ROCKY FLATS EXPERIENCE FROM OVER FOUR YEARS OF CHARACTERIZING AND SHIPPING TRU WASTE TO WIPP

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ABSTRACT

The Rocky Flats Environmental Technology Site (RFETS) is currently entering the final stages of decontamination and decommissioning (D&D) and subsequent site closure. Consequently, all transuranic (TRU) waste currently generated, and remaining to be generated, will have to be shipped and disposed of at the Waste Isolation Pilot Plant (WIPP) by early calendar year 2005. This has necessitated that RFETS aggressively develop and implement a wide variety of waste management options, processes and strategies to characterize, certify and ship the assortment of TRU waste generated at RFETS.

The purpose of this paper is to present and describe some of the options, processes and strategies that have been implemented at RFETS and proven effective and successful during the execution of its TRU waste shipment and disposal project. Additionally, this paper also shares some of the knowledge, experience and lessons learned during the four plus years that RFETS has been characterizing and shipping TRU waste to the WIPP. The paper addresses a variety of topics ranging from technical approaches/solutions to successful logistical and management strategies utilized.

INTRODUCTION

On June 15, 1999 RFETS made its first shipment of TRU waste to the WIPP. As of October 31, 2003, RFETS has successfully executed 1,174 TRUPACT-II shipments of transuranic waste to WIPP in which 25,171 208-liter (55-gallon) drums and 1,812 SWBs, for a total of 8,724 cubic meters, of TRU waste were transported to and disposed of at the WIPP. RFETS has transported and disposed of more TRU waste at the WIPP than any other site. The rate of shipping has progressed from one shipment per month at the beginning to a maximum of 18 shipments per week. Currently RFETS is executing 11 shipments per week.

The waste disposed of at the WIPP was derived from 20 different waste streams that included both mixed and non-mixed waste, and both debris and homogeneous solids type waste. Since issuance of the WIPP Hazardous Waste Facility Permit Waste Analysis Plan (WAP) in November 1999 through October 31, 2003, 15 separate WIPP audits were needed to achieve WIPP authorization of all the elements of the RFETS program. Consequently, RFETS has developed extensive experience and expertise in the characterization and shipping of TRU waste to the WIPP.

BACKGROUND

The Rocky Flats Environmental Technology Site in Colorado has been engaged in an accelerated closure project over the past few years. This closure project involves deactivation, decontamination, decommissioning and demolition of all site equipment and facilities with the objective of completing the closure project in 2006. A key aspect of this closure project is the shipment and disposal of all TRU waste stored and generated at RFETS to the WIPP.

As a result of the closure project, a variety of TRU waste materials are required to be prepared and characterized for shipment and disposal at WIPP. This material ranges significantly in contaminants and form consisting of materials such as:

- Stored legacy type waste (e.g., legacy debris, solidified sludges/liquids, supercompacted waste)
- Waste material derived from environmental restoration activities currently underway (e.g., soils/gravel)
- Residue waste material – waste highly contaminated with plutonium (e.g., pyrochemical salts, incinerator ash)
- Polychlorinated biphenyl (PCB) contaminated waste
- Waste that is classified for national security reasons
- Liquid waste that requires solidification prior to disposal
- Beryllium containing waste
- Radioactive sources
- Mixed waste

Because of the accelerated closure schedule and the variety of waste that requires disposal, RFETS has had to aggressively pursue and implement a variety of waste management options, processes and efficiencies to establish and maintain its shipping rate. These options, processes and strategies include:

- Flexible Packaging Configurations
- Special Requirement Authorizations/Modifications
- Variety and Redundancy of Processing Capabilities
- Effective Planning, Management and Execution

These four topics are discussed in more detail below.

FLEXIBLE PACKAGING CONFIGURATIONS

Currently, TRU waste is only transported to WIPP in the Transuranic Package Transporter-II (TRUPACT-II) Type B package. Three constraints in shipping TRU waste to WIPP in the TRUPACT-II are the Pu-239 fissile gram equivalent (FGE) limits, the restrictions imposed on the generation of flammable gas within the TRUPACT-II vessel during the transport period and weight limits for individual payload containers and assembled payloads. Compliance with these three requirements has necessitated that RFETS adopt a variety of packaging configurations and methodologies to allow certain waste types and packages to be shipped to WIPP for disposal.

