NOV 09 1993 Sta. 21 20	ENGINEERING DATA TRANSMITTAL	Page 1 of 1 1. EDT 157013
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2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) WRAP Technology	4. Related EDT No.:
5. Proj./Prog./Dept./Div.: WRAP 2A/W100-24910	6. Cog. Engr.: K. E. Parker	7. Purchase Order No.: N/A
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11. Receiver Remarks:		10. System/Bldg./Facility: WRAP 2A
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1	WHC-SD-W100-ICD-001		0	WRAP 2A Product Specification	4	1	1	

16. KEY			
Impact Level (F)	Reason for Transmittal (G)		Disposition (H) & (I)
1, 2, 3, or 4 (see MRP 5.43)	1. Approval 2. Release 3. Information	4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

(G)	(H)	17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)								(G)	(H)
Reason	Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	Reason	Disp.
2	1	Cog. Eng. KE Parker	<i>K. Parker</i>	8/26/93	H1-60	WRAP DMC (3)		8-6-51		3	
2	1	Cog. Mgr. CA Petersen	<i>CA Petersen</i>	8/26/93	H1-60						
2	1	JG Riddelle	<i>OL Kruger</i>	11/2/93	H5-33						
2	1	RD Pierce	<i>RD Pierce</i>	11/2/93	H3-13						
3	-	JA Swenson			G5-45						
3		TL Yount			H1-60						
3		OL Kruger			H5-33						

18. Signature of EDT Originator <i>K. Parker</i> 8/26/93	19. Authorized Representative Date for Receiving Organization _____	20. Cognizant/Project Engineer's Manager <i>CA Petersen</i> 8/26/93	21. DOE APPROVAL (if required) Ltr. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments
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Date Received: <u>11-8-93</u>		INFORMATION RELEASE REQUEST		Reference: WHC-CM-3-4	
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Purpose			ID Number (include revision, volume, etc.)		
☐ Speech or Presentation ☐ Full Paper (Check only one suffix) ☐ Summary ☐ Abstract ☐ Visual Aid ☐ Speakers Bureau ☐ Poster Session ☐ Videotape			WHC-SD-W100-ICD-001, Rev. 0		
			List attachments.		
			Appendices 1 and 2 Date Release Required <u>11/10/93</u> <u>10/1/93</u>		
Title WRAP 2A Product Specification			Unclassified Category UC- pa 721		Impact Level 4
New or novel (patentable) subject matter? ☒ No ☐ Yes If "Yes", has disclosure been submitted by WHC or other company? ☐ No ☐ Yes Disclosure No(s).			Information received from others in confidence, such as proprietary data, trade secrets, and/or inventions? ☒ No ☐ Yes (Identify)		
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Title of Journal					
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Review Required per WHC-CM-3-4		Yes	No	Reviewer - Signature Indicates Approval	
				Name (printed)	Signature Date
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Applied Technology/Export Controlled Information or International Program		☐	☒		
WHC Program/Project		☒	☒	J. J. Swenson	<i>[Signature]</i> 11-4-93
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Information conforms to all applicable requirements. The above information is certified to be correct.					
References Available to Intended Audience		Yes	No	INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP	
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Author/Requestor (Printed/Signature)		☒	☒
KE Parker <i>[Signature]</i>		Date			
Intended Audience		<u>8/26/93</u> <u>8/30/93</u>			
☐ Internal ☐ Sponsor ☒ External Responsible Manager (Printed/Signature) Date		CA Petersen <i>[Signature]</i> <u>8/30/93</u>		Date Cancelled	Date Disapproved

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Additional Information

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5. Key Words WRAP, Product Specification	6. Author Name: K. E. Parker Signature Organization/Charge Code 24910/A5501		
7. Abstract <p>This supporting document compiles all the product criteria for WRAP 2A program into a single document. The document is broken down by feed stream, source of the waste, waste codes and recommended final forms of the waste for each stream.</p>			
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9. Impact Level 4			

WRAP 2A PRODUCT SPECIFICATION

August 26, 1993

K. E. Parker

prepared for:
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P. O. Box 1970
Richland, Washington 99352

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1.0 SCOPE

This supporting document compiles all the product criteria for the Waste Receiving and Processing Facility, Module 2A (WRAP-2A) program into a single document. Its purpose is to ensure that the policies and guidelines of the Department of Energy (DOE) Order 5820.2A (DOE 1988) for compliance with federal, state and local environmental safety and health laws, regulations and DOE requirements are followed. The order states that radioactive and mixed wastes are to be managed to protect the health and safety of the public, the environment and the DOE and its contractors and employees.

1.1 INTRODUCTION

WRAP-2A will process mixed and low-level waste (MLLW) for disposal. The final treatment processes selected for use in WRAP-2A consist of stabilization using cementitious materials and immobilization using thermosetting polymers. Modifications or additions to these processes may be made as technology improvements become known. Knowledge of the diverse waste forms that must be processed will be important to the effective exploration of process technologies that may be available.

This document is a compilation of the current knowledge of the waste and process methods specified for each type of waste. As the uncertainties associated with the waste and methods of processing are addressed and resolved, revisions to this document will be made.

This document is broken down by feed stream, source of the waste, waste codes, radiological characterization and recommended final forms of the waste for each stream.

