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JAN 23 1995

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 152708

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Distribution	WRAP 1 Startup	n/a
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16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	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

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(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.
1	1	Cog.Eng. B.A. Mayancsik	B.A. Mayancsik	1-23-95	T3-01	J.G. Riddelle			N3-13	3	
1	1	Cog. Mgr. R.J. Bottenus	R.J. Bottenus	1/23/95	T3-01	J.R. Weidert			G3-15	3	
3		~~QA~~ Central Files			L8-04	C.J. Lewis			T3-01	3	
		Safety				M.L. Sheriff			T3-01	3	
3		Env. E.M. Greager			H6-20	M.B. Walsh			H6-20	3	
3		M.M. McCarthy			N3-13	Solid Waste Processing Center			T3-01	3	
3		K.S. Tollefson			H6-21	OSTI (2)			L8-07	3	

18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
B.A. Mayancsik 1-23-95	R.J. Bottenus 1/23/95	R.J. Bottenus 1/23/95	☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments
Signature of EDT Originator / Date	Authorized Representative for Receiving Organization / Date	Cognizant Manager / Date	

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Document Number:	WHC-SD-W026-PLN-005, REV.0
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This document was reviewed following the procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

Tamara Hohn for Vicky Birkland — January 23, 1995

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Name: B.A. Mayancsik

B A Mayancsik
Signature

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7. Abstract

This document provides the characterization methodology for waste generated, processed, or other the responsibility of the Waste Receiving and Processing Module 1 facility. This includes Low-Level Waste, Transuranic Waste, Mixed Waste, and Dangerous Waste.

8. RELEASE STAMP

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WHC-SD-W026-PLN-005

WRAP MODULE 1

WASTE CHARACTERIZATION PLAN

B.A. Mayancsik

LIST OF TERMS

AEA	Atomic Energy Act
ALARA	As Low As Reasonably Achieveable
CFR	Code of Federal Regulations
CH	Contact Handled
DOE	U. S. Department of Energy
HWMA	State of Washington Hazardous Waste Management Act
LLW	Low-Level Waste
MSDS	Material Safety Data Sheet
MW	Mixed Waste
NDA	Non-Destructive Assay
NDE	Non-Destructive Examination
RCA	Radiological Controlled Area
RCRA	Resource Conservation and Recovery Act
TRU	Transuranic
TRUSAF	Transuranic Storage and Assay Facility
TSCA	Toxic Substances Control Act
WAC	Washington Administrative Code
WIPP	Waste Isolation Pilot Plant
WRAP	Waste Receiving and Processing

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of this document is to present the characterization methodology for waste generated, processed, or otherwise the responsibility of the Waste Receiving and Processing (WRAP) Module 1 facility. The scope of this document includes all solid low level waste (LLW), transuranic (TRU), mixed waste (MW), and dangerous waste. This document is not meant to be all-inclusive of the waste processed or generated within WRAP Module 1, but to present a methodology for characterization. As other streams are identified, the method of characterization will be consistent with the other streams identified in this plan.

1.2 BACKGROUND

The WRAP Module 1 facility is located in the 200 West Area of the Hanford Site. The facility's function is two-fold. The first is to verify/characterize, treat and repackage contact handled (CH) waste currently in retrievable storage in the LLW Burial Grounds, Hanford Central Waste Complex, and the Transuranic Storage and Assay Facility (TRUSAF). The second is to verify newly generated CH TRU waste and LLW, including MW.

1.3 FACILITY DESCRIPTION

WRAP Module 1 consists of an engineered metal building of approximately 4,645.15 m^2 (50,000 ft^2) that containing a shipping/receiving area, a nondestructive examination (NDE) and nondestructive assay (NDA) area, a process area, a control room, a process support area, a sample management area, and an administrative support area.

