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

DEC - 8

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 the Central Characterization Project-ORNL Waste Stream Profile Form Number OR-GENR-CH-HET, Heterogeneous Debris from the ORNL General Research and Development Contact-Handled Transuranic Waste

Dear Mr. Bearzi:

The Carlsbad Field Office has approved the Waste Stream Profile Form OR-GENR-CH-HET, Heterogeneous Debris from the Oak Ridge National Laboratory (ORNL) General Research and Development Contact-Handled Transuranic (CH TRU) Waste. Enclosed is a copy of the form as required by Section B-5a of the WIPP Hazardous Waste Facility Permit No. NM4890139088-TSDF.

If you have questions on this matter, please contact Court Fesmire at (575) 234-7548.

Sincerely,

Edward Ziemianski
Acting Manager

Enclosure(s)

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

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

CBFO:NTP:CF:GS:10-2040:UFC 5900.00

Attachment 2 – CCP Waste Stream Profile Form

(1) Waste Stream Profile Number: OR-GENR-CH-HET							
(2) Generator site name: Oak Ridge National Laboratory					(4)Technical contact: Candice Weston		
(3) Generator site EPA ID: TN1890090003					(6) Technical contact phone number: 303-843-3257		
(5) Date of audit report approval by New Mexico Environment Department (NMED): April 24, 2008; April 23, 2009; August 12, 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 18, June 30, 2010. CCP-PO-002, CCP Transuranic Waste Certification Plan, Revision 24, June 30, 2010 CCP-PO-027 CCP/TRU Waste Processing Center/Oakridge National Laboratory Interface Document, Revision 2, April 22,2010							
(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: OR-GENR-CH-HET					(11) Summary Category Group: S5000		
(12) Waste Matrix Code Group: Heterogeneous Debris Waste					(13) Waste Stream Name: Heterogeneous Debris from the ORNL General Research and Development CH TRU Waste		
(14) Description from the TWBIR: Waste consists of CH-TRU debris from general R&D at ORNL.							
(15) Defense TRU Waste:	YES	X	NO				
(16) Check One:	CH	X	RH				
(17) Number of SWBs NA	(18) Number of Drums 191				(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: D004, D005, D006, D007, D008, D009, D010, D011, D019, D022, D028, F002, and F005							
(22) Applicable TRUCON Content Numbers: OR 125/225, SQ 154							
(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-ORNL-006, Revision 0, January 14, 2010, Figures 1, 2, and 3.							
(23B) Facility mission description: CCP-AK-ORNL-006, Revision 0, January 14, 2010, Section 4.2.							
(23C) Description of operations that generate waste: CCP-AK-ORNL-006, Revision 0, January 14, 2010, Sections 4.4 and 5.3.							
(23D) Waste identification/categorization schemes: CCP-AK-ORNL-006, Revision 0, January 14, 2010, Section 4.5.							
(23E) Types and quantities of waste generated: CCP-AK-ORNL-006, Revision 0, January 14, 2010, Section 4.6.1							
(23F) Correlation of waste streams generated from the same building and process, as applicable: CCP-AK-ORNL-006, Revision 0, January 14, 2010, Section 4.6.2.							
(24) Waste certification procedures: CCP-TP-030, Rev. 28, CCP CH TRU Waste Certification and WWIS/WDS Data Entry, May 12, 2010							
(25)Required Waste Stream Information							
(25A) Area(s) and building(s) from which the waste stream was generated: CCP-AK-ORNL-006, Revision 0, January 14, 2010, Section 5.1.							

(25B) Waste stream volume and time period of generation: CCP-AK-ORNL-006, Revision 0, January 14, 2010, Section 5.2.			
(25C) Waste generating process description for each building: CCP-AK-ORNL-006, Revision 0, January 14, 2010, Section 5.3.			
(25D) Waste Process flow diagrams: CCP-AK-ORNL-006, Revision 0, January 14, 2010, Figures 4 and 5.			
(25E) Material inputs or other information identifying chemical/radionuclide content and physical waste form: CCP-AK-ORNL-006, Revision 0, January 14, 2010, Section 5.4.			
(25F) Waste Material Parameter Weight Estimates per unit of waste See Table 2 of the Summation of Aspects of AK Summary Report: OR-GENR-CH-HET			
(26) Which Defense Activity generated the waste[3]: (check one)			
	Weapons activities including defense inertial confinement fusion		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: N/A			
(27B) Standard operating procedures: See S2 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(27C) Safety Analysis Reports: See S3 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(27D) Waste packaging logs: N/A			
(27E) Test plans/research project reports: See S5 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(27F) Site databases: See S6 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(27G) Information from site personnel: See S7 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(27H) Standard industry documents: N/A			
(27I) Previous analytical data: See S9 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(27J) Material safety data sheets: See S10 AK#s on Attachment 1 to Summation of Aspects of AK Summary Report			
(27K) Sampling and analysis data from comparable/surrogate Waste: N/A			
(27L) Laboratory notebooks: N/A			
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:** 10-6-10
Reviewed by STR (if necessary):	**YES**	[X]	**N/A** [ ]	**Date:** 10-18-10

Waste Stream Profile Form Certification:

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

(31)	(32) Candice Weston	(33) 11-16-10
Signature of Site Project Manager	Printed Name	Date

NOTE: (1) Use back of sheet or continuation sheets, if required.
(2) If, radiography, visual examination were used to confirm EPA Hazardous Waste Numbers, attach signed Characterization Information Summary documenting this determination.
(3) This waste was also generated by the following defense activity: Defense nuclear waste and materials by-product management.

CHARACTERIZATION INFORMATION SUMMARY

WSPF # OR-GENR-CH-HET

Lot 1

TABLE OF CONTENTS

CCP C[illegible]acterization Information Summary Cover Pa[illegible]

Waste Stream #	OR-GENR-CH-HET	Lot #:	1
AK Expert Review:	N/A	Date:	N/A
SPM Review:	Candice Weston	Date:	11/15/2010

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

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

List of procedures used:

Radiography (RTR/NDE)

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

Non Destructive Assay (NDA):

CCP-TP-166	Rev. 3	02/26/10	CCP Drum Waste Assay System Imaging Passive/Active Neutron Operations
CCP-TP-166	Rev. 2	12/05/08	CCP Drum Waste Assay System Imaging Passive/Active Neutron Operations
CCP-TP-168	Rev. 3	11/17/09	CCP Drum Waste Assay System Imaging Passive/Active Neutron/Segmented Gamma Scanner (DWAS IPAN/SGS) Data Generation Level
CCP-TP-169	Rev. 2	11/18/09	CCP Operating the Mobile Segmented Gamma Scanner

