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HNF-5108

Hanford Site Hazardous Waste Determination Report for Transuranic Debris Waste Stream NPFPDL2A

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SUMMARY

This Hazardous Waste Determination Report is intended to satisfy the terms of a Memorandum of Agreement (Agreement signed on June 16, 1999) between the U.S. Department of Energy and the New Mexico Environment Department. The Agreement pertains to the exchange of information before a final decision is made on the Waste Isolation Pilot Plant application for a permit under the *New Mexico Hazardous Waste Act*. The Agreement will terminate upon the effective date of a final *New Mexico Hazardous Waste Act* permit for the Waste Isolation Pilot Plant.

In keeping with the principles and terms of the Agreement, this report describes the waste stream data and information compilation process, and the physical and chemical analyses that the U.S. Department of Energy has performed on selected containers of transuranic debris waste to confirm that the waste is nonhazardous (non-mixed). This also summarizes the testing and analytical results that support the conclusion that the selected transuranic debris waste is not hazardous and thus, not subject to regulation under the *Resource Conservation and Recovery Act* or the *New Mexico Hazardous Waste Act*. This report will be submitted to the New Mexico Environment Department no later than 45 days before the first shipment of waste from the Hanford Site to the Waste Isolation Pilot Plant, unless the parties mutually agree in writing to a shorter time.

The 30 containers of transuranic debris waste addressed in this report were generated, packaged, and placed into storage between 1993 and 1997. Based on reviews of administrative documents, operating procedures, waste records, generator certifications, and personnel interviews, this transuranic debris waste was determined to be nonhazardous. This determination is supported by the data derived from nondestructive examination, confirmatory visual examination, and the results of container headspace gas sampling and analysis.

Therefore, it is concluded that this transuranic debris waste, which consists of 30 containers from waste stream NPFPDL2A, is not hazardous waste, and no hazardous waste numbers specified in Title 40 Code of Federal Regulations, Part 261, have been assigned. Accordingly, the 30 containers of transuranic debris waste addressed in this report meet the requirements for transuranic waste as defined by the Department of Energy Waste Acceptance Criteria for the Waste Isolation Pilot Plant. The 30 containers are acceptable for disposal at the Waste Isolation Pilot Plant as nonhazardous transuranic waste.

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CONTENTS

ATTACHMENTS

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GLOSSARY

CAO	Carlsbad Area Office
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
RCRA	*Resource Conservation and Recovery Act*
WIPP	Waste Isolation Pilot Plant

METRIC CONVERSION CHART

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	millimeters	millimeters	0.0393	inches
inches	2.54	centimeters	centimeters	0.393	inches
feet	0.3048	meters	meters	3.2808	feet
yards	0.914	meters	meters	1.09	yards
miles	1.609	kilometers	kilometers	0.62	miles
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092	square meters	square meters	10.7639	square feet
square yards	0.836	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	hectares	hectares	2.471	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	grams	grams	0.0352	ounces
pounds	0.453	kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			**Volume**		
fluid ounces	29.57	milliliters	milliliters	0.03	fluid ounces
quarts	0.95	liters	liters	1.057	quarts
gallons	3.79	liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76456	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Energy			**Energy**		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.948	British thermal unit per second	British thermal unit per second	1.055	kilowatt
Force			**Force**		
pounds per square inch	6.895	kilopascals	kilopascals	1.4504×10^{-4}	pounds per square inch

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Second Ed., 1990, Professional Publications, Inc., Belmont, California.

HANFORD SITE
HAZARDOUS WASTE DETERMINATION REPORT
FOR TRANSURANIC DEBRIS WASTE STREAM NPFPDL2A

1.0 INTRODUCTION

This hazardous waste determination report (Report) describes the process and information used on the Hanford Site to determine that waste stream number NPFPDL2A, consisting of 30 containers of contact-handled transuranic debris waste, is not hazardous waste regulated by the *Resource Conservation and Recovery Act* (RCRA) or the *New Mexico Hazardous Waste Act*. For a waste to be hazardous under these statutes, the waste either must be specifically listed as a hazardous waste, or exhibit one or more of the characteristics of a hazardous waste, i.e., ignitability, corrosivity, reactivity, or toxicity.

Waste stream NPFPDL2A was generated, packaged, and placed into storage between 1993 and 1997. Extensive knowledge of the waste generating process, facility operational history, and administrative controls and operating procedures in effect at the time of generation, supported the initial nonhazardous waste determination. Because of the extent and reliability of information pertaining to this waste type, and the total volume of waste in the debris matrix parameter category, the Hanford Site is focusing initial efforts on this and similar waste streams for the first shipment to the Waste Isolation Pilot Plant (WIPP).

