed materials included metal items such as tools and small equipment components. The plutonium-bearing materials received were first hand-sorted into combustible and leachable fractions. The combustible fraction was processed through the 232-Z incinerator and the non-combustible items were leached in nitric acid to recover plutonium.

Combustible materials were sent through a chopper, and then routed to the incinerator via a conveyor belt. The incinerator consisted of an externally heated furnace with primary and secondary combustion chambers. Electric elements maintained the temperature in the combustion chamber at a high temperature to ensure complete incineration of the feed materials. The resulting ash was then processed to recover plutonium. Incinerator gas was processed in an off-gas scrubber with a mixture of water, sodium hydroxide, and urea. The treated gas was heated and directed into the exhaust system. Spent scrubber solution was discarded to the 241-Z tank system. Condensate and cooling water was routed to the 216-Z-11 ditch for surface (crib) disposal. TRU debris waste was generated during replacement of hoods,

scrubber parts, and miscellaneous equipment (e.g., off-gas heaters, fire brick, heating elements, bellows, belts, temperature indicators, pumps, filters, valves, and chopper blades).

Non-combustible materials were placed in leach pots, leached in heated nitric acid and aluminum nitrate nonahydrate, and rinsed in water. Resultant leach solutions were then transferred to RECUPLEX for solvent extraction to recover the plutonium. After RECUPLEX was closed, the leach solutions were transferred to the PRF for solvent extraction.

Material balance and accountability for the incinerator were maintained by surveying feed material boxes with a package neutron counter located in Room 161 of the 234-5Z Building. The resulting ash from feed material was canned then scanned with another neutron counter. The plutonium-bearing ash produced in the incinerator was processed for plutonium recovery at the PRF; however, much of the ash as was disposed of as TRU waste residues.

After years of difficult operations and processing of more than 4,000 cubic feet of combustible solid waste, the incinerator operations were terminated in 1973. Preliminary isolation and terminal cleanout activities began in 1982. A deactivation activity initiated in 1984 involved the removal of three large gloveboxes. During another cleanout campaign in 1994, moveable equipment, instruments, portions of contaminated piping, ductwork, and other parts were removed. Removal of the furnaces, conveyor, piping, and the cyclone air separators from the inside of the gloveboxes started in 2004. Further D&D involved removal of residual plutonium from the ventilation piping, gloveboxes, and filter boxes, followed by decontamination and removal of the process equipment.

The objective of the deactivation phase was to remove enough plutonium in process equipment to allow the facility to be disposed of as LLW. Most of the D&D waste was disposed of as LLW. However, the incinerator glovebox could not be decontaminated to LLW. It was packaged and sent to T Plant for size-reduction. Other TRU waste generated during the equipment-removal and building dismantlement included contaminated greenhouses, solidified liquid waste (i.e., remaining liquid in scrubber system and rinsate from the decontamination process), and any other materials that could not be decontaminated to LLW levels.

At the conclusion of deactivation, PFP workers applied a final fixative coating of Polymeric Barrier System (a non-hazardous, water-based solution that forms an impenetrable barrier around contaminated materials) to the interior surfaces of the building to fix the remaining contamination during demolition. The deactivation of the 232-Z Facility was completed on June 1, 2006 and the facility was transferred to a demolition team. The building was dismantled and the above-grade structures were demolished to grade in July 2006.

242-Z Building Waste Treatment Facility

The 242-Z Building, constructed in 1963, houses the Waste Treatment Facility, also called the Americium Facility. The 242-Z Waste Treatment Facility was used to treat PFP Complex aqueous waste, including waste from the PRF, for further plutonium recovery. It was expanded in 1964 to accommodate americium recovery as a pure nitrate and in May 1965, the Americium Facility began operations.

A solvent extraction column and two ion-exchange columns were used to separate effluents into (1) a low-level radioactive waste routed for subsequent waste processing, (2) a plutonium-rich

stream returned to production, and (3) an americium-rich aqueous product stream. Batch recovery of americium utilized TBP in carbon tetrachloride to extract americium from the PRF solvent extraction waste stream. Later (1970-1976), a continuous countercurrent solvent extraction process was utilized. The americium product was concentrated by adsorption on a strongly acidic cation exchange resin followed by elution with a small volume of nitric acid. The resulting americium concentrate contained large amounts of iron, aluminum, and calcium impurities, and lesser amounts of plutonium, rare earths and other metal ions so that further purification of the americium was necessary.

On August 30, 1976, an explosion occurred during americium elution with nitric acid. An uncontrolled exothermic reaction led to the over-pressurization and failure of an ion exchange column used in the recovery of americium. The resin had been loaded with americium and plutonium and allowed to stand static for five months. Upon return to service, a rapid decomposition of the degraded resin occurred that resulted in a pressurization and rupture of the column. Gloves were blown off of a glovebox and some windows were blown out. The 242-Z Building was extensively contaminated and chemical operators were contaminated and injured. In the 1977–1980 time period, the 242-Z Building was stabilized and minor decontamination performed. The facility did not operate after the explosion in 1976.