1.3.1 Shipping and Receiving

Waste containers are received at the WRAP Module 1 shipping and receiving area. This area contains battery-powered forklift trucks and automated guided vehicles, powered conveyors, gravity conveyors used to assemble TRU waste packages for disposal at the Waste Isolation Pilot Plant (WIPP), an overhead crane, jib cranes, and an automated stacker/retriever system used for interim storage. Once received in the facility, waste containers are tracked using bar code labels.

After processing through the WRAP Module 1 facility, the low-level portion of the waste is disposed of in the Hanford Site Low-Level Burial Grounds or, as in the case of some MW, stored elsewhere in the Hanford Site Central Waste Complex awaiting further treatment. The TRU waste is shipped to the WIPP in Carlsbad, New Mexico.

1.3.2 Nondestructive Examination and Nondestructive Assay

The WRAP Module 1 facility provides NDE and NDA of the waste for both drums and boxes. The NDE is used to identify the physical contents of the waste containers to support waste characterization and processing, verification, or certification. The NDA results determine the radioactive content and distribution of the waste.

1.3.3 Process

The WRAP Module 1 facility process enclosures are used to open, sort, and sample for the purposes of verifying the characterization of retrieved waste and newly generated containers of TRU, LLW, and MW. Limited treatment of certain corrosive materials, loose particulate, and free liquids, as well as volume reduction of waste (i.e. supercompaction) and repackaging of waste to meet current disposal site waste acceptance criteria, are provided in the process area enclosures.

1.3.4 Control Room

Operation of the plant is monitored and/or controlled by a computer data management system and a process control system located in a centralized control room on the second floor. The data management system collects, stores, and reports waste container data for verification or certification. The process control system manages the movement of waste containers between operating stations, and monitors and controls the WRAP Module 1 process and utility systems.

1.3.5 Process Support

Process support areas provide space for heating, ventilating, air conditioning, mechanical, and electrical equipment used to support facility operations.

An electrical equipment room containing the facility motor control centers and other electrical switchgear is located adjacent to the process area. Incoming electrical power is brought to this room via an overhead bus from transformers located outside the facility.

Heating, ventilating, and air conditioning equipment is located in both the first and second floor mechanical equipment rooms. Heating, ventilating, and air conditioning exhaust fans and high-efficiency particulate air (HEPA) filtration equipment are located adjacent to the process area. Two chiller/tower units are located outside the building. The air is exhausted through a stack located outside the facility. Fire suppression system water enters the facility in the first floor mechanical room.

1.3.6 Sample Management

A sample management area is provided in which to manage the various waste samples taken within the process area enclosures or various process locations throughout the facility. Refrigerated storage is provided in this area.

1.3.7 Administrative Support

Space is provided for an administrative area. This area contains rest rooms, change rooms including an anti-contamination clothing change area, offices, and space for visitor control.

1.4 SOURCES OF SOLID WASTE

The main sources of solid waste at WRAP Module 1 include the following:

- Repackaged retrieved waste
- Waste produced by and during the retrieved waste sampling, treatment, and repackaging process
- Equipment, materials, and supplies from radiological controlled areas (RCAs)
- Equipment, materials, and supplies that have not been in RCAs.

Waste materials expected in the retrieved stream include paper, plastic, cloth, tape, rubber, metal, wood, small pieces of equipment, containerized liquids and solids, particulates, absorbent, filters, and aerosol cans. Wastes generated during maintenance and clean-up activities are similar to wastes expected from the retrieved stream.

1.5 REGULATORY BASIS

Wastes processed and/or generated at WRAP Module 1 are subject to the provisions of the Atomic Energy Act (AEA) of 1954, as amended, the Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA), and the State of Washington Hazardous Waste Management Act (HWMA), [(Title 70, revised Code of Washington Paragraph 105 (R.C.W. 70.105)].