Pu-239 FGE Limits

Payload containers are acceptable for shipment in TRUPACT-II only if the measured Pu-239 FGE (plus two times the measurement error) is less than or equal to 200 for a 208-liter (55-gallon) drum and a pipe overpack component (POC), and is less than or equal to 325 for a standard waste box (SWB) and a ten drum overpack (TDOP). The Pu-239 FGE limit for each TRUPACT-II vessel is 325, unless the payload consists of 14 POCs, in which case the limit is 2,800 (14 times 200).

Because of these requirements, it would take 14 TRUPACT-II vessels to ship 14 208-liter (55-gallon) drums each containing 200 FGE while it would only take one vessel to ship 14 POCs each containing 200 FGE. Consequently, for waste contaminated with high levels of plutonium (approaching 200 FGE per package), it is much more efficient to package this waste into POCs than into normal 208-liter (55-gallon) drums. RFETS incorporated the use of POC packaging during the residue-repackaging project in which certain legacy residue material was repackaged into POCs to meet WIPP disposal and TRUPACT-II shipping requirements. As of October 31, 2003, RFETS has shipped and disposed of 18,809 POCs in 685 shipments of TRU waste at the WIPP.

Another packaging configuration RFETS has adopted to achieve FGE compliance is the use of SWB overpacks. Specifically, certain drums, when assayed, were found to exceed the 200 FGE limit, but to be less than the 325 FGE limit for SWBs. Instead of repackaging this waste into two or more drums and increase worker radiation exposure, the offending drum was overpacked, with three other drums if possible, into an SWB such that compliance with the final SWB FGE limit was achieved.

Flammable Gas Generation

Radioactive material in contact with hydrogen bearing material is known to generate hydrogen gas by radiolysis. Shipment of waste in the TRUPACT-II requires assurance that a flammable gas mixture does not occur within the sealed TRUPACT-II vessel during the shipping period. This is controlled by assignment of shipping categories to payload containers and through wattage restrictions imposed on each payload container for the majority of the waste shipped in the TRUPACT-II. Containers that do not exceed their wattage limit will not generate significant hydrogen gas over the shipping period when shipped with other containers in the same shipping category that also do not exceed the wattage limit.

Wattage limits can severely limit the ability to ship affected waste in the TRUPACT-II for waste materials (e.g., combustible or organic type waste) that may generate hydrogen gas readily by radiolysis. The establishment of wattage limits is based, along with other things, on the following two factors:

- Gas generation potential of the waste material
- The resistance to release of hydrogen that is generated from the waste

The higher the gas generation potential, the lower the wattage limit. The higher the resistance to hydrogen release, the lower the wattage limit. Both the gas generation potential and the resistance to hydrogen release can be influenced by the packaging configuration of the waste, and thus affect the wattage limit assigned to the payload container.

For example, RFETS has implemented the use of multiple packaging configurations that utilize filtered bags or filtered layers of confinement. By using filtered layers of confinement, the resistance to hydrogen release from a payload container is greatly reduced, leading to a significant increase in the wattage limit for a given waste material.

Similarly, RFETS has also utilized packaging configurations in which waste is directly loaded into metal cans. This packaging configuration is of benefit where the waste material itself (e.g., metal debris) has a lower gas generation potential than that of the plastic packaging it is normally packaged in. By preventing the alpha radiation emitted from the radioactive waste material from interacting with plastic confinement bags, this packaging configuration has the effect of actually lowering the gas generation potential of the waste and thus increasing the container wattage limit.

The use of filtered confinement bags at RFETS has become the standard instead of the exception. The use of these expanded packaging configurations allows for more efficient packaging of waste (more waste in less containers) with reduced risk of noncompliance for exceeding wattage limits.

To illustrate the variety of packaging configurations available, RFETS currently has over 200 TRUCON codes approved. Each TRUCON code typically consists of at least three packaging configurations (one for a drum, one for an SWB and one for drums overpacked into an SWB).