The Emergency Decontamination Facility (EDF), also known as the 748 Building, adjacent to Kadlec Hospital in Richland provided emergency decontamination and medical care to persons who became radiologically contaminated. Activities at the EDF were under the direction of the HEHF. Fifty-five drums of waste came from HEHF. These drums were accepted at the burial grounds from September 9, 1976, through October 8, 1976. These dates are shortly after the explosion at 242-Z, suggesting this waste was generated from decontamination, and from medical care of the operator injured in the explosion at 242-Z. This waste is similar to other waste from 242-Z, and is considered part of the TRU waste generated by 242-Z.

2736-ZB Product Shipping and Receiving Facility

The 2736-ZB Building (Figure 8) was constructed from 1981 to 1983 to support Building 2736-Z storage vault operations. The 2736-ZB Product Shipping and Receiving Facility accommodates shipping and receiving of containers for PFP. In addition, the building provides an area for assaying and enclosed glovebox equipment for repackaging plutonium-bearing materials. Also, the building provided space for temporary storage and staging of storage containers. The 2736-ZB has been performing these functions from its inception. In 2000, a Thermal Stabilization and Packaging system was installed to stabilize and package PBMs in accordance with the new standard. The materials repacked to this standard are referred to as “3013” packages. The 2736-ZB Building has provided and still provides support to facility stabilization.

The majority of shipping containers handled at the 2736-ZB facility contain plutonium oxide powder, plutonium metal, or miscellaneous solid scrap materials from various onsite and offsite plutonium sources. Containers that were unstable, had failed in storage, or were damaged in transit were transferred to the Repackaging Room (Room 636). Source containers were opened and verified using remote handling devices.

Repackaging activities included opening the non-solution storage containers, extracting the plutonium, placing it in a new container, sealing the new container, verifying the seals, and decontaminating the sealed container if necessary. In addition, in the Room 636 Repackaging Glovebox, plutonium metal from the RMC Line was brushed with a paintbrush to remove loose

oxides. The plutonium metal was weighed, re-canned, and bagged out into food cans. Waste generated as a result of Room 636 activities was TRU debris.

The NDA Laboratory (Room 637) provided plutonium isotopic determinations (relative weight percentages of each isotope present) and heat output (watts) of the shipping container contents. Isotopic determinations were made using a gamma energy analysis system (isotopic analysis system) to spontaneously detect emitted gamma radiation or one of two Segmented Gamma Scan Assay Systems (SGSAS) that use a lithium-drifted germanium detector, which requires liquid nitrogen for cooling and a selenium-75 source for density determination. After isotopic counting, can temperatures were adjusted in a pre-equilibrium bath using de-mineralized water as a heat sink and then placed into a calorimeter for determination of heat output.

Staging Room (Room 638) activities included inspection to determine stability. If the materials were determined to be unstable (e.g., gas evolution, liquid), a recovery plan was implemented to provide interim safe storage and stabilization. Shipping containers were weighed and tested (e.g., pneumatic, hydrostatic, leak), when necessary. Also, decontamination of empty shipping containers was performed. The functions of each room in the 2736-ZB Building are provided in Table 6.

Table 6 – 2736-ZB Building Room Functions

Room #	Room Description
602	Mechanical room
630	Decontamination room
636	Plutonium material packaging
637	NDA laboratory
638	Shipping and receiving/interim storage room. 638A storage area with steel security cage
639	International Atomic Energy Agency room
641	Shipping and receiving/interim storage room. Outer can weld room
641B	HEPA filter room
642	Shipping and receiving/interim storage room. Equipment room. Stabilization and Packaging Equipment
642B	Control room

Repackaged shipping containers were moved to the 2736-ZC dock, placed in cardboard reinforced tubes, and secured in trucks for shipment. Only solid, stable, plutonium-bearing materials were shipped offsite.

The TRU waste generated in the 2736-ZB Building resulted from past processing, routine maintenance, and various operating activities. Since the 2736-ZB Building has received containers from the remote mechanical lines, laboratories, PRF, and other sites (primarily for temporary storage), the waste generated consists of weapons, fuels, and reactor grade plutonium materials that may be commingled.

291-Z Ventilation/Exhaust Air Stack Building

The 291-Z Ventilation/Exhaust Air Stack Building houses the exhaust fans and plenums that provide ventilation exhaust for the 234-5Z, 242-Z, 236-Z, and 291-Z Buildings by way of exhaust

ducting from those buildings. It also formerly provided ventilation exhaust for the 232-Z Building. Although the ductwork from the 232-Z Building remains physically connected to the 291-Z ventilation system, it was isolated from the 291-Z system in 1990, filled with grout, and replaced by dedicated ducting, fans and a stack for the 232-Z Building .

The 291-Z also houses electrical switchgear in room 252-Z-2. The electrical substation is located on the east side of the 291-Z Building. South of the switchgear room is a mechanical room containing two air compressors and two mercury-air-sample vacuum pumps. There is a plutonium-contaminated sump located in the northeast corner of the mechanical equipment room that has three electrical pumps, and one backup steam jet. The contamination in the sumps originates from the process vacuum pumps (previously removed). Contaminated process vacuum piping remains.

