MEETING THE WASTE CERTIFICATION PROGRAM REQUIREMENTS OF THE NEVADA TEST SITE (NTS) DISPOSAL FACILITY

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ABSTRACT

A successful program (process) for shipping waste to the Nevada Test Site (NTS) is predicated on collection and Independent verification of objective evidence to certify conformance with the NTS Waste Acceptance Criteria (WAC). There are four major "hold points" in the certification process requiring documented acceptance: 1. container requirements, 2. waste form criteria, 3. waste package preparation, and 4. waste shipment. Compilation of the documentation supporting the decisions made at each of these hold points constitutes the waste certification package for each shipment. Key questions in developing a shipping program include: What objective evidence is to be collected and how is it documented? How to demonstrate absence of a non-testable attribute? How much (evidence) is enough? What methods are used to verify WAC conformance?

The Fernald Environmental Management Project (FEMP) has developed and continues to refine a successful NTS waste shipping program that has grappled with these questions. The FEMP program recognizes their product to be both the physical disposition of waste and compilation of traceable documentation of the process. This paper will provide an overview of the FEMP waste shipping program with a focus on the following innovations and tools which support the program:

- Documenting Objective Evidence:
  - System for the control and traceability of containers/waste,
  - Basic documentation for waste characterization,
  - Streamlined approaches for waste characterization.
- Verifying Conformance to NVO-325 Requirements:
  - Decision-making criteria for each hold point,
  - Use of surveillance,
  - Use of Real-Time-Radiography (RTR).

BACKGROUND

The Fernald Environmental Management Project (FEMP) near Fernald, Ohio, located 17 miles northwest of Cincinnati, is a large-scale facility with a primary mission that has shifted from the production of uranium metals and compounds to completion of environmental restoration. Cleanup of the 1050-acre site and the support of waste management and remediation activities is now the major site mission.

FEMP was placed on the National Priority List (NPL) in November 1989, and site cleanup is now being conducted following the methodology detailed in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). In addition, the FEMP has several regulatory agreements governing actions at the site, including an Amended Consent Agreement with US EPA-V, an amended Consent Decree with the State of Ohio, and a Federal Facilities Agreement for the Control and Abatement of Radon-222 emissions.

FEMP began shipments of Low Level Waste to NTS in Fiscal Year 1985 and has shipped more than 75,000 cubic meters of waste to date. (See Fig. 1.)

The final certification that a waste container meets all requirements of the NTS waste acceptance criteria is a product of a series of elements. These elements or hold points can be further subdivided and made specific to individual activities that are the ongoing part of a successful waste shipping program. The FEMP waste shipping program was built upon two underlying foundations: a strong Quality Assurance program based on the objectives of NQA-1, and a well defined Nuclear Materials inventory system.

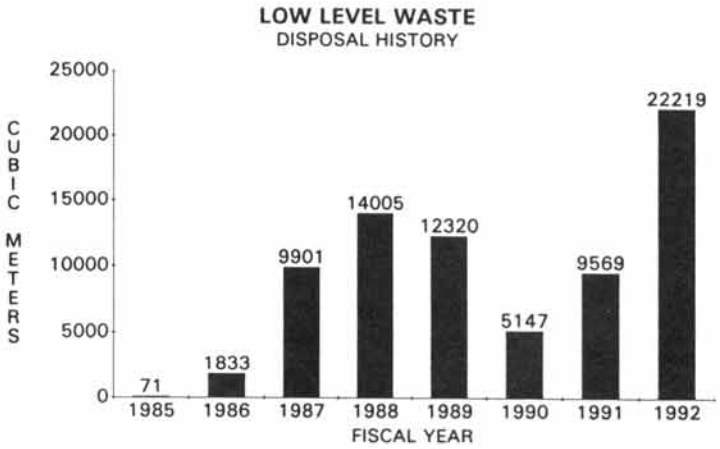

Fig. 1. FEMP was the first site to resume low level waste shipments to NTS after the 1990 Tiger Team stopped all disposal in 1990. The FEMP to date remains the largest generator shipping to NTS.