Headspace Gas Sampling and Analysis (HSG):

CCP-TP-093	Rev. 13	03/19/07	CCP Sampling of TRU Waste Containers
CCP-TP-106	Rev. 6	07/12/07	CCP Headspace Gas Sampling Batch Data Report Preparation
CCP-TP-173	Rev. 1	09/30/09	CCP Analysis of Gas Samples for VOCs by GC/FID
CCP-TP-175	Rev. 1	03/29/10	CCP Analysis of Gas Samples for VOCs by GC/MS

Project Level Data Validation / DQO Reconciliation:

CCP-TP-001	Rev. 18	08/09/10	CCP Project Level Data Validation and Verification
CCP-TP-001	Rev. 17	09/24/07	CCP Project Level Data Validation and Verification
CCP-TP-002	Rev. 22	06/30/10	CCP Reconciliation of DQOs and Reporting Characterization Data
CCP-TP-002	Rev. 21	08/04/09	CCP Reconciliation of DQOs and Reporting Characterization Data
CCP-TP-003	Rev. 17	11/09/09	CCP Data Analysis for S3000, S4000, and S5000 Characterization
CCP-TP-005	Rev. 19	07/06/10	CCP Acceptable Knowledge Documentation
CCP-TP-005	Rev. 18	11/16/06	CCP Acceptable Knowledge Documentation
CCP-TP-030	Rev. 28	05/12/10	CCP CH TRU Waste Certification and WWIS/WDS Data Entry

WAP Certification:

CCP-PO-001	Rev. 18	06/30/10	CCP Transuranic Waste Characterization Quality Assurance Project Plan
CCP-PO-001	Rev. 17	06/23/09	CCP Transuranic Waste Characterization Quality Assurance Project Plan
CCP-PO-002	Rev. 24	06/30/10	CCP Transuranic Waste Certification Plan
CCP-PO-002	Rev. 23	04/07/10	CCP Transuranic Waste Certification Plan
CCP-PO-027	Rev. 2	04/22/10	CCP/TRU Waste Processing Center/Oakridge National Laboratory (TWPC/ORNL) Interface Document

CFS-002

CCP Correlation of Container Identification Numbers to Batch Data Report Numbers

Waste Stream: # OR-GENR-CH-HET

Lot # 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	
X10C9801416A	OR-DWAS-0362	OR-RTR6-0284	N/A	N/A	N/A		ORHSGS100002	ECL10004M	ECL10004G
X10C9311502A	OR-IQ3-0076	OR-RTR6-0284	N/A	N/A	N/A		ORHSGS100002	ECL10004M	ECL10004G
X10C9801420A	OR-DWAS-0360	OR-RTR6-0284	N/A	N/A	N/A		ORHSGS100002	ECL10004M	ECL10004G
X10C9801312A	OR-DWAS-0369	OR-RTR6-0279	N/A	N/A	N/A		N/A	N/A	N/A
X10C9312515A	OR-DWAS-0369	OR-RTR6-0282	N/A	N/A	N/A		N/A	N/A	N/A
X10C9400200A	OR-IQ3-0076	OR-RTR6-0282	N/A	N/A	N/A		N/A	N/A	N/A
X10C9312239A	OR-IQ3-0076	OR-RTR6-0282	N/A	N/A	N/A		N/A	N/A	N/A
X10C0102698B	OR-IQ3-0078	OR-RTR6-0293	N/A	N/A	N/A		N/A	N/A	N/A
X10C0102698F	OR-IQ3-0078	OR-RTR6-0289	N/A	N/A	N/A		N/A	N/A	N/A
X10C9311271A	OR-IQ3-0078	OR-RTR6-0289	N/A	N/A	N/A		N/A	N/A	N/A
**The seven container below 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 seven containers are included for information purposes only.									
X10C0102697I	OR-IQ3-0076	OR-RTR6-0284	N/A	N/A	N/A		ORHSGS100002	ECL10004M	ECL10004G
X10C0102695A	OR-IQ3-0073	OR-RTR6-0284	N/A	N/A	N/A		ORHSGS100002	ECL10004M	ECL10004G
X10C0102696A	OR-IQ3-0075	OR-RTR6-0284	N/A	N/A	N/A		ORHSGS100002	ECL10004M	ECL10004G
X10C9311652A	OR-IQ3-0082	OR-RTR6-0283	N/A	N/A	N/A		ORHSGS100002	ECL10004M	ECL10004G
X10C0102698D	OR-IQ3-0073	OR-RTR6-0284	N/A	N/A	N/A		ORHSGS100002	ECL10004M	ECL10004G
X10C0102698A	OR-IQ3-0073	OR-RTR6-0283	N/A	N/A	N/A		ORHSGS100002	ECL10004M	ECL10004G
X10C0102695H	OR-IQ3-0073	OR-RTR6-0283	N/A	N/A	N/A		ORHSGS100002	ECL10004M	ECL10004G