PFP Effluent Infrastructure and Ancillary Facilities

The PFP effluent/effluent infrastructure consists of the 241-Z Treatment and Storage Tanks, 241-Z-361 Settling Tank, 241-Z-8 Silica Slurry Tank, 216-Z-1A Crib/Tile Field (which includes the 216-Z-1, -2, and -3 cribs), 216-Z-9 Process Crib, 216-Z-12 Process Crib, and the 2904-ZA Monitoring Station. Processes generating waste can be categorized as one of the following:

- 1973 to 1978 debris from the PFP Complex effluent;
- 1974 debris from around the 241-Z-8 Silica Slurry Tank associated with RECUPLEX operations;
- 1976-1978 debris from 216-Z-9 mining operation (removing upper layer of contaminated soil from the trench floor) ; and
- 1980 to 1981 debris from 216-Z-1A and 216-Z-12 soil sampling (PFP Complex effluent)

Subsurface characterization activities at the 216-Z-1A and 216-Z-12 Cribs from 1980 to 1981 were performed by a Hanford D&D team that was investigating inactive facilities around the PFP. Samples were collected through the soil column to determine plutonium and americium distribution as well as soil type and moisture content during drilling in the cribs. It is not expected that TRU waste directly from the cribs and trenches will be included in the waste stream, however samples of these materials may be contained in PFP laboratory waste from sampling campaigns.

Table 7 identifies toxicity characteristic (TC) and F-listed constituents in waste stream RLMPFPDD

Table 7 – Toxicity Characteristic and F-Listed Constituents in Waste Stream RLMPFPDD

Constituent	CAS Number	EPA Hazardous Waste Numbers
Arsenic	7440-38-2	D004
Barium	7440-39-3	D005
Benzene	71-43-2	F005
Cadmium	7440-43-9	D006
Carbon disulfide	75-15-0	F005
Carbon tetrachloride	56-23-5	F001

Constituent	CAS Number	EPA Hazardous Waste Numbers
Chloroform	67-66-3	D022
Chromium	7440-47-3	D007
2, 4- Dinitrotoluene	121-14-2	D030
Lead	7439-92-1	D008
Mercury	7439-97-6	D009
Methyl ethyl ketone	78-93-3	F005
Methylene chloride	75-09-2	F001, F002
Nitrobenzene	98-95-3	F004
Pyridine	110-86-1	F005
Selenium	7782-49-2	D010
Silver	7440-22-4	D011
Tetrachloroethylene	127-18-4	F001, F002
Toluene	108-88-3	F005
Trichloroethylene	79-01-6	F001, F002
1,1,1-Trichloroethane	71-55-6	F001, F002
Trichlorofluoromethane	75-69-4	F001, F002
1,1,2-trichloro-1,2,2-trifluoroethane	76-13-1	F001, F002

RCRA Determinations - Hazardous Waste Determinations

Historical Waste Management

Based on historical waste management and the HWNs assigned to the corresponding PFP debris waste stream characterized previously by Hanford (waste stream RLMPFPCD), the site HWN assignments have been maintained with the exception F003 constituents, including acetone, n-butyl alcohol, methanol, cyclohexanone, methyl isobutyl ketone and xylene, are listed solely because these solvents are ignitable in the liquid form. The waste stream will not exhibit the characteristic of ignitability because it is not liquid; therefore, F003 is not assigned (Reference DR010).

Ignitability, Corrosivity, Reactivity

Waste generated in this waste stream does not qualify for any of the exclusions outlined in 40 Code of Federal Regulations (CFR) 260 or 261. Real Time Radiography (RTR) or visual examination (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 exhibit the characteristic of ignitability as identified in 40 CFR 261.21. The materials are not liquid, compressed gases, or oxidizers, and are not capable of causing fire through friction, absorption of moisture, or spontaneous chemical change. The materials are not liquid, and RTR and/or VE are performed to ensure the absence of prohibited liquids.

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

removed or vented prior to WIPP disposal. Therefore, this waste does not exhibit the characteristic of ignitability (D001) (Reference DR010).

Corrosivity

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

Corrosive liquids (such as hydrochloric, nitric and hydrofluoric acid) were used at PFP but were neutralized and solidified prior to packaging. The materials are not liquid, and RTR and/or VE are performed to ensure the absence of prohibited liquids.

To ensure the waste does not exhibit the characteristic of corrosivity, liquid in excess of TSDF-WAC limits will be removed or immobilized prior to WIPP disposal. Therefore, this waste does not exhibit the characteristic of corrosivity (D002). (References M056)

Reactivity

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

Reactive metals (such as calcium, lithium and sodium) and alloys were reacted prior to disposal and potentially reactive reagents were not placed in the waste to ensure compliance with the Hanford Site Solid Waste Acceptance Criteria for storage at Hanford. Specifically, rags saturated with caustic and acidic decontamination agents have been neutralized with sodium carbonate and sodium bicarbonate to neutralize these compounds prior to disposal.

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, the waste does not exhibit the characteristic of reactivity (D003) (Reference M056).

Toxicity Characteristic

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

The waste stream contains or is contaminated with toxicity characteristic metals. EPA HWNs D004 (arsenic), D005 (barium), D006 (cadmium), D007 (chromium), D008 (lead), D009 (mercury), D010 (selenium), and D011 (silver) are assigned to waste stream RLMPFPDD. (References C074, DR010, M054, and P196)

The applicable HWNs for chloroform (D022) and 2,4-dinitrotoluene (D030) are also assigned to this waste stream for these chemicals. The AK sources identified the use of other organic

toxicity characteristic compounds, including benzene (D018), carbon tetrachloride (D019), nitrobenzene (D036), pyridine (D038), tetrachloroethylene (D039), and trichloroethylene (D040). EPA HWNs F001, F002, F004, and F005 are assigned to the waste stream for these solvents. Because the more specific F-listed HWNs have been assigned for these compounds, assignment of the corresponding toxicity characteristic HWNs is not necessary (Reference DR010).