RCRA regulations authorize hazardous waste determinations to be made either by using approved sampling and analysis methods or by applying knowledge of the waste in light of the materials or the process(es) used. This latter approach typically is referred to as process knowledge. The Transuranic Waste Characterization Quality Assurance Program Plan (CAO-94-1010) for WIPP refers to acceptable knowledge in essentially the same terms; acceptable knowledge as used throughout this Report is synonymous with the term process knowledge.

The 30 containers addressed in this Report were characterized by the following methods:

- Acceptable knowledge
- Nondestructive examination using real-time radiography
- Visual examination
- Headspace gas sampling and analysis.

The initial nonhazardous waste determination was based solely on acceptable knowledge. Relevant administrative documents and operating methods in effect at the time of waste generation were reviewed, generator waste profiles and certifications were examined, and personnel interviews were conducted. The acceptable knowledge information and supporting data were further evaluated based on the results of nondestructive examination, visual examination, and container headspace gas analysis. In all cases, the physical examination processes supported the initial nonhazardous waste determination, and in effect served to validate and finalize that determination. Sections 2.0 through 5.0 of this Report describe in more detail the actions taken and conclusions reached with respect to this nonhazardous waste determination. The hazardous waste determination process described in this Report fully satisfies the requirements of 40 CFR 261, and the Memorandum of Agreement (MOA-June 16, 1999) signed by the U.S. Department of Energy (DOE) and the New Mexico Environment Department pertaining to the exchange of waste stream information.

2.0 WASTE GENERATION PROCESS DESCRIPTION

Waste stream NPFPDL2A was generated in the Plutonium Finishing Plant Analytical Laboratory between 1993 and 1997. The laboratory performed analytical and physical tests on plutonium samples received from Plutonium Finishing Plant operations in the remote mechanical A line and remote mechanical C line, and the Plutonium Reclamation Facility. Samples were also received from other onsite facilities, including Plutonium-Uranium Extraction and Reduction-Oxidation, and a limited number of off-site sources. These waste streams were derived from routine laboratory maintenance and a variety of tests used to determine criticality safety and ensure that plutonium feeds and products were within specification. Waste stream NPFPDL2A consists of debris that was generated throughout the Analytical Laboratory and subsequently repackaged in Room 146. A chronological summary of the Analytical Laboratory's evolving mission is contained in HNF-4982.

The debris waste generated between 1993 and 1997 during routine operation and maintenance of the PFP Analytical Laboratory was managed as follows. Plutonium Finishing Plant personnel, in accordance with standard operating procedures, segregated laboratory waste at the point of generation into transuranic, transuranic-mixed, and low-level waste. Transuranic versus low-level waste decisions were based on the radionuclide distribution and plutonium content in the waste materials as determined by sodium iodide assay or a segmented gamma scan assay system. The requirement for segregation at the point of generation minimized the total quantity of mixed waste generated, and ensured that WIPP-prohibited and RCRA-regulated materials were excluded from the non-mixed debris. Individuals trained and qualified to identify WIPP-prohibited items and distinguish between mixed (hazardous) and nonmixed (nonhazardous) waste assisted operations personnel in making the appropriate determinations. Following the initial segregation, bagging and containerization at the point of generation, Analytical Laboratory waste was transported to Room 146 for further sorting and repackaging as needed.

The nonhazardous transuranic debris waste generated in the Plutonium Finishing Plant Analytical Laboratory consists of the following materials:

- Plastics – bags and sheeting used during glovebox loadin and loadout of tools, equipment, and waste, and post loadout contamination control; empty bottles; and highly absorbent polypropylene 'anti-corrosive radioactive pads' used in the packaging of transuranic waste

- Cellulosics – paper 'ice cream' cartons used during glovebox loadin and loadout of tools, small equipment, and waste; contaminated personal protective equipment consisting of gloves, hoods, overalls, etc; rags used for decontamination and radiological survey routines; wooden brush handles and filter media frames; and filter media

- Rubber – non-leaded rubber in respirators and gloves used for personal protective equipment

- Iron-based metals and alloys – tools, sheet metal scraps from maintenance activities, spent equipment (e.g., hot plates, sample racks, stirrers, burners, slip lid containers)

- Aluminum metals and alloys – household foil and respirator filters

- Other inorganic materials – glass (e.g., tubes, vials, stirrers), ceramic burners, diatomaceous earth or other similar inorganic materials used as absorbent during transuranic waste packaging, and small amounts of asbestos from hot plate and furnace insulation.

The Analytical Laboratory transuranic debris waste consistently is nonhomogeneous in that none of the various debris types were separated at the time or point of generation. Because the debris was not

separated and packaged based on type or material parameters, the debris waste matrix parameter category of S5490 ('Unknown/Other Heterogeneous Debris') was assigned. Matrix parameter category S5490 is defined as waste that is consistent with the definition for the Heterogeneous Debris (S5400) summary category, but does not meet the criteria for assignment into any of the other specific-detailed categories (DOE/LLW-217).