2.0 GENERAL PRODUCT REQUIREMENTS

The processed waste from WRAP 2A will be disposed of in the W-025 Landfill. This landfill consists of a double lined, RCRA compliant trench which is designed to meet all Federal, state and local requirements for the disposal of radioactive mixed waste. During the design of the landfill, some assumptions were made regarding the waste. In addition, some of the materials of construction have limits such as tear and puncture strength of the liner. Therefore, the waste product from WRAP 2A can not exceed these parameters. The following is a list of parameters that the product waste drums must meet, to insure that the landfill does not exceed the design limits.

- The pH of any leachate will be between 2.0 and 12.5. (References 1, 2, 11 and 12.)

- The radiation dose rate from each drum will be less than 200 mrem/hr. This will assure that the total dose rate for the liner will never exceed 50 kRad. (References 11, 12 and Attachment 2.)

- The compressive drum strength will be a minimum of 60 psi which will hold a 100 ton crane moving across the top of the landfill. (References 13 and Attachment 1.)

2.1 STORAGE REQUIREMENTS

The temporary storage requirements for the treated drums is directly related to the treatment processes. When the treatment processes are fully developed, the storage requirements will be added to this document.

2.2 PRODUCT STREAMS

2.2.1 Solidified 183-H Solar Basin Waste Liquids

A. Source

The four 183-H basins were used from 1973 to 1985 for solar evaporation of neutralized acid etch solutions from N-Reactor fuel fabrication activities. During closure of these basins, supernatant liquid was consolidated from all four basins. In 1988-1989, the liquid was mixed with solidification agents in a batch reactor and then packaged into drums. Additional drums of solidified liquid resulted from the solidification in 1990 of well purge water, washdown water and liquids that seeped from the remaining crystal solids.

B. Tracking Codes

SDAR Number

3-1C-3BM-0
 3-1C-3BM-1
 3-1C-3BM-1
 3-1C-3BM-2
 3A-1C-3BM-0
 6-1C-3BM-0

C. Waste Codes and Treatment Requirements

<u>Waste Code</u>	<u>Disposal Requirement</u>	<u>Treatment</u>	<u>Regulatory Requirement</u>
P029 Copper Cyanide	Total CN 110 mg/Kg Amenable 9.1 mg/Kg	No treatment Required	40 CFR 268.43
P030 Cyanide Salts	Same as Above	Same as Above	Same as Above
P098 Potassium Cyanide	Same as Above	Same as Above	Same as Above
P106 Sodium Cyanide	Same as Above	Same as Above	Same as Above
P120 Vanadium Pentoxide	Stabilization	Stabilization	40 CFR 268.42
U123 Formic Acid	Incineration	Apply for Variance	40 CFR 268.42
D007 EP Toxicity (Chromium)	TCLP, 5.0 mg/L	Solidification	40 CFR 268.41
WT01 Toxic EHW	Stabilization of Leachable Inorganics	Solidification	WAC 173-303-140

D. Radiological Characteristics and Treatment Requirements

<u>Radionuclide</u>	<u>Concentration Ci/Drum</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
Tc-99	1.9E-04	None	Class I
U	9.3E-06	None	Class I

No data available for I-129, Se-79 and Np-197.

E. Additional Waste Form Information

Package-55 Gallon DOT 17 C or H drum (with drum liner)
Drum Weight- <1000 pounds
Compressive Strength-60 psi
No free liquids

F. Treatment

The treatment of choice for this waste stream is Immobilization/Stabilization. Variances will be sought for those waste codes which have technology based treatment standards.

2.2.2 183-H Solar Basin Crystalline Solids

A. Source

The four 183-H basins were used from 1973 to 1985 for solar evaporation of neutralized acid etch solutions from N-Reactor fuel fabrication activities. During closure of these basins, supernatant liquid was consolidated from all four basins. As the water evaporated off, some material precipitated out of the liquid in the form of crystalline solids.

B. Tracking Codes

SDAR Number

3-1Y-6KM-0
 3-1Y-6KM-1
 3-1Y-6KM-3
 3A-1Y-6KM-0
 6-1Y-6KM-0

C. Waste Codes and Treatment Requirements

<u>Waste Code</u>	<u>Disposal Requirement</u>	<u>Treatment</u>	<u>Regulatory Requirement</u>
P029 Copper Cyanide	Total CN 110 mg/Kg Amenable 9.1 mg/Kg	No treatment Required	40 CFR 268.43
P030 Cyanide Salts	Same as Above	Same as Above	Same as Above
P098 Potassium Cyanide	Same as Above	Same as Above	Same as Above
P106 Sodium Cyanide	Same as Above	Same as Above	Same as Above
P120 Vanadium Pentoxide	Stabilization	Stabilization	40 CFR 268.42
U123 Formic Acid	Incineration	Apply for Variance	40 CFR 268.42
D001 Oxidizer	Deactivation	Solidification	40 CFR 268.42
D007 EP Toxicity (Chromium)	TCLP, 5.0 mg/L	Solidification	40 CFR 268.41
WT01 Toxic EHW	Stabilization of Leachable Inorganics	Solidification	WAC 173-303-140

D. Radiological Characteristics and Treatment Requirements

<u>Radionuclide</u>	<u>Concentration Ci/Drum</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
Tc-99	2.8E-04	None	Class I
U	2.8E-05	None	Class I

E. Additional Waste Form Information

Package-55 Gallon DOT 17 C or H drum (with drum liner)
 Drum Weight- <1000 pounds
 No free liquids

F. Treatment

The treatment of choice for this waste stream is
 Immobilization/Stabilization. Variances will be sought for those
 waste codes which have technology based treatment standards.