The use and potential sources for the characteristic compounds in the waste stream are listed below:

- arsenic (D004) – Identified as a contaminant of SS&C, suspected tank sludge constituent, and a chemical in the PFP inventory.
- barium (D005) – Identified as a precipitating reagent, suspected tank sludge constituent, and a chemical in the PFP inventory.
- cadmium (D006) – Used in the RECUPLEX process, emission spectrometric standard material, poison used for soil removal, suspected tank sludge and SS&C contaminant, and a component of NiCad batteries, neutron shielding, paint, and ion exchange column liners.
- chromium (D007) – Identified as a PFP inventory chemical and a suspected tank sludge and SS&C contaminant.
- lead (D008) – Identified as a component or contaminant of batteries, shielding, circuit boards, solder, leaded gloves, leaded glass, bricks, pigs, paint ingredient, tank sludge.
- mercury (D009) – Used to check void volume in casting and identified as a component or contaminant of electrodes, thermometers, batteries, inventory chemicals, catalysts, and tank sludge.
- selenium (D010) – Identified historically as a contaminant of PFP debris waste.
- silver (D011) – Identified as PFP inventory chemical and a contaminant of tank sludge, fuel specimens, and tank sludge.
- chloroform (D022) – Used as a chelating agent and identified as a contaminant detected in tank samles.
- 2,4-dinitrotoluene (D030) – Identified as a contaminant in tank sludge.

F-Listed Waste

Waste stream RLMPFPDD was mixed with or derived from F-listed hazardous wastes from non-specific sources as listed in 40 CFR261.31. Waste stream RLMPFPDD is assigned F-listed EPA HWNs F001, F002, F004 and F005 for the following chemicals (Reference C074, DR010, M054, and P196):

- 1,1,1-trichloroethane (F001, F002) – Used as a cleaning and drying agent, and HWNs for solvent assigned to Rocky Flats ash.
- benzene (F005) – Used for carbonization of mass spectrometric filaments, cleaning agent, etching agent, and suspected tank sludge constituent.
- carbon tetrachloride (F001) – Used for measuring density of Plutonium specimens, fabrication oil, metal and sample cleaning. RECUPLEX ion exchange extractant, and detected in tank samples.
- carbon disulfide (F005) – Identified as a tentatively identified compound (TIC) during previous Hanford TRU waste certification of PFP waste materials.
- 1,1,2-trichloro-1,2,2-trifluoroethane (F001, F002) – Used for degreasing, ultrasonic cleaning, density determinations, and HWNs for solvent assigned to Rocky Flats ash.

- methylene chloride (F001, F002) – Used as a solvent, component of TURCO paint remover, and HWNs for solvent assigned to Rocky Flats ash.
- methyl ethyl ketone (F005) – Ingredient in paint and paint thinners.
- nitrobenzene (F004) – PFP chemical reagent.
- pyridine (F005) – Chemical in the PFP inventory.
- tetrachloroethylene (F001, F002) - Detected in tank samples, suspect tank sludge constituent, inventory chemical, and HWNs for solvent assigned to Rocky Flats ash.
- toluene (F005) – Used in polycube stabilization, paint and paint thinner ingredient, detected in tank samples, and suspected tank sludge constituent.
- trichlorofluoromethane (F001, F002) – Chemical in PFP inventory, and HWNs for solvent assigned to Rocky Flats ash.
- trichloroethylene (F001, F002) – Used as a Coolant in the PPSL, chemical in the PFP inventory, detected in tank samples, and HWNs for solvent assigned to Rocky Flats ash.

While there were no large scale degreasing operations conducted at the PFP, F001 is applied to this waste, consistent with similar, Hanford waste that has already been shipped to WIPP, and due to the potential mixture and/or contamination with other F001 waste from large scale degreasing operations, such as ash from Rocky Flats. When the specific use of a F-listed chemical could not be determined (e.g., detected in samples or identified as in the PFP chemical inventory), the applicable HWN was assigned to the waste stream (Reference DR010).

F003 constituents, including acetone methanol, n-butyl alcohol, and xylene, are listed solely because these solvents are ignitable in the liquid form. The waste stream does not exhibit the characteristic of ignitability because it is not liquid; therefore, HWN F003 is not assigned to waste stream RLMPFPDD. (Reference DR010)

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

- F001 (1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, carbon tetrachloride, methylene chloride, tetrachloroethylene, trichloroethylene, and trichlorofluromethane)

- F002 (1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, tetrachloroethylene, methylene chloride, trichloroethylene, and trichlorofluoromethane)

- F004 (nitrobenzene)

- F005 (benzene, carbon disulfide, methyl ethyl ketone, pyridine, and toluene)

U, K, and P-Listed Chemicals

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

Beryllium and beryllium compounds may contaminate this waste stream. Small quantities of beryllium were used in the PFP laboratories in the form of metal and oxides. PFP also used beryllium tools that were removed and placed under separate control. Based on the AK documentation reviewed, the form of beryllium used does not meet the definition of commercial

chemical product beryllium powder. Therefore, the waste stream does not meet the definition of P015 waste. (References P189, and P1079).

