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

APR 2 0 2012

APR 2012

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

Subject: Review of Idaho National Laboratory-Central Characterization Project Waste Stream Profile Form Number IN-ID-NRF-SPC

Dear Mr. Kieling:

The Department of Energy, Carlsbad Field Office has approved the Waste Stream Profile Form (WSPF) Number IN-ID-NRF-SPC, *Remote-Handled Transuranic Debris Waste from the Naval Reactors Facility*, for the Central Characterization Project at the Idaho National Laboratory.

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

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

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

Sincerely,

Jose R. Franco, Manager
Carlsbad Field Office

Enclosure

120428

CBFO:NTP:JRS:PG:12-0467:UFC 5900.00

cc: w/enclosure

J. R. Stroble, CBFO	*ED
N. Castaneda, CBFO	ED
B. Mackie, CBFO	ED
T. Morgan, CBFO	ED
M. Pinzel, CBFO	ED
T. Hall, NMED	ED
S. Holmes, NMED	ED
T. Kliphuis, NMED	ED

CBFO M&RC

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Attachment 2 – CCP Waste Stream Profile Form (Example)

(1) Waste Stream Profile Number: IN-ID-NRF-SPC			
(2) Generator site name: Idaho National Laboratory		(3) Generator site EPA ID: ID4890008952	
(4) Technical contact: Irene Quintana		(5) Technical contact phone number: 575-499-4579	
(6) Date of audit report approval by New Mexico Environment Department (NMED): December 23, 2011			
(7) Title, version number, and date of documents used for WIPP-WAP Certification: CCP-PO-001, CCP Transuranic Waste Characterization Quality Assurance Project Plan, Revision 20, June 16, 2011 CCP-PO-002, CCP Transuranic Waste Certification Plan, Revision 26, July 14, 2011 CCP-PO-501, CCP/INL RH TRU Interface Document, Revision 5, December 29, 2010			
(8) Did your facility generate this waste? YES [X] NO [ ]			
(9) If no, provide the name and EPA ID of the original generator: NA			
Waste Stream Information[1]			
(10) WIPP ID: IN-NRF-SPC		(11) Summary Category Group: S5000	
(12) Waste Matrix Code Group: Heterogeneous Debris Waste		(13) Waste Stream Name: Remote-Handled Transuranic Debris Waste from the Naval Reactors Facility	
(14) Description from the ATWIR: Waste stream IN-ID-NRF-SPC consists predominantly of metal debris waste materials contaminated during the sectioning of fuel elements for examination.			
(15) Defense TRU Waste: YES [X] NO [ ]			
(16) Check One: CH [ ] RH [X]			
(17) Number of SWBs NA (17a) Number of SLB2 NA	(18) Number of Drums NA		(19) Number of Canisters 31[3]
(20) Batch Data Report numbers supporting this waste stream characterization: See Characterization Information Summary (CIS) Correlation of Container Identification Numbers to Batch Data Report Numbers			
(21) List applicable EPA Hazardous Waste Numbers:[2] D004, D005, D006, D007, D008, D010, D011			
(22) Applicable TRUCON Content Numbers: ID 321, ID 322, ID 325			
(23)**Acceptable Knowledge Information**[1]			
(For the following, enter the supporting documentation used [i.e., references and dates])			
Required Program Information			
(23A) Map of site: CCP-AK-INL-570, Revision 2, December 5, 2011, Attachment 3			
(23B) Facility mission description: CCP-AK-INL-570, Revision 2, December 5, 2011, Section 4.1.3			
(23C) Description of operations that generate waste: CCP-AK-INL-570, Revision 2, December 5, 2011, Section 4.2.2			
(23D) Waste identification/categorization schemes: CCP-AK-INL-570, Revision 2, December 5, 2011, Section 5.4			
(23E) Types and quantities of waste generated: CCP-AK-INL-570, Revision 2, December 5, 2011, Sections 4.2.1			
(23F) Correlation of waste streams generated from the same building and process, as applicable: NA			

(24) Waste certification procedures: CCP-TP-530, Revision 10, CCP RH TRU Waste Certification and WWIS/WDS Data Entry, April 25, 2011			
(25)Required Waste Stream Information			
(25A) Area(s) and building(s) from which the waste stream was generated: CCP-AK-INL-570, Revision 2, December 5, 2011, Section 5.1			
(25B) Waste stream volume and time period of generation: CCP-AK-INL-570, Revision 2, December 5, 2011, Section 5.2			
(25C) Waste generating process description for each building: CCP-AK-INL-570, Revision 2, December 5, 2011, Section 5.3			
(25D) Waste Process flow diagrams: CCP-AK-INL-570, Revision 2, December 5, 2011, Attachment 12			
(25E) Material inputs or other information identifying chemical/radionuclide content and physical waste form: CCP-AK-INL-570, Revision 2, December 5, 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: IN-ID-NRF-SPC			
(26) Which Defense Activity generated the waste:			
	Weapons activities including defense inertial confinement fusion	X	Naval Reactors development
	Verification and control technology	X	Defense research and development
	Defense nuclear waste and material by products management		Defense nuclear material production
	Defense nuclear waste and materials security and safeguards and security investigations		
(27)Supplemental Documentation:			
(27A) Process design documents: See P019 in Summation of Aspects of AK Summary Report IN-ID-NRF-SPC, Attachment 1, Source Documents.			
(27B) Standard operating procedures: See C011, P007, P008, P010, P012, P033, P049, P052, U039, U041, U042, U043, U044, U045, U046, U047, U048, U049, U050, U051, U052, U053, U054, U055, U056, U057, U058, U145, U146, U147 in Summation of Aspects of AK Summary Report IN-ID-NRF-SPC, Attachment 1, Source Documents.			
(27C) Safety Analysis Reports: See P053 in Summation of Aspects of AK Summary Report IN-ID-NRF-SPC, Attachment 1, Source Documents.			
(27D) Waste packaging logs: See P015, P073, U002, U027, U028, U106, U132, U133, U137 in Summation of Aspects of AK Summary Report IN-ID-NRF-SPC, Attachment 1, Source Documents.			
(27E) Test plans/research project reports: NA			
(27F) Site databases: NA			
(27G) Information from site personnel: See C029, C039, C111 in Summation of Aspects of AK Summary Report IN-ID-NRF-SPC, Attachment 1, Source Documents.			
(27H) Standard industry documents: See U068 in Summation of Aspects of AK Summary Report IN-ID-NRF-SPC, Attachment 1, Source Documents.			
(27I) Previous analytical data: See C014, C085, C109, U027, U028, U060, U061, U112, U125, U136 in Summation of Aspects of AK Summary Report IN-ID-NRF-SPC, Attachment 1, Source Documents.			
(27J) Material safety data sheets: See P017 and U068 in Summation of Aspects of AK Summary Report IN-ID-NRF-SPC, Attachment 1, Source Documents.			
(27K) Sampling and analysis data from comparable/surrogate Waste: NA			
(27L) Laboratory notebooks: See U027, U028, U038, U132 in Summation of Aspects of AK Summary Report IN-ID-NRF-SPC, Attachment 1, Source Documents.			
Confirmation Information[2]			
For the following, when applicable, enter procedure title(s), number(s) and date(s)			
(28)	Radiography: CCP-TP-508, Rev 7, April 21, 2011		
	Visual Examination: N/A		

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

Reviewed by AK Expert: **YES** [X] **Date:** 3/6/12

Reviewed by STR (if necessary): **YES** [X] **N/A** [ ] **Date:** 3/6/12

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.

[signature]	Irene Quintana	3/25/12
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 stream consists of 93 55-gallon drums that will be loaded into 31 RH canisters.