Plutonium Finishing Plant also used (and continues to use) material balance areas to maintain nuclear material control and accountability in designated areas. Each material balance area has at least one custodian who is responsible for maintaining the physical inventory of plutonium bearing material in their assigned area. Whenever material (product or waste) is shipped or transferred to another location, the custodian must log the inventory out of their assigned area, and the recipient custodian must log in the inventory. Further control and accountability are provided by assigning each waste container an identification number for tracking and identification, and a secondary package identification number to identify the material balance area where the waste originated. All of the debris waste addressed in this Report originated from material balance area 231.

3.0 CHARACTERIZATION PROCESS

CAO-94-1010 describes the activities and requirements that each DOE site must meet in characterizing transuranic waste intended for disposal at WIPP. Included are performance-based requirements to ensure that the acceptable knowledge process used to assemble and evaluate information for waste characterization purposes is implemented consistently by all of the participating sites. Each participating site must in turn, develop and implement a quality assurance project plan that addresses all of the requirements specified in CAO-94-1010. Hanford Site acceptable knowledge is compiled in accordance with the Final Hanford Site Transuranic Waste Characterization Quality Assurance Project Plan (HNF-2599). Hanford Site personnel implementing the acceptable knowledge process receive training requisite to the acceptable knowledge requirements and associated implementing methods. The following sections describe this characterization process.

3.1 HAZARDOUS WASTE DETERMINATION

Any waste that specifically is listed as a hazardous waste, or any waste that exhibits one or more of the characteristics of a hazardous waste, must be so identified under RCRA. However, the mere presence of particular constituents in a waste does not cause the waste to be hazardous if such constituents do not result from a prescribed use, or cause a representative sample of the waste to exhibit a characteristic property or exceed a specified regulatory limit. The RCRA regulations authorize hazardous waste determinations to be made either by using approved sampling and analysis methods or by applying knowledge of the waste in light of the materials or process(es) used. This latter method is referred to as acceptable knowledge. Additionally, the U.S. Environmental Protection Agency (EPA) and the U.S. Nuclear Regulatory Commission have recognized and encouraged the use of acceptable knowledge for radioactive waste ("Joint NRC/EPA Guidance on Testing Requirements for Mixed Radioactive and Hazardous Waste," 62 Federal Register 62079, 1997).

The Hanford Site initially used acceptable knowledge as the basis for a nonhazardous waste determination for the transuranic debris waste addressed in this Report. That initial determination has been supported and upheld on the basis of subsequent physical evaluations (i.e., nondestructive examination, visual examination, and headspace gas analysis,) of the waste. Each element of the waste characterization process is discussed in more detail in the following sections.

3.2 ACCEPTABLE KNOWLEDGE

Acceptable knowledge includes information regarding the physical form of the waste, the base materials composing the waste, the nature of the radioactivity present, and the process(es) generating the waste. This section describes the acceptable knowledge documentation used to characterize selected transuranic debris waste as nonhazardous. The compilation of acceptable knowledge and the conclusions reached following the acceptable knowledge review are discussed as follows and in Section 5.0.

3.2.1 Key Acceptable Knowledge Documentation

HNF-2599 requires that acceptable knowledge documentation be compiled into an auditable record for transuranic waste to be sent to the WIPP. Key Hanford Site acceptable knowledge documentation is presented, referenced, or attached in a transuranic program level document, *Hanford Site Transuranic Waste Management Program Acceptable Knowledge Documentation for Retrievably Stored Contact-Handled Waste* (HNF-3461). This programmatic document describes the entire group of transuranic waste generating facilities on the Hanford Site, and for each of those facilities provides the following:

- Mission and transuranic waste generating operational descriptions
- Maps identifying the locations of transuranic waste generation, treatment, and storage areas
- Transuranic waste identification or characterization methods used
- Types, quantities and forms of transuranic waste (current and projected)
- Offsite sources of currently stored transuranic waste and the relationship to the Hanford Site Transuranic Waste Management Program
- Waste certification procedure summaries
- References and a roadmap that identifies the physical location of all the acceptable knowledge source documents used.

Waste stream-specific documentation, acceptable knowledge checklists, waste stream summary forms, and waste stream profile forms are attached to the programmatic document, completing the auditable acceptable knowledge documentation record for selected transuranic debris waste to be sent to the WIPP.

3.2.2 Description of Acceptable Knowledge Compilation

Waste stream-specific acceptable knowledge documentation has been developed for waste stream NPFPDL2A that is intended for shipment to WIPP (HNF-4982). The waste stream-specific documentation, in conjunction with the programmatic document (HNF-3461) described in Section 3.2.1, meets the acceptable knowledge requirements contained in HNF-2599. The acceptable knowledge waste stream summary for waste stream NPFPDL2A is provided in Attachment A.