Hydrofluoric acid (U134) was used during oxidizing reactions, sample preparation and fabrication oil stripping. 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 RLMPFPDD.

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

Waste Stream RLMPFPDD is not assigned any U-, K-, or P-Listed EPA HWNs.

Headspace Gas/Volatile Organic Compound Information

Headspace gas sampling has been performed on 10 randomly selected containers in Lot 1 in this waste stream. No UCL_{90} values exceeded respective target analyte Program Required Quantitation Limits. No tentatively identified compounds were identified in this lot. No new EPA hazardous waste numbers were assigned as a consequence of headspace gas sampling and analysis. The specifics of this information are included in the attached Characterization Information Summary report.

Other Waste Streams Generated From the Same Buildings and Processes

PFP Complex TRU debris has been delineated into two waste streams, CH debris waste stream RLMPFPDD and RH debris waste stream RLCCPRHPFP. The RLMPFPDD waste stream consists of mixed heterogeneous debris generated by production, maintenance, cleanout, stabilization, and D&D activities in PFP Buildings 232-Z, 234-5Z, 236-Z, 242-Z, 2736-ZB, 291-Z, and the Ancillary Facilities. The containers exceeding 200 millirem per hour were reassigned to RH waste stream RLCCPRHPFP.

Historically, the previous TRU Waste Certification Program established three PFP generated debris waste streams identified over time as NPFPD, MPFPD, and RLMPFPCD. The NPFPD (waste stream profile form [WSPF] number RLNPDT.001) waste stream was assigned no EPA HWN and was discontinued after the MPFPD waste stream was established. The MPFPD (WSPF number RLMPDT.001) waste stream was assigned EPA HWN for characteristic constituents (D004, D005, D006, D007, D008, D009, D010, D011, D019, and D030)), but no F-listed EPA HWN were assigned to this waste stream. Finally, the previous TRU Waste Certification Program established the RLMPFPCD waste stream. The Hanford AK documentation identifies waste stream RLMPFPCD being generated from 1970 to present, and includes waste from PFP Buildings 232-Z, 234-5Z, 236-Z, 242-Z, 2736-ZB, 291-Z, and PFP's ancillary facilities and effluent infrastructure. Hanford waste stream RLMPFPCD is identical to the CCP defined waste stream RLMPFPDD in terms of time period of generation, areas of generation, and assigned EPA HWNs. With the exception of HWN F003, the HWN assigned to RLMPFPCD have been maintained and assigned to this waste stream. F003 constituents, are listed solely because these solvents are ignitable in the liquid form. The waste stream will not exhibit the characteristic of ignitability because it is not liquid; therefore, F003 is not assigned (Reference DR010).

Conclusion

The following EPA HWNs are assigned to this waste stream: D004, D005, D006, D007, D008, D009, D010, D011, D022, D030, F001, F002, F004, and F005

Polychlorinated Biphenyls

This waste stream contains PCBs, and therefore is regulated as Toxic Substances Control Act waste under 40 CFR 761.

The primary source of PCBs in this waste stream is absorbed hydraulic oils and trace impurities in the plutonium in the plutonium and plutonium oxide. Containers with PCB waste, identified during RTR and/or VE, will be managed in accordance with the PCB disposal requirements in the Waste Isolation Pilot Plant-Waste Acceptance Criteria. (References P134, P189, P506, P507, P508, and P1079)

Prohibited Items

The absence of prohibited items is determined and documented through acceptable knowledge and characterization activities. Radiography 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 waste not occurring as co-contaminants with TRU mixed wastes (non-mixed hazardous waste)
- Waste incompatible with backfill, seal and panel closure materials, container and packaging materials, or other wastes
- Explosives or compressed gases
- Waste with PCBs not authorized under an EPA PCB waste disposal authorization
- Waste exhibiting the characteristics of ignitability, corrosivity, or reactivity
- Waste that has ever been managed as high-level waste and waste from tanks specified in Table C-8 of the WIPP HWFP, unless specifically approved through a Class 3 permit modification.

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

Both Radiography and VE will be used to characterize the RLMPFPDD waste. RTR was selected as the characterization method for this lot because the waste containers were previously packaged and RTR is an acceptable characterization method to meet all the Data Quality Objectives for NDE of waste stream RLMPFPDD. VE will be performed on a small amount of newly generated waste at the PFP facility.

Method for Determining Waste Material Parameter (WMPs) Weights per Unit of Waste

The Waste Material Parameters (WMPs) for waste stream RLMPFPDD were derived from the corresponding PFP debris waste processed under the previous Hanford certified TRU Waste Program. Existing Hanford WWIS/WDS data was evaluated and a range was generated based on the certified WWIS/WDS data for PFP debris shipped to WIPP.

The WMPs, average weight percent and weight percent range are presented in Table 8.

Table 8. Waste Stream RLMPFPDD Waste Material Parameters

Waste Material Parameter	Average Weight Percent	Weight Percent Range
Iron-based Metals/Alloys	48%	0 - 100%
Aluminum-based Metals/Alloys	<1%	0 - 83%
Other Metals	5%	0 – 87%
Other Inorganic Materials	8%	0 – 100%
Cellulosics	12%	0 – 92%
Rubber	9%	0 - 91%
Plastics	18%	0 – 100%
Inorganic Matrix	<1%	NA
Organic Matrix	<1%	NA
Soils/Gravel	<1%	NA

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

Waste determined to contain greater than one weight percent of beryllium will be managed in accordance with the WIPP-WAC.