CHARACTERIZATION INFORMATION SUMMARY

WSPF # IN-ID-NRF-SPC

Lot 1

TABLE OF CONTENTS

CCP Characterization Information Summary Cover Page

Waste Stream #	IN-ID-NRF-SPC	Lot #:	1
AK Expert Review:	Jim Luginbyhl	Date:	3/13/2012
SPM Review:	Laura Nelson	Date:	3/13/12

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

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

List of procedures used:

Headspace Gas Sampling and Analysis (HSG):

CCP-TP-093	Rev. 16	9/7/2011	CCP Sampling of TRU Waste Containers
CCP-TP-106	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. 3	08/02/11	CCP Analysis of Gas Samples for VOCs by GC/MS

Real-Time Radiography (RTR)

CCP-TP-508	Rev. 6	12/29/10	CCP RH Standard Real-Time Radiography Inspection Procedure
CCP-TP-508	Rev. 7	04/21/11	CCP RH Standard Real-Time Radiography Inspection Procedure

Project Level Data Validation / DQO Reconciliation:

CCP-TP-001	Rev. 19	12/29/10	CCP Project Level Data Validation and Verification
CCP-TP-002	Rev. 24	12/28/11	CCP Reconciliation of DQOs and Reporting Characterization Data
CCP-TP-003	Rev. 18	12/29/10	CCP Data Analysis for S3000, S4000, and S5000 Characterization
CCP-TP-005	Rev. 24	11/28/11	CCP Acceptable Knowledge Documentation
CCP-TP-530	Rev. 10	04/25/11	CCP RH TRU Waste Certification and WWIS/WDS Data Entry

WAP Certification:

CCP-PO-001	Rev. 20	06/16/11	CCP Transuranic Waste Characterization Quality Assurance Project Plan
CCP-PO-501	Rev. 5	12/29/10	CCP/INL RH TRU Waste Interface Document

WAC Certification:

CCP-PO-002	Rev. 26	7/14/2011	CCP Transuranic Waste Certification Plan

CCP Correlation of Container Identification Numbers to Batch Data Report Numbers

Waste Stream: # IN-ID-NRF-SPC Lot # 1

Container ID Number	Historical Container ID	NDA BDR or Radiological Characterization BDR (CH only)	RTR BDR	VE BDR	Solids Sampling BDR	Solids Analytical BDR	Load Management/ Overpack Yes	Permit Required Headspace Gas BDR		
								Sample	Analysis	
*NRFTRUSPC065-1	NA	N/A	N/A	N/A	N/A	N/A		INHSG1103	ECL11014M	ECL11014G
NRFTRUSPC047-1	NA	INLRHDTC11001	INLRHRTR11001	N/A	N/A	N/A		INHSG1103	ECL11014M	ECL11014G
*NRFTRUSPC062-1	NA	N/A	N/A	N/A	N/A	N/A		INHSG1103	ECL11014M	ECL11014G
*NRFTRUSPC059-1	NA	N/A	N/A	N/A	N/A	N/A		INHSG1103	ECL11014M	ECL11014G
NRFTRUSPC064-1	NA	INLRHDTC11001	INLRHRTR11001	N/A	N/A	N/A		INHSG1103	ECL11014M	ECL11014G
NRFTRUSPC083-1	NA	INLRHDTC11001	INLRHRTR11001	N/A	N/A	N/A		INHSG1103	ECL11014M	ECL11014G
NRFTRUSPC039A-1	NA	INLRHDTC11001	INLRHRTR11001	N/A	N/A	N/A		INHSG1103	ECL11014M	ECL11014G
*NRFTRUSPC061-1	NA	N/A	N/A	N/A	N/A	N/A		INHSG1103	ECL11014M	ECL11014G
NRFTRUSPC040-1	NA	INLRHDTC11001	INLRHRTR11001	N/A	N/A	N/A		INHSG1103	ECL11014M	ECL11014G
NRFTRUSPC046-1	NA	INLRHDTC11001	INLRHRTR11001	N/A	N/A	N/A		INHSG1103	ECL11014M	ECL11014G

* These drums are only included for HSG Analysis purposes of the Tier 1 change. These drums will not be shipped to WIPP due to falling out as LLW.

Laura Nelson
Signature of Site Project Manager

Laura Nelson
Printed Name

4/9/12
Date

C15-003

CCP Headspace Gas UCL_{90} Evaluation Form

WSPF #: IN-ID-NRF-SPC **Waste Stream Lot Number** 1 through 1

ANALYTE	Transform Data Used (No, Data-Log, SQRT, other)	# Samples above MDL (1)	# Samples	Maximum (ppmv)	Mean (ppmv)	SD (ppmv)	UCL_{90} (ppmv)	PRQL (ppmv)	Transformed PRQL (N/A or Value)	UCL_{90} > PRQL Yes	EPA Code
Benzene	Log	0	10	-3.91	-4.01	0.04	-3.99	10	2.30		
Bromoform	No	0	10	0.01	0.01	0.00	0.01	10	N/A		
Carbon tetrachloride	Log	0	10	-3.99	-4.08	0.03	-4.06	10	2.30		
Chlorobenzene	Log	0	10	-4.17	-4.25	0.04	-4.24	10	2.30		
Chloroform	Log	0	10	-3.77	-3.86	0.03	-3.84	10	2.30		
Cyclohexane [a]	Log	0	10	-3.59	-3.69	0.04	-3.67	10	2.30		
1,1-Dichloroethane	Log	0	10	-3.04	-3.13	0.04	-3.11	10	2.30		
1,2-Dichloroethane	Log	0	10	-3.61	-3.71	0.04	-3.69	10	2.30		
1,1-Dichloroethylene	Log	0	10	-4.07	-4.16	0.03	-4.15	10	2.30		
trans-1,2-Dichloroethylene	Log	0	10	-3.82	-3.90	0.03	-3.88	10	2.30		
Ethyl benzene	Log	0	10	-3.94	-4.03	0.04	-4.02	10	2.30		
Ethyl ether	Log	0	10	-3.11	-3.20	0.03	-3.18	10	2.30		
Methylene chloride	Log	0	10	-3.89	-3.97	0.03	-3.96	10	2.30		
1,1,2,2-Tetrachloroethane	Log	0	10	-4.34	-4.44	0.04	-4.42	10	2.30		
Tetrachloroethylene	Log	0	10	-4.27	-4.37	0.04	-4.35	10	2.30		
Toluene	Log	3	10	-0.60	-2.63	0.86	-2.26	10	2.30		
1,1,1-Trichloroethane	Log	0	10	-3.99	-4.08	0.04	-4.07	10	2.30		
Trichloroethylene	Log	0	10	-3.91	-4.00	0.04	-3.98	10	2.30		
1,1,2-Trichloro-1,2,2-trifluoroethane	Log	0	10	-4.51	-4.60	0.04	-4.59	10	2.30		
1,2,4-Trimethylbenzene[a]	Log	0	10	-4.10	-4.18	0.03	-4.17	10	2.30		
1,3,5-Trimethylbenzene[a]	Log	0	10	-3.99	-4.08	0.04	-4.07	10	2.30		
m-p-Xylene[b]	Log	0	10	-4.02	-4.11	0.04	-4.09	10	2.30		
o-Xylene	Log	0	10	-3.94	-4.03	0.04	-4.02	10	2.30		
Acetone	Log	8	10	0.99	-1.68	1.55	-1.00	100	4.61		
Butanol	Log	0	10	-3.52	-3.61	0.03	-3.59	100	4.61		
Methanol	Log	0	10	2.77	2.68	0.04	2.69	100	4.61		
Methyl ethyl ketone	Log	0	10	-3.00	-3.05	0.02	-3.04	100	4.61		
Methyl isobutyl ketone	Log	1	10	-2.47	-3.26	0.28	-3.13	100	4.61		
Chloromethane[c]	Log	0	10	-3.31	-3.40	0.03	-3.38	10	2.30		
Carbon Disulfide[a]	Log	10	10	-1.77	-2.58	0.38	-2.41	10	2.30		

C15-004

CCP Headspace Gas UCL_{90} Evaluation Form

WSPF #: IN-ID-NRF-SPC **Waste Stream Lot Number** 1 through 1

ANALYTE	Transform Data Used (No, Data-Log, SQRT, other)	# Samples above MDL (1)	# Samples	Maximum (ppmv)	Mean (ppmv)	SD (ppmv)	UCL_{90} (ppmv)	PRQL (ppmv)	Transformed PRQL (N/A or Value)	UCL_{90} > PRQL Yes	EPA Code
1,2-Dichloropropane[a]	Log	0	10	-3.73	-3.82	0.04	-3.81	10	2.30		
Trichlorofluoromethane[c]	No	0	10	0.02	0.02	0.00	0.02	10	N/A		

[a] These compounds are from the TRAMPAC and or CH TRUCON Appendix B and are flammable VOCs that do not appear in the QAPjP or the WIPP WAP. These are not part of the target analyte list, but samples may be analyzed for these compounds.
[b] These xylene isomers cannot be resolved by the analytical methods employed in the program. m-Xylene and p-Xylene will be reported as "Total m-p-Xylene."
[c] Noted analytes are not required but are reported by the Environmental Chemistry Laboratory at Idaho and are included on the UCL90 for completeness.

