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MANAGEMENT AND DISPOSITION OF OFF-SITE LABORATORY-GENERATED MIXED/LOW LEVEL  
WASTE

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## MANAGEMENT AND DISPOSITION OF OFF-SITE LABORATORY-GENERATED MIXED/LOW LEVEL WASTE

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### ABSTRACT

The Fernald Environmental Management Project (FEMP) is the first Department of Energy (DOE) site to take back mixed and low level waste generated at commercial laboratories from chemical analyses and treatability studies on samples taken from the site. This paper discusses the steps addressed and the issues resolved in order to initiate the task of taking back mixed/low level waste. Such issues included regulatory, waste management and contractual issues.

### BACKGROUND

The FEMP began as a uranium processing plant in 1952. As a result of these processing activities, the materials at the FEMP are predominately radioactively contaminated. Therefore, the sample waste generated either through cleanup or processing activities is considered mixed or low level radioactive waste.

Since the mid-1980's the FEMP has conducted testing and analysis of different site materials and environmental media at off-site laboratories. In 1990, the DOE committed through the Proposed Amended Consent Decree (PACD) to characterize several groupings of waste materials. From 1990 until the present, approximately 76,000 containers have been characterized under the Resource Conservation Recovery Act (RCRA) requirements through the PACD program. In addition, the FEMP manages other characterization activities at off-site laboratories under regulatory programs such as the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). These various characterization analyses, particularly the testing and analyses conducted for RCRA determinations, create sample waste from the Toxicity Characteristic Leachate Procedure (TCLP) extractions, organic extractions, metals digestions, and contact waste.

In April 1990, analytical services contracts for potential RCRA hazardous/mixed waste samples were awarded to two commercial laboratories. In November 1990, an additional laboratory was awarded a contract. Section IX of these contracts was identified as "Sample Disposal". It stated that "All samples shall be retained by the Offeror for a maximum period of six (6) months. All remaining residual sample material shall be returned to the FEMP with freight prepaid and shipped in compliance with all Department of Transportation (DOT) requirements...". This statement in the contracts started lengthy discussions with the commercial

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laboratories and the FEMP operating departments on the definition of "residual sample material". Residual sample material was defined as the unused portion of the original sample and/or the associated mixed and/or low level wastes that are generated from the analyses of the said samples (i.e., TCLP extracts, organic extracts, metals digests, or contact waste). The FEMP decided that all material generated as a result of the analyses of the FEMP samples could and should be returned.

In July 1991, a task team was formed to develop a systematic approach at the FEMP for managing sample residues and sample waste returned from offsite analytical laboratories. This approach had to comply with all regulatory requirements, including those stipulated in the PACD. In addition, where not in conflict with regulatory requirements, the approach had to be consistent with contractual agreements with the off-site laboratories.

#### REGULATORY ISSUES AND RESOLUTIONS

Regulatory issues pertaining to three general areas had to be addressed. The three areas are termed overriding issues, waste identification issues, and waste management issues.

#### Overriding Issues

Issue 1: The applicability of the sample exclusion rule--What sample residues are included under the sample exclusion rule and at what specific point are samples no longer excluded?

Resolution: Neither the sample exclusion rule under Ohio Administration Code (OAC) 3745-51-04(D) (in lieu of the Code of Federal Regulation (CFR) Part 261.4(d)) nor the Federal Register (FR) notice (46 FR 47426, September 25, 1991) promulgating the rule provide specific guidance which addresses sample residues. The FR notice does clearly state that hazardous wastes generated in laboratories including spent solvents and discarded chemical products are not covered by this rule. Sample residues are, however, an inevitable result of sample analysis. Sample extracts and digestions are derivations of the original sample used for the determinative analyses. These residues contain portions of the original material as evidenced by radiological and chemical compositions. Therefore, the FEMP interpretation of the regulations is that the sample residues are covered under the sample exclusion as long as they a) are the original sample in the original sample bottle, b) are the residues from the sample analysis, and each residue is kept separate in its own container and managed as if it were original sample material, c) they are in transit to the lab, are being managed at the lab, or are in transit back to the original generating facility, and d) while in transit they are in compliance with the requirements of OAC 3745-51-04(D)(2).