2.2.3 183-H Solar Basin Sludge Waste

A. Source

The four 183-H basins were used from 1973 to 1985 for solar evaporation of neutralized acid etch solutions from N-Reactor fuel fabrication activities. Sludge subsequently precipitated to the bottom of each of the basins. A relatively dry crystalline solids comprise a distinct strata on the interior edges of basins 1,3 and 4. In basins 3 and 4 the sludge was packaged separately from the crystal solids.

B. Tracking Codes

SDAR Number

3-1A-1KM-1

3-1K-1KM-0

6-1Y-5EM-1

C. Waste Codes and Treatment Requirements

<u>Waste Code</u>	<u>Disposal Requirement</u>	<u>Treatment</u>	<u>Regulatory Requirement</u>
P029 Copper Cyanide	Total CN 110 mg/Kg Amenable 9.1 mg/Kg	No treatment Required	40 CFR 268.43
P030 Cyanide Salts	Same as Above	Same as Above	Same as Above
P098 Potassium Cyanide	Same as Above	Same as Above	Same as Above
P106 Sodium Cyanide	Same as Above	Same as Above	Same as Above
P120 Vanadium Pentoxide	Stabilization	Stabilization	40 CFR 268.42
U123 Formic Acid	Incineration	Apply for Variance	40 CFR 268.42
D001 Oxidizer	Deactivate	Solidification	40 CFR 268.42
WT01 Toxic EHW	Stabilization of Leachable Inorganics	Solidification	WAC 173-303-140

D. Radiological Characteristics and Treatment Requirements

<u>Radionuclide</u>	<u>Concentration Ci/Drum</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
Tc-99	3.7E-04	None	Class 1
Uranium	1.5E-04	None	Class 1
-Basin 3	8.70E-7 (Average)	None	Class 1
-Basin 4	5.20E-7 (Average)	None	Class 1

E. Additional Waste Form Information

Package-55 Gallon DOT 17 C or H drum (with drum liner)
 Drum Weight- <1000 pounds
 Compressive Strength-60 psi
 No free liquids

F. Treatment

The treatment of choice for this waste stream is Immobilization/Stabilization. Variances will be sought for those waste codes which have technology based treatment standards.

2.2.4 183-H Solar Basin Miscellaneous Waste

A. Source

The four 183-H basins were used from 1973 to 1985 for solar evaporation of neutralized acid etch solutions from N-Reactor fuel fabrication activities. Miscellaneous wastes generated during the waste removal and cleanout process between 1985 and 1990 included old basin liner material, solidified liquids, sandblast grit, expendable equipment and protective clothing.

B. Tracking Codes

SDAR Number

3-1C-1KM-0
 3-1C-1KM-2
 6-1Y-1KM-0
 3-1C-1AM-1
 6-1C-1AM-0
 3-1C-1AM-0
 3A-1A-1KM-2
 6-3D-1AM-0

C. Waste Codes and Treatment Requirements

<u>Waste Code</u>	<u>Disposal Requirement</u>	<u>Treatment</u>	<u>Regulatory Requirement</u>
P029 Copper Cyanide	Total CN ⁻ 110 mg/Kg Amenable 9.1 mg/Kg	No treatment Required	40 CFR 268.43
P030 Cyanide Salts	Same as Above	Same as Above	Same as Above
P098 Potassium Cyanide	Same as Above	Same as Above	Same as Above
P106 Sodium Cyanide	Same as Above	Same as Above	Same as Above
P120 Vanadium Pentoxide	Stabilization	Stabilization	40 CFR 268.42
U123 Formic Acid	Incineration	Apply for Variance	40 CFR 268.42
D001 Oxidizer	Deactivation	Solidification	40 CFR 268.42
D007 EP Toxicity (Chromium)	TCLP, 5.0 mg/L	Stabilization	40 CFR 268.41

C. Waste Codes and Treatment Requirements-continued

<u>Waste Code</u>	<u>Disposal Requirement</u>	<u>Treatment</u>	<u>Regulatory Requirement</u>
WT01 Toxic EHW -Basins 1,3,4	Stabilization of Leachable Inorganics	Stabilization	WAC 173-303-140
WT02 Toxic DW -Basin 2	Stabilization of Leachable Inorganics	Stabilization	WAC 173-303-140

D. Radiological Characteristics and Treatment Requirements

<u>Radionuclide</u>	<u>Concentration Ci/Drum</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
U	5.8E-07	None	Class I
Tc-99	4.8E-06	None	Class I

E. Additional Waste Form Information

Package-55 Gallon DOT 17 C or H drum (with drum liner)
 Drum Weight- <1000 pounds
 Compressive Strength-60 psi
 No free liquids

F. Treatment

The treatment of choice for this waste stream is immobilization/Stabilization. Variances will be sought for those waste codes which have technology based treatment standards.

2.2.5 Ammonium Sulfate Sludge

A. Source

The 200 Area Effluent Treatment Facility (ETF) will treat acidified Process Condensate from the 242-A Evaporator, primarily to remove dissolved solid contaminants. The contaminant solids and ETF process solutions are then dried to a powder.