The AEA provisions applicable to WRAP Module 1 waste are implemented by Title 10, Code of Federal Regulations (CFR), Part 61, Licensing Requirements for Land Disposal of Radioactive Waste; Department of Energy (DOE) Order 5400.3, Hazardous and Radioactive Mixed Waste Program; and DOE Order 5820.2A, Radioactive Waste Management. The HWMA is implemented by the Washington Department of Ecology (Ecology) through promulgation of Washington Administrative Code (WAC) 173-303, Dangerous Waste Regulations. Waste characterization and verification requirements are further identified in 40 CFR 262.

2.0 REQUIREMENTS

All waste from WRAP Module 1 must meet the waste acceptance criteria given in WHC-EP-0063-4, *Hanford Site Solid Waste Acceptance Criteria* (WHC 1993) and WIPP-DOE-069, *Waste Acceptance Criteria for the Waste Isolation Pilot Plant.*

This characterization plan is intended to ensure that all waste is characterized with sufficient accuracy to permit proper identification, minimization, segregation, transportation, treatment, storage, and disposal. Characterization activities shall ensure that after generation, and before packaging, the actual physical and chemical characteristics and radionuclide content of the waste are known and recorded for use during all subsequent stages of the waste management process. Note: all TRU waste shall be characterized to meet WIPP waste acceptance criteria only.

At a minimum, waste characterization shall include the following information:

- Physical and chemical characteristics of the waste and absorbent
- Volume of waste (total of waste and any solidification, void filler, or absorbent)
- Weight of waste (total of waste and any solidification, void filler, or absorbent)
- Isotopic distribution, concentration, and activity in waste matrix
- Method of assay or analysis used to determine isotopic inventory
- Packaging details, date, package weight, and total volume
- Transportation category per 49 CFR 173 (for example, low specific activity, limited quantity, Type A)
- Designation of dangerous waste per WAC 173-303-070 and 170.

All radioactive waste must be characterized and segregated based on TRU, LLW, or MW. The LLW portion, including the radioactive component of MW, must be characterized and segregated based on the three LLW classifications given in WHC-EP-0063-4.

If the waste is designated as a mixed or dangerous waste, then further segregation or specialized handling and packaging may be required. The requirements are based on whether the dangerous components are regulated by HWMA, RCRA, or TSCA and by the requirements given in WHC-EP-0063-4.

Characterization of solid waste is required for both radioactive and chemical/hazardous constituents of the waste. The radioactive characterization shall document the individual isotopes present within the waste container, and the content of each isotope. This characterization can be achieved using process knowledge and/or sampling and analysis.

Visual inspection of debris waste is employed as much as possible to assist in characterization of chemical/hazardous constituents. Visual inspection, used with process knowledge, identifies discoloration, crystalline formation, oily substances, or other suspicious materials.

3.0 WASTE CHARACTERIZATION METHODOLOGY

The characteristics and properties of solid waste at WRAP Module 1 are determined by direct or indirect methods. This section contains a description of the methods used at WRAP Module 1 for determining radioactive material content, chemical constituents, and physical properties. The methods discussed in this section are presented to allow the revision/promulgation of standard operating procedures for employees to follow in characterizing waste containers. These methods apply to all facility-generated or retrieved solid waste packaged for storage or disposal. Limitations for each method are provided in the method discussions.

The basic philosophy used to characterize facility-generated waste is to use process knowledge and the information identified in applicable material safety data sheets (MSDSs) and to use field screening techniques to verify process knowledge where MSDSs are not available but other documentation is. Designation of the waste can then be completed using the results of these activities.

The philosophy used to characterize/verify retrieved waste is to use field screening techniques to verify process knowledge and to perform sampling and analysis on the waste. The process knowledge is obtained from the various generators who have waste in retrievable storage, or from knowledge acquired about similar waste processed through WRAP Module 1. Waste designation is completed using the results of these activities.

3.1 CHARACTERIZATION BY PROCESS KNOWLEDGE

Documented process knowledge, relative to the source of the waste, is used as the basis of this method. Detailed information about the waste is obtained from existing documented waste analysis data, studies conducted on wastes generated by a process similar to that which generated the waste, or information collected while processing retrieved waste that can be applied to other containers of similar waste. Process knowledge is used when it can be shown that the process producing the waste is controlled, such as through procedures governing material input.