Issue 2: The involvement of the Ohio Environmental Protection Agency (OEPA)--Does the FEMP need prior approval to accept any of the sample residues being shipped back onsite?

Resolution: Item 3.5.2 in the Consent Decree with the State of Ohio stipulates that "No hazardous or mixed wastes from an offsite source not already listed in the FEMP Part B Permit Application or a revision as of the entry of this Consent Decree, shall be stored, disposed of, or treated at the FEMP without prior approval of the State of Ohio." This limitation was put on the FEMP to ensure that existing problems were not exacerbated with unnecessary hazardous waste management activities. However, receiving samples and sample residues back onsite is a necessary result of compliance efforts. Therefore, to apprise Ohio regulators, the FEMP provided the OEPA a copy of its sample management plan with a request for any comments or concerns before the plan was implemented.

Issue 3: The residues from analysis of samples of listed waste--Do the derived from and mixture rules apply to residues from the analysis of listed wastes?

Resolution: FEMP regulatory interpretations are that samples under the sample exclusion rule are not subject to the hazardous waste regulations, including the waste identification rules contained in OAC 3745-51 (in lieu of 40 CFR Part 261). Thus, samples which qualify for the exclusion are not regulated as hazardous waste. However, if the material that is being sampled is already known to be a listed waste, then the sample and any waste generated from the analyses of that sample will carry the listed code.

Issue 4: The efficacy of off-site disposal options--Could off-site laboratories ship wastes directly to a treatment or disposal facility for treatment/disposal?

Resolution: DOE Order 5820.2A, Radioactive Waste Management, stipulates in Chapter III, 2.c. that "DOE - low-level waste shall be disposed of on the site at which it is generated, if practical, or if onsite disposal capability is not available, at another DOE disposal facility." It further stipulates in 2.d., that "DOE - low-level waste that contains non-radioactive hazardous waste components (mixed waste) shall conform to the requirements of this order, applicable EH Orders, and shall also be regulated by the appropriate regional authorities under the Resource Conservation and Recovery Act." If the sample residues are managed outside the sample exclusion rule and are determined to be waste, one must then consider their "generator" and "ownership" status as well as their attendant liability issues. The "generator" status is primarily a regulatory responsibility issue under RCRA while "ownership" is both a contractual issue as well as a liability issue under CERCLA, Section 107(a). EPA has identified (40 CFR Part 261.10) the generator of a waste as "any person, by site, whose act or process produces hazardous waste identified or listed in Part 261 ...". This can be interpreted two ways: 1) DOE is the generator of the mixed waste since the original samples were from a DOE site, DOE had the samples transported to the laboratories, and DOE requested the analyses on the samples; or 2) that the laboratories conducting the analyses produced the sample residues. Also, if the residues are bulked from various sources into 55 gallon drums the residues would

be managed outside the sample exclusion rule and the lab would be considered the generator. However, the second issue regarding "ownership" involves CERCLA liability under Section 107(a). In this section the person who arranges for the transportation or disposal of the hazardous substances is a potentially responsible party (PRP) and responsible for cleanup costs jointly and severally. Because DOE would be a "person" under the CERCLA statute, the potential liability issues under Section 107(a) can be raised if the hazardous substance is not properly managed and future cleanup at offsite locations is necessary. The CERCLA liability concerns of Section 107(a) could be cause for interpreting DOE Order 5820.2A to mean that the sample residues must be returned to the FEMP. Therefore, the FEMP has determined that the offsite laboratories should not ship wastes directly to a treatment or disposal facility for treatment/disposal.

#### Waste Identification

Issue: Waste identification codes--What waste identification codes should be used and how would they apply to unused sample portions, TCLP extracts, organic extracts, and metal digests?