The potential pitfalls associated with the use of so many packaging configurations are the extra controls that need to be developed to ensure that the packaging configuration specified or desired is the actual packaging configuration achieved. RFETS has developed a very specific and proceduralized system for controlling the generation and packaging of waste. Even so, instances have arisen where packaging configurations specified were not achieved without subsequent corrective actions. Typically, these subsequent corrective actions involved either evaluating the affected container(s) for compliance to its as-packaged packaging configuration or to repack/rework containers to comply with its original, desired packaging configuration.

Weight Restrictions

SWBs are limited to a gross weight of 1,814 kilograms (4,000 pounds). TDOPs are limited to a gross weight of 3,039 kilograms (6,700 pounds). There have been instances where a large item that was generated during decommissioning operations was packaged into an SWB and the subsequently measured gross weight of the SWB exceeded 1,814 kilograms (4,000 pounds). The item could not be effectively size reduced without extensive effort and so instead of repackaging and splitting the contents, the overweight SWB was simply overpacked into a TDOP. In these cases, the gross weight of the TDOP was less than its gross weight limit of 3,039 kilograms (6,700 pounds) and so the package could be shipped and disposed of at WIPP.

To accomplish this, radioassay characterization was performed on the SWB prior to overpacking since RFETS did not have any WIPP approved assay characterization platform capable of assaying a container the size of a TDOP. This action proved to be of benefit for safety reasons – i.e., less hands on work with the actual waste material, less exposure to workers, and less chance of a contamination incident because the item packaged in the SWB did not require additional size reduction.

SPECIAL REQUIREMENT AUTHORIZATIONS/MODIFICATIONS

Technical requirements for the transportation of TRU waste in the TRUPACT-II are given in the TRUPACT-II Certificate of Compliance (C of C), the TRAMPAC document and the TRUPACT-II SAR. Technical requirements for the RCRA characterization of TRU waste to be disposed of at WIPP are provided in the WIPP Hazardous Waste Facility Permit WAP. Additional technical requirements for disposal of TRU waste at WIPP are contained in the WIPP Contact Handled Waste Acceptance Criteria (CH-WAC). RFETS has worked closely with WIPP and Carlsbad Field Office (CBFO) personnel to prepare and submit certain modifications to these requirement documents that have greatly assisted RFETS in the transportation and disposal of TRU waste at WIPP. Some of these modifications are discussed in greater detail below.

Visual Examination to Confirm Radiography

Initially, the WIPP WAP required that all waste examined by radiography be statistically evaluated by visual examination (VE) to establish and monitor the radiography miscertification rate. The VE to confirm radiography was an additional step that was required to be performed on a waste stream basis. This meant that a statistical number of containers from each waste stream examined by radiography must be opened and the contents visually examined to determine if radiography had miscertified any containers. Typically, 16 containers per waste stream per year would require VE to confirm radiography. With over 20 waste streams currently approved this could mean that up to 320 containers per year would require VE to confirm radiography. VE to confirm radiography is a rather difficult and labor intensive operation to perform, especially for SWBs, and so minimizing the amount of containers needing VE to confirm radiography was a priority for RFETS.

One of the first modifications made to the WIPP WAP involved changing the requirement to perform VE to confirm radiography for each Summary Category Group instead of for each waste stream. Currently, each of RFETS 20 approved waste streams fall into one of two Summary Category Groups: S3000 (homogeneous solids) and S5000 (debris). This WIPP WAP modification greatly reduced the number of containers that had to be visually examined thereby avoiding additional radiation dose exposure to workers and additional costs estimated at approximately $18 M.

To further minimize the number of containers being examined by radiography and thus requiring VE to confirm radiography, RFETS implemented a site wide program to perform visual examination at the time of packaging for newly generated waste (referred to as the VE technique). This characterization technique is allowed by the WIPP WAP and once implemented

and authorized eliminates the requirement to radiograph waste containers characterized in this manner. The development and implementation of this site wide program was lengthy and difficult, but once completed and authorized, it significantly reduced container handling and increased the container characterization throughput.

