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Plan

MFC CH-TRU Waste Certification Plan

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Idaho National Laboratory

MFC CH-TRU WASTE CERTIFICATION PLAN	Identifier: PLN-8300 Revision: 1 Effective Date: 06/11/10 Page: ii of **v**

Materials and Fuels Complex	Plan		eCR Number: 579190

Manual: 17 – Waste Management

Entire document changed

REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	10/27/08	All	New Issue. See DAR 510341.
1	06/11/10	All	See eCR 579190.

CONTENTS

FIGURES

ACRONYMS

AMWTP	Advance Mixed Waste Treatment Project
CH	contact-handled
DOE	Department of Energy
HWMA	State of Idaho Hazardous Waste Management Act
INL	Idaho National Laboratory
IWTS	Integrated Waste Tracking System
LLW	low-level waste
MFC	Materials and Fuels Complex
MLLW	mixed low-level waste
RCRA	Resource Conservation and Recovery Act
SHADE	Shielded Hot Air Drum Evaporator
TRU	Transuranic

1. PURPOSE/SCOPE

This Materials and Fuels Complex (MFC) contact-handled (CH) transuranic (TRU) Waste Certification Program plan has been prepared to ensure that CH-TRU waste sent to the Advanced Mixed Waste Treatment Project (AMWTP) facility meets the AMWTP waste acceptance criteria – MP-TRUW-8.40, "Non-AMWTP Mixed Transuranic Waste Acceptance" (most current version) – and PLN-3243, "Transport Plan for the Transfer of Material Between MFC and AMWTP."

This plan describes the approach MFC uses to ensure that all CH-TRU waste streams are properly controlled and waste characterization, packaging, and documentation are accurate. It cites applicable AMWTP requirements and MFC documents that must be referred to in order to properly manage CH-TRU waste. The CH-TRU waste characterization documentation must be maintained in an auditable form and be readily available.

AMWTP must assess and concur with the Waste Certification Program plan. The receiving facility evaluation and concurrence process must be completed prior to approval of MFC waste shipments to that facility. Concurrence is demonstrated by acceptance of the AMWTP waste stream profile and written shipment authorization.

2. WASTE CERTIFICATION PROGRAM PLAN KEY ELEMENTS

2.1 Facility Name and Location

MFC is located near the southeast corner of the Idaho National Laboratory (INL) Site about 3 miles north of U.S. Highway 20 (Figure 1). Prior to 1994, Argonne National Laboratory-West was engaged in research and development activities in support of the nation's advanced liquid metal reactor program. In October 1994, that program was terminated and the Experimental Breeder Reactor-II reactor ceased operations. Argonne National Laboratory-West has since conducted shutdown, with deactivation and Resource Conservation and Recovery Act (RCRA) closure activities, for the Experimental Breeder Reactor-II reactor and associated facilities. Fuel examination and fabrication facilities and the Analytical Laboratory continued research associated with fuel performance.

In February 2005, Argonne National Laboratory-West was renamed MFC as part of INL contractor consolidation. Current research activities at MFC include development of advanced reactor concepts, fuel cycle process development, homeland security research, decontamination and decommissioning technologies, reactor and fuel cycle safety, and treatment of Experimental Breeder Reactor-II spent fuel.

MFC projects and maintenance operations are being performed that will continue to generate CH-TRU waste. Primary MFC facilities (Figure 2) are listed in Appendix A.

Key Facilities

CFA	-	Central Facilities Area
CITRC	-	Critical Infrastructure Test Range Complex
CTF	-	Contained Test Facility
INTEC	-	Idaho Nuclear Technology & Engineering Center
MFC	-	Materials & Fuels Complex
NRF	-	Naval Reactors Facility
PBF	-	Power Burst Facility
RTC	-	Reactor Technology Complex
RWMC	-	Radioactive Waste Management Complex
SMC	-	Specific Manufacturing Capability
TAN	-	Test Area North
TSF	-	Technical Support Facility

Other Deactivated / Decommissioned Facilities

ARA	-	*Auxiliary Reactor Area*
ARVFS	-	*Army Reentry Vehicle Facility Site*
BORAX	-	*Boiling Water Reactor Experiment*
EBR-I	-	*Experimental Breeder Reactor- I (Historical Facility)*
IET	-	*Initial Engine Test Facility*
NOTF	-	*Naval Ordnance Test Facility*
STF	-	*Security Training Facility*
WRRTF	-	*Water Reactor Research Test Facility*

Figure 1. Location of Materials and Fuels Complex at the Idaho National Laboratory site.

