Department of Energy
Nevada Operations Office
P. O. Box 98518
Las Vegas, NV 89193-8518

-- 8070

AUG 10 1999

FERNALD
LOG M-1626
Aug 16 9 03 AM '99
FILE
LIBRARY

Paul J. Liebendorfer, P. E. Chief
Bureau of Federal Facilities
Department of Conservation
and Natural Resources
Division of Environmental Protection
333 West Nye Lane, Room 138
Carson City, NV 89710-0851

POSITION PAPER ON "ACCEPTABILITY FOR DISPOSAL OF FEMP OPERABLE UNIT 4 RESIDUES AS LOW-LEVEL RADIOACTIVE WASTE AT THE NEVADA TEST SITE"

Enclosed for your review is the subject position paper dated July 1999. As stated in the Executive Summary, the purpose of the paper is to address the issues with the acceptance and disposal of the Fernald Operable Unit 4 waste at the Nevada Test Site. The paper also defines the DOE/NV position regarding the acceptance and management of this waste, and those of similar origin and nature that may be offered for disposal in the future.

We are offering you the opportunity to provide comments on this position paper prior to our office issuing it to Fernald for their use in continuing their planning for the management of this waste. It would be appreciated if your comments or responses were provided to us by September 1, 1999.

If you have any questions or would like any additional information, please contact Wendy A. Clayton at (702) 295-5751.

E. Frank Di Sanza

E. Frank Di Sanza, Director
Waste Management Division

WMD:WAC

Enclosure:
As stated

1

cc w/encl:
Kandice Bellamy, EPA Region IX,
San Francisco, CA
M. D. McKinnon, NDEP, Las Vegas, NV
J. M. Sattler, DOE/FN, Fernald, OH
M. J. Kopp, FDF, Fernald, OH
B. D. Becker, BN, Mercury, NV
M. B. Noland, BN, Las Vegas, NV
R. M. Guertal, HAZMED, Las Vegas, NV
P. K. Matthews, BN, Las Vegas, NV
M. C. Giampaoli, HAZMED, Las Vegas, NV
C. T. Junio, Innovative Waste Solutions,
Las Vegas, NV

cc w/o encl:
S. R. Livenick, BN, Las Vegas, NV

8070

Position Paper

on the

Acceptability for Disposal of FEMP Operable Unit 4

Residues as Low-Level Radioactive Waste at the

Nevada Test Site

July 1999

Wendy A. Clayton — 8/2/99
Reviewed: Wendy A. Clayton, DOE/NV — Date
Low-Level Waste Project Manager

Jhon T. Carilli — 8/9/99
Concurred: Jhon T. Carilli, DOE/NV — Date
RCRA Program Manager

Sharon A. Hejazi — 8/10/99
Concurred: Sharon A. Hejazi, DOE/NV — Date
Office of Chief Counsel

E. Frank Di Sanza — 8/10/99
Approved: E. Frank Di Sanza, DOE/NV — Date:
Waste Management Division Director

3

Attachment to:
M-1626

Executive Summary

The Fernald Environmental Management Project (FEMP) has applied to the DOE Nevada Operations Office (DOE/NV) for approval to dispose of treated uranium residues from FEMP Operable Unit 4 (OU-4) at the Nevada Test Site (NTS) as a low-level radioactive waste. Removal of the OU-4 materials and the subsequent treatment, shipment, and disposal are mandated though a Record of Decision (ROD) driven by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The OU-4 residues were generated by the processing of pitchblende ores and concentrated uranium ores at the FEMP and other Department of Energy (DOE) facilities. The majority of the ores originated from the Shinkolobwe Mine in the Belgian Congo; the balance of the ores originated at the Rum Jungle and Radium Hill mines in Australia. The uranium metals processed from these ores were used in the production of special nuclear material, utilized in support of United States defense programs. The material is an 11(e)(2) byproduct material as defined by the Atomic Energy Act (AEA) of 1954, as amended.

The AEA identifies the DOE as the authority for disposal of certain radioactive wastes associated with the extraction and enrichment of uranium, which is used in the production of special nuclear material. Some of these materials, when determined to be a waste, are excluded from regulation under the Resource Conservation and Recovery Act (RCRA), as amended. A specific type of material known as "11(e)(2) by-product material" is one such waste. DOE Order 435.1 continues the policy of allowing the Department to manage small quantities of 11(e)(2) byproduct material as low-level waste at DOE low-level waste disposal facilities.

The purpose of this position paper is to address the issues associated with the acceptance and disposal of this waste stream at the NTS. Additionally, this paper defines the DOE/NV position regarding the acceptance and management of this waste stream, and those of similar origin and nature that may be offered for disposal in the future.