Reduced Headspace Gas Sampling

Initially, the WIPP WAP required that all containers (i.e., drums and SWBs) of waste be headspace gas sampled prior to being disposed of at WIPP. In general, headspace gas sampling is the rate-limiting step for characterization of waste containers because of the drum age criteria (DAC). The DAC is the minimum amount of time that a container must wait before a representative headspace gas sample can be collected. Consequently, because of this DAC, headspace gas sampling is typically the last characterization step to be performed on most containers prior to shipment and disposal.

RFETS had a large volume of waste that had undergone a high temperature thermal treatment process in which any volatile organic compounds (VOCs), if present in the waste, would have been effectively removed from the waste. Headspace gas sampling every one of these containers for VOCs seemed of no value for this type of waste and so a modification to the WIPP WAP was submitted that allowed for reduced headspace gas sampling of containers of thermally treated waste. This modification was approved and resulted in approximately 18,000 drums of waste not requiring headspace gas sampling, with an estimated cost saving of about $29 M. This modification greatly increased the available inventory of waste characterized and ready for shipment and disposal at WIPP and enabled RFETS to establish and maintain a shipping rate of over 10 shipments per week.

Headspace Gas Sampling of POCs

For reasons previously discussed, RFETS has packaged a large quantity of waste into POCs. Packaging of waste in POCs was initiated before the issuance of the WIPP WAP in November of 1999. The original WIPP WAP did not address the headspace gas sampling of POCs; however, since POCs were packaged into 208-liter (55-gallon) drums it was initially assumed that the headspace gas sampling of POCs would be accomplished the same as for any other 208-liter (55-gallon) drum. This assumption was quickly proven incorrect because the calculated DAC for a 208-liter (55-gallon) drum with a POC was much greater (on the order of years) than the established DAC for a normal, direct-loaded 208-liter (55-gallon) drum. Consequently, some method needed to be established for headspace gas sampling POCs such that the DAC was roughly equivalent to the DAC for a normal 208-liter (55-gallon) drum.

The method developed was to perform headspace gas sampling through the POC filter vent port as opposed to through the 208-liter (55-gallon) drum filter vent port. This methodology was incorporated into the WIPP WAP through a permit modification and allowed RFETS to characterize and ship POC drums to WIPP for disposal.

Characterization/Disposal of TRU Classified Waste

RFETS has a significant inventory of TRU waste that is classified because of national security reasons. Until recently, WIPP did not have the necessary authorizations and safeguards to accept classified waste for disposal. After considerable evaluation, a decision was made to upgrade WIPP to be able to accept this type of waste for direct disposal. A modification to the WIPP WAP to allow for characterization of this type of waste was submitted and approved. This modification saved RFETS significant time and effort that would have been needed to establish some other disposal pathway, such as either decontaminating this waste to low level for disposal at an acceptable low level waste repository or sanitizing the waste to remove its classified nature prior to shipment and disposal at WIPP.

Shorter Shipping Period for Shipment of Solidified Organics (Waste Type IV)

The maximum allowable shipping period for shipment of waste in TRUPACT-II is 60 days. This shipping period, along with other information, is used to determine the allowable flammable gas generation rate for waste that is shipped in TRUPACT-II. RFETS has demonstrated that the actual shipping time for waste shipped from RFETS to WIPP is much shorter than this 60-day maximum allowable shipping period. Consequently, in the next revision to the TRUPACT-II SAR, the maximum allowable shipping period for RFETS is being lowered to 20 days for routine shipments and may be shortened down to 10 days if additional administrative controls are utilized. This shorter maximum allowable shipping period has the benefit of increasing the allowable flammable gas generation rate because less time is allowed for the potential accumulation of flammable gas in the TRUPACT-II during shipping.

RFETS has several hundred drums of solidified organic waste. This waste is designated as Waste Type IV in the TRAMPAC document and as such does not have an established gas generation potential. Consequently, each drum of Waste Type IV currently requires gas generation testing at elevated temperature to determine if it can be shipped in TRUPACT-II.

Using the 60 day shipping period, a significant percentage of the drums tested to date (~30 %) have failed to comply with the flammable gas generation rate limit. By shortening the shipping period and increasing the allowable flammable gas generation rate limit, the failure percentage decreases to less than 5 %. Authorization (still pending) of this shorter shipping period should greatly facilitate the transportation and disposal of this waste type by decreasing the quantity of drums that will require reworking and subsequent re-testing to achieve compliance with the flammable gas generation rates.

