

THE REGULATORY COMPLIANCE PLAN FOR THE MAWS PROGRAM*

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ABSTRACT

The Fernald Environmental Management Project (FEMP) has initiated the Minimum Additive Waste Stabilization (MAWS) Program to demonstrate and evaluate integrated treatment of the FEMP site's Operable Unit 1 contaminated soils and sludges. The demonstration will require on-site operation of an integrated treatment system consisting of soil washing, water treatment by ion exchange, and vitrification of all contaminated solid wastes at a rate of 300 kg per day.

Compliance with all relevant environmental regulations is a major priority of this program. Relevant regulatory requirements come under the jurisdiction of the U.S. Environmental Protection Agency (U.S. EPA), the Ohio Environmental Protection Agency (Ohio EPA), and the Department of Energy (DOE). The plethora of potentially applicable regulations were reviewed and an efficient regulatory compliance strategy developed. This strategy was documented in the MAWS Regulatory Compliance Plan which was presented to the regulatory agencies as a reasonable working plan.

The FEMP has found the development of a comprehensive, organized regulatory plan to be critical to the successful implementation of integrated demonstration projects such as the MAWS Program. This paper discusses the approaches used in the MAWS Regulatory Compliance Plan and highlights which could prove useful for others that want to approach the DOE and/or EPA with technology demonstrations.

BACKGROUND

Site Description and History

The Fernald Environmental Management Project (FEMP), formerly the Feed Materials Production Center (FMPC), is a federal facility owned by the U.S. Department of Energy (DOE). The Fernald Environmental Restoration Management Corporation (FERMCO) is the contractor hired to conduct environmental restoration activities at the FEMP. The FEMP site is located on 425 hectares (1050 acres) approximately 29 kilometers (18 miles) northwest of Cincinnati, Ohio. The FEMP produced uranium metal cores, target element cores, and was used for interim storage of low-level radioactive and hazardous wastes from the early 1950's until 1989. The site contains waste storage facilities including waste pits, silos, fly ash disposal areas, sanitary landfill, and lime sludge ponds. The waste pits are located west of the FEMP and cover approximately 9.3 hectares (23 acres). The Great Miami River runs close to the FEMP east boundary.

Increased national emphasis on environmental cleanup has resulted in the evolution of new technologies and regulatory requirements regarding the management of the waste materials. The United States Environmental Protection Agency (U.S. EPA) issued a Notice of Noncompliance (NON) in March of 1985 identifying major concerns over potential environmental impacts associated with operations at the FEMP. Consequently, in July of 1986 a Federal Facilities Compliance Agreement (FFCA) was jointly signed by the DOE and the U.S. EPA. The FFCA was entered into pursuant to Executive Order 12088 (43CFR47707) to ensure compliance with existing environmental statutes and implementing regulations such as the Clean Air Act, the Resource Conser-

vation and Recovery Act (RCRA), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

A Remedial Investigation/Feasibility Study (RI/FS) was initiated, pursuant to CERCLA, to expedite remediations of the site. The RI/FS is a comprehensive environmental investigation systematically conducted according to EPA regulations and guidelines. The RI phase incorporates a broad-based study to characterize the type and extent of possible contamination and any associated environmental and human health risks. The FS phase develops and evaluates corrective action alternatives to mitigate environmental concerns.

In December of 1989, the FEMP was placed on U. S. EPA's National Priorities List (NPL) of sites requiring environmental cleanup. Consequently, in April of 1990 the DOE and EPA signed a CERCLA Consent Agreement. The FFCA was incorporated, by reference, in the Consent Agreement. In May of 1991, U.S. EPA and DOE entered into a dispute resolution agreement regarding certain alleged violations of the 1990 Consent Agreement. As a result, U.S. EPA and DOE agreed to amend certain terms of the 1990 Consent Agreement and the amended Consent Agreement was signed in September of 1991.

The FEMP site is divided into five operable units (OUs) according to geography and media (materials) by the Consent Agreement. The OUs are divided as follows:

Operable Unit 1 Waste Pit Area: Waste Pits 1-6, clearwell, burnpit, berms, liners and soils within the operable unit boundary as approved in the RI/FS work plan addendum.

* Fernald Environmental Restoration Management Corporation with the Fernald Environmental Restoration Management Corporation with the U.S. Department of Energy under Contract No. DE-ACOR-92-OR21972.