Comments:

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

Laura Nelson
Signature of Site Project Manager

Laura Nelson
Printed Name

4/12/12
Date

US-005

CCP Headspace Gas Summary Data

Waste Stream Number IN-ID-NRF-SPC 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 *Laura Nelson* Date *4/2/2012*

015 00U

CCP RTR/VE Summary of Prohibited Items and AK Confirmation

Waste Stream Number: IN-ID-NRF-SPC Lot #: 1

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

a. See Batch Data Reports

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 the applicable Data Quality Objectives for previously packaged debris in waste stream IN-ID-NRF-SPC.

Laura Nelson — Site Project Manager Signature

Laura Nelson — Printed Name

4/9/12 — Date

CCP Reconciliation with Data Quality Objectives

WSF# IN-ID-NRF-SPC   Lot # 1

Sampling Completeness

VE

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

RTR

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

NDA

Number of valid samples: 6   Number of Total Samples Analyzed: 6
Percent Complete: 100 (QAO is 100%)

HSG

Number of Valid Samples: 10   Number of Total Samples collected: 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# IN-ID-NRF-SPC Lot # 1

	Y/N/NA	Reconcilliation Parameter
1	Y	Waste Matrix Code.
2	Y	Waste Material Parameter Weights.
3	Y	The waste matrix code identified is consistent with the type of sampling and analysis used to characterize the waste.
4	Y	The TRU activity reported in the BDRs for each container demonstrates with a 95% probability that the container of waste contains TRU radioactive waste.
5	N	AK Sufficiency. Is there an approved AK sufficiency Determination for this waste stream?
6	Y	Mean concentrations, UCL90 values for the mean concentration, standard deviations, and the number of samples collected for each VOC in the HSG of each container were calculated and compared with the program required quantitation limits, as reported in CCP TP 003, Attachment 3, and additional Environmental Protection Agency (EPA) Hazardous Waste Numbers were assigned as required. Samples were randomly collected (when appropriate).
7a	NA	Mean concentrations, UCL90 values for the mean concentration, standard deviations, and the number of samples collected for solids VOCs were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in the Characterization Information Summary, CCP-TP-003-Attachment 4, and additional EPA Hazardous Waste Numbers were assigned as required. Samples were randomly collected.
7b	NA	Mean concentrations, UCL90 values for the mean concentration, standard deviations, and the number of samples collected for solids SVOCs were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in the Characterization Information Summary, CCP TP 003 Attachment 5, and additional EPA Hazardous Waste Numbers were assigned as required. Samples were randomly collected.
7c	NA	Mean concentrations, (UCL90) values for the mean concentration, standard deviations, and the number of samples collected for total metals were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in the Characterization Information Summary, CCP TP 003 Attachment 6, and additional EPA Hazardous Waste Numbers were assigned as required. Samples were randomly collected.

CIS-009

CCP Reconciliation with Data Quality Objectives

WSF# IN-ID-NRF-SPC 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	N	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 CCP-PO-001 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: N/A

Laura Nelson (signature)
Signature of Site Project Manager

Laura Nelson
Printed Name

3/13/2012
Date

CIS-010

SUMMATION OF ASPECTS OF AK SUMMARY REPORT: IN-ID-NRF-SPC

Overview

Waste Stream IN-ID-NRF-SPC is Remote Handled (RH) inorganic debris waste generated in the Alpha Box and the Wet Element Transverse Sectioning Abrasive Wheel (WETSAW) Enclosure in the Expended Core Facility (ECF) at the Naval Reactors Facility (NRF), located within the boundaries of the Idaho National Laboratory (INL). The RH transuranic (TRU) waste generated by these operations was transferred to the Idaho Nuclear Technology and Engineering Center (INTEC) facility for repackaging and characterization where it is currently stored in the INTEC Waste Management Facility. (References C016, C087, C093, P050, P066, P067, P073, U086, U106, U123, U124, U131, U132, and U133).

Waste Stream IN-ID-NRF-SPC is contaminated with materials from atomic energy defense activities conducted in the facility and with radiological materials examined in association with naval reactors development, and defense research and development activities. This waste stream was generated during the sectioning of fuel elements from primarily naval reactor fuels for evaluation of fuel.

This Summation of the AK Summary Report includes information to support Waste Stream Profile Form (WSPF) number IN-ID-NRF-SPC for Remote Handled (RH) TRU inorganic debris. The primary source of information for this Summation is CCP-AK-INL-570, *Central Characterization Project Acceptable Knowledge Summary Report For Idaho National Laboratory Remote-Handled Transuranic Debris Waste from the Naval Reactors Facility, Waste Stream: IN-ID-NRF-SPC*, Revision 2, December 5, 2011. CCP-AK-INL-570 includes information obtained from numerous sources, including facility safety basis documentation, historical document archives, generator and storage facility waste records and documents, interviews with cognizant personnel, and program/process documents (e.g., plans, procedures, etc.).

Waste Stream Identification Summary

Waste Stream Name:	Remote-Handled Transuranic Debris Waste from the Naval Reactors Facility
Waste Stream Number:	IN-ID-NRF-SPC
Waste Stream Volume – Current:	31 canisters[1]
Waste Stream Volume – Projected:	None
Dates of Waste Generation:	March 1975 – February 2007
Remote-Handled Transuranic Waste Content Code (RH TRUCON):	ID 321, ID 322, and ID 325
Summary Category Group:	S5000 – Debris Waste
Waste Matrix Code:	S5100 – Inorganic Debris Waste
Waste Matrix Code Group:	Heterogeneous Debris Waste
Annual Transuranic Waste Inventory Report Identification Numbers:	IN-NRF-SPC

[1]This waste stream consists of 93 55-gallon drums that will be loaded into 31 RH canisters.

Waste Stream Description and Physical Form

The waste stream is a mixed RH-TRU waste generated during analysis of post-irradiated nuclear fuel assemblies from naval reactor programs, using destructive examination methods (References P073, U106, U109, U132, and U133).

Waste stream IN-ID-NRF-SPC consists predominantly of metal debris waste materials contaminated during the sectioning of fuel elements for examination, and based on the review of the AK documentation, may contain the following materials (References C016, P050, P066, P067, U086, U106, U109, U123, U124, U132, and U133).

Iron Based Metals/Alloys: including ferrous materials made from carbon steel, stainless steel, and iron. Specific items include the Sludge Pan Container (SPC), stainless steel aircraft cable with crimps, steel saw parts, and stainless steel nuts and bolts.

Aluminum Based Metals/Alloys: including aluminum sludge pans, aluminum hex containers, and aluminum foil.

Other Metals: materials include items made from lead, brass, bronze and zirconium (Zircaloy). Specific items include cut-off wheel shaft assembly bronze bearings, brass tags, fuel fines, lead foil, and/or zircaloy foil.

Rubber: waste consists of the rubber binder used in the abrasive cut-off wheel blades, Buna-N (nitrile), slave fingers, and Room Temperature Vulcanizing (RTV) silicon rubber used to seal some of the small sludge pan lids.