B. Waste Codes and Treatment Requirements

<u>Waste Code</u>	<u>Disposal Requirement</u>	<u>Treatment</u>	<u>Regulatory Requirement</u>
F001 1,1,1 Trichloroethane	0.41 mg/L	No Treatment Required (NTR)	40 CFR 268.41
F002 Methylene Chloride	0.96 mg/L	NTR	Same as Above
F003 Acetone	0.59 mg/L	NTR	Same as Above
Butyl Alcohol	5.0 mg/L		
Methyl Isobutyl Ketone	0.33 mg/L		
F004 Cresylic Acid	0.75 mg/L	NTR	Same as Above
F005 Methyl Ethyl Ketone	0.75 mg/L	NTR	Same as Above
Pyridine	0.33 mg/L		
D007 EP Toxicity (Chromium)	TCLP, 5.0 mg/L	Immobilization	40 CFR 268.41
D009 EP Toxicity (Mercury)	TCLP, 0.2 mg/L	Immobilization	40 CFR 268.41
WT02 Dangerous Waste	Immobilization of Leachable Inorganics	Immobilization	WAC 173-303-140

C. Radiological Characteristics and Treatment Requirements

<u>Radionuclide</u>	<u>Concentration Ci/Drum</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
Alpha	8.5E-4	None	Class I
Beta/Gamma	6.5E-5	None	Class I
Ru-103	3.3E-3	None	Class I
Rh-103m	3.3E-3	None	Class I
Ru-106	2.0E-3	None	Class I
Rh-106	2.0E-3	None	Class I
Cs-137	1.0E-3	None	Class I
Ba-137m	1.0E-3	None	Class I

D. Additional Waste Form Information

Package-55 Gallon DOT 17 C or H drum (with drum liner)
 Drum Weight- <1000 pounds
 Compressive Strength-60 psi
 No free liquids

E. Treatment

The treatment of choice for this waste stream is Immobilization/Stabilization. Variances will be sought for those waste codes which have technology based treatment standards.

2.2.6 Ion Exchange Resin

A. Source

This waste stream consists of spent resins generated by facilities that treat liquid waste. Resins may be regenerated several times prior to being discarded, but will probably not be regenerated the last time used. Any of several types of cation, anion or mixed bed resins may be generated. Most resins will be of the styrene-divinyl benzene type.

B. Waste Codes and Treatment Requirements

These waste codes are for C-018. The waste codes for the L-045 are unknown until TCLP tests can be performed.

<u>Waste Code</u>	<u>Disposal Requirement</u>	<u>Treatment</u>	<u>Regulatory Requirement</u>
F001 1,1,1 Trichloroethane	0.41 mg/L	No Treatment Required (NTR)	40 CFR 268.41
F002 Methylene Chloride	0.96 mg/L	NTR	Same as Above
F003 Acetone	0.59 mg/L	NTR	Same as Above
Butyl Alcohol	5.0 mg/L		
Methyl Isobutyl Ketone	0.33 mg/L		
F004 Cresylic Acid	0.75 mg/L	NTR	Same as Above
F005 Methyl Ethyl Ketone	0.75 mg/L	NTR	Same as Above
Pyridine	0.33 mg/L		
WT02 Dangerous Waste	Immobilization of Leachable Inorganics	Immobilization	WAC 173-303-140

C. Radiological Characteristics and Treatment Requirements

Radiological characteristics for Project L-045.

<u>Radionuclide</u>	<u>Concentration Ci/Liter</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
Tritium	1.36E-7	None	Class I
Co-60	3.4 E-11	None	Class I
Sr-90	2.54E-10	None	Class I
Sr (total)	7.14E-10	None	Class I
Ru-106	1.02E-9	None	Class I
Cs-137	1.54E-8	None	Class I
Pm-147	3.02E-9	None	Class I
Radium Total	5.1E-11	None	Class I
U Total	1.36E-10	None	Class I
Pu-238	8.5E-4	None	Class I
Pu-239/240	3.4E-3	None	Class I
Pu-241	6.8E-10	None	Class I
Am-241	1.0E-11	None	Class I
<u>Radionuclide</u>	<u>Concentration Ci/Gram</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
Alpha	1.85E-8	None	Class I
Beta	1.7E-11	None	Class I

Radiological characteristics for Project C-018H.

<u>Radionuclide</u>	<u>Concentration Ci/Cubic Meter</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
Alpha	2.7E-06	None	Class I
Beta	3.6E-05	None	Class I
Tritium	6.3E-03	None	Class I
Y-90	5.7E-05	None	Class I
Sr-90	5.7E-05	None	Class I
Ru-103	1.4E-04	None	Class I
Rh-103m	1.4E-04	None	Class I
Ru-106	8.6E-05	None	Class I
Rh-106	8.6E-05	None	Class I
Sn-113	5.7E-05	None	Class I
In-113m	5.7E-05	None	Class I
I-129	None	None	Class I
Cs-134	None	None	Class I
Cs-137	4.1E-05	None	Class I
Ba-137m	4.1E-05	None	Class I
Pm-147	1.2E-05	None	Class I
Eu-155	None	None	Class I
U Total	2.5E-07	None	Class I
Pu-238	None	None	Class I
Pu-239	5.2E-12	None	Class I
Pu-241	None	None	Class I
Am-241	None	None	Class I
Total Activity	6.7E-04	None	Class I

D. Additional Waste Form Information

Package-55 Gallon DOT 17 C or H drum (with drum liner)
Drum Weight- <1000 pounds
Compressive Strength-60 psi
No free liquid

E. Treatment

The treatment of choice for this waste stream is
Immobilization/Stabilization. Variances will be sought for those
waste codes which have technology based treatment standards.