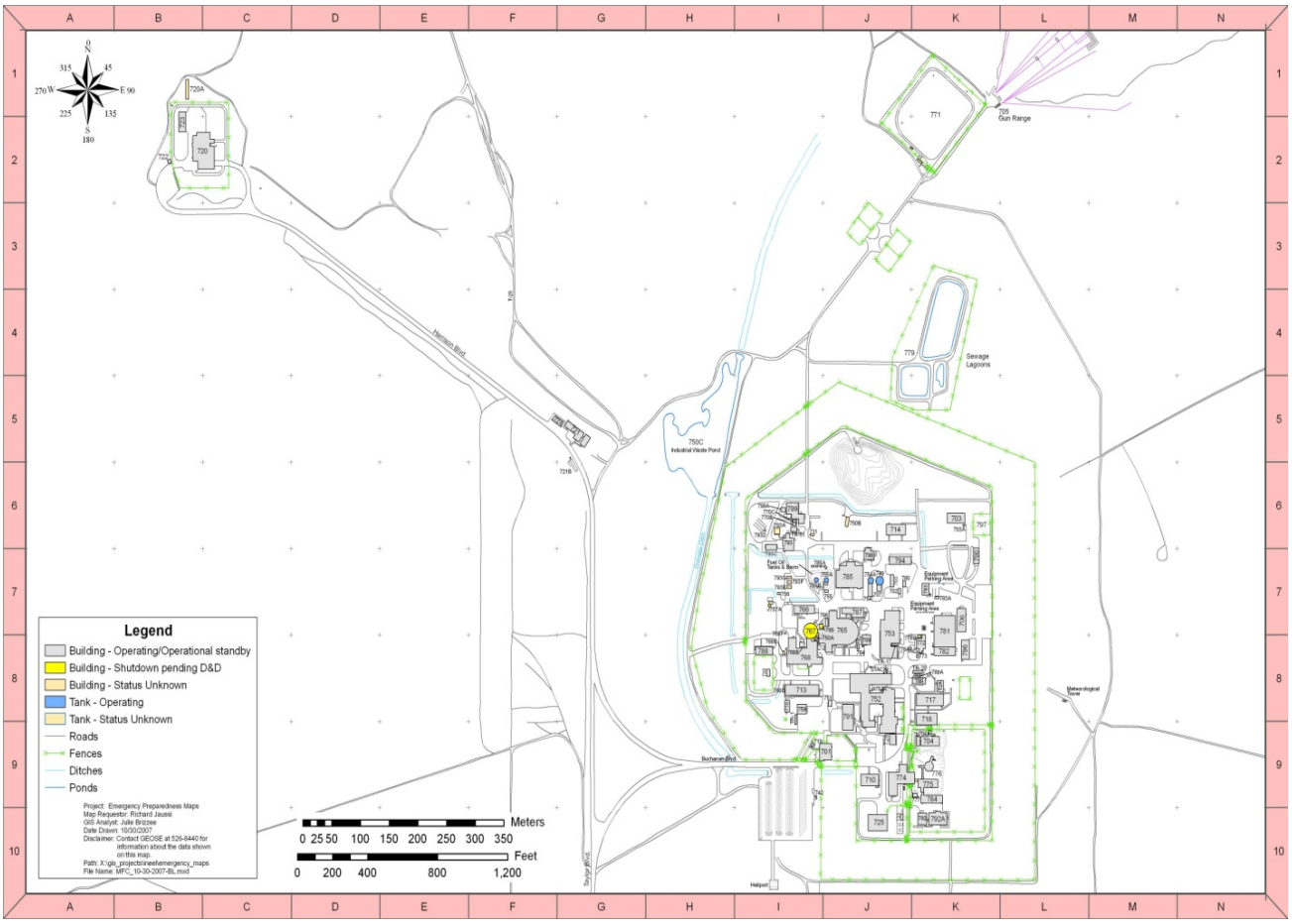

Figure 2. Materials and Fuels Complex site plot plan.