3.3 DISCUSSION OF ACCEPTABLE KNOWLEDGE DETERMINATION FOR TRANSURANIC DEBRIS WASTE

This section discusses in detail some key acceptable knowledge documentation for the transuranic debris waste that relates to the nonhazardous waste determination.

For waste to be RCRA-listed, the waste must meet listed waste criteria set forth in 40 CFR 261.31 through 261.33. Acceptable knowledge documentation pertaining to the Analytical Laboratory processes established the use of several reagents appearing on the list of hazardous wastes from non-specific sources. Similarly, several of the reagents used in the laboratory appear on the listings of discarded commercial chemical products, off-specification species, container residues, and spill residues thereof. However, strict adherence to administrative controls and operating methods required that such materials be properly segregated at the point of generation for management as mixed waste. Based on available information, there is no basis for assigning any of the listed waste codes to the transuranic debris waste addressed in this Report.

A waste is also considered hazardous if it exhibits any of the characteristic properties identified in 40 CFR 261.21 through 261.24. The analytical methods used in the laboratory were well documented. Although numerous reagents were used that could have caused a waste to exhibit one or more of the hazardous waste characteristics, strict adherence to administrative controls and operating methods required that such materials be properly segregated at the point of generation for management as mixed waste. Except for reagent bottles and laboratory glassware, there is no evidence that any of the debris waste addressed in this Report came in direct contact with the chemicals used for sample preparation and analysis. Bottles and glassware that did directly contact chemicals were properly rinsed to render them empty and no longer subject to RCRA regulation. Also, as waste was packaged, limitations were applied to the contents of the waste containers. For example, free liquids were prohibited; corrosive, ignitable, and reactive wastes were prohibited; explosive, pyrophoric, and oxidizing wastes were prohibited; unvented gas cylinders, acid or caustic soaked rags, and absorbed materials were prohibited.

In the event of spills in the Analytical Laboratory, chemicals and chemically contaminated areas were cleaned up with water soaked rags. The rags used to clean up spills of chemicals and chemically contaminated areas are not part of the debris waste addressed in this Report.

3.4 RELEVANT DATA AND SUPPORTING INFORMATION

Although the Hanford Site relies heavily on acceptable knowledge documentation for debris waste characterization, certain intrusive and nonintrusive physical and chemical examinations and analyses are conducted to (1) verify the waste stream acceptable knowledge documentation, (2) support and confirm the acceptable knowledge RCRA waste determination, and (3) ensure waste stream compliance with the WIPP waste acceptance criteria. The physical examinations and analyses conducted include nondestructive examination, visual examination to verify and validate the nondestructive examination results, and headspace gas sampling and analysis to determine the presence of volatile organic compounds and confirm or update, as necessary, EPA hazardous waste numbers for spent solvents. The data generated from these examinations and analyses are maintained as WIPP quality assurance records.

3.4.1 Physical Characterization

For the purposes of this Report, 'physical' characterization includes both intrusive (visual examination) and nonintrusive (nondestructive examination) examinations or inspections conducted under the requirements of CAO-94-1010.

3.4.1.1 Program Requirements for Examination of Contents

Radiography is required by CAO-94-1010 to verify the waste container contents and packaging configuration, document the matrix parameter categories of the waste, and detect prohibited items such as pressurized containers or free liquids. CAO-94-1010 delineates the requirements for the methods to be used, i.e., the quality assurance objectives and quality control requirements for the examination; instrument testing, inspection, calibration and maintenance requirements; the data management requirements; and the requirements for physical (visual) confirmation of the examination results. The techniques and methods for meeting these requirements have been established on the Hanford Site, and use has been authorized by the DOE Carlsbad Area Office (CAO).

The Hanford Site nondestructive examination system for characterizing transuranic waste containers for shipment to WIPP employs two different types of imaging technologies to examine waste container contents: real-time-radiography and linear diode array. Each system uses a 450-kilovolt X-ray source and an imaging system configured to allow the X-ray image to be displayed as the examination is taking place. As a method for monitoring the results and reliability of the nondestructive examination systems, the CAO-94-1010 states, "The results of radiography will be verified through visual examination of a statistically selected portion of retrievably stored waste containers." As a result of this requirement, and as part of the CAO-authorized program on the Hanford Site, the appropriate statistical measures are used to select X-rayed containers for direct visual examination to verify the nonintrusive nondestructive examination inspection results. Selected containers are opened in a glovebox inside Waste Receiving and Processing. The debris contents are removed, documented, and repackaged in a new container. The results of these intrusive examinations are compared to the nondestructive examination inspection results, discrepancies are identified and dispositioned by a subject matter expert, and the acceptable knowledge documentation is revised as appropriate.