Radionuclide Information

The two most prevalent radionuclides in this waste stream, by weight, based on the un-decayed data reported in AK are Pu-239 and U-238. Previous characterization results provided by Hanford were evaluated to determine the radionuclide distribution in the waste stream. The isotopes expected to be present in this waste stream are listed in Table 9.

Table 9 – Radionuclides in Waste Stream RLMPFPDD

WIPP Tracked	Other Radionuclides	
Am-241	Am-243	Eu-154
Cs-137	Pu-241	K-40
Pu-238	Th-232	Na-22
Pu-239	U-235	Nb-94
Pu-240	Np-237	Ra-226
Pu-242	Ba-133	Th-228
Sr-90	Cf-249	U-232
U-233	Cm-243	
U-234	Co-60	
U-238	Eu-152	

Payload management will not be applied to this waste stream.

Attachment 1, AK Source Documents – Supplemental Documentation

Source Doc. Tracking Number	AK Element #	Title	Document Number	Rev.	Date
C013	S7, S9	Interview with M. Wesselman by R Clinton concerning Sr-90/Cs-137 Ratio Determination Weselment	NA	NA	03/28/2002
C019	S7	Record of Communication for Interview of Ted Venetz Regarding Finishing Plant Wastes	NA	NA	04/26/07
C020	S7, S9	Memo to ET Abramowski re: Determination of PCB Concentration in Hydraulic oils	65452-82-159	NA	08/28/1998
C026	S7	PFP Soil Record of Communication with J. Mejia	NA	NA	12/19/2006
C027	S7,	PFP Soil Record of Communication – J Aranda	NA	NA	12/06/2006
C032	S9	Memo from D. C. DeRosa Re: NPFPD and MPFPD Waste Streams	M4T00-DCD-03-029	NA	02/07/2003
C037	S2	Memorandum from R. Clinton to P.J. Crane concerning Transmittal of AK Re-eval checklist for Waste Stream NPFPD	3T000-PJC-01-043	NA	03/21/2001
C051	S5	Sr-90 To Cs-137 Ratio for Appendix E of Hanford Site Transuranic Waste Certification Plan for NDA	M4T00-PJC-02-076	NA	04/11/2002
C060	S7	Record of Communication with Karl Husted 10/12/07 re: Adding U-232 as a trace radionuclide to MPUREXD and MPFPD AK	NA	NA	10/12/2007
C074	NA	PFP Debris Waste Designation	NA	NA	03/31/2004
C082	S2	Internal Memo from S.A. Jones and M.L. Winstetad to L. Dayley regarding Results of Sand, Slag, and Crucible Testing for Cementation Process	15F00-96-068	NA	08/07/1996
C105	S9	Communication from Michael G. Cantaloub to Rich Clinton concerning the Occurrence of Cs-137 and K-40 In Transuranic Waste	NA	NA	02/20/2001
C109	S10	Disposal Request for Downloaded CCL4 – TBP Waste - PFP-94-000189	15540-094-EJM-029	NA	02/23/1994
C110	S9	Memorandum from S.L. Fitzgerald to P.J. Crane concerning Analysis of TICs with Respect to Possible Addition to Target Analyte List	8F000-SLF-00-23	NA	09/13/2000

Source Doc. Tracking Number	AK Element #	Title	Document Number	Rev.	Date
C113	S5	Internal Memo from M.L. Winstead of PFP Process Engineering to E.G. Backlund Concerning the Corrosivity Test on Cemented Sand, Slag, and Crucible Items	15F0096-062	NA	07/10/1996
C114	S7	Email from Scott W. Bisping to Magdalena I. Rollosson regarding Use of the Term Soil in Past Practice	NA	NA	06/28/2006
C115	S7	WRP Strategy for Managing Chlorinated Biphenyl's Under TSCA	NA	NA	01/30/2008
C116	S7	Proposal to Delay Assignment of TSCA Status to Retrievably Stored Low-Level Waste	F9000-07-019	NA	06/26/2007
C364	S7	Interview with Rhonda Swan and Melvin Lakes regarding 232-Z Incinerator Feed	NA	NA	05/04/2010
C390	S7	Record of Communication - Subject: Absorbent (Debris vs. Solid)	NA	NA	09/10/10
DR010	S9	Discrepancy Resolution for Waste Stream Delineation and Assignment of EPA HWN	NA	NA	05/20/1999
M044	S4	Solid Waste Burial Records - Addendum for 218-W- 3A	NA	NA	07/23/1980
M052	S9	Reevaluation MPFPD Organic Matrix to Other Inorganic Material	NA	NA	02/22/2007
M054	NA	PFP PCB Debris Designation	PFP-DES-02-00	NA	10/11/2006
M056	NA	Review of PFP Complex Effluents AK/Designation and Applicability of WAC 173-303-090(7) and 40 CFR 261.23	NA	NA	04/03/2008
M102	S6	Waste Information Data System General Summary Report for 232-Z Waste Incineration Facility	NA	NA	03/14/2007
M122	S10	MSDS for Aspigel 100	065584	NA	04/04/2005
M124	S10	RadPro 0100	061823A	NA	09/01/1985
M280	S4	MPFPDD Drum Data Sheets	NA	NA	1970 – Current
M314	S10	MSDSs for Binding Agents	NA	NA	2007-2009
M315	S10	MSDSs for Fixatives	NA	NA	2001-2006
M316	S10	Pipe Stabilization Report and Associated MSDSs	NA	NA	2005, 2006