2.2 Contact Handled-Transuranic Waste Management

The CH-TRU waste management process will do the following:

A. Ensure protection of the environment, protection of the public from exposure to radiation and radioactive materials, and the health and safety of the public, Department of Energy (DOE), and contractor personnel. The generation, storage, and transport of TRU waste to the appropriate disposal facility will be accomplished in a manner that minimizes the generation of waste and complies with all applicable state, federal, and DOE safety and environmental regulations.

B. Minimize waste generation in accordance with DOE/ID-10333, "INL Site Pollution Prevention Plan;" properly manage TRU waste in accordance with LWP-8300, "Transuranic Waste Handling;" and disposition waste in accordance with MP-TRUW-8.40, "Non-AMWTP Mixed Transuranic Waste Acceptance."

C. Ensure that waste is properly segregated, characterized, handled, packaged, stored, and transported. Quality assurance will be maintained by adhering to quality assurance guidelines identified in the INL Quality Assurance Program and by managing waste in accordance with LWP-8300.

Periodic assessments of TRU waste management activities will be conducted in accordance with PDD-17000, "Waste Management," and PLN-522, "Quality Assurance Program Plan for the Waste Generator Services Quality/Waste Certification Program."

2.3 Quality Assurance

The INL Quality Assurance Program, MFC facility procedures, and the Waste Management Program quality assurance plan (PLN-522) will ensure the MFC waste certification process meets the requirements of the AMWTP waste acceptance criteria (MP-TRUW-8.40). Other sections of this plan specify methods for data collection and management in the areas of personnel training, waste segregation, characterization, packaging, storage, and transport.

2.4 Organization

The Waste Management Program organizational structure, including key position roles and responsibilities are identified in PDD-17000; TRU-specific roles and responsibilities can be found in LWP-8300.

2.5 Training and Qualifications

2.5.1 Training requirements are addressed in LWP-8300.

- CH-TRU-specific training and qualifications are contained in LWP-8300.

2.6 Procedures and Equipment

2.6.1 Procedures used in support of this plan are developed in accordance with LWP-21220, "Work Management." Procedures are controlled by the responsible document management organization. Specific procedures for document control are identified in LWP-1202, "Documents and Records," and LRD-13800, "Quality Improvement."

Tier 2 procedures require periodic review, upgrading, and control as specified in the INL Laboratory Excellence Program.

Equipment used to monitor, characterize, and control radioactive waste is calibrated, adjusted, and maintained at specific intervals in accordance with the requirements of the following:

- LWP-13455, "Control of Measuring and Test Equipment"
- PDD-13450, "Calibration and Data Integrity"
- Laboratory-wide Manual 15A, "Radiation Protection INEEL Radiological Control," Chapter 7, "Radiological Records"
- Laboratory-wide Manual 15D, "Radiological Instrument Calibration Procedures"
- Analytical Laboratory instruments are operated and procedures developed in accordance with PLN-2576, "Materials and Fuels Complex Analytical Laboratory Quality Assurance Plan."

2.7 Waste Segregation

MFC operations generate a wide variety of waste types. Radioactive waste is segregated into three low-level waste (LLW) categories, two mixed low-level waste (MLLW) categories, two TRU waste categories, and two mixed TRU waste categories. Waste is segregated into the proper category at the point of generation.

A brief description of radioactive waste categories is provided in Appendix B. MFC CH-TRU waste streams are primarily debris; defined in LWP-8300 as: "WIPP Summary Category Group S5000 that is at least 50% by volume materials that meet the criteria specified in 20.4.1.800 NMAC (incorporating 40 CFR § 268.2(g)." The AMWTP Hazardous Waste Management Act (HWMA)/RCRA Storage Permit, Part A provides a description of Hazardous Waste Debris Categories for AMWTP waste acceptance. This description further defines debris for MFC CH-TRU waste. The AMWTP debris categories list is found in Appendix C. Each MFC facility is responsible for maintaining segregation control for waste generated by its facilities, using waste stream characterization, employee training, and internal procedures.

2.8 Waste Characterization

In accordance with MP-TRUW-8.40., acceptable knowledge and sampling and analysis are used to accurately characterize TRU waste. MFC waste generation activities and processes are identified in Appendix A.

2.8.1 Acceptable Knowledge

In acceptable knowledge-characterized waste streams, sampling and analysis are used to provide initial characterization and are still used to verify the accuracy of existing waste characteristics. Whenever uncertainty exists as to the composition of a new or existing waste stream, sampling and analysis procedures must be used.