2.2.7 Ferric Hydroxide Sludge; Metal Sludge; LO45 Sludge; Filter Press Sludge**A. Source**

The 300 Area Treated Effluent Disposal Facility (TEDF) will treat process waste water. The waste water is generated in the 300 Area laboratories office buildings, fabrication and maintenance buildings and utilities facilities. The waste water will be treated by ferric hydroxide co-precipitation, clarification, filtration, ion exchange and ultra violet light oxidation. The co-precipitation step in the process produces a large quantity of metal hydroxide solids. The solids are transferred from the clarifier to a thickener tank prior to dewatering. The water is removed from the sludge in a filter press. After being pressed, the sludge is approximately 20-30% solids and 70-80% water.

B. Waste Codes and Treatment Requirements

None have been listed until TCLP tests can be performed on the sludge.

C. Radiological Characteristics and Treatment Requirements

<u>Radionuclide</u>	<u>Concentration Ci/Liter</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
Tritium	2.67E-7	None	Class I
Co-60	1.7E-6	None	Class I
Sr-90	4.71E-7	None	Class I
Sr (total)	1.32E-6	None	Class I
Ru-106	1.89E-6	None	Class I
Cs-137	3.97E-7	None	Class I
Pm-147	1.75E-7	None	Class I
Radium Total	9.43E-8	None	Class I
U Total	1.43E-5	None	Class I
Pu-238	8.95E-8	None	Class I
Pu-239/240	3.58E-7	None	Class I
Pu-241	7.16E-5	None	Class I
Am-241	1.007E-5	None	Class I

C. Radiological Characteristics and Treatment Requirements-continued

<u>Radionuclide</u>	<u>Concentration Ci/Gram</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
Alpha	8.0E-11	None	Class I
Beta	3.5E-10	None	Class I

D. Additional Waste Form Information

Package-55 Gallon DOT 17 C or H drum (with drum liner)
Drum Weight- <1000 pounds
No free liquids

E. Treatment

The treatment of choice for this waste stream is Immobilization/Stabilization. Variances will be sought for those waste codes which have technology based treatment standards.

2.2.8 Elemental Mercury

A. Source

Mercury was used throughout the Hanford site and DOE Complex in vacuum pumps, gauges and other applications.

B. Waste Codes and Treatment Requirements

<u>Waste Code</u>	<u>Disposal Requirement</u>	<u>Treatment</u>	<u>Regulatory Requirement</u>
D009 Mercury	TCLP, 0.2 mg/L	Retort & Immobilization	40 CFR 268.41
U151 Mercury Elemental Radioactive	Amalgamate	Retort & Amalgamation	40 CFR 268.41
WT01 Toxic EHW	Stabilization of Leachable Inorganics	Solidification	WAC 173-303-140

C. Radiological Characteristics and Treatment Requirements

<u>Radionuclide</u>	<u>Concentration Total Ci</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
U Total	4E-09	None	Class I

Existing waste does not contain significant curies of Tc-99, I-129, Se-79 or Np-137.

D. Additional Waste Form Information

Package-55 Gallon DOT 17 C or H drum (with drum liner)
Drum Weight- <1000 pounds
Compressive Strength-60 psi
No free liquids

E. Treatment

The treatment of choice for this waste stream is Amalgamation and Immobilization/Stabilization.

2.2.9 Mercury Chemicals/Solutions

A. Source

Mercury chemical/solution waste is generated from a variety of sources throughout the Hanford site. The mercury and other component contents of the waste are variable.

B. Waste Codes and Treatment Requirements

<u>Waste Code</u>	<u>Disposal Requirement</u>	<u>Treatment</u>	<u>Regulatory Requirement</u>
D009 Mercury <260mg/Kg	TCLP, 0.2 mg/L	Immobilization	40 CFR 268.41
D009 Mercury >260mg/Kg	Retort, TCLP, 0.2 mg/L	Retort and Immobilization	40 CFR 268.41
D004 Arsenic	TCLP, 5.0 mg/L	Solidification	40 CFR 268.41
D005 Barium	TCLP, 100 mg/L	Same as Above	Same as Above
D006 Cadmium	TCLP, 1.0 mg/L	Same as Above	Same as Above
D007 Chromium	TCLP, 5.0 mg/L	Same as Above	Same as Above
D008 Lead	Macro Encapsulation	Same as Above	Same as Above
D010 Selenium	TCLP, 5.7 mg/L	Same as Above	Same as Above
D011 Silver	TCLP, 5.0 mg/L	Same as Above	Same as Above
U151 Mercury Elemental Radioactive	Amalgamation	Amalgamation & Solidification	40 CFR 268.41
D001 Ignitable	Deactivate	Special Treatment	40 CFR 268.42
D002 Corrosive	Deactivate	Same as Above	Same as Above
D003 Reactive	Deactivate	Same as Above	Same as Above
WT01 Toxic	Stabilization of Leachable Inorganic	Solidification	WAC 173-303-140
WT02 Toxic	Same as Above	Same as Above	Same as Above
WC01 Carcinogenic	Same as Above	Same as Above	Same as Above

C. Radiological Characteristics and Treatment Requirements

<u>Radionuclide</u>	<u>Concentration Total Ci</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
U Total	5E-05	None	Class I

Existing waste does not contain significant curies of Tc-99, I-129, Se-79 or Np-137.

