

CONF-880903--6

CONF-880903--6

DEVELOPMENT OF A MIXED WASTE MANAGEMENT FACILITY

DE88 010556

AT THE NEVADA TEST SITE

R. L. Dodge, Reynolds Electrical &
Engineering Co., Inc.
P. O. Box 98521
Las Vegas, NV 89193-8521
702-295-1632

R. F. Brich, U.S. Department of Energy
Nevada Operations Office
P. O. Box 98518
Las Vegas, NV 89193-8518
702-295-0994

I. ABSTRACT

The U.S. Department of Energy (DOE) produces radioactive low-level wastes (LLW) which contain hazardous components as identified by 40 Code of Federal Regulations (CFR) 261. Management of those mixed wastes (MW) requires compliance with U.S. Environmental Protection Agency (EPA) regulations for hazardous wastes and DOE regulations for LLW. In 1988, DOE's Nevada Operations Office (NV) began disposing of MW at the Nevada Test Site (NTS) under interim status as authorized by the state of Nevada. MW disposal is limited to Pit 3 while operating under interim status.

Preparations for operation of a separate Mixed Waste Management Facility (MWMF) by the end of 1989 are underway. Those preparations include revising the NTS Part B Permit application, developing a MW certification program, developing and operating a vadose zone monitoring system, preparing an Environmental Assessment (EA), developing protocols for analysis of MW, and facility design and construction.

II. INTRODUCTION

U.S. Department of Energy activities, in support of defense programs, result in the generation of MW which contain both radioactive and hazardous components. In further support of the defense programs, the DOE/NV is developing a facility at NTS which can receive and dispose of a portion of the MW generated by DOE defense operations. The MWMF is being developed in response to DOE Office of Defense Waste and Transportation Management need to provide enhanced capabilities and facilities for safe, secure, and efficient disposal of defense-related MW in accordance with DOE, EPA, and state of Nevada requirements.

This paper describes the permitting and design of a MWMF at the NTS. This 167-acre facility will be a part of the 732-acre Area 5 Radioactive Waste Management Site (RWMS).

III. SITE DESCRIPTION

The Area 5 RWMS is located in Frenchman Flat, an intermontane valley without external surface drainage or surface water resources. The RWMS is located on alluvial fan material derived from the Tertiary volcanics of the Massachusetts Mountains located to the northwest. The valley fill is poorly sorted and only loosely stratified. It contains clay- to boulder-sized materials and is composed of tuff, limestone, dolomite, quartzite, granite, basalt, and other lithologic remnants in various proportions.

Annual estimated precipitation is calculated to be 14 cm; and the soil moisture content, to a depth of 6 m, was found to be approximately eight percent. Potential evapotranspiration greatly exceeds the yearly precipitation. The Ash Meadows groundwater basin underlies the RWMS and is an interbasin flow system which occupies the lower portion of the Cenozoic alluvial fill and the basement Paleozoic carbonates. It is relatively independent of the topographic boundaries of Frenchman Flat. Depth to the water table at the waste site is approximately 240 m with the direction of flow generally south to southwest.

Pit 3, the existing disposal unit to be used for the disposal of MW during interim status, is located in the northeast corner of the Area 5 RWMS. Its dimensions are roughly 115.8 m x 329.2 m and 9 m in depth. It has previously been used as a repository for LLW. However, the present quantity of LLW stored in Pit 3 is small in comparison to the pit dimensions, and this waste will not interfere with the disposal of MW.

IV. REGULATORY REQUIREMENTS

Mixed waste contains both radioactive and hazardous components as defined respectively by the Atomic Energy Act (AEA) and the Resource Conservation and Recovery Act (RCRA). Radioactive components of MW are regulated by DOE under the AEA. Hazardous components of MW are subject to RCRA regulations as enforced by the state of Nevada and approved by the EPA.