3.4.1.2 Nondestructive Examination (Real-Time-Radiography) Results

Nondestructive examination results for the 30 containers of transuranic debris from waste stream NPFPDL2A verified the presence of nonhomogeneous debris waste, plastic and paper packaging materials, and absorbent (diatomaceous earth). No RCRA-regulated or WIPP-prohibited items were observed. The nondestructive examination results are documented in data packages that have been validated and verified. In addition to looking for prohibited items, nondestructive examination is used to ensure the absence of liquids. In all cases, there were no notable anomalies between the nondestructive examination and visual examination results for selected containers.

3.4.1.3 Visual Examination and Verification

Four containers were statistically selected for visual examination to verify the nondestructive examination results. As required by the visual examination process, the entire contents of each container were removed, inspected, documented, and returned to a new container. The visual examination verified the presence of nonhomogeneous debris and packaging materials only, and the absence of RCRA-regulated and WIPP-prohibited items.

3.4.2 Headspace Gas Sampling and Analysis

CAO-94-1010 requirements for headspace gas sampling and analysis, and the results obtained, are identified and discussed in the following.

3.4.2.1 Program Requirements

CAO-94-1010 requires that all waste streams, regardless of matrix parameter category, be assessed for the presence of spent solvents based on the results of headspace gas sampling and analysis. The headspace gas analytical results for containers in each waste stream are combined to confirm, and update as necessary, the hazardous waste numbers for spent solvents (i.e., F001, F002, F003, F004, and F005) associated with each waste stream. HNF-2599 contains the headspace gas sampling and analysis requirements and methods that must be followed to meet the CAO-94-1010 requirements and quality assurance objectives. The headspace gas sampling protocols are based largely on EPA guidelines.

Headspace gas sampling and analysis must be performed on each container of debris waste intended for disposal at WIPP. The headspace gas analytical result for each constituent associated with any of the spent solvent waste numbers is evaluated per CAO-94-1010 requirements. If any constituent is determined to be present above the program-required quantitation limit, the acceptable knowledge information for the waste stream is re-evaluated to determine the potential source of the constituent. If the source of the constituent is identified as a spent solvent used in the process, or is determined to be the result of mixing a listed waste with a solid waste, the affected containers are assigned the applicable hazardous waste number(s) and segregated into a separate waste stream.

3.4.2.2 Analytical Results

Results of the headspace gas analyses for the 30 containers making up waste stream NPFPDL2A are summarized in Attachment B. Based on these results, no constituent associated with the F001 through F005 listed solvents was present above the program-required quantitation limit at the 90 percent confidence level. Therefore, headspace gas analysis supports the determination that this waste is not hazardous pursuant to RCRA and the *New Mexico Hazardous Waste Act*.

The occurrence of tentatively identified compounds (i.e., those listed in 40CFR 264, Appendix IX) was evaluated in accordance with CAO-94-1010. Carbon disulfide was detected in more than 25 percent of the headspace gas samples thus far analyzed from waste stream NPFPDL2A. In accordance with CAO-94-1010, this compound will be added to the target analyte list, against which future headspace gas samples will be evaluated.

4.0 RCRA ANALYSIS OF TRANSURANIC DEBRIS WASTE

A waste is a hazardous waste under RCRA and the *New Mexico Hazardous Waste Act* if the waste is specifically listed as a hazardous waste or if the waste exhibits one or more of the characteristics of a hazardous waste. However, the mere presence of hazardous constituents does not cause a waste to be hazardous by definition if the constituents do not result from a prescribed use or do not exceed regulatory limits. The RCRA regulations authorize a generator to determine if a waste is hazardous by either applying knowledge of the hazardous nature of the waste in light of the material or process used, or by testing the waste in accordance with approved methods.

Section 5.0 of CAO-94-1010 describes the sampling process design (i.e., the data collection design) and use of acceptable knowledge in sorting waste containers into waste streams and assigning waste streams to an appropriate matrix parameter category. The matrix parameter categories are divided into three broad groups: homogeneous solids, soil/gravel, and debris. For debris waste, CAO-94-1010 states that knowledge of the original organic compounds used and the operations that generated these waste streams are sufficient to determine if the waste is hazardous or contains polychlorinated biphenyls and other hazardous constituents. RCRA-regulated metals present in debris wastes are associated with specific materials (e.g., lead in leaded rubber, leaded glass, or lead shielding). Knowledge of the materials and

operations that generated these waste streams are sufficient to determine if the waste contains RCRA-regulated metals. Therefore, RCRA characterization of debris waste is accomplished using acceptable knowledge instead of the sampling and analysis for total-RCRA regulated organic compounds and metals that are required for characterizing homogeneous solids and soil/gravel.