Definitions

11(e)(2) Byproduct Material. A specific type of byproduct material defined at Section 11(e)(2) of the AEA, 11(e)(2) comprises the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content. [Source: Atomic Energy Act of 1954, as amended, 42 U.S.C. Section 2014(e)(2)]

AEA, as amended, 42 U.S.C. 2011 et seq., enacted by Pub. L. No. 83-703. The AEA ensures proper management, production, possession, and use of radioactive materials. The Act also provides the Department with authority for developing generally applicable standards for protecting the environment from radioactive materials. Pursuant to the AEA, DOE has established a system of standards and requirements issued as DOE Orders. The Act also authorizes the Uranium Mill Tailings Radiation Control Act, under

4

which the DOE is responsible for stabilizing and controlling uranium mill sites contaminated as a result of the extraction of uranium or thorium ores, used in nuclear weapons production.

CERCLA of 1980, 42U.S.C. 9601, enacted by Pub. L. No. 96-510, also known as Superfund: Amended in 1986 by the Superfund Amendments and Reauthorization Act, Pub. L. No. 99-499. CERCLA provides a statutory framework for the cleanup of waste sites containing hazardous substances and, as amended by the Superfund Amendments and Reauthorization Act, provides an emergency response program in the event of a release (or threat of a release) of a hazardous substance to the environment. CERCLA's goal is to provide for response and remediation of environmental problems that are not adequately covered by permit programs of other environmental laws, such as the Clean Air Act, the Clean Water Act, the RCRA, and the AEA.

DOE Order 435.1 - Radioactive Waste Management. The purpose of DOE Order 435.1 (previously 5820.2A) is to resolve high priority radioactive waste management issues; establish policy, requirements, and guidance to ensure that management of DOE's radioactive waste protects worker and public health and safety, the environment, and is cost effective; and assign responsibilities for implementing the Order. The Order includes requirements for the management of radioactive waste, including High-Level Waste (HLW), Transuranic (TRU) Waste, Low-Level Waste (LLW), wastes containing byproduct material and naturally occurring and accelerator produced radioactive material as defined by Section 11(e)(2) of the AEA, and wastes from decontamination and decommissioning of radioactively contaminated facilities.

Land Disposal Restrictions. As codified in 40 CFR 268, Land Disposal Restrictions (LDRs) require the use of the best demonstrated available technologies to treat certain hazardous waste and other waste containing certain hazardous components before land disposal to destroy or immobilize hazardous constituents that might migrate into soil and groundwater. The land disposal restrictions also prohibit storing waste that requires treatment, except to facilitate proper recovery, treatment, or disposal.

Low-Level Waste. LLW is radioactive waste that is not HLW, spent nuclear fuel, TRU, byproduct material (as defined in section 11(e)(2) of the AEA of 1954, as amended), or naturally occurring radioactive material [Source: DOE Order 435.1].

Record of Decision. A ROD, in accordance with CERCLA regulations codified at 40 CFR 300, is prepared after an environmental remedy has been selected. In the ROD, the Environmental Protection Agency (EPA) states its remedial decision; identifies and discusses the other remedies considered, and states why one remedy was preferred over the others; states the factors entering into EPA's decision.

RCRA of 1976, 42 U.S.C. 6901, enacted by Pub. L. No. 94580 as amended. RCRA was enacted to ensure the safe and environmentally responsible management of hazardous and non-hazardous solid waste, and to promote resource recovery techniques to minimize waste volumes. Regulations issued by the EPA under RCRA set forth a comprehensive program to provide "cradle to grave" control of hazardous waste by

5

requiring generators and transporters of hazardous waste, as well as owners and operators of treatment, storage, and disposal facilities, to meet specific standards and procedures. Hazardous waste is defined under the RCRA as a waste that poses a potential hazard to human health or the environment when improperly treated, stored, or disposed. The Act includes requirements for locating and operating treatment, storage, and disposal facilities.

Universal Treatment Standards (UTS). As codified in 40 CFR 268.48, this standard is applicable to hazardous waste or waste derived from the treatment of hazardous waste. The UTSs identify the hazardous constituents, along with the concentration based treatment standards required to be achieved prior to land disposal.

Summary of Issues Associated with FEMP OU-4 Waste

Three types of issues are present and are addressed. There are regulatory issues stemming from the applicability of definitions and material status. The next issue relates to the interpretation and applicability of the NTS Waste Acceptance Criteria (WAC). Finally, there is the issue of the actual physical risks associated with the waste, and how these risks are best managed.

A. Regulatory Issues

1. Does the OU-4 material, declared to be 11(e)(2) by-product material by the generator, meet the definition of 11(e)(2) by-product material? If so, are any components of the waste stream subject to RCRA?