Source Doc. Tracking Number	AK Element #	Title	Document Number	Rev.	Date
P116	S5	Stabilization of Polycubes Engineering Study Historical Use and Fabrication and Treatment Schemes	WHC-SC-SP-TI-204	0	07/08/1996
P123	S2	Criticality Prevention Specification, Incinerator Burning Hood Characterization and Disassembly Activities	CPS-Z-165-80625	A-0	05/08/1995
P124	S2	Criticality Prevention Specification, Glovebox Clean-up Operations	CPS-Z-165-80012	A-1	05/08/1995
P126	S2	Thermal Stabilization Process Flowsheet Room 230A, 234-5 Building	PFD-Z-190-00004	A-0	10/1994
P127	S2	Plant Operating Procedure, Oxidize Plutonium Metal in Glovebox HC-21-C and HA-21-I	ZO-160-033	A-7	11/02/1987
P128	S2	Stablize Reactive Scrap (Operate HC-21C Muffle Furnace)	ZO-160-032	B-2	08/26/1982
P134	NA	PFP Liquid Organic Disposal as 20 Year Retrievable TRU Waste	HNF-26402	0	06/2005
P146	S2	Decommissioning of Division of Military Application (DMA) Equipment at Hanford - Summary Report: June 1977	ARH-ST-141	NA	06/01/1977
P147	S2	Handling of Pu Contaminated, Acid Soaked Rags	ZO-160-030	A-0, B-0, C-0	1977-1985
P148	S2	Critical Mass Specification, Waste Treatment Facility, Buildings 241-Z and 242-Z	HW-82632	NA	06/08/1964
P149	S2	Handle Pu Contaminated, Acid Soaked Rags	ZO-160-030	A-1	1977-1985
P150	S2	Recovery of Plutonium from Fabrication Oil	HW-74350	A-4	08/01/1962
P154	S2	Stabilize Material Handling	ZO-160-034	B-0	02/22/1995
P159	S2	Scrap Stabilization and Calcination Glovebox 4, Room 41, 236-Z Building	CPS-Z-165-82090	C-0	05/04/1987
P162	S2	Glovebox MT-5: Dissolving and Leaching	CPS-Z-165-80715	A-3	08/09/1994
P163	S2	Glovebox MT 6: Solution Clarification	CPS-Z-165-80716	C-1	08/17/1994
P164	S2	Access Glovebox: 2nd Floor East	CPS-Z-165-80709	A-0	08/08/1989
P165	S2	Access Glovebox: 1st Floor West	CPS-Z-165-80708	B-0	03/30/1994

Source Doc. Tracking Number	AK Element #	Title	Document Number	Rev.	Date
P166	S2	Access Glovebox: 1st Floor East	CPS-Z-165-80707	A-1	09/25/1989
P167	S2	Process Cell	CPS-165-80701	A-1	01/12/1995
P168	S2	Slag and Crucible Processing Gloveboxes	CPS-Z-165-80731	A-0	09/19/1989
P169	S2	Operate Glovebox 60	ZO-160-040	B-0, E-2	1981, 1987
P170	S2	Handling of Plutonium Contaminated Acid and Water Soaked Rags	ZO-170-005	A-0, B-1, C-0	04/28/1980
P172	S2, S3	Sample Plutonium Bearing Powders for the International Atomic Energy Agency (IAEA)	ZO-300-110	A-2	08/21/1995
P173	S2, S3	Recan Plutonium-Bearing Recoverable Material	ZO-200-505	J-2	09/11/1996
P174	S2	Handle PFP Reactive Material	ZO-170-014	D-0, E-2	1993, 1996
P175	S2	Sorting Glove box	CPS-Z-165-80290	A-0	09/12/1983
P176	S2	Dismantle HEPA Filters	ZO-170-823	B-0	07/07/1994
P177	S2	Repackage 55-Gallon Waste Drums	ZO-170-040	A-1, C-0	04/03/1989
P178	S2	Seal Out	ZO-170-0299	A-0, A-1, A-2, B-0, D-0, D-1, I-4	1984-1992
P179	S2	Handle and Package TRU Solid Waste in 55 Gallon Drums	ZO-170-015	D-6,E-0,F-0,F-1,F-4,F-5,H-6	1984-1999
P180	S2	Solid Waste Repackaging and Disposal	ZL-100-323	B-1, B-2, F-1	09/18/1998
P181	S2	PFP Analytical Laboratory Organic Waste Loadout	ZL-100-326	D-1	01/14/1998
P189	NA	Plutonium Process Support Laboratories	NA	NA	06/21/2004
P192	S2	FY 1988 Remote Mechanical C Line Campaign Blend Plan	WHC-88-245	NA	06/24/1988
P196	NA	241-Z-361 Sludge Characterization Sampling and Analysis Plan	HNF-4371	1	07/29/1999
P198	S2	T-Plant Operating Procedure Package Transuranic Waste	DO-100-039	B-2	07/05/2005