ature of Site Project Manager

Candice Weston
Printed Name

11/15/2010
Date

CIS-003

CCP Headspace Gas UCL_{90} Evaluation Form

WSPF #: OR-GENR-CH-HET **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	0	10	-1.49	-3.23	0.61	-2.96	10	2.30		
Bromoform	Log	1	10	-2.04	-4.18	0.96	-3.76	10	2.30		
Carbon Tetrachloride	Log	0	10	-2.25	-4.01	0.62	-3.74	10	2.30		
Chlorobenzene	Log	0	10	-1.71	-3.44	0.61	-3.17	10	2.30		
Chloroform	Log	0	10	-1.90	-3.63	0.61	-3.37	10	2.30		
Cyclohexane[a]	Log	3	10	-1.14	-2.55	0.72	-2.24	10	2.30		
1,1-Dichloroethane	Log	0	10	-1.47	-3.21	0.61	-2.94	10	2.30		
1,2-Dichloroethane	Log	0	10	-1.86	-3.61	0.61	-3.34	10	2.30		
1,1-Dichloroethylene	Log	0	10	-1.83	-3.57	0.61	-3.30	10	2.30		
cis-1,2-Dichloroethylene	Log	0	10	-1.29	-3.03	0.61	-2.76	10	2.30		
trans 1,2-Dichloroethylene	Log	0	10	-1.31	-3.04	0.61	-2.78	10	2.30		
Ethyl benzene	Log	1	10	-1.58	-3.20	0.66	-2.91	10	2.30		
Ethyl Ether	Log	0	10	-0.92	-2.64	0.61	-2.38	10	2.30		
Methylene chloride	Log	0	10	-1.26	-2.98	0.61	-2.72	10	2.30		
1,1,2,2-Tetrachloroethane	Log	0	10	-2.16	-3.88	0.60	-3.62	10	2.30		
Tetrachloroethylene	Log	0	10	-1.93	-3.66	0.61	-3.39	10	2.30		
Toluene	Log	10	10	1.87	0.98	0.49	1.19	10	2.30		
1,1,1-Trichloroethane	No	0	10	0.06	0.01	0.02	0.02	10	N/A		
Trichloroethylene	Log	0	10	-2.21	-3.94	0.61	-3.67	10	2.30		
Trichlorofluoromethane[e]	Log	0	10	-2.30	-4.07	0.62	-3.79	10	2.30		
1,1,2-Trichloro-1,2,2-trifluoroethane	Log	0	10	-2.73	-4.50	0.62	-4.23	10	2.30		
1,2,4-Trimethylbenzene[a]	No	1	10	0.21	0.06	0.07	0.09	10	N/A		
1,3,5-Trimethylbenzene[a]	Log	1	10	-1.69	-3.29	0.68	-2.99	10	2.30		
m,p-Xylenes[b]	Log	3	10	-1.66	-3.12	0.82	-2.77	10	2.30		
o-Xylene	Log	1	10	-1.45	-3.10	0.63	-2.82	100	4.61		
Acetone	Log	10	10	3.47	0.75	1.31	1.32	100	4.61		
Butanol	Log	5	10	3.91	-1.52	2.14	-0.59	100	4.61		
Methanol	Log	1	10	4.79	1.82	1.04	2.27	100	4.61		
Methyl ethyl ketone	No	4	10	0.73	0.29	0.25	0.40	100	N/A		

CIS-004

WSPF #: OR-GENR-CH-HET **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	1	10	-2.38	-3.98	0.82	-3.62	10	2.30		
Chloromethane[e]	Log	1	10	-0.60	-2.26	0.62	-1.99	10	2.30		
Carbon Disulfide[e]	SQRT	3	10	0.51	0.29	0.13	0.34	10	3.16		
1,2-Dichloropropane[e]	Log	0	10	-1.71	-3.44	0.61	-3.17	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.

[e] These compounds are reported by the Laboratory and are included for completeness.

Comments:

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

Signature of Site Project Manager

Candice Weston
Printed Name

11/15/2010
Date

CIS-005

CCR Headspace Gas Summary Data

Waste Stream Number OR-GENR-CH-HET Lot Number (s) 1

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

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

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

SPM Signature [signature] Date 11/15/2010

CCP RTR/VE Summary of Prohibited Items and AK Confirmation

Waste Stream Number: OR-GENR-CH-HET Lot(s)#: 1

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

a. See Batch Data Reports

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

Justification for the selection of RTR and/or VE: RTR is an acceptable characterization method because RTR meets all the data quality objectives for NDE of waste stream OR-GENR-CH-HET.

Site Project Manager Signature | Candice Weston (Printed Name) | 11/15/2010 (Date)

CIS-007

CCP Reconciliation with Data Quality Objectives

WSF# OR-GENR-CH-HET 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%)

CIS-008

CCP Reconciliation with Data Quality Objectives

WSF# OR-GENR-CH-HET 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.

CIS-009

CCP Reconciliation with Data Quality Objectives

WSF# OR-GENR-CH-HET Lot # 1

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

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

Comments: NONE

Signature of Site Project Manager | Candice Weston (Printed Name) | 11/15/2010 (Date)

CIS-010

SUMMATION OF ASPECTS OF AK SUMMARY REPORT: WASTE STREAM OR-GENR-CH-HET

Overview

Waste stream OR-GENR-CH-HET is contact-handled (CH) transuranic (TRU) heterogeneous debris waste generated in the Transuranium Research Laboratory (TRL) in Building 5505 at the Oak Ridge National Laboratory (ORNL) in Oak Ridge, Tennessee. The primary objective of Building 5505 was research and development (R&D) activities in fundamental chemistry, physics, and materials science of the actinide elements and their compounds through systematic studies. The information acquired was valuable in promoting actinide science and was relevant to advancing a diversity of technological applications of national interest. The waste generated in Building 5505 is stored at the ORNL.

Waste stream OR-GENR-CH-HET was generated in Building 5505 by R&D activities that were undertaken to provide basic scientific data for the (Department of Energy) DOE Defense Mission and the Defense Waste Cleanup Mission. The Office of Basic Energy Sciences (BES) staff at DOE Headquarters has indicated that the Heavy Element Chemistry Research program generating this waste was in support of the DOE defense mission, thereby making the waste eligible for ultimate disposal at WIPP. The work related to the Hanford and Savannah River tank waste, glass and ceramic immobilization matrices, and actinide migration behavior would be considered "defense nuclear waste and materials by-products management." However, the overall defense activity that generated waste stream OR-GENR-CH-HET is "defense research and development."

This Summation of Aspects of the AK Summary Report includes information to support Waste Stream Profile Form (WSPF) number OR-GENR-CH-HET for CH TRU heterogeneous debris. The primary source of information for this summation is CCP-AK-ORNL-006, *Central Characterization Project Acceptable Knowledge Summary Report For Oak Ridge National Laboratory General Research and Development Contact-Handled Transuranic Waste, Waste Stream: OR-GENR-CH-HET*, Revision 0, January 14, 2010. CCP-AK-ORNL-006 includes information obtained from numerous sources, including facility safety basis documentation, historical document archives, generator and storage facility waste records and documents, program/processing documentation, and interviews with knowledgeable personnel.

Waste Stream Identification Summary

Waste Stream Name:	Heterogeneous Debris from the ORNL General Research and Development CH TRU Waste
Waste Stream Number:	OR-GENR-CH-HET
Site Where TRU Waste Was Generated:	Oak Ridge National Laboratory
Facility Where TRU Waste Was Generated:	Building 5505
Site Where TRU Waste Is Currently Stored:	Oak Ridge National Laboratory
Waste Stream Volume – Current:	142 55-gallon drums
Waste Stream Volume – Projected:	49 55-gallon drum equivalents (from repackaging of 4 boxes totaling 360 cubic feet)
Dates of Waste Generation:	1970 – 2007
TRUCON Content Numbers:	OR 125, OR 225, SQ 154
Summary Category Group	S5000- Debris Waste

Waste Matrix Code:	S5400, Heterogeneous Debris
Waste Matrix Code Group	Heterogeneous Debris Waste
Waste Stream TWBIR Identification:	OR-GENR-CH-HET
RCRA EPA Hazardous Waste Numbers:	D004, D005, D006, D007, D008, D009, D010, D011, D019, D022, D028, F002, and F005