2.8.1.1 ***Radioactive Isotope Identification and Quantification.*** Accurate radioisotope data are identified on the Integrated Waste Tracking System (IWTS) material and container profiles. MFC generators provide this data through a combination of acceptable knowledge and analytical methods. Radiological surveys and effluent monitoring provide verification of waste stream characteristics that can be used to accurately identify and quantify radioactive waste for TRU waste streams. Curie content is determined through radiological smear analysis, nondestructive assay testing, and Analytical Laboratory methods. MFC performs analyses in those cases where the process is not as well known, monitoring indicates unexpected results, or regulations require specific sampling and analyses. Radiological characterization of each container is documented in accordance with LWP-10200, “Calculations and Analysis.”

2.8.1.2 ***Chemical Constituent Identification and Quantification.*** Accurate CH-TRU waste characterization data are provided on IWTS material profiles. This information is supplied through a combination of acceptable knowledge and analytical methods. A breakdown of each waste generation process and identification of the radioactive waste stream usually indicates chemical constituents of concern and quantification range. Sampling and analysis may be required to identify lesser known waste or provide greater analytical detail.

2.9 Sampling and Analysis

MFC Analytical Laboratory standard procedures are used to verify process knowledge used to demonstrate CH-TRU waste generated at MFC meets the AMWTP waste acceptance criteria.

2.10 Packaging, Handling, and Storage Control

MFC TRU waste are packaged, handled, and stored in accordance with LWP-8300, MP-TRUW-8.40, and this plan.

Radioactive waste containers are identified and controlled in accordance with MP-TRUW-8.40 and Department of Transportation specifications. An Acceptance Criteria Listing quality assurance inspection is performed on receipt of all purchased shipping containers.

LWP-8300 details packaging and storage requirements for all MFC TRU waste and provides general requirements for designation of INL storage facilities, MFC storage facilities, waste acceptance restrictions, labeling of waste containers, and packaging criteria.

2.11 Waste Certification Methodology

The Waste Management Program TRU waste certification methodology consists of the following formal controls and documentation on activities related to radioactive waste generation, packaging, and handling:

- Sample data gathered to characterize mixed radioactive waste streams are controlled in accordance with generating facility procedures, LWP-1202, and this plan.
- The contents of each container are inventoried and loaded, with second operator verification and documented on facility waste container inventory sheets. Radiological characterization is documented in accordance with LWP-10200.
- Form 435.83 is used to document that all waste acceptance requirements for CH-TRU waste packaging and characterization are met prior to shipment.
- If the CH-TRU waste will be stored at an MFC storage facility, Waste Generator Services completes the applicable sections of the IWTS material and container profiles and requests the appropriate treatment, storage, and disposal facility (MFC storage facility) to review/approve the material profile and containers proposed for storage.
- If the CH-TRU waste is being shipped to AMWTP, after completing the applicable sections of the IWTS material and container profiles, the waste management subject matter expert requests that AMWTP review/approve the material profile and containers proposed for storage or shipment.
- Individual containers of CH-TRU waste shipped to AMWTP are certified to meet waste acceptance criteria by signing the generator certification statement on Form 435.83 and completing shipping tasks located on IWTS.

- Shipments of CH-TRU waste are coordinated with INL Packaging and Transportation personnel to ensure that shipments to AMWTP are conducted in accordance with PLN-3243, Department of Transportation regulations, and DOE orders.

3. RECORDS MANAGEMENT

Maintain documented evidence of verification of activities and items affecting certification. This documentation will include those documents and items specified on Form 435.83 in accordance with PLN-3318, "Records Management Plan for Waste Generator Services."

4. DEFINITIONS

See definitions in LWP-8300.

5. REFERENCES

NOTE: *Below is a list of references, drivers, and additional documentation associated with the certification program.*

40 CFR 260 through 270, Code of Federal Regulations

DOE/ID-10333, "INL Site Pollution Prevention Plan

DOE Order 435.1-1, "Radioactive Waste Management"

DOE/WIPP-02-3122, "Contact-Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant"

INL Manual 13A, "Quality Assurance Program Requirements Documents"

INL Manual 15A, "Radiation Protection, INL Radiological Control"

INL Manual 15D, "Radiological Instrument Calibration Procedures"

LRD-13800, "Quality Improvement"

LRD-13900, "Documents and Records"