4.1 LISTED WASTE

Waste potentially is subject to RCRA regulation as a hazardous waste if the waste is listed in 40 CFR 261.31 through 261.33. Acceptable knowledge has established that certain reagents (e.g., acetone, benzene, carbon tetrachloride, hydrazine) were used for their solvent properties in the laboratory to digest and otherwise prepare samples for analysis. However, in accordance with administrative controls and operating methods in effect throughout the laboratory, the resulting spent solvents and materials directly contacted during their use were segregated and subsequently managed at the point of generation as mixed waste. Based on the acceptable knowledge discussion in Section 3.3, the transuranic debris waste addressed in this Report is not a listed waste. There is no information supporting a conclusion that any spent solvents came in direct contact with waste stream NPFPDL2A. Finally, as stated in Section 3.4.2, no constituents associated with the F001 through F005 spent solvent waste codes were detected at or above the PRQL in any of the container headspace gas samples.

4.2 CHARACTERISTIC WASTE

A waste also is considered hazardous if the waste exhibits any of the characteristic properties listed in 40 CFR 261.21 through 261.24.

4.2.1 Ignitability

Based on acceptable knowledge and physical examination of the waste streams (i.e., nondestructive examination, visual examination, and headspace gas sampling and analysis), a determination was made that the transuranic debris waste addressed in this Report does not meet the definition of an ignitable waste under RCRA. A waste exhibits the characteristic of ignitability if the waste possess any of the following properties.

- Waste is a liquid other than an aqueous solution containing less than 24 percent alcohol by volume and has a flashpoint less than 140°F (60°C).
- Waste is not liquid and is capable of causing fire through friction, absorption of moisture, or spontaneous chemical changes.
- Waste is an ignitable compressed gas.
- Waste is an oxidizer as defined by the U.S. Department of Transportation regulations.

As established previously in this Report, this transuranic debris does not contain liquids. Also, there is nothing in the debris waste that would render the waste capable of ignition through friction, moisture absorption, or chemical changes, and the waste does not contain any compressed gas. Finally, the waste is not an oxidizer as defined in the U.S. Department of Transportation regulations at 49 CFR 173.127. The required physical examination process has confirmed these conclusions.

4.2.2 Corrosivity

Based on acceptable knowledge, a determination was made that 30 containers of transuranic debris waste addressed in this Report do not meet the definition of a corrosive waste. For a waste to be corrosive, the waste must exhibit one of the following properties.

- Waste is aqueous with a pH less than or equal to 2 or greater than or equal to 12.5. To measure the pH, Method 9040 in the definition of corrosively found at 40 CFR 261.22 is used. This method requires that greater than 20 percent of the total waste volume is aqueous.

- Waste is a liquid as determined by the ability of the waste to pass through a certain type of filter and will corrode steel at a rate greater than 0.25 inch per year.

As determined by nondestructive examination and confirmed by visual examination, this transuranic debris waste is neither aqueous nor liquid. Therefore, the waste cannot be corrosive per RCRA definition. This conclusion is substantiated by the EPA Policy Compendium 9443.1987(17). The EPA stated that the characteristic of corrosivity as defined in 40 CFR 261.22 is intended to apply only to aqueous or liquid media, "unless and until the EPA promulgates a definition for solids. The agency has no plans to do this at the present time." EPA has not promulgated a definition of solids as of this date.

4.2.3 Reactivity

Based on knowledge of the waste stream and the generation process, a determination was made that the transuranic debris waste addressed in this Report does not meet the definition of a reactive waste. A waste exhibits the characteristic of reactivity if the waste has any of the following properties.

- Waste is unstable and can undergo violent change.
- Waste reacts violently with water.
- Waste forms potentially explosive mixtures with water.
- Waste reacts with water to generate toxic gases, vapors, or fumes that are harmful.
- Waste contains cyanide or sulfide that can generate toxic gases, vapors, or fumes.
- Waste can detonate or explode at standard temperature and pressure.
- Waste is an U.S. Department of Transportation forbidden Class A or B explosive.

The transuranic debris waste is stable and not subject to violent chemical change. None of the materials identified in Section 2.0 are capable of reacting violently with water or forming explosive mixtures with water, or generating toxic gases, vapors, or fumes when mixed with water. Finally, the transuranic debris waste does not contain cyanides or sulfides, and is not capable of detonation or explosive reaction.

4.2.4 Toxicity

Based on acceptable knowledge and the required physical examination process, a determination was made that the containers of transuranic debris waste addressed in this Report do not meet the definition of toxic waste. To exhibit the toxicity characteristic, the extract from a representative sample of the waste (obtained by using the toxicity characteristic leaching procedure) must contain certain contaminants at or above the concentrations listed in Table 1 of 40 CFR 261.24. There is no information or data indicating that any of the contaminants listed in Table 1 are present in the transuranic debris waste.