- Operable Unit 2 Other Waste Units: Fly ash piles, other south filed disposal areas, lime sludge ponds, solid waste landfill, berms, liners, and soil within the operable unit boundary as approved in the RI/FS work plan addendum.
- Operable Unit 3 Production Area: Production area and production associated facilities and equipment (include all above and below-grade improvements) including, but not limited to, all structures, equipment, utilities, drums, tanks, solid waste, thorium, effluent lines, K-65 transfer line, wastewater treatment facilities, fire training facilities, scrap metals piles, feedstocks, and coal pile.
- Operable Unit 4 Silos 1-4: Silos 1, 2, 3, and 4 berms, decant tank system, and soil within the operable unit boundary as approved in the RI/FS work plan addendum.
- Operable Unit 5 Environmental Media: Groundwater, surface water, soil not included in the definitions of Operable Units #1-4, sediments, flora, and fauna.

The volume of waste at FEMP is a major issue in remedial actions. OU 1 alone contains approximately 350,000 m³ of wastes and up to 600,000 m³ of soils needing remediation.

Description of Minimum Additive Waste Stabilization (MAWS)

OU 1 is investigating vitrification (making waste into glass) technology as a treatment method for its waste in the Waste Pits. The MAWS Program utilizes the different waste streams on site to maximize waste loading and minimize additives.

The objective of MAWS is to maximize waste loading by blending contaminated waste streams on site, reducing the volume of wastes and the cost of disposal. Some chemical additives are expected to be used for the vitrification; however, the cost of the additives are minimized by blending wastes.

MAWS is a synergistic concept that combines soil washing, water treatment, and vitrification of blended wastes. MAWS soil washing equipment will treat the soils at a rate of 1/4 m³ per hour. Approximately 80 percent of the soils will be washed "clean" and disposed on site. The remaining 20 percent represent enriched contaminated soils, which fortunately, are higher in silica content (the main constituent of glass). This contaminated fraction is blended with the pit sludges and fed to the vitrification process. The soil washing in MAWS is a closed treatment cycle which does not create any other waste.

The water generated by soil washing is cleaned through an ion exchange water treatment system and is re-used for soil washing. Spent water treatment filter media, which consists mainly of sand and glass ion exchange resin, can be used as feed for the vitrification process. Thus, combining water treatment with soil washing and vitrification, the only materials generated are clean water, clean soil, and glass.

Currently, laboratory and small-scale vitrification studies are being conducted by GTS Duratek and its subcontractor, the Vitreous State Laboratory (VSL) at the Catholic Univer-

sity of America (CUA). Waste Pit 5 materials are blended with contaminated soils to make glass. The studies encompass crucible melts and continuous vitrifier tests. Preliminary results are very promising. The glasses produced pass the Toxicity Characteristic Leach Procedure (TCLP). The TCLP is a test the EPA uses to test the leaching potential of a waste and protect human health and the environment.

The small-scale tests will lead to the construction of two melters by the MAWS program. A 100-kg per day vitrification melter is being installed at the VSL. Test results from this melter will be presented to the EPA and DOE as assurance that a 300-kg per day melter being constructed at the FEMP will operate as designed and should be given approval for startup. The operation of 300-kg per day melter will provide information for making decisions for OU 1's Record of Decision (ROD).

Regulatory Requirements

The MAWS process is expected to be a very effective tool in remediating the large quantities of soil, sludge, and other wastes at the FEMP. Immobilization of the radioactive contaminants and destruction of non-radioactive contaminants from these wastes will significantly reduce the potential of pollutants being carried into aquifers or, during dry periods, being picked up by the wind and blown outside the FEMP site.

In addition to the glass product produced, the MAWS process will generate treated soil, water, and off-gasses that will be monitored to ensure compliance with environmental laws and regulations. Recycling of the treated water will minimize the amount of fresh water required by the system.

Regulatory requirements result from laws and regulations at the federal and state levels. In addition, the DOE and the FEMP have internal requirements to protect the environment and the safety of the workers at the site. The MAWS Regulatory Compliance Plan addresses each of these concerns.

At the federal level, the MAWS demonstration must comply with the applicable section of the Comprehensive Environmental Responsibility, Compensation and Liability Act (CERCLA), since the FEMP is on the National Priorities List. The MAWS Program is considered an intermediate step in a CERCLA remedial action since it will provide data to demonstrate treatment feasibility and to determine which treatment alternative will be used for full-scale remediation. In this situation, CERCLA provides a mechanism to help accelerate the conduct of the demonstration. Specifically, Section 121(e)(1) of CERCLA (40 CFR 330.400(e)) states:

"No Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely on site, where such remedial action is selected and carried out in compliance with this section."