In DOE's interpretive rule published in the Federal Register on May 1, 1987, DOE clarified its position on applicability of RCRA to 11(e)(1) by-product material. In this rule, DOE identifies only the non-radiologic, hazardous constituents of the 11(e)(1) by-product waste streams as subject to regulation under RCRA. The rule cites EPA-Nuclear Regulatory Commission (NRC) Guidance on the Definition and Identification of Commercial Mixed Low-Level Radioactive and Hazardous Waste, and notes that the DOE's interpretation is consistent with the interpretation made by EPA and NRC.

Although silent on the issue of 11(e)(2) byproduct material, because DOE notes a consistent interpretation and approach to management of 11(e)(1) byproduct, it is reasonable to assume that the DOE approach to management of 11(e)(2) byproduct would also be consistent with that of EPA and NRC guidance.

The following section from the EPA-NRC guidance explains the 11(e)(2) byproduct definition: "Except for certain ores containing source material, which are defined as source material in 10 CFR 40.4, and uranium and thorium mill tailings or wastes, NRC , and EPA interpret the definitions of source, special nuclear, and byproduct materials to include only the radioactive elements themselves." Thus, the excepted uranium and thorium mill tailings or wastes, which include a mixture of both radiologic and non-radiologic components, comprise the material known as 11(e)(2) byproduct material.

6

Although uranium and thorium mill tailings and wastes naturally contain numerous metals that would otherwise meet the definition of a RCRA hazardous waste, one can conclude that such an 11(e)(2) byproduct waste stream, including any constituents that could meet the definition of a hazardous waste, are ~~intended to be~~ excluded from regulation under RCRA, at 40 CFR 261.4(a)(4), which states, "(T)he following materials are not solid wastes for the purpose of this part: . . . (4) Source, special nuclear or by-product material as defined by the Atomic Energy Act of 1954, as amended, 42 U.S.C. 2011 et seq." Thus, the metals in the FEMP OU-4 11(e)(2) byproduct waste stream are exempt from RCRA. Additionally, because the 11(e)(2) byproduct material is excluded from regulation under RCRA, listed wastes identified at 40 CFR 261 Subpart D cannot be present within the waste stream

2. Does the quantity of waste offered by FEMP meet the definition of a "small quantity" as described in DOE Order 435.1? Does the waste offered by FEMP meet the definition of a low-level radioactive waste?

DOE derives authority from the AEA to manage small quantities of 11(e)(2) byproduct material as "low-level waste" so that it may dispose of such small waste quantities at DOE low-level waste disposal facilities. Such quantities must not be "too large for acceptance at DOE low-level waste disposal sites," and such wastes must meet the requirements for low-level waste in accordance with DOE Order 435.1. The quantity of waste offered by FEMP is easily accommodated at the NTS and is not a "large volume of diffuse material at several locations," or a mine site, as would be regulated by UMTRCA [Uranium Mill Tailings Radiation Control Act of 1978].

FEMP has applied this 11(e)(2) byproduct material to low level waste deviation in pursuing disposal of the Silo 3 waste stream, a subset of the OU-4 wastes, at the NTS. At the point of origin, that is Silo 3, the waste is an 11(e)(2) byproduct material and is excluded from compliance with the standards of RCRA. The 11(e)(2) byproduct, RCRA-exempt waste will then be treated pursuant to the CERCLA ROD to stabilize hazardous constituents, and to greatly reduce radon emanations. This treated 11(e)(2) byproduct waste stream will then be received as a low-level waste, pursuant to the provisions of DOE Order 435.1. Thus, the FEMP Silo 3 waste stream, as well as similar OU-4 waste streams, may be considered to be LLW at the point of receipt, and the NTSWAC for the management of low-level waste is the applicable standard.

B. Compliance with the NTSWAC

3. To what extent must the OU-4 waste meet the NTSWAC? Do the exclusions of 40 CFR 261.4(a)(4) carry through into the NTSWAC?

The FEMP waste is a treated 11(e)(2) by product material and is by declaration, a LLW pursuant to DOE Order 435.1. ***As a LLW, it must meet the NTSWAC and therefore may not contain a RCRA listed waste, or exhibit a RCRA characteristic, regardless of the exclusion defined for byproduct material at 40 CFR 261.4(a)(4).***

7

Because the process that generated the "low-level" waste was exempt from the provisions of RCRA, the low-level waste offered for disposal cannot contain a "listed" waste, as defined at 40 CFR 261 Subpart D. Assuming FEMP demonstrates that the waste does not exhibit a characteristic of hazardous waste, the waste will not be subject to the requirements of RCRA. Additionally, if the waste has never met the criteria for regulation as a mixed waste, FEMP would not be required to demonstrate compliance with the RCRA LDR UTSs.