D. Additional Waste Form Information

Package-55 Gallon DOT 17 C or H drum (with drum liner)
 Drum Weight- <1000 pounds
 Compressive Strength-60 psi
 No free liquids

E. Treatment

The treatment of choice for this waste stream is Immobilization/Stabilization. Variances will be sought for those waste codes which have technology based treatment standards.

2.2.10 Mercury Contaminated Heterogeneous Solids

A. Source

Mercury waste is generated from a variety of sources throughout the Hanford site. The mercury and other component contents of the waste are variable in composition.

B. Waste Codes and Treatment Requirements

<u>Waste Code</u>	<u>Disposal Requirement</u>	<u>Treatment</u>	<u>Regulatory Requirement</u>
D009 Mercury <260mg/Kg	TCLP, 0.2 mg/L	Immobilization	40 CFR 268.41
D009 Mercury >260mg/Kg	Retort, TCLP, 0.2 mg/L	Retort and Immobilization	40 CFR 268.41
D005 Barium	TCLP, 100 mg/L	Same as Above	Same as Above
D006 Cadmium	TCLP, 1.0 mg/L	Same as Above	Same as Above
D008 Lead	Macro Encapsulation	Same as Above	Same as Above
U151 Mercury Elemental Radioactive	Amalgamation	Amalgamation & Solidification	40 CFR 268.41
D002 Corrosive	Deactivate	Special Treatment	40 CFR 268.42
WT01 Toxic EHW	Stabilization of Leachable Inorganic	Solidification	WAC 173-303-140
WT02 Toxic DW	Same as Above	Same as Above	Same as Above
WC01 Carcinogenic EHW	Same as Above	Same as Above	Same as Above
WC02 Carcinogenic DW	Same as Above	Same as Above	Same as Above

Note: If this stream is declared "Debris" the waste codes will not be applicable and per 40 CFR 268.45, the disposal requirement is macro encapsulation and the treatment is immobilization.

C. Radiological Characteristics and Treatment Requirements

<u>Radionuclide</u>	<u>Concentration Ci/Drum</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
Tc-99	6.1E-13	None	Class I
I-129	1.2E-15	None	Class I
U Total	1.2E-06	None	Class I

No Se-79 or Np-137 was reported.

D. Additional Waste Form Information

Package-55 Gallon DOT 17 C or H drum (with drum liner)
 Drum Weight- <1000 pounds
 Compressive Strength-60 psi
 No free liquids

E. Treatment

The treatment of choice for this waste stream is unknown at this time and therefore the waste loading has not been estimated. The waste could be handled as debris.

2.2.11 Elemental Lead

A. Source

Lead waste is generated from a variety of sources throughout Hanford and other DOE sites.

B. Waste Codes and Treatment Requirements

<u>Waste Code</u>	<u>Disposal Requirement</u>	<u>Treatment</u>	<u>Regulatory Requirement</u>
D008 Radioactive Lead Solids	Macro Encapsulation	Immobilization	40 CFR 268.41
WT01 Toxic EHW	Stabilization of Leachable Inorganic	Solidification	WAC 173-303-140

C. Radiological Characteristics and Treatment Requirements

<u>Radionuclide</u>	<u>Concentration Total Ci</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
U Total	4.7E-06	None	Class I

Existing waste does not contain significant curies of Tc-99, I-129, Se-79 or Np-137.

D. Additional Waste Form Information

Package-55 Gallon DOT 17 C or H drum (with drum liner)
 Drum Weight- <1000 pounds
 Compressive Strength-60 psi
 No free liquids

E. Treatment

The treatment of choice for this waste stream is Immobilization/Stabilization. Variances will be sought for those waste codes which have technology based treatment standards.

2.2.12 Lead Chemicals/Solutions

A. Source

Lead waste is generated from a variety of sources throughout Hanford and other DOE sites.

B. Waste Codes and Treatment Requirements

<u>Waste Code</u>	<u>Disposal Requirement</u>	<u>Treatment</u>	<u>Regulatory Requirement</u>
D008 Lead	TCLP, 5.0 mg/L	Immobilization	40 CFR 268.41
D001 Oxidizer	Deactivate	Solidification	40 CFR 268.42
WT01 Toxic EHW	Stabilization of Leachable Inorganic	Solidification	WAC 173-303-140
WT02 Toxic DW	Same as Above	Same as Above	Same as Above
WP01 Persistent EHW	Same as Above	Same as Above	Same as Above
WC01 Carcinogenic	Same as Above	Same as Above	Same as Above

C. Radiological Characteristics and Treatment Requirements

<u>Radionuclide</u>	<u>Concentration Ci/Drum</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
Tc-99	6.E-10	None	Class 1
I-129	7.E-12	None	Class 1
Se-79	1.6E-11	None	Class 1
U Total	3.7E-10	None	Class 1

No Np-197 was reported.

D. Additional Waste Form Information

Package-55 Gallon DOT 17 C or H drum (with drum liner)
 Drum Weight- <1000 pounds
 Compressive Strength-60 psi
 No free liquids

E. Treatment

The treatment of choice for this waste stream is Immobilization/Stabilization. Variances will be sought for those waste codes which have technology based treatment standards.