Waste Stream Description and Physical Form

Waste stream OR-GENR-CH-HET is comprised primarily of organic and inorganic debris waste items and generally consists of cellulosics, plastic, rubber, glass, ceramic, and metal. Examples of waste items include:

- Iron-based metal items including cartridges, clips, containers (e.g., buckets, cans, drums), fittings, gas cylinders (punctured and empty), gauges, gloveboxes (disassembled and packaged into drums), hand tools (e.g., razors, scissors, screwdrivers, tweezers, vise, wrenches), hardware (e.g., bolts, brackets, clamps, nails, nuts, screws, springs, washers), heating elements, labware (e.g., pans, ring stands), pipe, planchets, plates, racks, rods, saw blades, screens, and wire
- Aluminum metal items such as cans, foil, and trays
- Other metals such as brass (e.g., fittings, tubing), copper (e.g., fittings, tubing, wire), and lead (e.g., bricks and pigs)
- Other inorganic materials including absorbents/adsorbents (e.g., Nochar Petrobond, Quick-Solid, silica gel), ceramics (e.g., firebrick, rods), and glass (e.g., beakers, bottles, capillaries, flasks, glovebox windows, jars, light bulbs, Petri dishes, pipettes, tubing, vials), and oxide powder
- Cellulosic items such as cardboard (e.g., boxes, cartons, liner inserts), cheesecloth, cloth lab coats, cloth glove liners, cloth rags, coveralls, Herculite cloth, leather gloves, masking tape, paper (e.g., sheet, tissues, towels), smears, wipes, and wood
- Plastic items including bags, bottle caps, containers (e.g., bottles, cartons, jugs), electrical cord, fittings, ion-exchange resin, labware (e.g., vials), Lexan, plexiglass, sheeting, tape, and tubing
- Rubber items such as aspirators, gaskets, gloves, glovebox gloves (butyl, neoprene, or chlorosulfonated polyethylene polymer), hose, o-rings, stoppers, and styrofoam
- Lab equipment and electrical devices (e.g., balance, Bunsen burners, diffuser pumps, evaporators, furnaces, hot plates, jack, ion separator, light fixtures, vacuum pumps)
- Metal framed HEPA filters and roughing filters.

Waste stream OR-GENR-CH-HET was generated from a single process or from an activity that is similar in material, physical form, and hazardous constituents and is therefore a single waste stream.

Point of Generation

Location

Waste stream OR-GENR-CH-HET was generated at the ORNL which is located on the DOE Oak Ridge Reservation. The waste generated in Building 5505 is stored at the ORNL.

Area and/or Buildings of Generation

Waste stream OR-GENR-CH-HET was generated in the TRL in Building 5505 located off of Southside Avenue on the southeast side of the main ORNL area. TRU waste from Building 5505 was generated primarily in several laboratories but also includes waste from cleanout of the radioactive material storage vault and the mechanical equipment room on the roof where the glovebox exhaust filters and fume hood prefilters were located.

Generating Processes

Description of Waste Generating Processes

General Description of Research and Development

The waste was generated from the Heavy Element Chemistry Research program. When Building 5505 began operations in 1967, the research was focused on the heaviest elements as they first became available. The heavy elements studied included plutonium, americium, curium, berkelium, californium, einsteinium, and fermium. Over the years, metals and many compounds of these rare elements were synthesized and many of their chemical and physical properties determined. The chemical behavior in solution of trans-fermium elements that had been synthesized in accelerator irradiations have also been studied. The research program also studied the chemical and physical properties of the actinides in the solid state, vapor state, and in solution. Metals and many solid compounds and various species in solution were prepared to study the stabilities of different oxidation states, atomic and molecular energy levels, crystal structures of compounds and of metals, thermodynamic properties, effects of ultra-high pressures, magnetic phenomena, chemical and physical effects of radioactive decay, and the thermodynamics and reactions at high temperatures. Building 5505 was also used for the study of solid compounds related to the behavior of actinides in nuclear waste forms in terms of their stability toward heat, radiation and external chemical conditions. Such studies of multi-component, inorganic, actinide-containing compounds aided in the development of synthetic methods and in the selection of the most suitable host materials.

Investigations of the chemistry of solutions of actinides considerably increased in scope, with emphasis being placed upon filling in the large gaps in knowledge of the actinides in concentrated media, where complexation and association reactions can occur, and in extremely dilute media, where conditions are similar to those expected to be encountered in the natural environment. Information about phenomena such as solubilities, hydration, short-range structures, complexation, and hydrolysis was needed for the development of the chemical theory of solutions. Such information was imperative in the decision-making process concerning the options available for the handling and the disposal of waste from spent nuclear fuels. Also, very little was known about the interactions of actinides at tracer levels with rocks and minerals. Environmental conditions of temperature, pH, and redox potential affect the nature of the species in solution and their interactions with the surface of the solid, in turn determining the transport behavior of each actinide in the environment. The objective of this aspect of the research program was to determine experimental parameters so that an accurate model for predicting long-term transport behavior could be developed. Numerous chemicals were used for actinide research, including inorganic and organic acids, bases, and hydrocarbons. Common

chemicals used included hydrochloric acid, nitric acid, sodium hydroxide, dodecane, and α-hydroxyisobutyric acid.

Specific Research and Development Techniques

A variety of chemical preparations and experimental measures were made in Building 5505 to determine the chemical and physical properties of the actinides, and to correlate the results with information obtained for similar elements, such as the lanthanides, and with chemical theory. Gram amounts of material, at the most, were involved in such processes as reduction with hydrogen gas or with metal, halogenation, and oxidation with atomic oxygen or ozone.

Samples were prepared by a variety of methods, including electrodeposition, ion-exchange, and precipitation. Experimental measurements were made using a wide variety of laboratory techniques, including differential thermal analysis, laser ablation, magnetic susceptibility measurement of actinides using a semiconductor device, micro-calorimetry, differential scanning calorimetry, polarography, radiotracer assays, spectrometry (absorption, emission, fluorescence, mass, Raman, x-ray), voltammetry, and x-ray and electron diffraction. Building 5505 was also equipped with an electromagnetic isotope separator which was modified to provide necessary containment for the handling of transuranium elements. This separator was used to prepare sources and targets of specific isotopes, when needed, since reactor and cyclotron produced elements are often mixtures.