VARIETY AND REDUNDANCY OF PROCESSING CAPABILITIES

To meet site closure schedules and maintain an adequate throughput and shipping rate, a variety and redundancy of processing capability is necessary. This processing capability includes characterization/testing capability, TRUPACT-II loading and shipping capability and capability to treat/solidify unacceptable waste forms (i.e., liquids) at the point of generation.

Characterization/Testing Capabilities

During start up of the RFETS TRU waste characterization program, it became clear that reliance on one and only one characterization/testing facility or piece of equipment would not be successful. Deployment and authorization of a variety and redundancy of characterization/testing capabilities/equipment was essential for providing operational flexibility, achieving sufficient throughput to support high shipping campaigns and to avoid single point failures in the overall characterization process. Equipment and capability relocation was frequently necessary as facilities were decontaminated and decommissioned. In many cases, relocation of equipment/capability required re-certification/re-authorization from WIPP. Table I summarizes the various capabilities at RFETS for performance of each characterization/testing activity.

Table I Summary of RFETS characterization/testing capabilities

Characterization/Testing Technique	Capability
Radiography	• Drums - three different facilities. • SWBs - two different facilities.
Gas Generation Testing	Capability to test (both at room temperature and at elevated temperature) up to 40 drums concurrently in 40 separate testing canisters.
Headspace Gas Sampling	• Initially used Summa canister method. • Now use three separate automated online mobile units in two locations.
Solids Sampling	Three separate facilities – two facilities at RFETS and one facility at Argonne National Laboratory – West (ANL-W). • Cone and Quarter Method for small containers. • Grid Method for small containers. • Push Tube Full Drum Core Method for pliable solidified waste. • Full Drum Core Method for cemented solidified waste (at ANL-W).
Solids Analysis	Two separate facilities – one facility at RFETS and one at Idaho National Engineering and Environmental Laboratory (INEEL)
VE to Confirm Radiography	Four separate facilities, all at RFETS.
VE of Newly Generated Waste (VE technique)	Implemented site-wide at RFETS for newly generated waste.
Non-Destructive Assay	• 29 small can counters in two different facilities. • 7 drum counters in 6 different locations. • 2 SWB counters in 2 different locations.

TRUPACT-II Loading and Shipping Capabilities

In addition to characterization/testing capabilities, another potential bottleneck for maintaining a steady shipping throughput involves the facilities for loading and leak testing of TRUPACT-II vessels. Initially, RFETS started shipping with one TRUPACT-II loading facility. The use of this facility was highly constrained by space limitations. Specifically, the facility lacked sufficient space for drums to be efficiently staged for certification and loading. To achieve desired shipping rates, additional TRUPACT-II loading and testing facilities were required. Consequently, a new loading facility was designed and constructed, utilizing extensive input from operations personnel, to support optimum loading and operational efficiency. The new facility consisted of two separate TRUPACT-II loading bays and was located in an adjacent facility to the existing TRUPACT-II loading facility. The new loading facility was designed and constructed to accomplish the following:

- Incorporation of state-of-the-art equipment to maximize loading efficiency.
- Enable consolidation of all post characterization activities through loading (i.e., staging, surveys, inspection, and certification activities).
- Provide adequate space to stage waste inventories to achieve production oriented strategy for inspection, certification, loading and leak testing operations.
- Incorporation of both technical facility and operations requirements.
- Redundant capability to ensure continual operations.

Point-Of-Generation Liquid Solidification

As site closure progresses, various facilities and processes become deactivated. One facility that has been deactivated housed the site liquid waste treatment system for both organic and aqueous liquids. Although the majority of the liquid waste on site was treated (solidified) prior to deactivation of the facility, liquid waste is still occasionally discovered and generated during D&D operations. To address this situation, a point-of-generation liquid solidification process was developed and implemented. The process consists of adding liquid waste to certain qualified solidification agents at the point that the waste is generated and packaged into payload containers. Solidification agents for organic liquids, aqueous liquids (for acidic, neutral and basic solutions) and combinations of organic and aqueous liquids have been qualified for use. The implementation of the point of generation liquid solidification process allows waste generators to directly solidify liquid waste where it is generated instead of transferring the liquid to some centralized treatment facility for solidification some time later.