2.2.13 Lead Contaminated Heterogeneous Solids

A. Source

Lead waste is generated from a variety of sources throughout Hanford and other DOE sites.

B. Waste Codes and Treatment Requirements

<u>Waste Code</u>	<u>Disposal Requirement</u>	<u>Treatment</u>	<u>Regulatory Requirement</u>
D007 Chromium	TCLP, 5.0 mg/L	Solidification	40 CFR 268.41
D008 Lead	Macro Encapsulation	Same as Above	Same as Above
D002 Corrosive	Deactivate	Same as Above	Same as Above
D003 Reactive	Deactivate	Same as Above	Same as Above
WT01 Toxic EHW	Stabilization of Leachable Inorganic	Solidification	WAC 173-303-140
WP01 Persistent EHW	Same as Above	Same as Above	Same as Above
WC01 Carcinogenic	Same as Above	Same as Above	Same as Above

Note: If this stream is declared "Debris" the waste codes will not be applicable and per 40 CFR 268.45, the disposal requirement is macro encapsulation and the treatment is immobilization.

C. Radiological Characteristics and Treatment Requirements

<u>Radionuclide</u>	<u>Concentration Ci/Drum</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
Tc-99	9.5E-07	None	Class I
I-129	1.8E-06	None	Class I
U Total	1.1E-07	None	Class I

D. Additional Waste Form Information

Package-55 Gallon DOT 17 C or H drum (with drum liner)
Drum Weight- <1000 pounds
Compressive Strength-60 psi
No free liquids

E. Treatment

The treatment of choice for this waste stream is
Immobilization/Stabilization. Variances will be sought for those
waste codes which have technology based treatment standards.

2.2.14 Thermal Treatment Ash .

A. Source

Ash waste is CH-LLMW that has been treated by the specific incineration technology but still contains hazardous constituents that must be immobilized.

B. Waste Codes and Treatment Requirements

<u>Waste Code</u>	<u>Disposal Requirement</u>	<u>Treatment</u>	<u>Regulatory Requirement</u>
D004 Arsenic	TCLP, 5.0 mg/L	Solidification	40 CFR 268.41
D005 Barium	TCLP, 100 mg/L	Same as Above	Same as Above
D006 Cadmium	TCLP, 1.0 mg/L	Same as Above	Same as Above
D007 Chromium	TCLP, 5.0 mg/L	Same as Above	Same as Above
D008 Lead	TCLP, 5.0 mg/L	Same as Above	Same as Above
D009 Mercury	TCLP, 0.025 mg/L	Same as Above	Same as Above
D010 Selenium	TCLP, 5.7 mg/L	Same as Above	Same as Above
D011 Silver	TCLP, 5.0 mg/L	Same as Above	Same as Above
D002 Corrosive	Deactivate	Special Treatment	40 CFR 268.42
D003 Reactive	Deactivate	Same as Above	Same as Above
WT01 Toxic EHW	Stabilization of Leachable Inorganic	Solidification	WAC 173-303-140
WT02 Toxic DW	Same as Above	Same as Above	Same as Above
WC01 Carcinogenic EHW	Same as Above	Same as Above	Same as Above
WC02 Carcinogenic DW	Same as Above	Same as Above	Same as Above

C. Radiological Characteristics and Treatment Requirements

<u>Radionuclide</u>	<u>Concentration Ci/Drum</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
Tc-99	4.1E-08	None	Class 1
I-129	7.8E-13	None	Class 1
Se-79	1.2E-11	None	Class 1
U Total	9.4E-04	None	Class 1

No Np-197 was reported.

D. Additional Waste Form Information

Package-55 Gallon DOT 17 C or H drum (with drum liner)
 Drum Weight- <1000 pounds
 Compressive Strength-60 psi
 No free liquids

E. Treatment

The treatment of choice for this waste stream is Immobilization/Stabilization. Variances will be sought for those waste codes which have technology based treatment standards.

1.1.15 Particulate/Sludge

A. Source

Particulate/sludge waste is generated from a variety of sources throughout the Hanford site.

B. Waste Codes and Treatment Requirements

<u>Waste Code</u>	<u>Disposal Requirement</u>	<u>Treatment</u>	<u>Regulatory Requirement</u>
D004 Arsenic	TCLP, 5.0 mg/L	Solidification	40 CFR 268.41
D005 Barium	TCLP, 100 mg/L	Same as Above	Same as Above
D006 Cadmium	TCLP, 1.0 mg/L	Same as Above	Same as Above
D007 Chromium	TCLP, 5.0 mg/L	Same as Above	Same as Above
D008 Lead	TCLP, 5.0 mg/L	Same as Above	Same as Above
D009 Mercury	TCLP, 0.2 mg/L	Same as Above	Same as Above
D010 Selenium	TCLP, 5.7 mg/L	Same as Above	Same as Above
D011 Silver	TCLP, 5.0 mg/L	Same as Above	Same as Above
D001 Ignitable	Deactivate	Special Treatment	40 CFR 268.42
D002 Corrosive	Deactivate	Special Treatment	40 CFR 268.42
WT01 Toxic	Stabilization of Leachable Inorganic	Solidification	WAC 173-303-140
WT02 Toxic	Same as Above	Same as Above	Same as Above
WC01 Carcinogenic	Same as Above	Same as Above	Same as Above
WC02 Carcinogenic	Same as Above	Same as Above	Same as Above
WP02 Persistent	Same as Above	Same as Above	Same as Above

C. Radiological Characteristics and Treatment Requirements

<u>Radionuclide</u>	<u>Concentration Ci/Drum</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
Tc-99	4.1E-08	None	Class 1
I-129	7.8E-13	None	Class 1
Se-79	1.2E-11	None	Class 1
U Total	9.4E-04	None	Class 1

No Np-197 was reported.