Other Inorganic Material: items include Fuller's Earth absorbent, Calcium Carbonate, vermiculite, resin and silicon carbide grit from the cut-off wheels.Waste stream IN-ID-NRF-SPC contains less than 50 percent by volume in any container of homogeneous inorganic materials. Water used as the cutting wheel coolant was absorbed with Fuller's Earth or vermiculite if it was not allowed to air dry. No liquids were placed in the waste (References C029, C084, P008, and P012).

The inorganic debris from the operations in the Alpha Box and WETSAW Enclosure in waste stream IN-ID-NRF-SPC was placed into one of four types of sludge pan configurations:

1. Open top sludge pans (1.5 inches x 18 inches x 3.75 inches)
2. Foil Pouches (The open top sludge pan was lined with either aluminum foil or Zircaloy Foil. When full, the foil was folded over and removed from the sludge pan so that the sludge pan could be reused).
3. Small sludge pans with loose lids (1.75 inches x 14.25 inches x 2.75 inches)
4. Small sludge pans with the lids sealed with RTV silicon rubber

The sludge pans are made of 0.06-inch thick aluminum. Each sludge pan contained approximately three teaspoons of fuel fines (References C093, C098, C101, P043, P050, and U131).

The sludge pans or foil pouches were placed in either a carbon steel SPC or a stainless steel SPC. The stainless steel SPC is 23.62 inches long with four lifting rings. The carbon steel SPC is 26.25 inches long with two lifting rings. Of the 93 SPCs, 15 are carbon steel and 78 are stainless steel (References C093, C098, P068, and P216).

For shipment to INTEC, the SPC is placed in a plastic bag and then in a shielded container, which has a shielding sleeve welded on the outside. The shielded container is constructed of carbon steel. The shielded container with the SPC is placed in a drum with cribbing to hold the items in the centered-location of the drum. Filtered vents are located on all the containers to prevent pressurization and allow gasses to flow in and out of the drum (Reference U131).

The waste materials that comprise waste stream IN-ID-NRF-SPC have common physical form, contain similar hazardous constituents, and were generated from a single process or activity and are, therefore, a single waste stream. All the waste was generated from remote sectioning of fuel specimens operations associated with the operations of the Alpha Box.

Point of Generation

Location

Waste stream IN-ID-NRF-SPC was generated at the NRF at the INL.

Area and/or Buildings of Generation

Waste stream IN-ID-NRF-SPC was generated at the Alpha Box and WETSAW Enclosure in the Expended Core Facility (ECF) at the NRF.

Generating Processes

Description of Waste Generating Processes

All of the waste described in this document was generated from NRF operations associated with the operations of the Alpha Box conducted from 1975 through 1995 or in the WETSAW Enclosure from 1995 through 2007. All work activity generating SPCs was controlled by specific Route Cards (RCs) detailing every activity (References P008, P073, and U106).

The Alpha Box and WETSAW Enclosure were used for remote sectioning of specimens to obtain specific portions of that specimen for subsequent destructive tests. Destructive tests were used to predict and confirm the behavior of nuclear fuel (References C011, P006, and P019).

Sectioning of the fuel elements requires a method that minimizes air-borne contaminations to reduce filter loads and contain contamination. A slow speed, wet abrasive cut-off wheel is used for that purpose. The Alpha Box cut-off wheel was modular in design and could be installed through a 14-inch by 16-inch port in the containment box when dismantled. The unit was capable of cutting specimens up to two inches by four inches, with lengths up to 20 inches (longer if outriggers are used). The Alpha Box cut-off wheels were composite blades with no reinforcement. They were made of silicon carbide grit and rubber bonding particles. Operations were designed to be performed remotely using the master-slave manipulators. The lower portion of the cutting wheel was immersed in water. The water kept the wheel cool and acted as a lubricant. The abrasive wheel had to be changed regularly because it was designed to wear as it cut the material. The used wheels were placed in the sludge pans (References C037, P006, P008, and P050).

The WETSAW Enclosure used a similar process except the blade was replaced with a diamond impregnated metal saw blade (10 inch diameter, 0.05 inch thickness) that would not wear as quickly. The saw blade rotated at approximately 60 revolutions per minute (rpm). The diamond edge saw blade was also used in the Alpha Box before the operations ended in that enclosure. The Saw Table in the WETSAW Enclosure had a capacity of 4.0 inches wide by 3.0 inches high and 61.0 inches long (References C039, P052, and U028).

Due to the high radiation in the fuel element sectioning operation, it was determined that the material in the waste would not be directly measured. Approximately 85 percent of the fuel chips that were cut away by the abrasive wheel fell into the sludge pan beneath the cut-off wheel. Approximately 15 percent of the material removed by the wheel was considered lost into the Alpha Box or WETSAW Enclosure. When the enclosures were cleaned out, the material lost into the box was picked up by the cleaning materials. That portion of the material was disposed of as combustible waste (the combustible waste is not part of this waste stream) (Reference U015). The 85/15 percent distribution of the fuel chips was confirmed through experiments (Reference P014).

All outputs from the fuel element sectioning operation can be divided into five different categories. Three of these categories were waste, but only one of those waste categories is included in waste stream IN-ID-NRF-SPC (References C011, P008, P015, P049, and U110). Outputs from the Alpha Box and WETSAW Enclosure were as follows:

> Waste stream IN-ID-NRF-SPC consists of the fuel chips that were collected in the sludge pans. It is estimated that 85 percent of the fuel chips were in the sludge pans. Worn or broken abrasive wheels and other non-combustible waste were placed in the sludge pans.

The Alpha Box and the WETSAW Enclosure logbooks were kept current and used to record the specific details of every activity. The logbook entries included fuel element sectioning, equipment installation, and cleaning. Form ECF-NRFE-169 was used to record necessary details of each container of waste (References P008, P015, U027, U028, and U106).

Historic Fuel Element Sectioning Process Description

The Alpha Box was constructed beginning in 1974 and was completed in 1975. Operation in the Alpha Box began in 1975 and continued until 1995. The WETSAW Enclosure was constructed in 1992 and operations started in 1995. Sawing operations on samples continued in the WETSAW Enclosure until 2001. The last SPC was generated during decontamination and cleanup operations in 2007. The WETSAW Enclosure was dismantled in 2008 (Reference C039).

Originally a silicon carbide abrasive blade was used to cut the fuel elements. That type of blade was later replaced by a diamond edged blade. Otherwise, the process of sectioning reactor core samples was stable (References C029, P008, P012, U027, U028, U038, U039, U041, U042, U043, U044, U045, U046, U047, U048, U049, U050, U051, U052, U053, U054, U055, U056, U057, U058, U106, U145, U146, and U147).

SPC Hydrogen Remediation Process

In 2003, a Cut Fuel Storage Container (CFSC), which is similar to the SPC, ruptured while submerged in the ECF water pit. The cause was determined to be the buildup of hydrogen gas. The source of hydrogen was the radiolysis of water that leaked into the container and the corrosion of canister materials such as zinc. The event resulted in a hydrogen remediation program to render safe all sealed containers in the ECF water pit. All 67 SPCs in the water pit were permanently vented in this program. One SPC was generated in 2007 and not stored in the water pit. Pressurization was not a concern for this SPC and it was not vented. The 25 SPCs stored in the Transuranic Vault (TUVs) could have been wet when placed in the TUV. The SPCs were shipped in the TUVs to INTEC for remediation (References C075, C086, C088, C089, C092, C093, C094, C098, C100, C104, C105, C106, P207, P208, P209, P210, P211, P212, P213, P214, P215, U139, U140, and U339).

The SPCs stored in the water pit were placed inside of the Pressure Abatement Container (PAC) while submerged in the water pit. All water was pumped out of the PAC and it was pressurized to approximately five pounds per square inch gauge (psig) using nitrogen. Hydraulic cylinders forced the vent/plug punch through the side of the SPC. After punching the hole, the vent/plug punch was pushed further into the side of the SPC until seated in the hole, forming a water-tight seal.