There are circumstances where U.S. Environmental Protection Agency/Ecology protocol sampling and analysis are not feasible or necessary for characterization of hazardous constituents (40 CFR 262). Under these circumstances, techniques that rely primarily on documented knowledge of raw materials, processes, and material balances can be employed to characterize wastes. Such techniques may be employed when one or more of the following conditions are met:

- The waste stream is difficult to sample because of physical form. This condition primarily applies to the presence of pieces of metal (i.e, lead shielding) that contain dangerous constituents in their composition rather than as a residue that could be removed for testing.

- Sampling and analysis of the waste stream could result in unacceptable risks of radiation exposure [i.e., the activities could not be conducted consistent with the "as low as reasonably achievable" (ALARA) precept].
- The waste is too variable to be characterized by one set of samples (e.g., drums containing contaminated protective clothing, rags, and absorbent), provided sufficient process knowledge is available.
- Process knowledge is available, documentable, and sufficient to provide a complete characterization of the waste stream.

3.2 CHARACTERIZATION BY VISUAL INSPECTION

The physical form characterization is accomplished by visual inspection using NDE and/or by opening and sorting the contents in the drum. Visual inspection of debris-type waste is used as much as possible to identify discoloration, crystalline materials, oily substances, or other suspicious materials. When these areas are identified, and if it is a matrix that can be sampled, field screening and/or sampling and analysis are performed to determine the identity of the contaminant.

3.3 CHARACTERIZATION BY FIELD SCREENING

Field screening techniques are used as much as possible to identify hazardous constituents and to assist in proper segregation of incompatible waste streams. The screening techniques, coupled with process knowledge of the waste stream, are used as much as practical to characterize the waste. Although these activities do not totally replace sampling and analysis, screening techniques will be used as much as possible to verify process knowledge, to minimize cost.

3.4 CHARACTERIZATION BY SAMPLING AND ANALYSIS

Characterization by sampling and analysis is used for waste that cannot be fully characterized by documented process knowledge. Conditions under which sampling and analysis could be used include the following:

- Retrieved waste containers no longer have readable identification
- There is a question as to where the waste stream was generated within a multi-stream generator
- Containers are not labeled at all
- To verify field screening techniques.

Samples are collected and analyzed to provide both radiological and chemical information. For radiological sampling, the radionuclides present and

relative activity are determined. For chemical sampling, the constituent and concentration are determined.

3.5 CHARACTERIZATION BY NONDESTRUCTIVE ASSAY

All waste leaving WRAP Module 1 is assayed to determine the distribution of radionuclides within each container. The containers are assayed using passive/active neutron interrogation and/or gamma energy assay. Process knowledge or sampling and analysis are used to identify the radionuclides that are in the waste stream.

The radionuclide inventory of the waste handled in WRAP Module 1 was initially generated in other facilities either onsite or offsite. Therefore, the radionuclide distribution of all waste is based primarily on process knowledge from the original generator and, to a lesser degree, sampling and analysis. The radionuclide characterization of waste generated in WRAP Module 1 is the same as for the retrieved stream.

3.6 CHARACTERIZATION OF RETRIEVED WASTE DURING RETRIEVAL

Assay, radiography, and headspace gas analysis are performed on every retrieved waste drum prior to receipt in WRAP Module 1, thereby providing some initial characterization data. The assay confirms the TRU gram loading of the waste. The radiography identifies the physical contents of the drum, and the gas analysis identifies the presence of gases found only in the headspace of the drum. (Note: Other vapors or gases may still be contained in the headspace of inner containers and may not appear in the overall container headspace analysis.) Visual inspection, field screening, chemical analysis, and assay are used to complete the characterization of the retrieved waste within WRAP Module 1. Information specific to certain waste types is provided in the next section.