There are four major hold points in the certification process requiring documented acceptance: 1) container requirements, 2) waste form criteria, 3) waste package preparation, and 4) waste shipment. Compilation of the documentation supporting the decisions made at each of these hold points constitutes the waste certification package for each shipment. This document will discuss the criteria defined

for acceptance, the objective evidence that is collected and documented, the methods used to verify WAC conformance for each hold point.

CONTAINER PROCUREMENT

The waste certification process begins prior to the identification of a particular waste stream. At the FEMP the waste certification officials begin their review with the procurement of waste containers. Procurement documents are reviewed and graded, this grade determines the level of management system controls to assure conformance to applicable quality requirements. Formal surveillance of suppliers and their fabrication, inspection, testing and shipping process are conducted to verify that they follow all purchase order requirements. If necessary, periodic surveillance can be conducted to review supplier performance. Suppliers forward their inspection reports to the FEMP prior to shipment of containers.

All shipping containers are initially reviewed upon receipt at he FEMP for visible damage and completeness of the shipping order. All inspections are documented on an inspection form detailing the acceptance requirements. Acceptable items are tagged acceptable and released for use. Items that do not meet the inspection standards are tagged as nonconforming and a report of these deficiencies is issued.

WASTE FORM CRITERIA

The second major hold point in the waste certification process is verifying that the waste form meets the NVO-325 WAC. The waste form Waste Acceptance Criteria (WAC) identify acceptable waste types for disposal at the NTS according to 1) regulatory status, 2) physical/chemical parameters, and 3) radiological characteristics. The DOE/NV Operations Office requires that approved generators demonstrate a credible and well documented process for waste characterization and waste certification through the application review and generator audit processes. (They receive assistance and input from the State of Nevada Department of Environmental Protection in reviewing generator programs.)

Focused on restoration and waste management activities, the FEMP recognizes the primacy of waste characterization in environmental decision making processes. Waste characterization delimits the viable waste management options and identifies health and safety concerns related to materials management. As such, waste characterization is viewed as a key enabling management objective to be completed *in accordance with regulatory requirements*.

The FEMP has developed a process for characterizing waste such that it can be evaluated with respect to the NVO-325 WAC. The process is designed to meet the following objectives: 1. characterization criteria are explicitly defined, 2. data to support decision making are of known and sufficient quality, and 3. characterization is documented and traceable. The FEMP has standardized its process for waste characterization and developed a series of work-sheets to facilitate the stated objectives. The FEMP utilizes a waste profile sheet known as the **Material Evaluation Form** (MEF) for summarizing waste characterization information. The MEF number provides a unique identifier for waste tracking and identification on-site. A simplified diagram of the process is provided in Fig 2.

The product of waste characterization is a completed waste characterization file for a specific waste stream that documents the waste characterization process. Specific documentation generated from key steps of the process are placed in the file along with a summary of file contents. In addition, summary information is entered into site databases that track waste characterization and site waste inventories. The structure of a typical waste characterization file is provided in Fig. 3.

Based on a review of the NVO-325 WAC, candidate waste streams for shipment to the NTS are identified. One of the work-sheets that the FEMP has developed is the **NTS WAC Review Work-sheet**. This provides a means of identifying to the waste shipping program and the Waste Certification Official those waste streams that have been evaluated and determined to meet the NVO-325 WAC. This work-sheet in addition to the MEF provides traceability to both the waste form and the waste characterization documentation.

WASTE PACKAGE PREPARATION

The FEMP Waste Certification Officials are supported by a team of Waste Package Certifiers. These waste package certification are trained personnel who are familiar with the myriad of requirements involved in the transportation of waste. Prior to filling a waste container an initial examination is conducted to determine if any damage has occurred during site storage or transportation. As each container is packaged a **Prohibited Materials Checklist or MEF Checklist** is completed as the container is filled to confirm no improper waste is packaged.

Packages are weighed and weights are marked on a weight ticket and marked on the outside of the container to assure that package weight limits are not exceeded. Radiation surveys are conducted and the results recorded for each package to verify that the results are with the DOT limits.