Resolution: Because the FEMP decided that sample residues were to be managed using the sample exclusion rule under OAC 3745-51-04 (in lieu of 40 CFR Part 261.4(d)), the waste identification codes would not be applicable.

#### Waste Management

Issue 1: Sample disposition--Can samples be returned to the original waste stream?

Resolution: Excess original sample material may be returned to the original waste stream so long as the original waste is either containerized or being managed in an active waste management unit. Sample residues (i.e., extracts, leachates, and digestions) may not be returned to the original waste stream, but must be managed separately in either containers or active waste management units.

Issue 2: Sample residue management--Can sample residues be returned in an accumulation drum?

Resolution: The accumulation of sample leachates, extracts, and digestions, is permissible so long as certain criteria are met for compliance with the Land Disposal Restriction (LDR) rules and restrictions for onsite treatment. The LDR rules allow for accumulation as long as no dilution takes place that acts as a substitute for adequate treatment to achieve compliance with the treatment standards. For the small amount of material associated with individual sample leachates, extracts and digestions this accumulation approach makes a great deal of sense. These sample derivations must be segregated by waste code to ensure that no impermissible dilution takes place. Waste code segregation of these materials also addresses waste compatibility issues. Full accumulation drums must be sampled and

analyzed for characterization of the waste prior to storage and disposal. Empty sample containers generated from this approach can be managed as non-hazardous waste under RCRA.

Issue 3: Sample residue management--Is lab packing the sample leachates, extracts, digests, etc. a viable option for disposal?

Resolution: Lab packing represents a straightforward approach for management and disposal of these wastes that is allowed within the hazardous waste regulations (e.g., 40 CFR 265.316) and is specifically addressed within the LDR program. However, the costs associated with the lab pack approach would be significantly higher than the accumulation drum approach and would result in a greater number of containers to be managed. Therefore, the FEMP is not currently utilizing this approach.

### IMPLEMENTATION

Due to the complexity of these issues, the task team broke down the return of material from the offsite laboratories into two manageable categories. The first category was unused sample material. The FEMP's position was that if the material were unused sample material and if it were excluded under 40 CFR 261.4(f) and OAC 3745-51-04(D), then the material could be returned to the FEMP in the manner in which it was received. Procedures were written and implemented to complete the task of receiving and dispositioning the unused sample material.

The second category was low level and mixed waste generated as a result of sample analysis activities. An Operational Readiness Review (ORR) team. Its mission was to establish a process that would allow for the off-site waste generators to return waste to the FEMP in accordance with the site RCRA Part B Permit Application requirements as well as DOE Radioactive Waste Management Policies. Various FEMP groups, such as Receiving, Waste Characterization, Compliance, Legal, Facilities and Warehousing, and the Sample Management Office were instrumental in writing procedures, modifying the RCRA Part A & B Permit Applications and writing the FEMP's Waste Acceptance Criteria (WAC) document. These documents were reviewed and approved by the DOE Fernald Site Office, and copies were sent to the OEPA for their information.

The WAC outlines the requirements a generator must meet to return to the FEMP waste generated as a result of analyzing a FEMP sample. Only waste generated as a result of processing a FEMP sample or material will be received at the FEMP. The shipper must comply with the applicable regulations and orders as they pertain to waste classification, waste packaging, marking and labeling requirements. To characterize wastes, evaluation by process knowledge and/or analytical methods must be performed. If sample collection from accumulated wastes is necessary, a plan describing the procedures for collection and analysis is required. The information obtained from characterization will be used for waste certification and documentation to meet the request for transfer requirements.