3.7 CHARACTERIZATION OF SPECIFIC WASTE TYPES

This section provides an overview of the characterization methodology of specific waste streams processed through or generated within WRAP Module 1.

3.7.1 Compactible Waste Characterization

Traditionally this waste stream consists of paper, plastic, rubber, cloth, and soft plastic. Because WRAP Module 1 has a supercompactor within the LLW main process glovebox, all LLW is considered compactible. Exceptions include containerized liquids, containerized solids, unvented aerosol cans, compressed gas cylinders, lead, mercury, HEPA filters, and other noncompliant or MW items.

Compactible waste is expected in both the retrieved waste stream and the WRAP Module 1 facility-generated waste stream. It is expected that the retrieved waste stream will undergo supercompaction on a routine basis, with the facility-generated stream undergoing supercompaction on a case-by-case basis. An empty drum compactor is located in the TRU main process glovebox. Although

the compacted empty drums are processed through the TRU line, it is anticipated that this stream will assay as LLW. TRU waste will not undergo compaction in WRAP Module 1. Possible activities that would generate compactible waste during facility operations include decontamination, maintenance, and spill cleanup.

3.7.1.1 Physical/Chemical Property Characterization. Use of decontamination agents, hydraulic fluid, or other materials containing hazardous substances is minimized as much as possible in WRAP Module 1. The presence of hazardous materials in the form of surface or internal contamination is assumed to contaminate any materials associated with the decontamination, maintenance, or spill cleanup process. The appropriate MSDS for these materials is used to characterize the facility-generated stream. Visual inspection, process knowledge, field screening, and laboratory analysis are used to characterize chemical properties of suspect items in the retrieved waste stream. Field screening or sampling and analysis are only employed on matrices that can be sampled.

3.7.2 Non-Compactible Waste Characterization

Non-compactible waste traditionally consists of metal, glass, and bulky items. This waste form may include small pieces of equipment, sheet metal, glass containers, or other materials. All TRU waste, regardless of form, is considered non-compactible.

3.7.2.1 Physical/Chemical Property Characterization. Determination of physical and chemical properties for facility-generated waste is based on information from MSDSs for materials associated with decontamination or maintenance. For waste from the retrieved stream, process knowledge shall be used as much as practical. Field screening or sampling and analysis are only employed on matrices that can be sampled.

3.7.3 Liquids

Liquid waste is generated within WRAP Module 1 or may be found in the retrieved waste stream. Liquids generated within WRAP Module 1 are from maintenance activities, and include hydraulic fluid and routine equipment decontamination fluids. Liquid waste found in the retrieved waste stream consists of small containers of liquids that were once absorbed and now have de-sorbed during the years of storage due to breakdown of the absorbent material, or liquids that have spilt from the smaller containers and are free inside the drums.

3.7.3.1 Physical/Chemical Property Characterization. Use of decontamination agents, hydraulic fluid, or other materials containing hazardous substances is minimized as much as possible in WRAP Module 1. The appropriate MSDS for the material is used in the characterization of the facility-generated stream.

Free or containerized liquids are identified in the retrieved waste stream through NDE by observing the fluids in motion. The liquids are removed from the drum in the process glovebox and sent to restricted waste management. Process knowledge, field screening techniques, and/or sampling and analysis are then used to complete the characterization process.

3.7.4 Particulates

Particulates are found primarily in the retrieved waste stream in smaller containers but can also be found dispersed throughout or at the bottom of the drum. Particulates may be absorbent material, dirt, or other debris from cleanup activities.

3.7.4.1 Physical/Chemical Property Characterization. Particulates are identified through NDE, removed from the drum, and sent to the restricted waste management glovebox. Because particulate size determination, other than coarse versus fine, is not feasible using NDE, this determination is made using visual inspection. Process knowledge, field screening techniques and/or sampling and analysis are then used to complete the characterization process. For spill cleanup or absorbing liquids from facility-generated waste, MSDS or process knowledge is used to characterize the waste.