Water Inspection Operation

To ensure that no free standing water was in the SPC, a Water Inspection Tool was designed. A 7/16-inch hole was drilled in the side of the SPC at the same location as the hole punched earlier. The water inspection tool was placed in the drilled hole. The Water Inspection Tool has a water indication polyester/paper laminate that permanently changes color from white to red when in contact with water.

After the Water Inspection Tool was inserted in the SPC, the SPC was installed in the CFSC Rotator, Water Inspection Tooling. The SPC was rotated to place the Water Inspection Tool on Bottom Dead Center (BDC). If any water was present inside the SPC, it would flow toward the Water Inspection Tool and contact the water indication laminate. Of the 67 SPCs stored in the water pit, 22 indicated water present during the inspection.

After the inspection was completed, the Water Inspection Tool was pressed inside of the SPC, where it became part of the waste (References C048, C049, C101, P031, P051, U103, U104, and U121).

Vacuum Drying Operation

The vacuum drying process (also referred to as cold evaporation) was used to dry wetted materials by evaporation inside a vacuum sealed container at temperatures above the freezing point, but below the standard boiling point temperature (at atmospheric pressure). During the evaporation process, the less volatile contaminants remained inside the vacuum sealed container and the moisture saturated vapor was pumped out of the container where it collected and condensed into a distillate.

This process allowed the evaporation of water at a lower temperature (<100 degrees C), which was one of the assumptions made as part of the National Emission Standards for Hazardous Air Pollutants (NESHAPS) evaluation for work inside the hot cells.

The vacuum system was connected to the SPC through the 7/16-inch hole drilled into the side of the SPC. The SPC is heated using Thinband heaters. Once the water inside the SPC reached 80 to 90 degrees C, the moisture saturated vapor was pumped out of the container, through a filter, using an oil-less diaphragm pump. The procedure continued until no more moisture was removed from the SPC. The filter was placed inside the SPC after use (References C090, C093, C094, C101, P032, and U103).

Packaging for Shipment to INTEC

After venting and drying, as necessary, the SPC was placed in a Sludge Pan Container Shielded Container (SPCSC). The SPCSCs were fitted with filters, Model 019DS. A plastic bag lined the inside of the SPCSC. The plastic bag was closed with a velcro strip, but not sealed. The SPCSC was then placed into a 55-gallon drum. The 55-gallon drum has plywood cribbing to keep the SPCSC in place. Up to four 55-gallon drums were then placed into a concrete INTEC Interim Storage Container (IISC) for shipment to INTEC. The 25 SPCs stored in the TUVs were shipped to INTEC for remediation (References C087, C093, C094, C110, P033, P034, P035, P036, P037, P038, P039, P040, P041, P042, P046, P061, P071, P072, U107, U131, and U339).

Characterization, Remediation, and Packaging for Shipment to WIPP

Because the SPCSC is too thick for RTR to be effective, at INTEC the SPCSCs were removed from the 55-gallon drums, and the SPC was removed from the SPCSC. The SPC was placed in an unshielded 30-gallon drum. The 30-gallon drum was overpacked in an unshielded 55-gallon drum. The drums were sent through RTR. Any prohibited items will be remediated.
Table 1 identifies the toxicity characteristic constituents in waste stream IN-ID-NRF-SPC.

Table 1 – Toxicity Characteristic Constituents in Waste Stream IN-ID-NRF-SPC

Chemical/Material	Use/Description/Location	AK Source	EPA HWNs
Arsenic	Metal found in the fuel core	C031, P212, P213	D004
Barium	Metal found in the fuel core	C031, P212, P213	D005
Cadmium	Metal found in the fuel core	C031, P212, P213	D006
Chromium	An alloy of the Zircaloy structural members of the fuel	C031, P212, P213	D007
Lead	Metal found in the fuel core, Lead pouches and Bronze bearings and bushings.	P008, C029, P050, C115, P212, P213	D008
Selenium	Metal found in the fuel core	C031, P212, P213	D010
Silver	Metal found in the fuel core and diamond edged saw blade	C031	D011

RCRA Determinations - Hazardous Waste Determinations

Historical Waste Management

The 93 containers in this waste stream were historically managed as non-hazardous waste (References C032 and U072). To assign EPA HWNs to this waste stream, AK sources, including procedures, personnel interviews, previous AK reports, container packaging and shipping documentation, and material safety data sheet (MSDS) information for commercial products noted in the AK record, were reviewed to determine potential waste material inputs and possible chemical contaminants associated with the NRF program and historic fuel element sectioning operations. A comprehensive list of materials and chemicals identified during this assessment were used to assign EPA HWNs for Waste Stream IN-ID-NRF-SPC. The toxicity characteristic metals were assigned to all of the containers in the waste stream for compounds used in Alpha Box or WETSAW Enclosure due to the lack of analytical evidence quantifying the concentration of RCRA contaminants in the waste matrix (Reference U072).

Ignitability, Corrosivity, Reactivity

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

This waste does not exhibit the characteristic of ignitability as defined in 40 CFR 261.21. The waste is not a liquid, an ignitable compressed gas, or an oxidizer, and is not capable of causing fire through friction, absorption of moisture, or spontaneous chemical change. The materials are not compressed gases, nor does the waste contain compressed gases. Although potentially ignitable compounds such as naphtha, isopropyl alcohol, and mineral spirits were managed in the facility, these materials were absorbed, deactivated and solidified as necessary.

This waste does not exhibit the characteristic of corrosivity as defined in 40 CFR 261.22. The waste materials are not liquid and RTR was performed to verify the absence of prohibited liquids. Corrosive liquids were not used in the fuel element sectioning processes. The materials are not liquid and VE was performed to ensure liquids were not present in the waste. Aqueous liquids such as light machine oil, neolube, and isopropyl alcohol were allowed to air dry or absorbed with Fuller's Earth.

This waste stream does not meet the definition of reactivity as defined in 40 CFR 261.23. The materials are stable and will not undergo violent chemical change. The 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 of detonation or explosive reaction.

The waste is not pyrophoric. The waste contains some zircaloy swarf from the processing of spent fuel assemblies. Because of reported concerns that finely divided zirconium may spontaneously combust, tests were performed on the zircaloy swarf. Zircaloy particles of various sizes, including zircaloy powder, were tested. The test results showed that even particles much smaller than what is included in the waste were not pyrophoric (References C014, C030, C032, C033, C049, C069, C093, P010, U016, and U120).

The containers in the waste stream will be evaluated in accordance with the WIPP-WAP using radiography prior to shipment to ensure the waste is not ignitable, reactive or corrosive.

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, in accordance with RCRA, to the waste stream.

A Toxicity Characteristic Leachate Procedure (TCLP) was performed outside of the certified program on the fuel-bearing region of a naval reactor core and zircaloy core structural material (which contains chromium) (Reference C031). The TCLP results for selenium (D010) and chromium (D007) were above the regulatory threshold (Reference C031). Therefore, EPA HWNs D007 (chromium) and D010 (selenium) are applied to this waste stream. The TCLP on the naval reactor fuel also indicated the presence of arsenic (D004), barium (D005), cadmium (D006), lead (D008) and silver (D011). Although that test indicated levels below regulatory limits for that sample, the HWNs for arsenic (D004), barium (D005), cadmium (D006), lead (D008) and silver (D011) were applied to the waste in the absence of any other confirmatory test results on the waste stream (References C029, C111, P050, U141, U028).

The AK sources did not identify the use of any organic toxicity characteristic compounds. Therefore, no EPA HWNs for organic toxicity characteristic compounds were assigned to waste stream IN-ID-NRF-SPC.

The waste stream contains or is contaminated with toxicity characteristic metals. Based on the references identified EPA HWNs D004, D005, D006, D007, D008, D010, and D011 are assigned to waste stream IN-ID-NRF-SPC.