Facility Maintenance and Cleanup

Each glovebox included an 8-inch square or 12-inch square HEPA exhaust filter. After passing through the filter, the exhaust traveled through ductwork to the service attic of the building where two stages of HEPA filtration were provided for the total flow of the building glovebox system. Provisions were made to allow filter changing to be performed without interruption of glovebox exhaust system air flow. The laboratory and fume hood exhaust system consisted of one stage of 27 roughing filters followed by one stage of HEPA filters arranged in compartments to allow filter maintenance without full interruption of flow. Five of six compartments were operative while the sixth was being changed out. The service area needed for filter maintenance was separated from the other attic service area, and a suitable barrier was provided to prevent any spread of contamination should spillage occur during filter change-outs or testing. Another routine maintenance activity is changing glovebox gloves.

Due to a decrease in shielded glovebox work, one of the two concrete shielded glove boxes was removed in 1974. During this same year the facility began replacing plastic glovebox windows with safety glass. Beginning in the mid-1980s, several out-of-service gloveboxes and their equipment were removed. Decontamination and removal of gloveboxes no longer in use continued into the early-1990s. R&D operations continued throughout the 1990s until 2007, but the majority of the waste generated during this period was from cleanup of legacy waste materials.

Transuranic Waste Processing Center (TWPC)

Drums containing CH-TRU waste in this waste stream were emptied into sorting trays in the TWPC. The waste was sorted and segregated to remove prohibited items and repackaged. Prohibited items identified during repackaging of drums and boxes were removed from the waste stream or were remediated. Secondary wastes created during waste processing, such as rubber glovebox gloves and tools, were placed into the same TRU waste drums. Repackaging of this waste stream began in 2007 and is an ongoing process.

Table 1 identifies the toxicity characteristic (TC) and F-listed constituents, in waste stream OR-GENR-CH-HET.

Table 1 – Metal and Organic Toxicity Characteristic and F-Listed Waste Stream Constituents

Constituent	CAS #	EPA Hazardous Waste Number
Arsenic	7440-38-2	D004
Barium	7440-39-3	D005
Cadmium	7440-43-9	D006
Chromium	7440-47-3	D007
Lead	7439-92-1	D008
Mercury	7439-97-6	D009
Selenium	7782-49-2	D010
Silver	7440-22-4	D011
Carbon tetrachloride	56-23-5	D019
Chloroform	67-66-3	D022
1,2-Dichloroethane	107-06-2	D028
Trichlorofluoromethane (Freon 11)	75-69-4	F002
Benzene	71-43-2	F005
Pyridine	110-86-1	F005
Toluene	108-88-3	F005

RCRA Determinations

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.

Examples of ignitable liquids used in Building 5505 include acetone, benzene, dodecane, and xylene. Solutions containing oxidizing compounds were also used in Building 5505. Examples of oxidizing compounds include chlorate, perchlorate, and peroxide compounds (References C158, P099, P100, P162, P163, P167, P168, P169, P170, P171, P172, P234, P360, P365, P1235, P1247, P1251, P1258, P1261, P1270, P1273, U848). Wipes dampened with flammable solvents were dried out before disposal (Reference P1251). Waste management practices in the facility prohibited the accumulation of liquids in this waste stream and the waste stream is not liquid waste (References P1122, P1250, P1251).

Free liquid, pyrophoric material, and compressed gases were verified to be absent in TRU waste in accordance with the ORNL Health Physics Manual and facility-specific procedures (References M165,

P241, P244, P566, P956). Examples of pyrophoric materials used for research in Building 5505 include lithium, lithium aluminum hydride, potassium, and sodium. These materials were used in small quantities and were completely reacted (e.g., oxidized in air) prior to disposal (Reference C159).

To ensure the waste does not exhibit the characteristic of ignitability, liquid in excess of TSDF-WAC limits is removed or immobilized, and compressed gases (e.g., aerosol cans) are removed or vented prior to WIPP disposal. Therefore, this waste does not exhibit the characteristic of ignitability (D001).

Corrosivity

This waste does not meet the definition of corrosivity as defined in 40 CFR 261.22. The materials are not liquid, and RTR and/or VE are performed to ensure the absence of prohibited liquids.

Numerous acidic and caustic liquids were used in Building 5505. Examples of acidic and caustic liquids include hydrochloric acid, hydrofluoric acid, nitric acid, oxalic acid, perchloric acid, phosphoric acid, sulfuric acid, ammonium hydroxide, potassium hydroxide, and sodium hydroxide (References C159, P099, P100, P162, P163, P166, P167, P168, P169, P170, P171, P172, P234, P354, P358, P360, P365, P1235, P1247, P1248, P1249, P1251, U848). Waste management practices in the facility prohibited the accumulation of liquids in this waste stream (References P1122, P1250, P1251).

Corrosive liquids were verified to be absent in TRU waste in accordance with the ORNL Health Physics Manual and facility-specific procedures (References M165, P241, P244, P566, P956).

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

Reactivity

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

Several cyanide and sulfide compounds were used in Building 5505. Examples include thulium cyanide, holmium sulfide, and zinc sulfide (References P099, P169, P1251, P1265, P1270, U848). TRU waste will contain only small amounts of cyanide and sulfide contamination that will not be reactive. Reactive metals were also used in Building 5505. Examples include lithium, lithium aluminum hydride, potassium, and sodium (References P099, P162, P168, P170, P171, P172, P360, P1234, P1249, P1277). Reactive metals were used in small quantities and were completely reacted (e.g., oxidized in air) prior to disposal (Reference C159).

Free liquids and explosives were verified to be absent in TRU waste in accordance with the ORNL Health Physics Manual and facility-specific procedures (References M165, P241, P244, P566, P956).

To ensure the waste does not exhibit the characteristic of reactivity, liquid in excess of TSDF-WAC limits is removed or immobilized, and compressed gases (e.g., aerosol cans) are removed or vented prior to WIPP disposal. Therefore this waste stream does not exhibit the characteristic of reactivity (D003).

Toxicity

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 conservatively applied to the waste stream.

Several uses and sources have been identified for arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. Triphenylarsine and triphenylarsine oxide were used as complexing agents (References P358, P365, P1235). Barium chloride and barium sulfate were used as precipitation agents (References P360, P365). Cadmium was used as shielding, targets, and a neutron filter (References P100, P162, P172, P234, P1247, P1248, P1249, P1270). Chromium is contained in Nichrome heating elements (Reference P1249). Lead metal was used as shielding such as pigs (References P163, P166, P172, P1248, P1251, P1258). Mercury was used as a titrant, as a superconductor material, and was present in mercury arc lamps and electrodes (References P099, P100, P163, P170, P172). Selenium was used as a reactive matrix in actinide laser ablation studies (References P1251, P1270). Silver was used as a substrate, matrix material, target, and a phosphor activator (References P163, P166, P169, P171, P172, U848).