5.0 CONCLUSION

The Hanford Site has established that the 30 containers of transuranic debris waste selected for shipment to WIPP are not a hazardous waste. The waste is not a listed waste and the waste does not exhibit any of the hazardous waste characteristics. Although the initial nonhazardous waste determination was based solely on acceptable knowledge as allowed by EPA guidance and established in CAO-94-1010, the required physical evaluations (i.e., nondestructive examination, visual examination, and headspace gas analysis) have confirmed that the acceptable knowledge documentation is correct. The transuranic debris waste addressed in this Report meets the requirements for transuranic waste as defined by the WIPP waste acceptance criteria, and the waste is acceptable for shipment to and disposal at WIPP as nonhazardous transuranic debris.

6.0 REFERENCES

62 FR 62079, "Joint NRC/EPA Guidance on Testing Requirements for Mixed Radioactive and Hazardous Waste".

CAO-94-1010, *Transuranic Waste Characterization Quality Assurance Program Plan*, Current Revision, Carlsbad Area Office, Carlsbad, New Mexico, U.S. Department of Energy.

DOE/LLW-217, "DOE Waste Treatability Group Guidance", Current Revision, INEEL-Lockheed Idaho Technologies Company, U.S. Department of Energy, Idaho Falls, Idaho, 1995.

Environmental Protection Agency Policy Compendium, 9443.1987(17), August 18, 1987.

HNF-2599, "Final Hanford Site Transuranic Waste Characterization Quality Assurance Project Plan", Revision 0, Waste Management Federal Services of Hanford, Inc., Richland, Washington, October 20, 1998.

HNF-3461, "Hanford Site Transuranic Waste Management Program Acceptable Knowledge Documentation for Retrievably Stored Contact-Handled Waste", Revision 1, Waste Management Federal Services of Hanford, Inc., Richland, Washington, 1999.

HNF-4982, "Hanford Site Transuranic Waste Management Waste Specific Acceptable Knowledge Documentation for NPFPDL2A and NPFPDL2B of Non-Mixed Debris from the Plutonium Finishing Plant", Waste Management Federal Services of Hanford, Inc., Richland, Washington, 1999.

MOA-June 16, 1999, Memorandum of Agreement between the U.S. Department of Energy and the New Mexico Environment Department, June 16, 1999.

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ATTACHMENT A

WASTE STREAM SUMMARIES

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WASTE STREAM SUMMARY

Site: Hanford Site	
Waste Stream/Waste Stream Lot: Non-mixed PFP Debris	
Waste Stream/Waste Stream Lot Number: NPFPDL2A	
Generator Site: 200 West Area, Plutonium Finishing Plant	Waste Stream Generation Building(s): Building 234-5Z. MBA 231, Analytical Laboratory
Waste Stream Volume: 6.24 m^3	Waste Stream Generation Time Period: 1995 to 1997
TRUCON Codes:RH225G	*Maximum number of layers of confinement:* 4
Transuranic Waste Baseline Inventory Report Information (Enter information obtained from the current revision of the Transuranic Waste Baseline Inventory Report only in this section.)	
WIPP Identification Number(s): RL-W377	
Summary Category Group:S5000	Waste Matrix Code Group:S5490
Waste Stream Name: *234-5Z Combination Debris Contact-Handled TRU*	
Description: TRU Glovebox Waste from 234-5Z from the PFP Complex	
Waste Stream Description: Defense and non-defense TRU waste from past processing, routine maintenance, and various operating activities that was packaged between 1993 and 1997 and generated at the Hanford Site 200 West Area Plutonium Finishing Plant Complex located in Building 234-5Z. Material Balance Area 231 Analytical Laboratory located in Rooms 146, 148, and 149.	
Matrix Parameter Categories Assigned: There are a variety of matrix parameter categories within this waste stream, but the wastes are all intermixed within the containers. There is no specific waste form that comprises 80% of the waste matrix, therefore the subcategory assigned to this waste stream is S5490.	

Site: Hanford Site

Waste Stream/Waste Stream Lot: Non-mixed PFP Debris

Waste Stream/Waste Stream Lot Number: NPFPDL2A

Waste Material Parameters Present:

Waste Contents

Inorganic debris (metal, glass, ceramics):

- Iron-based Metals/Alloys: tools and scraps remaining after maintenance activities, spent equipment (e.g., hot plates, sample racks, stirrers, burners, slip lid cans)
- Aluminum-based Metals/Alloys- household foil and mask filters.
- Other Inorganic Materials
- Glass: laboratory equipment (e.g., tubes, vials, stirrers)
- Ceramic: burners

Organic debris (plastic, rubber, paper, cloth, wood

- Rubber: non-leaded rubber in masks and gloves used for PPE
- Plastics (waste material): used exclusively to bag out glovebox waste, load equipment and tools into gloveboxes, contamination control during and after bagging out waste, empty bags, poly jars, and bottles
- Cellulosics:
- Paper: cardboard and "ice cream" cartons to place tools in the gloveboxes at the glovebox seal out and hood areas
- Cloth: PPE that could not be decontaminated, rags used for decontamination, and masselin clothes used in radiological routines
- Wood: brush handles and framing material for filter media
- Filter media: laboratory hood and glovebox ventilation systems

Waste Packaging

- Other Inorganic Materials: diatomaceous earth used in the waste packaging of all drums
- Steel: DOT 17C or UN1A2 steel drums
- Plastic: Anti-Corrosive Rad Pad used in the waste packaging of all waste drums

The waste containers are not expected to contain any prohibited items.