While a strict interpretation of this CERCLA exclusion could be taken to indicate that no additional permits are required, the FEMP Consent Agreement between the DOE and the U.S. EPA clearly requires compliance with all substantive portions of applicable federal and state requirements. Specifically, Section XIII of the Consent Agreement states:

"U.S. EPA and U.S. DOE recognize, under Section 121(d) and 121(e)(1) of CERCLA, ...that portions of the response actions under this Agreement and conducted entirely on the Site are exempt from the procedural requirement to obtain Federal, State, or local permits. U.S.

DOE must satisfy the Federal and State standards, requirements, criteria, or limitations that would have been included in any such permit to the extent required by CERCLA and the NCP."

The Consent Agreement goes on to require the identification of each permit that would otherwise be required, the specific standards associated with that permit, and an explanation of how those standards will be met. Thus, the CERCLA exclusion accelerates what would otherwise be the permitting process but still requires that all applicable substantive requirements be met.

The substantive reporting requirements of the appropriate permits must be submitted. The appropriate permits otherwise required are listed and the substantive reporting requirements are provided in the MAWS treatability study work plan submitted to the U.S. EPA and Ohio EPA in November, 1992.

In the case of the MAWS Program, the appropriate federal state and DOE regulations follow:

- a. Compliance with National Emission Standards for Hazardous Air Pollutants (NESHAP)
- b. Potential modification of the FEMP National Pollutant Discharge Elimination System (NPDES) Permit
- c. National Environmental Policy Act (NEPA) documentation
- d. State construction and operation permits (Permit to Install and Permit to Operate)

The MAWS Program would qualify for a RCRA RD&D Permit since it falls within the scope of RCRA Section 3005(g), i.e., it is a "...hazardous waste treatment facility which proposes to utilize an innovative and experimental hazardous waste treatment technology or process for which permit standards for such experimental activity have not been promulgated under this subtitle." However, this is not applicable to the MAWS Program under CERCLA since the RCRA RD&D permit is a State requirement rather than a U.S. EPA requirement.

Two sections of the NESHAP are applicable to the MAWS Program. Subpart H provides standards for emissions of radionuclides other than radon. The amount of radionuclide emissions resulting from the removal of excavated materials (soils and waste pit sludge), and from the treatment of these materials in the MAWS process will be estimated. The FEMP's compliance model will be used to estimate the effective dose equivalent (EDE) to the nearest off-site receptor. EDE's less than 0.1 mrem require no further action. An application, and potentially further action, under NESHAP must be submitted for EDE's above this level.

The NESHAP, under Subpart Q, requires that radon emissions from DOE facilities be under 20 pCi/m²-sec. Radon emissions in the off-gasses will be monitored to ensure compliance with this standard. The NESHAP also regulates asbestos emissions (under Subpart M). There is no asbestos in the materials to be fed to the MAWS process. However, the building (Plant 9) where the MAWS equipment will be located contains asbestos insulation, some of which will be removed as part of the preparation for the MAWS demonstration.

The existing FEMP site-wide NPDES Permit is adequate for the discharge of wastewater from the MAWS bench-scale facility. The contaminated water will be reused in the vitrification process while the treated water will be pumped to the

Contaminated General Sump and then processed through the FEMP's water treatment facilities.

The National Environmental Policy Act (NEPA) applies to remediation projects at federal sites. However, Categorical Exclusions for bench and small pilot-scale treatment facilities, such as the MAWS demonstrations, became effective on May 26, 1992 (10 CFR 1021). This eliminated the need for an Environmental Assessment or an Environmental Impact Statement. A Categorical Exclusion has been granted for MAWS.

The Ohio EPA requires a Permit to Install (PTI) and a Permit to Operate (PTO) for new sources of air pollutants. The CERCLA exemption relieves the FEMP from applying for these permits explicitly. Even though the emission data is not required by the permit exemption, this data will be collected as if it were required.

In addition to the statutes discussed above, the DOE and the FEMP itself place a number of regulatory requirements on the MAWS Program. These are discussed further in § 2.3. Compliance with the federal, state, DOE and site requirements ensure protection for the environment and personnel both on and off the FEMP site. The use of the CERCLA exclusion accelerates the permitting of the MAWS demonstrations while maintaining this regulatory safety net.

REGULATORY COMPLIANCE PLAN (RCP)

Objectives of the Regulatory Compliance Plan (RCP)

The major objective of the RCP is to establish a framework for obtaining approval to start-up and operate the MAWS facilities and perform development testing. In addition, the document was written to achieve the following steps leading to approval:

- a. Introduce the MAWS program to the U.S. EPA, Ohio EPA, the DOE, and other organizations involved in remediation at the FEMP.
- b. Initiate a dialogue among the agencies so issues and misunderstandings about the MAWS program can be resolved quickly.
- c. Obtain consensus among the agencies of which regulatory requirements, documentation, and permits are required to obtain approval of the project.