Listed Waste

F-Listed Waste

Waste stream IN-ID-NRF-SPC was not mixed with or derived from F-listed hazardous waste from non-specific sources as listed in Title 40 CFR 261.31. One F002-listed solvent (1,1,1-trichloroethane was used in the Alpha Box for clean-up but, based on review of AK and personnel interviews the solvent contaminated waste was never placed in the Sludge Pans. Procedures required the Alpha Box be completely wiped down and cleaned between cutting operations of different fuel types. The wet or damp rags were allowed to dry and placed in a poly canister, packaged as combustible TRU waste, and are not included in this waste stream (References C097, P008, U015, U027, and U028).

Although organic solvents were used to clean the Alpha Box, there is no indication that any of the organic solvents were placed in the SPCs (References C096, C097, and P050).

U, K, and P-Listed Chemicals

Waste stream IN-ID-NRF-SPC 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). No listed chemicals were identified in the container-specific documentation completed in accordance with the INL waste management program. No specific source for beryllium powder (P015) was identified for this waste stream in the AK record. Therefore, P015 is not assigned to this waste stream. Waste stream IN-ID-NRF-SPC is, therefore, not assigned a P- or U-listed HWN (C031, P006, P017, P212, and P213),

The review of the AK source documentation did not identify the disposal of unused hydrofluoric acid (U134) or disposal of materials contaminated with spills of this acid; therefore the EPA HWN U134 is not assigned to waste stream IN-ID-NRF-SPC.

Waste stream IN-ID-NRF-SPC does not include any of the manufacturing process wastes from the specific industries or sources listed in 40 CFR 261.32. Waste stream IN-ID-NRF-SPC is, therefore, not assigned a K-listed HWN (C014, C030, C031, P212, P213, and U016).

Waste Stream IN-ID-NRF-SPC is not assigned any U-, K-, or P-Listed EPA HWNs.

Polychlorinated Biphenyls (PCBs)

The paint on the carbon steel SPCs from the TUVs is assumed to be PCB contaminated. Containers will be managed in accordance with the PCB disposal requirements in the WIPP-WAC (P047).

Prohibited Items

The absence of prohibited items is determined and documented through acceptable knowledge and characterization activities. RTR is performed on each container to verify the absence of prohibited items.

Materials entering the Alpha Box and WETSAW Enclosure were closely monitored. Water, used as the coolant for the abrasive cut-off wheel and the diamond blade, was the main liquid. Free liquids were not packaged. The SPC was either allowed to air dry before packaging or the SPC was filled with absorbent to remove all free liquids. A concern that water could have leaked into the SPC prompted an inspection of all SPCs to look for free water. Any SPCs determined to have water inside went through a vacuum drying process to remove the free water (C092, C093, C098, P008, P010, P012, P032, and U103).

All containers in this waste stream will be characterized using RTR to ensure no prohibited items are present. Any prohibited item will be remediated prior to shipment to WIPP.

Method for Determining Waste Material Parameter Weights per Unit of Waste

The waste material parameters (WMPs) for waste stream IN-ID-NRF-SPC were estimated based on the data logs used in the loading of the SPCs and Alpha Box waste material identification (C016 and U106). This waste stream is greater than 50 percent by volume material that meets the criteria for debris (References C016 and U130).

Waste items were categorized into one or more of the following WMPs: iron-based metals/alloys, aluminum-based metals/alloys, other metals, other inorganic materials, cellulosics, rubber, plastics (waste materials), inorganic matrix, and organic matrix. Weights were calculated based on volume averages for each waste parameter. The calculations were used to conclude that the relative waste weight percentages for inorganic waste materials and organic waste materials for Waste Stream IN-ID-NRF-SPC are 99.8 percent and 0.2 percent, respectively. The results of the assessment are presented in Table 2, Waste Stream IN-ID-NRF-SPC Waste Material Parameter Estimates (ReferencesC016, C048, P044, P050, P066, P067, U086, U106, U111, U112, U123, U124, U130, U131, U132, and U137).

Table 2. Waste Stream IN-ID-NRF-SPC Waste Material Parameter Estimates

Waste Material Parameter	Average Weight Percent	Weight Percent Range
Iron-based Metals/Alloys	92.03 %	61.38 – 99.49 %
Aluminum-based Metals/Alloys	1.56 %	0 – 4.18 %
Other Metals	0.17 %	0 – 0.19 %
Other Inorganic Materials	6.07 %	0 – 38.60 %
Cellulosics	0.004 %	0 – 0.14 %
Rubber	0.14 %	0 – 0.15 %
Plastic (waste materials)	0.03 %	0.02 – 0.03 %
Organic Matrix	0 %	0 – 0 %
Inorganic Matrix	0 %	0 – 0 %
Soils/Gravel	0 %	0 – 0 %

List of AK Sufficiency Determinations

No AK Sufficiency Determinations were requested for this waste stream.

Transportation

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

Beryllium

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

Radionuclide Information

Containers in this waste stream have surface dose rates exceeding 200 mrem/h, but less than 1000 rem/h, and contain more than 100 nanocuries per gram (nCi/g) of waste of alpha-emitting TRU isotopes with half lives greater than 20 years. The waste is contaminated primarily with U235 and Th-232 by mass and Cs-137, Sr-90, Ba-137m and Y-90 by activity. The isotopes expected to be present in this waste stream are listed in Table 3.

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

Table 3. Summary of IN-ID-NRF-SPC Radionuclides

Radionuclide	Specific Activity curies per gram(Ci/g)	Activity Fraction	Mass Fraction
WIPP Required Radionuclides			
Pu-238	1.73E+01	1.58E-02	1.82E-03
Pu-239	6.29E-02	4.06E-05	1.29E-03
Pu-240	2.30E-01	1.71E-05	1.48E-04
Pu-242	3.97E-03	5.15E-08	2.59E-05
Am-241	3.47E+00	2.02E-04	1.16E-04
U-233	9.76E-03	4.9E-05	1.00E-02
U-234	6.32E-03	1.86E-05	5.88E-03
U-238	3.40E-07	2.48E-09	1.46E-02
Cs-137	8.80E+01	2.54E-01	5.75E-03
Sr-90	1.38E+02	2.39E-01	3.45E-03
Additional Radionuclides			
Pu-241	1.04E+02	1.73E-03	3.31E-05
U-235	2.19E-06	6.55E-07	5.96E-01
U-236	6.54E-05	2.17E-06	6.61E-02
Th-228	8.29E+02	8.45E-05	2.03E-07
Th-232	1.11E-07	1.46E-08	2.63E-01
Ac-227	7.32E+01	5.21E-07	1.42E-08
Ra-224	1.59E+05	8.45E-05	1.06E-09
U-232	2.16E+01	8.21E-05	7.58E-06
Pa-231	4.78E-02	8.36E-07	3.49E-06
Ba-137m	5.38E+08	2.39E-01	8.87E-10
Y-90	5.44E+05	2.39E-01	8.76E-07
All Other Identified Radionuclides	–	1.10E-02	3.12E-02
Total	–	**1.00E+00**	**1.00E+00**

Payload Management

Payload management is not authorized to be utilized on this waste stream.