Areas of Operation:
Building 234-5Z. . Material Balance Area 231 Analytical Laboratory located in Rooms 146, 148, and 149

Waste Generating Process:

Analysis of PFP, PUREX, REDOX, PRF powder and solution samples for fissile material content, impurities, isotopic content, and particle size.

EPA Hazardous Waste Constituents Present
None

EPA Hazardous Waste Number
None

Washington State Hazardous Waste Constituents Present
None

Washington State Hazardous Waste Number
None

Site: Hanford Site

Waste Stream/Waste Stream Lot: Non-mixed PFP Debris

Waste Stream/Waste Stream Lot Number: NPFPDL2A

Radionuclides Present:
The typical radionuclides present are Pu-239, Pu-238, Pu-240, Pu-241, Pu-242, Am-241. These radionuclides come in variable distributions based on the weight percent of Pu-240. The percent Pu-240 varies from less than 6% to 20% because of a variety of plutonium nitrate feed. Most of this waste will contain 6% or 12% Pu-241. Additional radionuclides as determine during data reconciliation include K-40, Am-243, Eu-152, Eu-154, Np-237, and Cs-137.

Waste Container Numbers: See the attached list of containers.

Applicable Source Documents (refer to Source Document Reference List):

Tracking No.	Title	
		See Internal Memo #: 33220-99-GCT-080
		See Internal Memo #: 33220-99-GCT-081
		See Internal Memo #: 33220-99-GCT-075

Data Collector Signature: Richard Clinton Date: 09/24/99

Site Project Manager Signature: PAUL J. CRANE Date: 9/24/99
(or designee)

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ATTACHMENT B

RESULTS OF THE HEADSPACE GAS ANALYSES

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ATTACHMENT B
HEADSPACE GAS SUMMARY DATA

Waste Stream NPFPFL2A[a]

ANALYTE	Number of Samples	Mean (ppmv)	SD (ppmv)	UCL_{90} (ppmv)	PRQL (ppmv)	EPA Number[a] (F001-5)
1,1,1-Trichloroethane	30	0.005	0.011	0.008	10	N/A
1,1,2-Trichloro-1,2,2-Trifluoroethane	30	0.001	0.001	0.001	10	N/A
Acetone	30	1.326	1.300	1.637	100	N/A
Benzene	30	0.358	0.441	0.463	10	N/A
Butanol	30	0.728	0.657	0.885	100	N/A
Carbon tetrachloride[b]	30	0.462	1.998	0.948	10	N/A
Chlorobenzene	30	0.007	0.007	0.009	10	N/A
Ethyl benzene	30	0.013	0.052	0.026	10	N/A
Ethyl ether	30	0.000	0.000	0.001	10	N/A
Methanol	30	11.96	15.49	15.67	100	N/A
Methyl ethyl ketone	30	0.130	0.147	0.165	100	N/A
Methyl isobutyl ketone	30	0.009	0.009	0.012	100	N/A
Methylene chloride	30	0.066	0.254	0.128	10	N/A
o-Xylene	30	0.024	0.076	0.042	10	N/A
m-Xylene[c]	30	0.053	0.190	0.042	10	N/A
p-Xylene[c]	30	0.042	0.181	0.086	10	N/A
Tetrachloroethylene	30	0.023	0.065	0.039	10	N/A
Toluene	30	0.118	0.291	0.188	10	N/A
Trichloroethylene	30	0.012	0.058	0.026	10	N/A

[a] The sample data set for Waste Stream NPFPDL2A contains 30 samples; per CAO-94-1010, Section 5.0, the data is assumed to be approximately normal (i.e., normally distributed) and the Central Limit Theorem was applied (the data are not transformed).

[b] One container in NPFPDL2A (CIN #9406526) revealed a high carbon tetrachloride. The results for this container do not fit the results of the other containers in this waste stream. The container is an anomaly and was removed from the waste stream for analysis and possible waste stream reassignment.

[c] The meta and para isomers of xylene coelude and are analytically indistinguishable; therefore, the analytical result for m,p-xylene conservatively reflect the individual isomer concentrations.

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