Once the package is certified for shipment it is held in a secure area to await transportation. Any breach in this security is logged as a non-conformance and will result in the reexamination of the container. Prior to being placed on the transport vehicle each container examined for proper seal and markings being in place and a **Ready to Ship Checklist** is completed. Labels and markings are checked against three documents a **Storage and Disposal Data Sheet**, a **Tally Sheet** describing the components of a shipment, and the **Circle Copy**, a computerized print of the items scheduled for shipment, to verify weight and label accuracy. Any non-conformance found is corrected prior to loading. Finally, upon satisfactory examination, an **NV-211 Packaging Certification Label** is affixed to each container.

SHIPMENT CERTIFICATION

The vehicles used for over the road transport of waste are the highest profile part of the *waste shipment*. The vehicles are on the public roads/rails and represent your site and your program.

Vehicles arriving at the **FEMP** are inspected for radiological contamination and for overall vehicle condition. **A Vehicle Radiation Monitoring Report** is completed to record that upon arrival the vehicle meets the Department of Transportation standards. Initial trailer condition is determined by examination and recording any comments on the following items on the **Waste Certification Preliminary Trailer Checklist:**

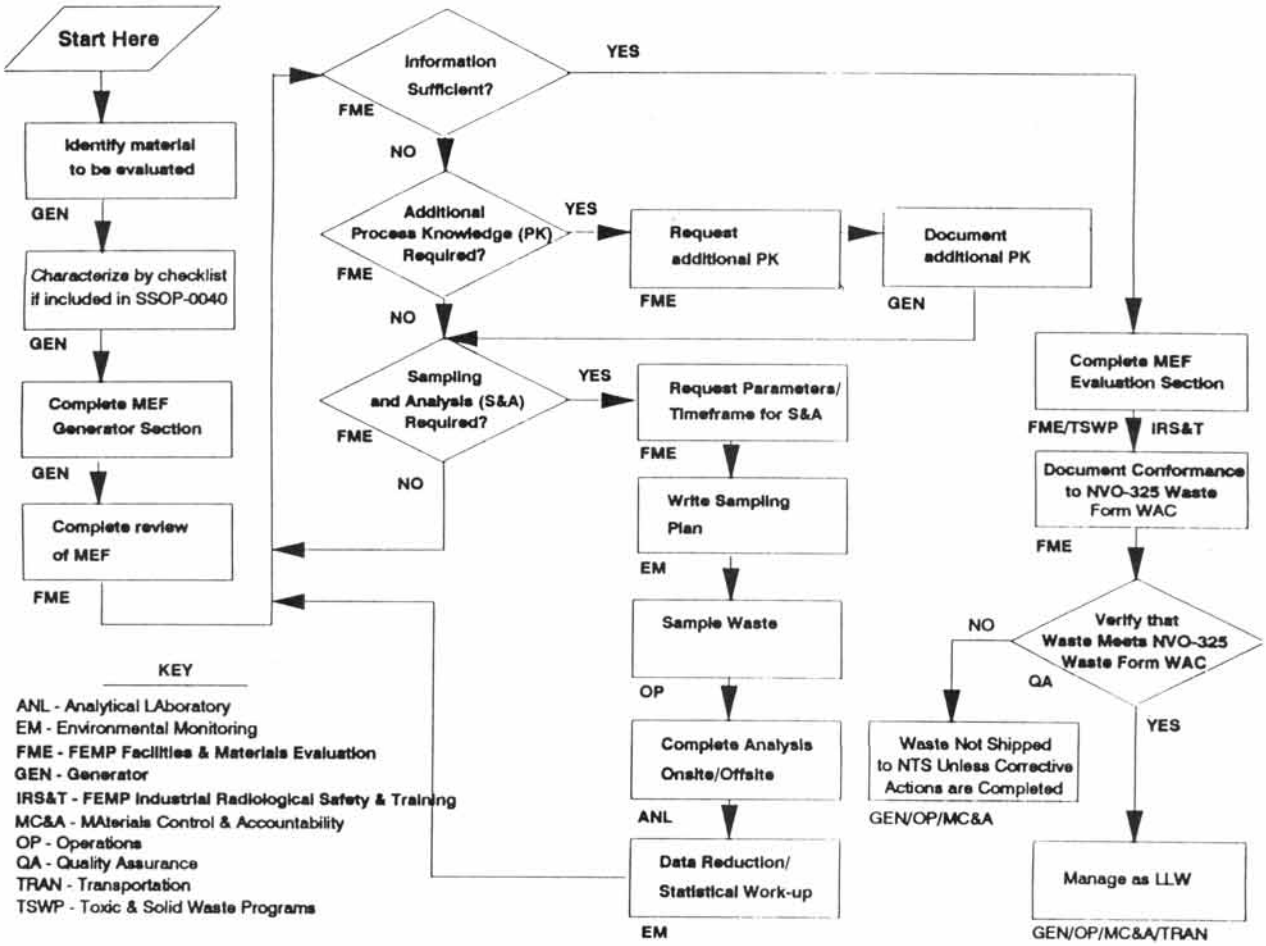

Fig. 2. Simplified block flow diagram for MEF process.

CHARACTERIZATION DOCUMENTATION

- File Index;
- Material Evaluation Form (MEF);
- MEF Worksheets (including NTS Waste Acceptance Criteria);
- Characterization Quality Assurance (QA) Review Sheet;

PROCESS KNOWLEDGE (PK)

- PK Statements (e.g., personnel affidavits);
- Material Safety Data Sheet(s);
- Excerpts from SOPs/Manufacturing Specifications;
- Excerpts from Technical References;
- List of References;

SAMPLING AND ANALYSIS (S&A)

- S&A Request;
- Sampling Plan;
- Sampling Field Logbook Notes;
- Analytical Data Report;
- Offsite Data Review Checklist;
- Visual Inspection Form.

Fig. 3. Waste characterization file contents.

- vehicle flooring interior
- contamination/liquids
- rear door
- rear door seals
- tire condition