Attachment 1

AK SOURCE DOCUMENTS

Source Document Tracking Number	Title
C002	Correspondence to Phil Hamric (DOE-ID) and Stan Ahrends (DOE-OR) from Goetz K. Oertel, Re: Disposal of TRU Waste from Naval Reactors Facilities.
C003	Letter to Phil Hamric (DOE-ID) from C. K. Gaddis Re: Certification of Transuranic Waste at the Idaho National Engineering Laboratory
C007	Letter to P.W. Eselgroth from H.F. Daugherty, Re: Information to Support Previous Request, Attachment Annex 10-1, Sequence Chart for Measurement Recording and Shipment of Transuranic Waste
C009	Letter to Mr. D.J. Miller from G.D. Carpenter, Re: Transuranic Curie Content of Enriched Uranium Fuels TWR No. 09865 pp. 93-100
C011	Interview of N. Spackman and S. Lunt, Re: Flow Diagram For Alpha Box Operations
C014	Letter to Jeff W. Frazier from Timothy L. Cox, Vicente Munne, and Michael S. Wilkie, Re: DOT Hazard Categorization of Zircaloy Swarf
C016	Memorandum to Harker/Wade: Re: Alpha Box Waste Material Identification
C021	Letter to Manager, Pittsburgh Naval Reactors Office, Re: Approval Request of NRF Alpha-Box Waste Accountability Facilities
C022	Letter to C.H. Price, Re: Documentation of Measurement Methods For Accountable Nuclear Material Content of Transuranic Waste
C023	Letter to J.A. Logan, Re: Documentation of Measurement Methods for Accountable Nuclear Material Content of Scrap
C024	Telephone Conference Confirming Uncertainty in Pu Values for ECF TRU wastes
C025	Draft Letter to Manager, Re: Proposed Nuclear Material Measurement and Accountability Methods to Be Used By Facility PZB for Alpha-Box Generated Waste Shipments To The INEL Burial Grounds

Source Document Tracking Number	Title
C026	Correspondence to C.H. Price, Re: Documentation of Measurement Methods For Accountable Nuclear Material Content of Scrap
C027	Correspondence to C.H. Price, Re: Documentation of Measurement Methods For Accountable Nuclear Material Content of Scrap
C028	Correspondence to M.W. Littleton, Re: ECF Transuranic Waste Disposal Plan Summary
C029	Interview of J.F. Ruggiero, Re: History of NRF Combustible TRU Waste
C030	Telephone Conference with ECF Examination Engineering on Combustible Transuranic Waste From The ECF Hot Cell Alpha Box
C031	Correspondence to Mr. Joe Nagel, Re: TCLP Testing
C032	Correspondence to File, Re: Incidental Material Accumulation in the Expended Core Facility (ECF) Water Pits
C033	Correspondence to Jeff W. Frasier, Re: method for the passivation of the zirconium swarf in the ECF water pits.
C037	Correspondence to R.D. Denney, Re: Custom Processing ECF Residual Spent Fuel
C039	Interview of Harold Thompson, NRF Hot Cell Technician, Re: WETSAW Operations
C048	Letter to C.J. Sing, Re: Design Process Requirements and Documentation for the SPC Water Inspection Tool and SPC Rotator Spacer
C049	Email to Heidi Walk, Re: SPC AK Package Info: Zirc Pyrophoricity and Water Checker
C069	Correspondence to Mr. E.L. Juell, Re: Zircaloy and Uranium Shipment Request
C071	Correspondence to J.L. Gregory, Re: ECF Plan To Reduce Backlog of Transuranic
C075	Correspondence to B. Kammenzind, Re: Hydrogen Detonation Pressure Transient
C084	Email to Mark Sherick, Re: Pressurized Containers
C085	Correspondence to C.J. Sing, Re: Sludge Pan Container Activity Estimates
C086	Letter to T. Clements, from J. I. Eavenson, Re: SPC I (For INTEC) Remediation Documentation
C087	Letter to T. Clements from T. N. Miller Re: SPC II (For INTEC) "Initial Acceptable Knowledge Package"
C088	Letter to T. Clements from T. N. Miller Re: SPC V (INTEC) "Acceptable Knowledge Package"
C089	Letter from T. N. Miller to T. Clements Re: SPC VIII (For INTEC) "Acceptable Knowledge Package"
C090	Letter to C. J. Sing from NRF Engineering Re: Design Process Requirements and Documentation for the SPC Vacuum Dry System
C091	Letter to Manager, Pittsburgh Naval Reactors Office from C. E. Congelio Re: Expended Core Facility-Sludge Pan Container Remediation Planning Letter Revision D-for Naval Reactors Information and Servicing Facility Use

Source Document Tracking Number	Title
C092	Letter to Manager, Pittsburgh Naval Reactors Office from R. L. Elder Re: Expended Core Facility- Sludge Pan Container Remediation Planning Letter-For Approval
C093	Letter to Manager, Pittsburgh Naval Reactors Office from M. J. Zavidny, NRF East Engineering Re: Expended Core Facility-Sludge Pan Container Disposal Plan-for Approval
C094	Letter to T. Clements from T. N. Miller Re: SPC VII (For INTEC) "Acceptable Knowledge Package"
C095	Letter to C. J. Sing from Radiological Controls Engineering Re: Sludge Pan Container Radionuclide Mixture Control Systems
C096	Letter to T. Clements from R. D. Wingfield Re: SPC X (For INTEC) "Acceptable Knowledge Package"
C097	To File from T. N. Miller Re: Response to References Organic Solvents in Alpha Box Log
C098	Letter to Manager, Pittsburgh Naval Reactors Office from R. L. Elder Re: Expended Core Facility-Sludge Pan Container Remediation Planning Letter-for Servicing Facility Use
C099	PCER Number B-REO(A4W)-7130; Re: Radiological Controls for Potential Containers Requiring Remediation
C100	Letter to T. Clements from T. N. Miller Re: SPC VI (For INTEC) "Acceptable Knowledge Package"
C101	Letter to file from T. N. Miller, CC: H. B. Gonzales Re: SPC Procedures with Liquid
C102	Letter to T. Clements from J. I. Eavenson Re: Trans-U Vault Information (For INTEC)
C103	Correspondence to D. A. Arcidiacono, Manager, RPCO/NRF Re: Transuranic Vault Sludge Pan Containers
C104	Correspondence to D. Arcidiacona, Manager, ECF-RPCO Re: Detonation Pressure in the Transuranic Vaults
C105	Correspondence to D. A. Arcidiacono, Manager, RPCO/NRF Re: Response to B-REO(SC)-291
C106	Correspondence to D. Arcidiacono, Manager, ECF-RPCO, Re: Transuranic Vault Structural Assessment
C108	Letter to Tom Clements, Re: Transmittal of Documents Supporting Acceptable Knowledge for the Naval Reactors Facility Remote-Handled Waste
C109	Letter to Tom Clements, Re: Letter to INTEC Documenting the Updated Sludge Pan Activities
C110	Letter to DOE, Re: Sludge Pan Shielded Container Modification Final Design for Naval Reactors Information
C111	Second Interview with Harold Thompson, NRF Hot Cell Technician, Re: Hazardous material note in Alpha Box Log for SPC-88, and Vacuum bag information
C112	Letter to J. Sherman, Re: Fuel Contents of NRX Rods
C115	Letter to T. Clements, Re: Letter to INTEC Documenting the Radionuclide Activities and Hazard Evaluation for Sludge Pan Container 96
P003	Expended Core Facility Maintenance and Operations Guide

Source Document Tracking Number	Title
P005	Transmittal of the Evaluation of Naval Reactors Facility Radioactive Waste Disposed of at the Radioactive Waste Management Complex
P006	Slow Speed Abrasive Cut-Off Wheel Operation
P007	Alpha Box Support Operations
P008	Alpha Box Operations and Maintenance
P010	Alpha Box Support Operations
P012	Alpha Box Operations and Maintenance
P013	RH-TRU – CPP-1634 Drum Handling/Venting Operations
P014	Technical Work Record 61033 Summary
P015	Management of Alpha Box Waste
P016	The NRF Environmental Monitoring Program
P017	MSDS for Neolube and Graphite in Isopropanol
P018	Canister Remediation Prioritization
P019	Attachment B: Description of Naval Spent Nuclear Fuel Receipt and Handling at the Expended Core Facility at the Idaho National Engineering Laboratory
P025	Mission Need Statement: RH-TRU to WIPP Project
P027	AK Summary Documentation RH-TRU Repackaging
P031	SPC Remediation in Hot Cell 1
P032	SPC Vacuum Drying in Hot Cell 1
P033	SPC Shielded Container Packaging
P034	Shielded Container Operations
P035	SPC Shielded Container Assembly
P036	SPC Shielded Container Canister Weldment
P037	SPC Shielded Container Lid Weldment
P038	Drain Plug Detail
P039	SPC Shielded Container 38.00 inches Long External Bag Weldment
P040	SPC Shielded Container 60.00 inches Long External Bag Weldment
P041	SP Shielded Internal Bag Weldment
P042	SPC Shielded Container Shipping Assembly
P043	Cut Off Wheel Sludge Pan
P044	Dry SPC Weight Table
P046	Nuclear Filter Technology (NucFIL) Product List 2005
P047	The NRF Environmental Controls Manual
P049	NRF 1664.03 Radiological Control Requirements for Work Area No. 2