3.7.5 Heavy Metals

Although lead use in WRAP Module 1 is restricted as much as possible, it is used as a shielding material in the glovebox gloves. Lead waste is generated when the gloves are changed out during maintenance activities. Various heavy metals such as lead and mercury may also be found in the retrieved waste stream. The lead, once used for shielding purposes, is in the form of bricks, sheets and lead-lined gloves. Mercury may be found in discarded instruments and thermometers.

3.7.5.1 Physical/Chemical Property Characterization. Containers or instruments potentially containing lead and liquid mercury will be identified through NDE by observing a very dense material that has been removed from the drum and sent to the restricted waste management glovebox. Process knowledge, visual inspection, field screening techniques and/or sampling and analysis are then used to complete the characterization process.

3.7.6 Aerosol Cans

Aerosol cans may be used throughout WRAP Module 1 for maintenance or other operations activities. Any aerosol can used within an RCA is surveyed for unconditional release. Cans not initially released are decontaminated and re-surveyed for release status. Cans not releasable shall be handled as LLW or MW depending on the original contents of the can. These cans are vented and drained of their contents, which are treated or repackaged as appropriate. No attempts will be made at this time to survey and release aerosol cans found in the retrieved waste stream.

3.7.6.1 Physical/Chemical Property Characterization. Common nonregulated propellants are generally used at WRAP Module 1. Sometimes regulated materials other than the propellants are present in the aerosol cans. The cans are identified through NDE. Propellants and the other contents are determined from the MSDS for the aerosol can. The can and the contents are discarded as dangerous waste, LLW, or MW as appropriate, depending on the original contents of the can.

Aerosol cans found in the retrieved waste stream are vented and drained of their contents. The contents are screened or sampled as appropriate, and the

contents are treated or repackaged as appropriate. The empty cans and the treated or repackaged contents are discarded as LLW, TRU, or MW as appropriate.

3.7.7 Gas Cylinders

Small gas cylinders may be found in the retrieved waste stream but may also be discarded from maintenance or operations activities within the facility.

3.7.7.1 Physical/Chemical Property Characterization. Gas cylinders in the retrieved waste stream are identified through NDE. Unless NDE identifies a permanent vent (proof that the container has been punctured), the cylinder can be removed and repackaged in WRAP Module 1. Note that cylinders will not be vented in WRAP Module 1. The container may also be sent elsewhere to have the cylinder removed, or the container may be placed in storage for removal and venting of the cylinder in a future facility.

3.7.8 HEPA Filters

HEPA filters are used in the WRAP Module 1 process area ventilation system and may be found in the retrieved waste stream.

3.7.8.1 Physical/Chemical Property Characterization. If the plant operations history indicates that the filters may have collected hazardous materials (such as release of airborne pollutants into a ventilated area), then process knowledge is used to characterize the waste HEPA filters. If process knowledge cannot be used, then field screening or sampling and analysis could be used to screen/analyze the filter media. The filters most likely to be contaminated with toxic pollutants are the small filters located at the glovebox.

HEPA filters found in the retrieved waste stream will be characterized using process knowledge of where the filters were used. Field screening techniques may be used to verify the process knowledge. If this process knowledge is not available, the filters will undergo sampling and laboratory analysis.

3.7.9 Asbestos

Asbestos is expected to be found in the retrieved waste stream. Some materials suspected of containing asbestos may be identified through NDE if other materials present are indicative of asbestos, such as pipe, wire ties, and bands.

3.7.9.1 Physical/Chemical Property Characterization. Asbestos waste is characterized by visual inspection and process knowledge. If asbestos content is uncertain but suspected, then a sample is analyzed to verify the asbestos content.

3.7.10 Lamps

Various lamps will be used in WRAP Module 1, including fluorescent lamps. These lamps will be routinely changed out and discarded.