Source Doc. Tracking Number	AK Element #	Title	Document Number	Rev.	Date
P200	S2	Remote Mechanical C (RMC) Line Material Balance and Leid Summary-June 27, 1985 to December 11, 1985	RHO-SS-SR-183-85-1	NA	01/30/1986
P202	S2	Nuclear Material Transfer and Control	FSP-PFP-5-8, Vol. 1, Chapt. 4.5	8	06/08/1998
P205	S2	Organic Waste Loadout	ZL-100-326	2	04/12/1996
P212	S2	Chemical and Radioactive Material Spill Clean Up	ZL-191-322	C-0	04/12/1996
P213	S2, S3	Seal Out-PPSL Glove boxes	ZP-100-001	C-10	01/18/2000
P218	S2	Nuclear Material Control-Physical Inventory	FSP-PFP-5-8, Chapt. 4. 4	8	05/19/1988
P220	S2	Seal in and Seal Out of Material from Glove box by Plastic bag or Sphincter	ZL-161-302	G-1	12/11/1998
P228	S5, S8	Criticality Safety	NA	NA	05/01/1998
P236	S9	Tank 241-Z-361, Cores 263 and 264 Analytical Results for the Final Report	HNF-1692	0B	05/2000
P250	S2	Work Plan For Removal of Division of Military Application Equipment 234-5Z Building	ARH-3079	NA	04/26/1974
P254	S2	Room 27: Maintenance Glovebox	CPS-Z-165-80727	A-0	09/19/1989
P277	S2	Plutonium Finishing Plant Standard Practices, Seal In	ZO-170-301	N-0	06/21/1994
P414	S2	Retrieval Process Description	HNF-5597	3	03/31/2004
P415	S3	Transuranic (TRU) Waste Phase I Retrieval Plan	HNF-4781	1	09/26/2000
P416	S3	WRAP Final Safety Analysis Report	HNF-SD-W026-SAR-002	2	07/01/2001
P506	S2	Load Standard Waste Box (SWB) Storage Containers with TRU Waste	ZO-170-044	F-26	11/04/2008
P507	S2	Visual Examination Technique for PFP Debris Waste	ZO-170-057	C-11	11/04/2008
P508	S2	Waste Isolation Pilot Plant (WIPP) Procedures - TRU Waste Visual Examination	WMP-400	12	03/24/2009
P509	S2	Handle TRU/TRU Mixed Waste in 55-Gallon Drums	ZO-170-015	P-3	11/25/2008
P510	S2	Package TRU/TRU Mixed Waste	ZO-170-061	A-5	04/28/08

Source Doc. Tracking Number	AK Element #	Title	Document Number	Rev.	Date
P511	S5	Acceptable Knowledge Document for the Richland Mixed Plutonium Finishing Plant Comprehensive Debris Waste Stream, RLMPFPCD	HNF-36515	1	05/01/2009
P512	S2	Procedure for Equipment Removal from the PRF West Gallery Gloveboxes	2Z-08-7986	NA	NA
P513	S2	RADPRO Chemical Decontamination of Equipment/Gloveboxes and Hoods Containing Plutonium	ZDD-1-002	B-2	04/29/2009
P529	S5	Hazard Evaluation for Use of Aspigel 100TM at PFP	HNF-40187	NA	01/2009
P735	S10	Material Safety Data Sheet: Magnesium Oxide	058563	NA	09/30/1997
P1079	S9	Hanford Facility Fact Sheet, 234-5Z	NA	NA	06/30/2004
P1081	S3	Safety Evaluation Report for the Stabilization Processing of High Chloride Bearing Plutonium Materials at the Plutonium Finishing Plant	03-ABD-0071	NA	04/17/2003
P1088	S2	TRU Sorting Glovebox	WRP1-OP-0725	C-20	06/24/2009
P1089	S2	TRU Loadout Gloveobx Operation	WRP1-OP-0726	E-0	07/02/2009
P1129	S3	Thermal Stability Studies of Candidate Decontamination Agents for Hanford's Plutonium Finishing Plant Plutonium - Contaminated GloveboxeS	PNL-15410	0	09/2005
P1130	S9	Thermal Analysis of RadPro Waste Drum	Chprc-00532	0	01/2010
P1187	S10	MSDS – Radiacwash	018081	NA	10/25/2008
P1188	S10	SelectSorb Oil Absorbent	063895	NA	03/02/2007
P1189	S8, S10	MSDS - Acetoxy White (Sealant)	012135A	NA	09/05/2007
P1190	S10	MSDS - Sodium Carbonate	064355	NA	03/03/2003
P1191	S10	MSDS - Shell Alvania® EP LF Grease 2	25047A	NA	06/06/1994
P1192	S10	MSDS - Sodium Carbonate	038904	NA	06/05/2006
P1194	S10	MSDS - Red 706	14238	NA	04/1984
P1195	S10	MSDS - ETGS Invisible Blue	057802	NA	04/03/2007
P1196	S10	MSDS - RadPro® 0100	061823B	NA	03/20/2006
P1197	S10	MSDS - RadPro® 0200	061824B	NA	02/10/2004
P1198	S10	MSDS - Sodium Carbonate, Anhydrous	064987	NA	06/07/2006

Source Doc. Tracking Number	AK Element #	Title	Document Number	Rev.	Date
U202	S9	Waste Certification Summary	REPORT-111111	NA	NA

Alphanumeric Designations

C Correspondence
D Documents (e.g. published reports)
DR Discrepancy Resolution
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