D. Additional Waste Form Information

Package-55 Gallon DOT 17 C or H drum (with drum liner)
 Drum Weight- <1000 pounds
 Compressive Strength-60 psi
 No free liquids

E. Treatment

The treatment of choice for this waste stream is Immobilization/Stabilization. Variances will be sought for those waste codes which have technology based treatment standards.

2.2.16 Heterogeneous Solids/Debris

A. Source

Heterogeneous solids/debris waste is generated from a variety of sources throughout the Hanford site.

B. Waste Codes and Treatment Requirements

<u>Waste Code</u>	<u>Disposal Requirement</u>	<u>Treatment</u>	<u>Regulatory Requirement</u>
D006 Cadmium	TCLP, 1.0 mg/L	Solidification	40 CFR 268.41
D007 Chromium	TCLP, 5.0 mg/L	Same as Above	Same as Above
D011 Silver	TCLP, 5.0 mg/L	Same as Above	Same as Above
D018 Benzene	36 mg/L	No Treatment Required (NTR)	40 CFR 268.41
F001 1,1,1 Trichloroethane	0.41 mg/L	NTR	40 CFR 268.41
F002 Methylene Chloride	0.96 mg/L	NTR	Same as Above
F003 Acetone	0.59 mg/L	NTR	Same as Above
Butyl Alcohol	5.0 mg/L		
Methyl Isobutyl Ketone	0.33 mg/L		
F005 Methyl Ethyl Ketone	0.75 mg/L	NTR	Same as Above
Pyridine	0.33 mg/L		
D001 Ignitable	Deactivate	Special Treatment	40 CFR 268.42
D002 Corrosive	Deactivate	Special Treatment	40 CFR 268.42
D003 Reactive	Deactivate	Special Treatment	40 CFR 268.42
WT01 Toxic EHW	Stabilization of Leachable Inorganic	Solidification	WAC 173-303-140
WT02 Toxic DW	Same as Above	Same as Above	Same as Above
WC01 Carcinogenic EHW	Same as Above	Same as Above	Same as Above
WC02 Carcinogenic DW	Same as Above	Same as Above	Same as Above

C. Radiological Characteristics and Treatment Requirements

<u>Radionuclide</u>	<u>Concentration Ci/Drum</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
Tc-99	4.2E-06	None	Class 1
I-129	4.4E-06	None	Class 1
U Total	4.7E-02	None	Class 1

No Se-79 or Np-197 was reported.

D. Additional Waste Form Information

Package-55 Gallon DOT 17 C or H drum (with drum liner)
 Drum Weight- <1000 pounds
 Compressive Strength-60 psi
 No free liquids

E. Treatment

The treatment of choice for this waste stream is
 Immobilization/Stabilization. Variances will be sought for those
 waste codes which have technology based treatment standards.

Note: If this stream is declared "Debris" the waste codes will not be
 applicable and per 40 CFR 268.45, the disposal requirement is macro
 encapsulation and the treatment is immobilization.

2.2.17 Contained Liquid

A. Source

Liquid waste is generated from a variety of sources throughout Hanford and other DOE sites.

B. Waste Codes and Treatment Requirements

<u>Waste Code</u>	<u>Disposal Requirement</u>	<u>Treatment</u>	<u>Regulatory Requirement</u>
D004 Arsenic	TCLP, 5.0 mg/L	Immobilization	40 CFR 268.41
D005 Barium	TCLP, 100 mg/L	Same as Above	Same as Above
D007 Chromium	TCLP, 5.0 mg/L	Same as Above	Same as Above
D010 Selenium	TCLP, 5.7 mg/L	Same as Above	Same as Above
D011 Silver	TCLP, 5.0 mg/L	Same as Above	Same as Above
D001 Ignitable	Deactivate	Special Treatment	40 CFR 268.42
D002 Corrosive	Deactivate	Special Treatment	40 CFR 268.42
WT01 Toxic EHW	Immobilization of Leachable Inorganic	Immobilization	WAC 173-303-140
WT02 Toxic DW	Same as Above	Same as Above	WAC 173-303-140
WC01 Carcinogenic EHW	Same as Above	Same as Above	WAC 173-303-140

C. Radiological Characteristics and Treatment Requirements

<u>Radionuclide</u>	<u>Concentration Ci/Drum</u>	<u>Treatment Requirements For Disposal</u>	<u>Waste Category (Reference 3)</u>
Tc-99	1.8E-10	None	Class 1
I-129	3.3E-13	None	Class 1
Se-79	9.4E-12	None	Class 1
U Total	2.4E-06	None	Class 1

D. Additional Waste Form Information

Package-55 Gallon DOT 17 C or H drum (with drum liner)
Drum Weight- <1000 pounds
Compressive Strength-60 psi
No free liquids -

E. Treatment

The treatment of choice for this waste stream is Immobilization/Stabilization. Variances will be sought for those waste codes which have technology based treatment standards.

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