Uses have also been identified for carbon tetrachloride, chloroform, and 1,2-dichloroethane. Carbon tetrachloride was used as a chlorination agent and an extraction agent (References P162, P166, P1247, U848). Chloroform was used as an organic solvent (References P100, P360, P1247, P1248, P1249). 1,2-dichloroethane was used as a reagent (References P1270, U848).

Since analytical data are not available to demonstrate the concentrations of these metal and organic compounds in this debris waste stream are less than the regulatory threshold, EPA hazardous waste numbers D004, D005, D006, D007, D008, D009, D010, D011, D019, D022, and D028 are assigned to waste stream OR-GENR-CH-HET (Reference DR016).

Benzene and pyridine were used in the process that generated this waste stream. Since the more specific F-listed EPA HWNs have been assigned for benzene and pyridine, the corresponding toxicity characteristic HWNs D018 and D038 are not applied.

Listed Waste

F-Listed Waste

Waste stream OR-GENR-CH-HET was mixed with or derived from F-listed hazardous wastes from non-specific sources as listed in 40 CFR 261.31. F002 and F005 listed solvents were used in Building 5505 and contaminate the waste (Reference DR016).

Although several F001-listed solvents were identified in the AK record (i.e., carbon tetrachloride and Freon), these listed solvents were not used in a "large-scale" degreasing operation such as cold cleaning or vapor degreasing. Building 5505 did not conduct large-scale degreasing operations, and therefore, EPA HWN F001 is not assigned to this waste stream.

Unspecified Freon compounds were used as process media and trichlorofluoromethane (Freon 11) was used as a chlorinating agent during R&D activities (References C159, P099, P162). These uses do not constitute solvent use. However, Freon may also have been used for cleaning on a small scale (e.g., on rags or squirt bottles). The Freon compound used for cleaning was not specified, but Freon 11 is the only F002-listed chlorofluorocarbon known to have been used in Building 5505 (Reference C159). Therefore, EPA hazardous waste number F002 is assigned to this waste stream.

Benzene, pyridine, and toluene were used as organic solvents in Building 5505 (References P100, P162, P166, P167, P171, P365, P1248, P1261, P1270, P1273, U848). Therefore, EPA hazardous waste number F005 is assigned to this waste stream.

The F003-listed constituents acetone, n-butanol, methanol, and xylene were also used in Building 5505. These solvents are listed solely as ignitable in the liquid form. The waste stream does not exhibit the characteristic of ignitability because it is not liquid; therefore, F003 is not assigned.

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

F002 – Trichlorofluoromethane

F005 – Benzene, pyridine, and toluene

U, K and P-Listed Wastes

Waste stream OR-GENR-CH-HET 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 (References P099, P162, P163, P166, P167, P172, P234, P354, P1247, P1249). Based on the AK documentation reviewed, the form of beryllium used does not meet the definition of commercial chemical product beryllium powder (40 CFR 261.33). Therefore, EPA hazardous waste number P015 is not assigned to waste stream OR-GENR-CH-HET.

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 hazardous waste number U134 is not assigned to waste stream OR-GENR-CH-HET.

Waste stream OR-GENR-CH-HET does not include any of the manufacturing process wastes from the specific industries or sources listed in 40 CFR 261.32.

Waste Stream OR-GENR-CH-HET is not assigned any U-, K-, or P-Listed EPA hazardous waste number.

Headspace Gas/Volatile Organic Compound Information

Headspace gas analysis was performed on 10 randomly selected containers in Lot 1 of this waste stream. No target analyte UCL90 values exceeded the program required quantitation limits. No tentatively identified compounds were identified.

No new EPA hazardous waste numbers were added as a consequence of headspace gas sampling and analysis. The specifics of this information are included in the attached Characterization Information Summary report.

Conclusion

The EPA hazardous waste numbers that apply to the waste stream are D004, D005, D006, D007, D008, D009, D010, D011, D019, D022, D028, F002, and F005.

Polychlorinated Biphenyls

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

Based on a review of AK documentation and discussions with ORNL personnel, some drums in this waste stream contain equipment with small PCB capacitors and pumps that contained PCB oil. The oil was drained from the pumps and is not included in this waste stream. Examples of equipment containing small capacitors include fluorescent light ballasts and electric motors such as a vacuum pump motor. ORNL did not make a concerted effort to inventory pumps or electrical equipment containing small capacitors to determine if they contained PCBs so these items are potentially present in this waste stream (References C159, C308).

Containers with PCB waste, identified during RTR and/or VE, are managed in accordance with the PCB disposal requirements in the Waste Isolation Pilot Plant-Waste Acceptance Criteria.

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

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 and/or VE

RTR is an acceptable characterization method because RTR meets all the data quality objectives for NDE of waste stream OR-GENR-CH-HET

Method for Determining Waste Material Parameter Weights per Unit of Waste

The waste material parameters (WMPs) for waste stream OR-GENR-CH-HET were derived from VE of one drum performed at the TWPC. The WMPs, average weight percent and weight percent range are presented in Table 2. This evaluation is documented in a memorandum as required by CCP-TP-005, *CCP Acceptable Knowledge Documentation*.

Table 2. Waste Stream OR-GENR-CH-HET Waste Material Parameter Estimates

Waste Material Parameter	Average Weight Percent	Weight Percent Range
Iron-based Metals/Alloys	16.5%	0% – 16.5%
Aluminum-based Metals/Alloys	4.1%	0% – 4.1%
Other Metals	4.1%	0% – 4.1%
Other Inorganic Materials	16.5%	0% – 16.5%
Cellulosics	30.4%	0% – 30.4%
Plastics (waste materials)	8.3%	0% – 8.3%
Rubber	20.0%	0% – 20.0%
Organic Matrix [1]	<1.0%	0% – <1.0%
Inorganic Matrix	0%	0% – 0%
Soils/Gravel	0%	0% – 0%

1. Although not identified in limited VE data, small amounts of organic matrix may be present in this waste stream. The TWPC uses NOCHAR Petrobond ® (organic polymer absorbent) to absorb residual liquids (References P432, P1116). Building 5505 used Quick-Solid (organic polymer absorbent) to absorb residual liquids (Reference M165). Some ion-exchange resin may also be present in the waste stream.

List of Any AK Sufficiency Determinations Requested for the Waste Stream

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 drum.