### CONTRACTUAL AGREEMENTS

The FEMP has developed standardized contract language for each of its analytical services contracts. This language enables the FEMP to systematically manage and

coordinate the activities associated with the return and/or disposal of sample residues and any associated mixed and/or low level wastes that are generated from the analyses of the samples. The language is as follows:

X.6 WASTE MANAGEMENT

X.6.A LABORATORY ANALYTICAL WASTES

Waste generated by the laboratory during analysis of FEMP samples, will be properly stored and disposed of in accordance with applicable Nuclear Regulatory Commission (or Agreement State) license and U.S. Environmental Protection Agency Regulations. Care should be taken to minimize generation of Mixed Wastes through selection of appropriate reagents and methods including selection of non-hazardous liquid scintillation cocktails. Only by prior agreement will unused sample fractions be returned to the FEMP for archiving, storage, and/or disposal. If required, the unused sample will be managed in accordance with Section C.6.A.1.b.

X.6.A.1 MANAGEMENT OF WASTES TO BE RETURNED TO THE FEMP

Wastes generated by the contractor during the analysis of FEMP samples, including, but not limited to, contact waste, equipment wash waters, and rinsates, shall be managed and disposed of by the subcontractor and only by prior agreement will they be returned to FEMP for management. The preparation and shipment of waste shall be in accordance with the FEMP's Waste Acceptance Criteria (WAC) Document. If required, the analytical wastes will be managed in accordance with Section X.6.A.1.a.

X.6.A.1.a Management of Bulk Wastes to be Returned

- a. Waste streams that are generated from the analysis of FEMP samples will be segregated by waste type. Each waste stream will be accumulated in the appropriate DOT containers as specified in 49 CFR Part 173. The FEMP may be contacted for advice in selecting the appropriate containers.
- b. An inventory shall be maintained for each container including, at a minimum, the following information for each addition to the container:
  1. The FEMP sample number and release number;
  2. The waste type (e.g., acid digestate, leachate, etc...);
  3. The estimated (within +/- 10%) volume of waste added;
  4. The date when the waste was added; and
  5. Identification of the person making the addition.
- c. The subcontractor shall provide the FEMP the required documentation in accordance with the FEMP's Waste Acceptance

(WAC) document. The WAC provides guidance to facilitate transfer of waste from offsite generators to the FEMP site in accordance with applicable federal and state regulations.

- d. The FEMP will schedule a pickup date with an authorized trucking company for return of the wastes.

X 6.A.1.b Management of Unused Sample

Unused portions of FEMP samples shall be managed in the following manner:

- a. Unused portions of FEMP samples shall be packaged for return to FERMCO in the same manner that they were sent to the subcontractor;
- b. Samples shall be returned under the exclusion provision in 40 CFR Part 261.4(d);
- c. Copies of all required shipping papers (which must include, but are not limited to, an inventory of all samples in each shipping container with each inventory attached to the outside of each container, bill of lading, and radiation screening results) and copies of the chain of custody forms and other documentation that was sent with the original shipment shall be completed by the subcontractor laboratory and sent to FEMP prior to shipment; and
- d. FEMP will schedule a pickup date with an authorized trucking company for return of the unused samples.

CONCLUSION

On November 20, 1992, the first return shipment from an off-site laboratory was received at the FEMP. Additional waste shipments have since been returned. On December 1, 1992, the FEMP went under the new management of the Fernald Environmental Restoration Management Corporation (FERMCO). The Sample Processing Lab (SPL) subsection in the Sample Management Office (SMO) under the Analytical Laboratory Services (ALS) department has a major responsibility for managing and coordinating all activities related to the return and/or disposition of sample residues and the associated mixed and/or low level wastes that are generated from the analyses of samples from both on-site and off-site laboratories.

The FEMP has accepted the responsibility under RCRA for managing its' waste from "cradle to grave". As FERMCO continues to complete the remediation activities at the FEMP SPL will continue to manage the disposition of offsite generated waste in accordance with the FERMCO mission "Together DOE and FERMCO are committed to the safe, least-cost, earliest, final cleanup of the Fernald site, within applicable DOE orders, regulations and commitments and in a manner which addresses stakeholder concerns."

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