LRD-15001, "Radiological Control Manual"

LWP-1202, "Records Management"

LWP-8300, "Transuranic Waste Handling"

LWP-10200, "Calculations and Analysis"

LWP-12003, “Individual Training Plans”

LWP-12035, “Training Needs Analysis”

LWP-13740, “Performing Inspections”

LWP-13830, “Control of Non-Conforming Items”

LWP-21220, “Work Management”

Manual 17, “Waste Management”

MCP-1559, “Chain of Custody”

MP-TRUW-8.40, “Non-AMWTP Mixed Transuranic Waste Acceptance”

PDD-13450, “Calibration and Data Integrity”

PDD-17000, “Waste Management”

PLN-522, “Quality Assurance Program Plan for the Waste Generator Services Quality/Waste Certification Program”

PLN-2576, “Materials and Fuels Complex Analytical Laboratory Quality Assurance Plan”

PLN-2700, “Analysis of Environmental Impact Samples”

PLN-3243, “Transport Plan for the Transfer of Material Between MFC and AMWTP”

PLN-3318, “Records Management Plan for Waste Generator Services”

6. APPENDIXES

Appendix A, MFC Facilities where TRU/TRU-Mixed Waste may be Generated or Stored

Appendix B, Radioactive Waste Categories

Appendix C, Hazardous Waste Debris Categories for AMWTP Waste Acceptance

Appendix A

MFC Facilities where TRU/TRU-Mixed Waste may be Generated or Stored

Facility/Bldg. No.	Purpose
Analytical Laboratory Building 752	The Analytical Laboratory provides a variety of chemical and radiological services in support of MFC programs. The Analytical Laboratory contains numerous gloveboxes/chemistry laboratories and the nondestructive assay laboratory. Waste generation includes LLW, MLLW, TRU, and mixed TRU waste.
Contaminated Equipment Storage Building Building 794	Contaminated Equipment Storage Building is a HWMA/RCRA permitted treatment, storage, and disposal facility and contains storage areas and a tent for operations including characterizing and packaging LLW generated from discarded equipment and TRU waste.
Electron Microscopy Laboratory Building 774	Electron Microscopy Laboratory houses two major pieces of equipment: a scanning electron and a transmission electron microscope. The laboratory performs material analyses on stainless steel, irradiated metals, and ceramics, resulting in the generation of TRU waste, LLW, and MLLW.
Fuel and Applied Science Building Building 787	Fuel and Applied Science Building contains the reactor materials laboratory. Waste generation will include LLW and MLLW and may generate TRU waste in the future.
Fuel Conditioning Facility Building 765	Fuel Conditioning Facility performs treatment of sodium-bonded spent fuel and demonstrates DOE spent fuel treatment technologies. Waste generation includes LLW, MLLW, TRU, and mixed TRU waste.
Fuel Manufacturing Facility Building 704	Fuel Manufacturing Facility was used to fabricate metal fuels for use in Experimental Breeder Reactor-II and other reactors. Waste generation includes LLW, TRU, and mixed TRU waste resulting from research, development, and fabrication of experimental reactor fuels.
Hot Fuel Examination Facility Building 785	Hot Fuel Examination Facility is a large hot cell facility equipped for examining irradiated fuels and performing other materials experiments. The Neutron Radiography Reactor Facility and Waste Characterization Area also are located at the Hot Fuel Examination Facility. Waste generation includes LLW, MLLW, TRU, and mixed TRU waste.

Facility/Bldg. No.	Purpose
Radioactive Scrap and Waste Facility Building 771	The Radioactive Scrap and Waste Facility is an HWMA/RCRA-permitted treatment, storage, and disposal facility for storage of remote-handled LLW, MLLW, TRU, mixed TRU, and other nuclear materials.
Sodium Storage Building Building 703	Sodium Storage Building is a HWMA/RCRA-permitted treatment, storage, and disposal facility allowing storage of MLLW and mixed TRU.
Space and Security Power Systems Facility Building 792A	Space and Security Power Systems Facility handles and fabricates Pu-238 batteries for various national/international missions. Waste generation is primarily LLW, but the facility could generate TRU waste in the future.
Transient Reactor and Experiment Test Facility Building 720	Designed for high power transient operation for reactor safety tests, Transient Reactor and Experiment Test Facility is in a standby condition. LLW, TRU, and mixed TRU waste generation may result from maintenance operations and future research projects.
Zero Power Physics Reactor Building 776	Designed for studying properties of experimental reactor cores, the Zero Power Physics Reactor is in a standby condition. LLW and mixed TRU waste generation may result from maintenance operations and future research projects.