EFFECTIVE PLANNING, MANAGEMENT AND EXECUTION

Effective planning, management and execution of programmatic and operational activities are vital for maintaining any successful TRU waste characterization, shipment and disposal program. At RFETS, a detailed shipping schedule plan based on available waste profiles and characterization capabilities for both the short and long term was developed and maintained. This schedule consisted of a detailed scheduling of RFETS' entire waste inventory, both existing and planned generation, to ensure proper scheduling of both easy and problematic wastes. Development of this schedule provided a clear understanding of waste inventories, both existing

and future generation, which allowed for the characterization requirements for each waste stream to be clearly defined. A systematic tracking system for managing waste at the container level was developed and utilized. Retrievably stored waste containers in inventory were blocked or grouped together by waste stream profile, waste container type (208-liter [55-gallon] drum, SWB, POC) and specific characterization elements required. These waste containers were typically characterized in block fashion to ensure that like groups of waste were completed as a unit. Sequencing of characterization activities was also established to minimize waste container movements.

Sequencing of Characterization Activities

For newly generated waste, sequencing of characterization activities was usually established to accomplish as much characterization prior to or during waste generation and packaging as possible, thereby minimizing post-packaging container handling and movement. This includes performance of visual examination of waste contents at the time of packaging (i.e., the VE technique), solid sampling and analysis of homogeneous waste streams and performance of NDA of small packages in POCs. Performance of the VE technique eliminated the need to perform radiographic examination after packaging for these containers and subsequent consideration for performance of VE to confirm radiography. For non-POC containers, typically the first transfer of the container after packaging is to an NDA platform where the container is radioassayed. After this, the container is then transferred to storage, where the container is allowed to stay until compliance with its DAC is achieved. Once DAC is achieved, the container is then processed through headspace gas sampling and analysis (HSGS&A) and then through gas generation testing (if necessary). Concurrently and after completion of HSGS&A, data are reviewed and processed and the container is staged for inspection, certification and TRUPACT-II loading and shipment.

For retrievably stored waste in inventory, the sequencing of characterization activities usually consists as follows:

- NDA to ensure that the waste is transuranic using a WIPP authorized NDA platform/procedure
- Radiography to ensure there are no prohibited items, such as sealed containers greater than four liters, that would compromise the validity of subsequent characterization activities
- HSGS&A
- Statistical solid sampling and analysis for homogeneous solids waste streams
- VE to confirm radiography
- Gas Generation Testing, as necessary

Infrastructure and Resources

A detailed evaluation of all characterization infrastructure and staffing availability and needs was conducted. This evaluation identified potential characterization deficiencies or limitations and associated corrective actions. Additional infrastructure and staffing was identified and obtained

as needed. Additionally, performance expectations for all available characterization systems were defined and established.

147 full time equivalent (FTE) personnel are required at RFETS to maintain a shipment rate of 10 to 15 shipments per week. This does not include personnel required to retrieve and transfer containers onsite or to perform solid sampling and repack operations. A breakdown of the 147 FTEs is provided in Table II.

Table II Breakdown of Personnel Resources to Maintain a Shipment Rate of 10 to 15 Shipments per Week

Function	Number of FTEs
TRU Program Management	19
TRU Program Quality Assurance	2
Records Management	10
Project Level Data Verification and Validation	6
Measurements	14
NDA Operations	16
Real-Time Radiography (includes TRUPACT-II leak testing)	11
HSGS&A	17
Gas Generation Testing	2
Analytical Laboratory (Operations terminated 12/30/03)	15
TRUPACT-II Loading Operations	24
Waste and Transportation Certification	11
TOTAL	**147**

Establishing Shipping Inventories

Waste characterization and shipping activities were prioritized and managed to support closure objectives. A technical approach was developed and authorized to use VE technique and RTR testing batch data collected before the WIPP RCRA permit became effective in November 1999. This, in association with the reduced headspace gas sampling permit modification and other things previously discussed, allowed for a sizeable inventory of previously or readily characterized waste to be quickly established. This previously or readily characterized waste was shipped while other waste streams were characterized and profiled. Approval of multiple waste stream profiles not only allowed more waste containers to be shipped to WIPP for disposal, but also enabled flexibility in processing of waste containers and recovery options when problems were encountered for a given waste stream. This additional flexibility directly supports the site closure mission by allowing preference to be given to processing waste stored in facilities slated for early decommissioning and closure.