Radionuclide Information

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

Table 3 – Radionuclides in Waste Stream OR-GENR-CH-HET

WIPP Tracked	Other Radionuclides Present			
Am-241	Co-60	Th-230	Np-237	Cm-246
Pu-238	Ce-139	Th-232	Np-239	Cm-248
Pu-239	Ce-144	Th-234	Pu-241	Bk-249
Pu-240	Pm-147	Pa-231	Am-243	Cf-249
Pu-242	Eu-152	Pa-233	Cm-242	Cf-252
U-233	Eu-154	U-232	Cm-243	Cf-253
U-234	Ra-226	U-235	Cm-244	Es-253
U-238	Th-227	U-236	Cm-245	
Cs-137				
Sr-90				

Payload management will not be implemented for this waste stream.

Attachment 1, AK SOURCE DOCUMENTS, SUPPLEMENTAL DOCUMENTATION

Source Document Number	AK #	Title	Document Number	Revision	Date
C020	S7	Memo to Madia, ORNL re: ORNL Transuranic Waste Generated at the Transuranium Research Laboratory, Building 5505	NA	NA	09/13/2000
C022	S7	Email To Trabalka Re: Potential For Extension of 'Defense Waste' Umbrella For ORNL's Transuranium Research Lab to Cover Wastes Generated From 1970-1999	NA	NA	09/19/2000
C078	S5	Memo to Bryan Roy Transmitting Historical Survey – RCRA Information	NA	NA	04/04/2005
C157	S7	Interview of Kim Jeskie, Building 5505 CSD Waste Service Group	NA	NA	11/16/2009
C158	S7	Interview of Rob Peacher, Building 5505 Facility Manager from 1995 - 2005	NA	NA	11/17/2009
C159	S7	Interview with Dick Haire, Building 5505 Research Chemist	NA	NA	11/19/2009
C308	S7	Interview of Jason Taylor, ORNL-PCB Coordinator from 1997 - 2004 re: PCB Management at ORNL	NA	NA	04/08/2008
DR016	NA	Discrepancy Resolution – Waste Stream OR-GENR-CH-HET EPA Hazardous Waste Number Assignment	NA	NA	01/13/2010
M151	S6	ORNL EM Waste Database Query	DR-09-001168	NA	04/22/2009
M165	NA	UCN-2109 and UCN-2822 Forms and Associated Container Paperwork for Building 5505	NA	NA	Various
M171	S6	ORNL EM Waste Database Query	DR-10-000450	NA	11/09/2009
M176	S10	Material Safety Data Sheets for Commercial Products Used in Building 5505	NA	NA	Various
P099	S5	Chemistry Division Annual Progress Report, Period Ending November 1, 1975	ORNL-5111	NA	02/1976
P100	S5	Chemistry Division Annual Progress Report, Period Ending January 31, 1984	ORNL-6037	NA	05/1984

Source Document Number	AK #	Title	Document Number	Revision	Date
P162	S5	Chemistry Division Annual Progress Report for Period Ending May 20, 1970	ORNL-4581	NA	09/08/1970
P163	S5	Chemistry Division Annual Progress Report Period Ending May 20, 1972	ORNL-4791	NA	08/1972
P166	S5	Chemistry Division Annual Progress Report Period Ending May 20, 1974	ORNL-4976	NA	10/01/1975
P167	S5	Chemistry Division Annual Progress Report Period Ending March 31, 1977	ORNL-5297	NA	09/1977
P168	S5	Chemistry Division Annual Progress Report Period Ending August 31, 1978	ORNL-5485	NA	02/1979
P169	S5	Chemistry Division Annual Progress Report for Period Ending February 29, 1980	ORNL-5665	NA	07/1980
P170	S5	Chemistry Division Annual Progress Report for Period Ending July 31, 1981	ORNL-5817	NA	01/1982
P171	S5	Chemistry Division Annual Progress Report for Period Ending January 31, 1983	ORNL-5954	NA	06/1983
P172	S5	Chemistry Division Annual Progress Report Period Ending May 20, 1973	ORNL-4891	NA	09/1973
P234	S5	Chemistry Division Annual Progress Report for Period Ending May 20, 1971	ORNL-4706	NA	09/1971
P241	NA	Oak Ridge National Laboratory Contact-Handled Transuranic Waste Certification Program Plan	ORNL/TM-10322	1, 2, 3	06/1992
P244	NA	Certification Document for Newly Generated Contact-Handled Transuranic Waste	ORNL-5985	1	05/1984
P251	S2	Box Breakdown Area Operations	CH-P-OP-003	7, 9, 12, 15, 18	03/13/2007 - 09/09/2009
P252	S2	Glove Box Operations	CH-P-OP-004	8, 10, 14, 17, 18	03/13/2007 - 07/28/2009
P253	S2	Drum Bag In/Bag Out and Glove Ports	CH-P-OP-011	10, 12, 13, 14, 16	05/02/2007 - 08/24/2009
P254	S2	Contact Handled Waste Repackaging	CH-P-OP-013	6, 7, 8, 9	04/30/2007 - 03/23/2009

Source Document Number	AK #	Title	Document Number	Revision	Date
P256	S3	TRU/Alpha Low Level Waste (LLW) Treatment Project Documented Safety Analysis	T-CM-FW-R-AD-001	13	03/01/2007
P354	S5	Chemistry Division Annual Progress Report for Period Ending March 1, 1991	ORNL-6668	NA	08/13/1991
P358	S5	Chemistry Division Annual Progress Report for Period Ending January 31, 1986	ORNL-6261	NA	05/1986
P360	S5	Chemistry Division Annual Progress Report for Period Ending January 31, 1985	ORNL-6152	NA	05/1985
P364	S5	Analytical Chemistry Division Annual Progress Report for Period Ending December 31, 1992	ORNL-6749	NA	04/1993
P365	S5	Chemistry Division Annual Progress Report for Period Ending March 31, 1987	ORNL-6385	NA	08/1985
P432	S3	TRU Waste Processing Center Document Safety Analysis	CM-R-AD-001	15, 16, 17, 18	10/31/2007 - 06/23/2009
P566	S2	ORNL Health Physics Manual; Procedures RP-4.1; RP-4.2; RP-5.1	ORNL/M-804; RP-4.1; RP-4.2; RP-5.1	NA	11/02/1994
P641	S2	Oak Ridge National Laboratory Chemical and Analytical Sciences Division Standard Operating Procedure for Handling of Samples and Decontamination of Ion Lenses in the 5505 TRU Laboratory	CASD-OP-TRL-RP01	1	07/16/1999
P905	S2	Health Physics Procedure - Handling and Transfer of Radioactive Materials within the Laboratory and Guide for the Transfer of Materials Between Contaminated Enclosure Systems and Non-Contaminated Areas	Procedure 4.1	NA	01/01/1976
P956	S2	Segregation and Management of Solid Radioactive Materials	NA	NA	11/27/1985 05/15/1986
P1110	S5	Chemistry Division Annual Progress Report for Period Ending April 30, 1993	ORNL-6756	NA	08/1993
P1116	S2	EnergX TRU Waste Processing Center Procedure: Absorbing Liquids	CH-I-OP-013	4, 6	11/17/2008