3.7.10.1 Physical/Chemical Property Characterization. The determination of the chemical properties and designation of the lamps is made using the

appropriate MSDS for the type of lamp. Lamps located in an RCA will normally be surveyed for contamination, decontaminated, and released. If the MSDS shows that the lamps are regulated, then the lamps are discarded as dangerous waste as appropriate. If the lamp can not be decontaminated, then it will be discarded as MW. Other lamps will be discarded as nonregulated waste or LLW.

3.7.11 Pyrophoric Material

There is a potential for pyrophoric material such as alkali metals, uranium, or other metal fines to be found in a very small portion of the retrieved waste stream.

3.7.11.1 Physical/Chemical Property Characterization. Pyrophoric materials may be identified through NDE. The alkali metals were generally packaged in a container of an oily liquid. The solid metal is either silvery gray or has a white powdery surface. Process knowledge or field screening may be used to identify pyrophoric materials.

3.7.12 Explosives

The retrieved waste stream could potentially contain explosive materials in the form of liquids, powders, or cartridges.

3.7.12.1 Physical/Chemical Property Characterization. Liquids, powders, and cartridges may be identified through NDE. Liquids are identified by observing a moving fluid using real time radiography. Nitric acid could be detected through headspace gas analysis. Those drums with the potential for explosive conditions are opened and the contents sorted to remove the potentially explosive packages. Visual sorting of waste is limited to specific batches where solid forms that are suspected of being potentially explosive are known to exist and cannot be identified through other means.

3.7.13 Etiological Agents

Etiological agents may be present in a small portion of the retrieved waste stream. Experimentation using various animals was performed by some of the generators.

3.7.13.1 Physical/Chemical Property Characterization. Nondestructive examination is used to identify drums suspected of containing etiological agents. The presence of needles, syringes, scalpels and/or glassware in association with un-decomposed animal skeletal features is used to indicate potential etiologic agents. These drums are opened and visually examined, and selected samples are taken for laboratory analysis.

4.0 QUALITY ASSURANCE

4.1 DOCUMENTATION

WAC 173-303-300 requires that the owner/operator of a treatment, storage, and disposal facility confirm knowledge of a dangerous waste before treating, storing, or disposing of it. A detailed chemical, physical, and/or biological analysis of a dangerous waste must be obtained before the waste is treated, stored, or disposed. This analysis is done either with published or documented data on the dangerous waste or on waste generated from similar processes, or with data obtained by testing. The records that must be retained to comply with these criteria, as a minimum, include such items as inventories of what is placed in waste containers, and any analytical results of samples taken of the waste. Where process knowledge is used to characterize waste, process knowledge documentation is also required. WRAP Module 1 must be able to supply any and all characterization information to a facility that treats, stores, or disposes of its waste. These records are also considered "Quality Records" and are maintained as appropriate.

5.0 REFERENCES

5.1 FEDERAL AND STATE REGULATIONS

10 CFR 61, 1990, "Licensing Requirements for Land Disposal of Radioactive Waste," *Code of Federal Regulations*, as amended.

49 CFR 173, 1990, "Transportation," *Code of Federal Regulations*, as amended.

40 CFR 262, 1992, "Standards Applicable to Generators of Hazardous Waste," *Code of Federal Regulations*, as amended.

WAC-173-303, 1993, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.

5.2 DEPARTMENT OF ENERGY AND HANFORD SITE REQUIREMENTS

DOE, 1989, *Hazardous and Radioactive Mixed Waste Management*, DOE Order 5400.3, U.S. Department of Energy, Washington, D.C.

DOE, 1988, *Radioactive Waste Management*, DOE Order 5820.2A, U.S. Department of Energy, Washington, D.C.

DOE, 1991, *Waste Acceptance Criteria for the Waste Isolation Pilot Plant*, WIPP-DOE-069 (most current revision), U.S. Department of Energy, Washington, D.C.

WHC, 1993, *Hanford Site Solid Waste Acceptance Criteria*, WHC-EP-0063-4 (most current revision), Westinghouse Hanford Company, Richland, Washington.