Source Document Tracking Number	Title
P050	Hazardous Evaluation/Disposition Form No. 2954 for ECF Sludge Pan Containers (SPCs) and Contents for SPCs 31 through 95, 39A and 71A
P051	Deficiency Form For SPC 39
P052	Wet Element Transverse Sectioning Abrasive Wheel (Wetsaw) Enclosure Operations and Maintenance
P053	NRF Local Safeguards Manual for Control of High-Grade Special Nuclear Material
P054	Component Movement and Inventory System
P055	Transuranic and Alpha Container Remediation Meeting at Naval Reactors Facility
P056	ECF Trans-U Waste Vault Liner for Sludge Pipes
P057	ECF Transuranic Waste Shipping Vault Details and Ass'y
P058	ECF Transuranic Waste Vault Details and Ass'y
P061	Design Verification of Interim Storage Containers for Increased Drum Size for NRF
P062	Naval Nuclear Form Procedure, Re: Control and Protection of Unclassified Naval Nuclear Propulsion Information
P063	Naval Nuclear Form Procedure, Re: Control and Protection of Classified Naval Nuclear Propulsion Information
P065	RWMC Remote-Handled TRU Waste Interim Storage System—Interim
P066	ECF Sample Storage Tube (Hex Containers)
P067	Cut Fuel Storage Container (Hex Container)
P068	ECF Cut-Off Wheel Stainless Steel Sludge Pan Container
P069	PAC Operations
P070	Phase 3 PAC Venting Operations in the Hot Cells
P071	SPC Packaging Prep
P072	SPC Shielded Container Packaging
P073	Store WETSAW Fines in the Main Hot Cell Bank
P207	Stainless Steel Sludge Pan Containers (SPCs) and Contents for SPCs 21 through 30 which are currently located in Trans Uranic Vaults (TUVs)
P208	ECF Carbon Steel Sludge Pan Containers (SPCs) and Contents for SPCs 00, 1, 2, 3, 4, 5, 6, 7, 9, 11, 13, 14, 15, 16, 18
P209	ECF Empty Group 1 Transuranic Waste Vaults (POLY-6-LWBR, TRU-POLY-7-S3G)
P210	ECF Empty Group 1 Transuranic Waste Vault ECO100004 which contains Carbon Steel SPCs 15, 16, 18 and Stainless Steel SPC 22 in a SPC storage insert
P211	ECF Group 1 Transuranic Waste Vault ECO200002 which contains Carbon Steel SPCs 00, 14 and Stainless Steel SPCs 21, 24, 25, 28 in a SPC storage insert
P212	ECF Group 1 Transuranic Waste Vault ECO300001 which contains Carbon Steel SPCs 1, 2, 3, 4 and Stainless Steel SPC 26 in a SPC storage insert

Source Document Tracking Number	Title
P213	ECF Group 1 Transuranic Waste Vault ECO300002 which contains Carbon Steel SPCs 5, 6, 7 and 9 in a SPC storage insert
P214	ECF Group 1 Transuranic Waste Vault TR-U- SPC-5-MIX which contains Carbon Steel SPCs 11, 13 and Stainless Steel SPCs 23, 27, 29, 30 in a SPC storage insert
P215	Transuranic Vault Transport System Assembly and spare parts
P216	Cut-Off Wheel Sludge Pan Container
U001	Attachment-Table I-Pu Curie Conversion Factors and Figures
U002	ECF Route Card on Resin Column Beads and Fuel Chips Disposal
U015	General Procedures for the Expended Core Facility Nuclear Material Balance Area
U016	Pyrophoricity and Ignitability of SPC Contents
U019	Summation of Partial Activities of SPCs
U027	Alpha Box Log Volume I
U028	Alpha Box Log Volume 2
U038	NRF Form 433 (Pages from Log Book)
U039	Route Card For Element Sectioning
U041	Route Card For Element Sectioning
U042	Route Card For Element Sectioning
U043	Route Card For Element Sectioning
U044	Route Card For Element Sectioning
U045	Route Card For Element Sectioning
U046	Route Card For Element Sectioning
U047	Route Card For Element Sectioning
U048	Route Card For Element Sectioning
U049	Route Card For Element Sectioning
U050	Route Card For Element Sectioning
U051	Route Card For Element Sectioning
U052	Route Card For Element Sectioning
U053	Route Card For Element Sectioning
U054	Route Card For Subassembly Preparation
U055	Route Card For Element Sectioning
U056	Route Card For Element Sectioning
U057	Route Card For Element Sectioning
U058	ECF Route Card-Grip II Rod 79-441D Alpha Box Sectioning
U060	Results of Plutonium Analysis of Core

Source Document Tracking Number	Title
U061	Plutonium and Uranium Content Per Drum Number
U068	Various Material Safety Data Sheets-Chlorothene NU P/N 6997-0001, T Grade Marking Pen Ink, T-Grade Pigment Type Marking Pen Ink (AEC)
U069	ECF Route Card: "Facit" Specimen Hysol Mounting and Harding Mill Sectioning
U070	ANL Radiation Dose To Packaging Over 20 Year Storage Hand Calculations
U072	Review of the Intermediate Level Transuranic Storage Facility Mixed Waste
U086	Technical Work Record on Noncombustible "Transuranic Waste" in ECF Storage
U101	UN Test Summary for Type A Drums
U103	SPC Remediation Flow Chart
U104	Basic Illustrations of SPC Remediation and Packaging
U105	Test Summary, Non-Bulk Steel Packagings, DOT 7A-Type A Compliance Testing
U106	SPC Load Logs for SPCs 31-85, 87-89, 71A, and 39A
U107	Polybags Filter Information
U109	Data Logs for SPCs in TUVs
U110	SPC Generation Flow Chart
U111	SPC Weight Check Comparisons of Load Cell versus Mettler-Toledo to Scale
U112	NRF Metrology Laboratory Calibration Data Report
U115	Approximate SPC Initial Pressures
U116	UN Test Summary for Non-Bulk Steel Packagings
U120	Drill Plug Ignition Test Video
U121	INTEC Initial Data Needs for NRF Sludge Pan Containers
U122	Technical Work Record (TWR) No. 18515
U123	ECF Route Card on Resin Column Disposal
U124	ECF Route Card on Repackaging Zirc Chips and Resin For Water Pit Storage
U125	NRF Chemistry Analysis Requests/Reports For a Resin Samples
U126	Sludge Pan Container (SPC) Printout
U127	Gamma Scan Zirc Chip Waste ECF Route Card 30759
U128	ECF Route Card-Alpha Box Waste Container Radiation Survey
U130	SPC Drum Evaluation, WMP, Red
U131	Engineering Design File: Radiological Properties of Remote-Handled Transuranic Waste from Naval Reactors Facility
U132	Log Book for WETSAW
U133	WETSAW Records
U134	WETSAW Drawings

Source Document Tracking Number	Title
U135	DOT7A-Type A Compliance Testing
U136	Radiological Survey Forms, SPC In-Cell Radiation Survey Map
U137	Report of SPC 86, 91, 92, 93, 94, and 95, Gemini Printouts (Classified)
U139	Trouble Record Cut Fuel Storage Container (Hex Container)
U140	Trouble Record ECF Sample Storage Tube (Hex Container)
U141	Trouble Record Response
U145	Route Card for Alpha Box Sectioning
U146	Route Card for Alpha Box Sectioning
U147	Route Card for WETSAW Sectioning
U148	Sludge Pan Container Activity Estimates
U339	Technical Work Record, Free Standing Water in the TUVs
U357	NRF TUV Project: Vault Processing Options for CPP-659
U358	Engineering Design File, Packaging Configuration for Repackaged Naval Reactors Facility Sludge Pan Containers