Integration and Communication

One organization was appointed single point accountability for overall TRU waste characterization and shipping. An integrated support team composed of union, subcontractors and management was assembled to function as a Production Control group to facilitate and coordinate container retrieval and movement in support of TRU waste characterization and

shipping. Production Control meetings and operations plan of the day meetings were conducted on a daily basis to ensure clear and consistent communication of expectations and plans between team members. These meetings enabled daily assessment of infrastructure and staffing availability that allowed daily adjustment of resources and activities as necessary and served to focus personnel on the objectives to be completed.

An effective working relationship was established with Department of Energy, Carlsbad Field Office (CBFO) and WIPP contractor personnel. Daily and weekly conference calls were held with the CBFO to discuss and resolve site issues and concerns. Successful channels of communication were established between site and WIPP technical experts to quickly assist in resolution of technical issues encountered. This working relationship between knowledgeable RFETS personnel and WIPP/CBFO technical experts was of great benefit for initiating and maintaining the RFETS TRU waste characterization and shipping project.

Data Management

Batch data reports generated from NDA, radiography, VE to confirm radiography, VE technique, HSGS&A, solid sampling/analysis and gas generation testing are prepared as paper copies. Data review and validation is documented on hardcopy checklists included with the batch data reports. Typically, applicable data are manually entered into a centralized Waste and Environmental Management System (WEMS) database. Data entry is independently verified upon completion of data review and validation, after which the data are locked out in WEMS from any additional modification. Once a waste stream lot of containers is completely characterized, applicable data are then extracted from the WEMS system and statistically evaluated, as necessary. The containers are subsequently certified in the WEMS system and then the appropriate data for these containers are electronically extracted and transmitted to the WIPP Waste Information System (WWIS) for WIPP approval and payload evaluation and creation using the eTRAMPAC software system.

SUMMARY

RFETS has developed and implemented a mature TRU waste characterization, shipping and disposal program that addresses a wide variety of waste types and packaging configurations. To accomplish this, RFETS has had to develop and implement a variety of approaches, techniques and strategies. Many difficulties have been encountered along the way, and more will certainly be encountered in the future; however, a disposal path forward has been identified for all known TRU waste streams at RFETS. At present, RFETS is on track to complete the shipment and disposal of all TRU waste from RFETS by early calendar year 2005.

REFERENCES

1 U.S. Nuclear Regulatory Commission (NRC), "Certificate of Compliance for Radioactive Material Packages Model No.: TRUPACT-II", Certificate of Compliance No. 9218, Revision 16, Office of Regulatory Procedures, U.S. Nuclear Regulatory Commission (2003)

2 U.S. Nuclear Regulatory Commission (NRC), "Safety Analysis Report for the TRUPACT-II Shipping Package", Docket No. 71-9218, Revision 19c, Office of Regulatory Procedures, U.S. Nuclear Regulatory Commission (2003)

3 U.S. Nuclear Regulatory Commission (NRC), "TRUPACT-II Authorized Methods for Payload Control (TRAMPAC)", Revision 19c, Office of Regulatory Procedures, U.S. Nuclear Regulatory Commission (2003)

4 U.S. Department Of Energy (DOE), "TRUPACT-II Content Codes (TRUCON)", DOE/WIPP-89-004, Revision 14, Carlsbad Field Office, U.S. Department of Energy (2002)

5 New Mexico Environmental Department (NMED), "Waste Isolation Pilot Plant Hazardous Waste Permit, Attachment B, Waste Analysis Plan", Permit No. NM4890139088-TSDF, New Mexico Environmental Department (2003)

6 U.S. department of energy (DOE), "Contact-Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant", DOE/WIPP-02-3122, Revision 0.1, Carlsbad Field Office, U.S. Department of Energy (2002)