Source Document Number	AK #	Title	Document Number	Revision	Date
P1122	NA	ORAU Team NIOSH dose Reconstruction Project: Technical Basis Document for the Oak Ridge National Laboratory - Site Description	ORAUT-TKBS-0012-2	0, 1	11/14/2008 08/30/2006
P1195	S2	Use of Radiochemical Glove Boxes in the Transuranium Research Laboratory	CASD-OP-TRL-GB01	1	08/01/1997
P1196	S2	Handling of Samples and Decontamination of Ion Lenses in the 5505 TRU Laboratory	CASD-OP-TRL-RP01	1	07/16/1999
P1197	S5	Guidelines for Radioactive Work with Quartz Capillaries and Diamond Anvil Cells	CASD-OP-TRL-RP02	0	04/14/1998
P1234	S5	Chemistry Division Annual Progress Report for Period Ending March 31, 1989	ORNL-6555	NA	09/1989
P1235	S5	Chemistry Division Annual Progress Report for Period Ending March 31, 1988	ORNL-6481	NA	09/18/1988
P1242	S9	Radioactive Operations Committee Review of Activities at the Transuranium Research Laboratory, Building 5505	ORNL/CF-88/223	NA	08/26/1988
P1247	S5	Chemistry Division Annual Progress Report for Period Ending May 20, 1968	ORNL-4306	NA	09/1971
P1248	S5	Chemistry Division Annual Progress Report for Period Ending May 20, 1967	ORNL-4164	NA	09/1967
P1249	S5	Chemistry Division Annual Progress Report for Period Ending May 20, 1969	ORNL-4437	NA	09/24/1969
P1250	S3	Operations Safety Requirements for the ORNL Transuranium Research Laboratory (Building 5505)	ORNL/CF-84/82	NA	03/23/1984
P1251	S3	The ORNL Transuranium Research Laboratory Description and Safety Analysis	ORNL/CF-84/85	NA	03/28/1984
P1256	S5	Gas-Phase Thermochemical Studies of Actinide Oxides	NA	NA	NA
P1257	S5	Probing The Participation of 5f Electrons In Gas-Phase Reactions of Actinide Cations with Small Alkanes and Alkenes	NA	NA	NA

Source Document Number	AK #	Title	Document Number	Revision	Date
P1258	S5	Oxidation Studies of Dispositive Actinide Ions, An^2+ (An = Th, U, Np, Pu, Am) in the Gas Phase: Synthesis and Characterization of the Isolated Uranyl, Neptunyl and Plutonyl Ions, UO2^2+ (g), NpO2^2+ (g) and PuO2^2+ (g).	NA	Draft	05/06/2004
P1259	S5	Determination of the Ionization Energy of NpO2 and Comparative Ionization Energies of Actinide Oxides	NA	Draft	09/22/2004
P1260	S5	Syntheses, Structures, and the Raman and Photoluminescence Properties of Am(IO3)3 and Cm(IO3)3	NA	NA	NA
P1261	S5	New Developments in Gas-Phase Actinide Ion Chemistry	NA	NA	NA
P1262	S5	Laser Ablation of Silicate Glasses Doped with Transuranic Actinides	ORNL/CP-98252	NA	06/10/1998
P1263	S5	Reactions of Actinide Ions with Pentamethylcyclopentadiene: Atypical Hydrocarbon Activation	NA	Draft	11/29/1999
P1264	S5	Gas-Phase Plutonium Oxide Cluster Ions; and Initial Actinide Ion Trapping Experiments	NA	NA	NA
P1265	S5	Berkelium and Californium Organometallic Ions	NA	NA	04/26/2000
P1266	S5	Synthesis and Investigation of Plutonium Oxide Cluster Ions: PuxOy^+ (x <= 18)	NA	NA	06/20/2000
P1270	S5	On-Site Review Document: Actinide Science, Chemistry of Transuranium Elements and Compounds	NA	NA	04/08/1999
P1271	S5	The Neptunium-Iron Phase Diagram	0022-3115(94)00305-8	NA	04/18/1994
P1273	S5	Gas-Phase Reactions of Americium Ion, Am+, with Alkenes	S0276-333(98)00155-1	NA	03/03/1998

Source Document Number	AK #	Title	Document Number	Revision	Date
P1274	S5	Activation of Pentamethylcyclopentadiene by Bk+, Cf+, and Es+ Ions in the Gas Phase: Probing Electronic Structures of Transcurium Actinides	10.1021/om049387v	NA	08/06/1994
P1275	S5	Semi-Empirical Models of Actinide Alloying	S0022-3115(99)00038-0	NA	02/02/1999
P1276	S5	Self-Irradiation Induced Structural Changes in the Transplutonium Pyrochlores An2Zr2O7 (An=Am, Cf)	10.1016/j.jssc.2004.07.037	NA	07/22/2004
P1277	S5	Preparation and Lattice Parameters of Americium and Curium Monobismuthides	0022-5088/87	NA	10/21/1986
P1278	S5	High-Temperature DTA Of Transuranium Materials with Application to the Np-Zr Phase Diagram	NA	NA	02/03/1992
U044	S2, S9	Weston Report: Acceptable Knowledge Summary Report for Oak Ridge National Laboratory Contact-Handled TRU Debris Waste Facility Maintenance Operations	AK-ORNL-001	3A, 4	05/24/2006; 06/19/2006
U124	S2	Contamination Control Plan for Hot Cell (TWPC Hot Cell)	NA	Draft	NA
U848	S5	Logbook: J. K. Gibson, A-108215-L, ORNL-5505-Lab 15, Laser Mass. Spec.	A-108215-L	NA	7/15/1996 - 6/15/2004

Alphanumeric Designations

C Correspondence
DR Discrepancy Resolution
I Internal Procedures and Notes
M Miscellaneous
P Published Documents
U Unpublished Documents

AK Numbers

S1	Process Design Documents
S2	Standard Operating Procedure
S3	Safety Analysis Reports
S4	Waste Packaging Logs
S5	Test plans/research project reports
S6	Site databases
S7	Information from site personnel
S8	Standard industry documents
S9	Previous analytical data
S10	Material safety data sheets
S11	Laboratory Notebooks
S12	Comparable or surrogate sampling and analysis data
NA	Not applicable