The RCP also served as a gauge to determine if the agencies were sufficiently interested in the program to obtain timely approval of the MAWS.

Structure of the RCP

The RCP provides a comprehensive list of reports, documentation, issues, papers, permits, etc. as deliverables. There are a large number of regulatory and DOE compliance deliverables involved in a program such as MAWS and any one of these deliverables forgotten or left unaddressed could lead to failure in obtaining approval of the MAWS program or, as a minimum, delay its start-up. Therefore, the RCP was structured to address all potential regulatory or compliance deliverables required. Perhaps, more importantly, the document also addresses those deliverables that are not being pursued and explains why. This helps eliminate unfortunate surprises that could appear when approval is requested for start-up. Figure 1 shows the Table of Contents for the RCP. This table shows the topics (and deliverables) addressed.

A term in the Fig. 1 that may be unfamiliar is "delisting." Some hazardous wastes receive special EPA attention and are

listed in tables as such; hence, so-called "listed" wastes. Restrictive regulations apply to these wastes. Delisting is a special legal process that (1) documents a listed material has been treated and rendered non-hazardous and (2) formally requests that the treated material no longer be classified as listed waste.

Deliverables Discussed in the RCP

There were several audiences addressed by the RCP. However, the main audiences for the MAWS program were the U.S. EPA, Ohio EPA, DOE, and FEMP Site. Each audience required certain deliverables. Table I lists most of the deliverables discussed in the RCP. Included in the list is an indication whether the RCP cited a deliverable as required or not for the MAWS Program. Exemptions for some deliverables were requested, but are listed in Table I as not required. Reasons for these exemptions discussed in ¶ 1.3.

CONCLUSION

The MAWS Program has demonstrated that with careful planning and good dialogue among the agencies and U.S. DOE, timely implementation of remedial activities is achievable. Careful planning includes communication with those implementing the program. As a result of these coordination and communication efforts, implementation of the MAWS

Program and the project team have faced the minimum resistance from all participants.

Compliance with the Federal, State, DOE and site requirements ensure protection for the environment and human health both on and off the FEMP site. The use of the CERCLA exclusion accelerates the permitting of the MAWS demonstrations while maintaining this regulatory safety net.

DISCLAIMER

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Fig. 1. Table of Contents.

TABLE I
MAWS Deliverables

<u>Deliverable</u>	<u>Required:Yes/No</u>	<u>Comment</u>
US EPA:		
Treatability Study Work Plan (WP)	Yes	Includes Permit Information Summary. See ¶ 1.3
Air Emission Permit to Install (PTI)	No	See ¶ 1.3
Air Emission Permit to Operate (PTO)	No	See ¶ 1.3
National Emission Standards for Hazardous Air Pollutants (NESHAP)	n/a	Included in Permit Information Summary
National Environmental Policy Act (NPDES) Permit	No	Existing FEMP permit suffices
Water Discharge PTI	n/a	Included in Permit Information Summary
Quality Assurance (QA) Plan	Yes	A MAWS specific plan will be written
Engineering Evaluation/Cost Analysis (EECA)	No	Required for removal action projects, not research programs
DOE:		
Environment Assessment (EA), Environmental Impact Statement (EIS), or Finding of No Significant Impact (FONSI) report	No	Not required since a CAT.EX is applicable
Categorical Exclusion (CAT.EX)	Yes	New ruling allow CAT.EX for small pilot demonstrations
Removal Site Evaluation - Operations (RSE)	No	Determine if wastes are RCRA. Already done for FEMP wastes.
RSE for MAWS Construction	Yes	Determine if construction demolition debris is RCRA.
Safety Analysis, Safety Assessment (SA)	Yes	Required of all programs and projects
Preliminary Safety Analysis Report (PSAR) and Final Safety Analysis Report (FSAR)	No	Preliminary SA indicated the advanced SAs (PSAR & FSAR) are not required
Risk Assessment (RA) and Health and Safety Plan	Yes	Required of all programs and projects
Engineering System Acquisition Advisory Board Approval (ESAAB)	No	Required of special high risk, unique, or "high visibility" projects
FEMP Site Related:		
- FEMP Work Permit	Yes	These documents are normally handled at FEMP. They cover standardized CERCLA and RCRA needs at the FEMP.
- Confined Work Space Permit		
- Radiation Work Survey Permit		
- Construction Environmental, Safety & Health Work Survey		
- Asbestos Work Permit		
- Material Evaluation Form (MEF)		
- Construction Waste Identification (CWID)		
Operational Readiness Review	Yes	A specially chosen board reviews all MAWS aspects for completeness and safety. Board approval require prior to MAWS start-up