The generator would be responsible for demonstrating compliance with the NTSWAC. Specifically, the generator should document the absence of the hazardous characteristics defined at 40 CFR 261 Subpart C, especially those toxic constituents identified in Table 1 of 40 CFR 261.24 that may have been used in any processes, regardless of the waste's regulatory status. Official approval of the waste stream would be documented under separate cover after a successful review by the DOE/NV Radioactive Waste Acceptance Program.

C. Physical Risks of Managing the Silo 3 Waste

4. What are the physical risks to the workers, environment, and public posed by the FEMP OU-4 waste?

The physical risks to the workers, environment, and public posed by the FEMP OU-4 waste are primarily radiological, and secondarily, hazardous. Radiologic hazards will be mitigated through disposal at greater depth. The waste, regardless of its legal status, exhibits the properties of a treated, non-LDR compliant low-level radioactive mixed-waste. For this reason, disposal in an area designed to monitor such potential hazards is advisable. The panel recognizes, however, that operational considerations associated with the radiologic hazards of the waste might take precedent in establishing the final disposal location and configuration.

Conclusions

The DOE/NV Panel concludes the following:

A. Based upon the origin of the materials as described by the generator, the FEMP OU-4 waste meets the definition of an 11(e)(2) byproduct material. Because the volume offered for disposal is small, the material may be managed as a low-level radioactive waste and may be accepted for disposal at the NTS. As such, the waste must meet the requirements of the NTSWAC. In meeting the NTSWAC, compliance with 40 CFR Subpart D need not be demonstrated since such wastes cannot occur in 11(e)(2) byproduct material.

B. Consistent with the NTSWAC, prior to waste acceptance, FEMP must provide documentation (preferably in the form of analytical results) that the LLW offered for disposal does not exhibit the hazardous characteristics defined at 40 CFR Subpart C (including the toxic characteristics defined at 40 CFR 261.24, Table 1), at the point of offering. Parameters for demonstrating compliance with 40 CFR

8

Subpart C should be based upon constituents and processes used during processing of the material regardless of the material status at time of processing.

C. The FEMP OU-4 waste would best be managed in an area where groundwater monitoring can be conducted, if deemed appropriate, in the future. For this reason, the panel recommends that Area 5 be considered during the operational review process.

References

Atomic Energy Act of 1954, 42 U.S.C. 2011 et seq., enacted by Pub. Law No. 83-703.

Code of Federal Regulations, Title 40 Parts 260 through 270; December 1997.

Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42U.S.C. 9601, enacted by Pub. L. No. 96-510, also known as Superfund: Amended in 1986 by the Superfund Amendments and Reauthorization Act, Pub. L. No. 99-499.

DOE, 1987. Radioactive Waste; Byproduct Material; 10 CFR Part 962: Volume 52 Federal Register 15937; Final Rule. Washington, D.C.

DOE, 1998. Nevada Test Site Waste Acceptance Criteria, Revision 2; U.S. Department of Energy/Nevada Operations Office, North Las Vegas, Nevada.

DOE Order 435.1 - Radioactive Waste Management, 1999, U.S. Department of Energy, Washington, D.C.

Fiore, Joseph N., 1995, Letter to Jack R. Craig. Resolution to the Request for Approval to Dispose of 11(e)(2) Byproduct Material at the Nevada Test Site; Las Vegas, Nevada.

Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, enacted by Pub. Law No. 94580 as amended.

Sattler, John, 1999. Memorandum to Wendy A. Clayton. Fernald Environmental Management Project Documents; various dates. Project information including (1) Documentation of processes generating the Silos 1, 2, and 3 material, (2) the December OU-4 ROD, (3) Ohio EPA Concurrence with OU-4 ROD, (4) Explanation of Significant Differences (ESD) for OU-4 Silo 3 Remedial Action, (5) Ohio EPA Concurrence with ESD for UO-4 Remedial Action, (6) EPA Region IX CERCLA Off-site Rule Approval for Disposal of OU-4 11(e)(2) material at the NTS, (7) Documentation of Acceptability of Silo 3 Material as 11(e)(2) [byproduct material] by Envirocare; DOE Ohio Field Office.

U.S. Environmental Protection Agency, U.S. Nuclear Regulatory Commission, 1998; Guidance on the Definition and Identification of Commercial Mixed Low-Level Radioactive and Hazardous Waste: EPA Mixed Waste Team Home Page URL http:www.epa.gov/radiation/mixed-waste/mw_pg25.htm.

9

Preparers

Craig Junio
RCRA Compliance, HAZMED
Date: July 27, 1999

Patrick K. Matthews
RCRA Compliance, Bechtel Nevada
Date: July 27, 1999

MaryEllen C. Giampaoli
RCRA Compliance, HAZMED
Date: July 27, 1999