The second step in this process is to review the loading of each vehicle. Criteria have been established for each load type prepared by the FEMP. Drums and white metal boxes are shipped in exclusive use trailers. Sea/Land cargo containers are shipped with a maximum of two containers on a flatbed trailer. After loading of the trailer is completed photographs are taken to verify that proper tamper proof seal and required locks are in place. The **Waste Shipment Final Authorization** checklist is completed and any deficiencies noted are reported to the transportation manager for correction. Prior to the offering of the shipment for over the road transport the final examination of the vehicle is conducted. A second **Vehicle Radiation Monitoring Report** is conducted to verify that the vehicle meets transport indices. The **Storage & Disposal Data Sheet** is compared to shipment **Bill of Lading** to verify that the following information is correct:

- Number and type of containers
- Total curie content
- Shipment gross and net weight
- Shipment number

Copies of the **Storage and Disposal Data Sheet, Low Specific Activity/Reportable Quantity, Limited Quantity** documentation, and **Tally Sheet** are attached to the waste shipment or carried with the driver of the waste shipment. The **Tally Sheet** is the form **FEMP** use as a packing list to describe the materials/containers on a shipment. Proper placarding is verified to be in place on the shipment. Vehicles are inspected and **Waste Certification Final Trailer/Vehicle Checklist**

completed by inspecting headlights, turn signals, brake lights, horn, and tire condition. The **Bill of Lading** is compared to the **Shipping Order for Nuclear Material** to verify:

- Trailer Number
- Shipment Number
- Gross and Net Weight
- Bill of Lading Number
- Shipping Order Number
- Seal Number
- Lot Number
- Container Number

Seal numbers are recorded on the **Bill of Lading** and **LLW Shipment Checklist** and **Off-Site Loading Tie-Down Inspection-Vehicle Inspection** form are completed. Gross Weights are verified to be within 100 pounds of actual weights.

The final check prior to shipment is the **Waste Shipment Verification Checklist** that verifies that all previous paperwork has been properly completed. The process provides a series of cross-checks to limit and attempt to eliminate the possibility of errors in the transportation of waste shipments.

WASTE SHIPPING FILE

The Waste Shipping File captures all key documentation required to certify that the waste offered for shipment meets all the criteria for disposal. The file provides an auditable trail of information back through the certification hold points for each waste shipment. The availability of the information, training of site waste management personnel, and clear definition of hold points allow the lead Waste Certification Official to certify each waste shipment. This process also allows for easy review during recertification audits and outside program appraisals.