MASTER

A. Resource Conservation and Recovery Act Requirements

The RCRA regulations govern facility development and operation, and prescribe a multitude of administrative and technical requirements. Compliance with these requirements must be demonstrated by documentation which specifically addresses each of the requirements. Permitted operations regulations are contained in 40 CFR Part 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," and include the following: General Facility Standards, Preparedness and Prevention, Contingency Plan and Emergency Procedures, Manifest System, Recordkeeping and Reporting, Releases from Solid Waste Management Units, Closure and Post-Closure, Financial Requirements, Use and Management of Containers, and Landfills.

The state of Nevada adopted the RCRA regulations and is an authorized state for hazardous waste regulation. As such, the state possesses regulations which are at least as stringent as the RCRA regulations. The state of Nevada is authorized to regulate in accordance with the pre-Hazardous & Solid Waste Act Amendments (HSWA) RCRA regulations. The state has applied for, but has not yet received, authority for enforcing the HSWA regulations for MW. EPA Region IX is reviewing the state applications and could issue a decision by spring 1989.

B. DOE Requirements

The MWMF will meet all DOE regulations relating to radiation safety, environmental compliance, and waste disposal. Those requirements include waste analysis and waste acceptance criteria. In support of those regulations, a radiological performance assessment of all activities conducted at the RWMS was conducted. Based on that performance assessment, operation of the MWMF will meet all required radiological performance objectives.

C. National Environmental Policy Act (NEPA) Requirements

An EA of the impact of MW disposal operations at the Area 5 RWMS is being prepared. That assessment will include the results of a radiological performance assessment of all radioactive waste management operations at the Area 5 RWMS.

D. Waivers

Nevada Operations Office has requested a waiver on the use of disposal unit liners, leachate collection systems, and groundwater monitoring wells as required by RCRA. In accordance with 40 CFR 265.90(c) and 40 CFR 254.90(b) (4), documentation of the low potential for migration of hazardous components to groundwater was developed. This determination is necessary

to operate under interim status without groundwater monitoring. For permitted status operations, that document, in conjunction with the vadose zone monitoring system, will support the waivers for groundwater monitoring wells and trench liners. The state has verbally indicated their concurrence with this approach; however, the EPA has not offered a position on the waiver request.

V. FACILITY MONITORING

A monitoring system utilizing groundwater monitoring wells is inappropriate at the NTS. The travel time of a contaminant, from the near surface to the water table (calculated to take as long as 20,000 years), precludes the use of monitoring wells as a detection system. In addition, wells could create accelerated transport pathways for the migration of waste contaminants from the near surface to the water table. For those reasons, a system has been designed for monitoring the vadose zone beneath the MW disposal units.

The methods selected as most appropriate for monitoring MW at the NTS are (1) neutron logging, (2) soil air sampling (SAS), and (3) gamma logging. MW consists of both hazardous and radioactive components. Accordingly, both components should be included in the monitoring plan. Because water movement through the unsaturated zone is the major vehicle for the transport of waste components, neutron logging will provide long-term spatial monitoring of soil moisture conditions within and beneath the disposal unit. SAS will indicate the presence and concentration of volatile hydrocarbon components, while gamma logging will identify radioactive components in the soil.

During interim status operations, the vadose zone monitoring system will be installed in the dedicated portion of Pit 3. Refinements will be made in order to improve specificity and sensitivity of the system. During permitted operations, the vadose zone monitoring system will be used as an alternative to conventional groundwater monitoring.

VI. FACILITY OPERATIONS

A. Interim Status

On November 8, 1985, NV provided the NTS RCRA Part B Permit application for the RWMS to EPA Region IX and the state of Nevada in support of developing an MWMF. On September 17, 1987, the state of Nevada Department of Conservation and Natural Resources granted NV interim status for the receipt and disposal of hazardous waste. Subsequent discussions with the state confirmed that interim status authorized the NTS to accept MW which can only be disposed in the existing LLW disposal unit, Pit 3. In October 1987, EPA

Region IX informed NV that the proposed MWMF would not be subject to RCRA regulations and EPA scrutiny until the state of Nevada received authority to regulate MW. The Colorado Department of Health approved Rocky Flats Plant (RFP) to ship pondcrete and saltcrete to NV on November 18, 1987, with concurrence from EPA Headquarters on February 8, 1988.