Appendix B

Radioactive Waste Categories

Waste Category	Description
CH-LLW	Consists of metal wastes such as machinery components, equipment repair parts, contaminated tools and various contamination control equipment and materials such as polyethylene bags, personal protective equipment, paper, wood, rags and filters.
Remote-handled LLW	Generated from hot cell activities and includes broken or obsolete equipment, activated metals from experimental fuel assemblies and highly contaminated filters and decontamination materials.
Radioactive low-level shielded hot air drum evaporators (SHADEs) waste	After radioactive liquids are evaporated in SHADEs, some solids remain. The SHADE units are capped and then shipped to the Radioactive Waste Management Complex in accordance with the waste acceptance criteria of the INL waste acceptance criteria (DOE/ID-01-10381).
Remote-handled MLLW	Consists of experiment hardware and items or materials that contain sodium, cadmium, chromium, lead, or other heavy metals. This waste is identified on the INL Site Treatment Plan and is stored at MFC for treatment or shipment to an appropriate treatment, storage, and disposal facility.
CH-MLLW	Consists of facility maintenance, repair and contamination control wastes that contain sodium, cadmium, chromium, lead, or other heavy metals. CH-MLLW is generated and stored at MFC facilities for treatment or shipment to an appropriate treatment, storage, and disposal facility.
CH-TRU waste	Waste generated from fuel fabrication and processing, sample analysis, and examination. Waste consists of glass, metals, ceramics, dissolved fuel samples (neutralized and solidified), personal protective equipment, glovebox equipment, anti-Cs, paper, rags, filters, and plastic. This waste meets waste acceptance criteria of MP-TRUW-8.40.

Waste Category	Description
Remote-handled TRU waste	Generated from hot cell operations, chemical analysis, and metallurgical examination of fuel samples. The waste consists of metallographic specimens, neutralized and solidified fuel samples, fuel residues on filters, cutting and polishing wheels, paper, and cloth. This waste will meet waste acceptance criteria of the Radioactive Scrap and Waste Facility as contained in RSWF-OI-003, "Material Acceptance for Storage."
CH mixed TRU waste	Generated from sodium handling, analytical sampling, etching contaminated surfaces, replacement of lead-lined glovebox gloves, and waste characterization. The waste consists primarily of fuel samples, experiment hardware, and glovebox waste that contain cadmium, chromium, lead, or other heavy metals. With the exception of mixed TRU waste containing sodium or sodium potassium alloy, this waste will meet waste acceptance criteria of MP-TRUW-8.40.
Remote-handled mixed TRU waste	Generated from hot cell operations, chemical analysis, and metallurgical examination of fuel samples. The waste consists of fuel samples, experiment hardware, and items that contain sodium, cadmium, chromium, lead, or other heavy metals. This waste will meet the waste acceptance criteria of the Radioactive Scrap and Waste Facility as contained in RSWF-OI-003.

Appendix C

Hazardous Waste Debris Categories for AMWTP Waste Acceptance

IDAPA 58.01.05.012 [40 CFR 270.13(n)] requires a description of the debris categories to be treated, stored, or disposed of at a facility to be submitted in the Part A Permit Application. Debris defined by 40 CFR 268.2 means a solid material exceeding a 60-mm particle size that is intended for disposal and that is: 1) a manufactured object; 2) plant or animal matter; 3) natural geologic material. Debris storage at the Radioactive Waste Management Complex includes waste in all three general categories. The following is a list of examples in each debris category that may be stored at the Waste Storage Facility or Stored Waste Examination Pilot Plant.

Category I Manufactured Objects	Category II Plant and Animal Matter	Category III Natural Geologic Material
Glass	Biological debris	Rock
Concrete	Animal carcasses	Cobbles
Masonry and refractory bricks	Other plant matter	Boulders
Paper	Wood debris	Asbestos
Plastic	Wood	
Rubber	Plant stumps	
Cloth		
Pavement		
Metal debris		
Pipes		
Valves		
Scrap metal		
Other heterogeneous debris:		
Non-intact containers		
Tanks		
Appliances		
Industrial equipment		