The Part B Permit application will be reviewed by the state, and a draft permit (and possibly an operating permit) will be issued without formal EPA review if the schedule for facility development is met. Potential shortcomings of this timing may include operations proceeding at a level which may be inconsistent with EPA policy since EPA possesses ultimate approval authority for the Part B Permit conditions.

The MWMF will be operated in a series of phases which coincide with the permitting process. Phases I and II (retrievable storage and disposal, respectively) occur under interim status authorization. Phases III and IV (construction and operation of the MWMF, respectively) occur under permitted status authorization. The operations corresponding with each of these phases follow:

1. Phase I - Retrievable Storage.

Although interim status has been granted to NV, operations under Phase I will only include the receipt of RFP pondcrete and saltcrete MW streams and placement of those wastes into retrievable storage in Pit 3. Disposal is not allowed under Phase I because of the need to complete the EA to satisfy NEPA requirements. NEPA requirements for retrievable storage are covered by the DOE memorandum to file, "Temporary Storage of Rocky Flats Waste at NTS." Upon completion of the EA, operations will shift from storage to disposal (Phase II).

In accordance with NVO-185, all waste generators must operate under Waste Certification Quality Assurance Plans which address the elements described in NVO-185. Annual audits of generators' certification programs will be conducted jointly by NV/Reynolds Electrical & Engineering Co., Inc. (REECo) audit teams. Upon demonstration of satisfactory compliance with the audit findings and observations, a generator would be approved for a specific MW stream. Each MW stream will be subject to the audit process. In order to receive the pondcrete and saltcrete under Phase I, an audit of waste certification practices was conducted at the RFP in December 1987.

During interim status operations, the vadose zone monitoring system will be installed in the dedicated portion of Pit 3. The monitoring system is designed to assess the migration of mobile hazardous components via a SAS system, moisture via a neutron density probe, and selected radionuclides via a gamma ray spectroscopy system.

During interim status, refinements will be made to improve specificity and sensitivity.

2. Phase II - Disposal Under Interim Status. Once NEPA requirements have been satisfied with the issuance of the final EA, disposal of the RFP waste streams in Pit 3 will commence. In addition, waste streams from other generators will be eligible for disposal providing all waste certification requirements, including generator audits, have been satisfied. All waste disposal operations will be conducted in accordance with the requirements of 40 CFR Part 265. Review of the Part B Permit application by the state of Nevada, and responses to any notices of deficiencies, will be completed during Phase II.

B. Permitted Status

1. Phase III - Procurement and Construction. Once the state of Nevada issues the Part B Permit, MWMF construction activities will commence. Site construction activities include construction of the flood control dike, completion of new road work, excavation of the first disposal unit, installation of onsite utilities and fire protection systems, and installation of the vadose zone monitoring system. Until the construction of the MWMF is complete, waste operations will continue in Pit 3. This transitional period includes state reviews of "as-builts" and verification inspections at the site. Upon approval by the state, placement of MW in the new disposal unit (Phase IV) will proceed.

2. Phase IV - Permitted Disposal. Upon completion of the MWMF, disposal of MW from approved generators will commence in accordance with the conditions of the Part B Permit. Generators' waste certification activities will be audited for conformance with the MW acceptance criteria outlined in NVO-185. No generator waste streams will be authorized for disposal until compliance with NVO-185 is demonstrated.

In addition to the waste certification program, random examination of package contents will be conducted at a Waste Examination Facility (WEF) which should become operational at approximately the same time as the MWMF. WEF will utilize real-time radiography, and intrusive sampling and analysis of package contents, to provide additional assurance that the waste acceptance criteria of NVO-185 are met.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.