

RCRA COMPLIANCE ACTIVITIES AT THE WASTE ISOLATION PILOT PLANT

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ABSTRACT

The Department of Energy and the Environmental Protection Agency have concurred that the hazardous chemical component of radioactive mixed wastes is subject to regulation under the Resource Conservation and Recovery Act. This is important to the WIPP project since it is anticipated that approximately 60 percent of the radioactive waste to be shipped to WIPP includes a regulated hazardous chemical component. This paper describes RCRA-compliance issues pertinent to WIPP. The discussion focuses on the "mixed waste" issue, the availability of interim status authorization to the project, the effects upon WIPP of the land disposal prohibitions, and characterization requirements for mixed wastes.

INTRODUCTION

The Waste Isolation Pilot Plant (WIPP) was authorized by the Department of Energy National Security and Military Applications of Nuclear Energy Authorization Act of 1980 (Pub. L. 96-164). Its legislative mandate is to provide a research and development facility to demonstrate the safe disposal of radioactive waste resulting from U.S. Defense activities and programs. The WIPP is scheduled to commence receiving contact-handled transuranic (CH-TRU) waste from various DOE waste storage or generator facilities about September 1989. Approximately 60 percent of the TRU wastes destined for shipment to the WIPP contain chemical constituents or properties which qualify as "hazardous waste" under the Resource Conservation and Recovery Act (RCRA)(1).

The WIPP facility is being constructed in a 2,000-foot thick bedded salt formation 2,150 feet beneath the land surface 26 miles east of Carlsbad, New Mexico. It is designed, ultimately, to receive waste over a 25-year period with the emplaced waste capable of being readily retrieved during the first five years of demonstration. The completion of operational demonstration and compliance activities is planned before any TRU waste is permanently emplaced in the WIPP.

The majority of the waste that will be transported to the WIPP is generally referred to as "radioactive mixed waste" which is composed of mixtures of TRU radioisotopes and RCRA-hazardous chemical components or properties (e.g. corrosivity, ignitability, etc.). According to a U.S. Environmental Protection Agency (EPA) notification on radioactive mixed waste of July 3, 1986(2) and a DOE interpretive rule of May 1, 1987(3), all DOE radioactive waste which contains RCRA-regulated hazardous waste constituents is subject to dual regulation under both RCRA and the Atomic Energy Act (AEA)(4).

WIPP'S CURRENT RCRA-COMPLIANCE STATUS

The EPA July 1986 interpretive rule requires states with an authorized RCRA program to obtain additional EPA authorization to regulate radioactive mixed waste by July 1, 1989, at the latest, in order to retain their RCRA program authority. As of this date (March 1989), the State of New Mexico has not yet applied for EPA mixed waste authorization. In order to receive mixed waste authorization, the State of New Mexico recently amended its Hazardous Waste Act which exempted the WIPP from State regulation.

On August 25, 1988, the EPA Office of Solid Waste issued an interpretive memorandum which determined that: (1) the WIPP does not require interim status to operate prior to New Mexico's receipt of EPA authorization to regulate radioactive mixed wastes because, in authorized states, interim status is a matter of state and not federal law; and (2) radioactive mixed waste may be shipped from a DOE generator site in a state of origin to a treatment, storage, or disposal facility in a consignment state in which radioactive mixed waste is not classified as a hazardous waste without violating federal or state law.

Thus, the WIPP finds itself in a "no man's land" where neither the EPA nor the State will assert regulatory authority over what has been determined by both the EPA and the DOE to be a hazardous waste until certain legislative and procedural events take place. However, proceeding to operate the WIPP as an unpermitted hazardous waste management facility is viewed by the DOE as being undesirable. In order to demonstrate its commitment to RCRA compliance by the WIPP, the DOE has attempted to qualify the WIPP as an interim status facility by (1) submitting Part A of the RCRA permit application to the New Mexico Environmental Improvement Division (EID) and EPA Region VI, and (2) taking the necessary steps to assure that the WIPP complies with the interim status regulatory requirements of 40 CFR Part 265.

WIPP RCRA-COMPLIANCE ISSUES

Although there are additional related or subsidiary issues, the three major RCRA-compliance issues in need of resolution are as follows:

1. **Interim Status Authorization.** Although the State EID need not take overt action to confer interim status on the WIPP, it must obtain mixed waste regulatory authority from the EPA before the WIPP can officially qualify. It is anticipated that New Mexico will have the requisite authority over radioactive mixed waste by or before July 1, 1989.
2. **Waste Characterization.** The RCRA regulations require that anyone who treats, stores, or disposes of hazardous waste must obtain a "detailed chemical and physical analysis of a representative sample of the waste."(5) The land disposal restriction requirements, discussed below, also require a detailed waste characterization to determine if a waste to be land disposed meets the treatment standards. To date, characterization of waste destined for WIPP has relied solely on knowledge of the process from which the waste was

derived. This is because collecting and analyzing "representative samples" of TRU waste in storage would pose an unacceptable radiological risk to workers.

3. **Land Disposal Restrictions.** The 1984 Hazardous and Solid Waste Amendments (HSWA) included a prohibition on the land disposal of hazardous waste. The prohibition occurs in phases, with various groups of waste "banned" from land disposal according to statutory deadlines ending May 8, 1990. Land disposal is defined under the amendments to include any placement (storage or disposal) in various land management units including salt dome formations, salt bed formations, underground mines, and caves. Since waste emplacement at the WIPP will occur at a depth of 2,150 feet below the surface in a bedded salt formation, such emplacement constitutes land disposal. Thus, a portion of the TRU mixed waste intended for emplacement at the WIPP is subject to the land disposal restrictions. Until these restrictions are accommodated through waste treatment, variances, or new EPA rulemaking, the new regulations pose a major barrier to waste emplacement at the WIPP.

WIPP RCRA-COMPLIANCE OPTIONS

Resolution of RCRA-compliance issues related to operation of the WIPP require implementation of a comprehensive legal and institutional strategy which includes several elements: (1) legislative action and RCRA program modification by the State of New Mexico; (2) pursuing one or several available administrative remedies pertaining to the land disposal restrictions; (3) exploring new EPA rulemaking options, particularly with reference to radioactive mixed waste; (4) executing memoranda of understanding between the DOE and various regulatory agencies; and (5) undertaking DOE legislative initiatives associated with or independent of pending land withdrawal legislation to transfer jurisdiction over WIPP site lands from the Bureau of Land Management (BLM) to the DOE. Continuing discussions and negotiations between the DOE, EPA headquarters, EPA Region VIII, and the State of New Mexico will be required to arrive at a final resolution of RCRA-compliance issues at the WIPP.

INTERIM STATUS AUTHORIZATION

RCRA §3005(a) requires that each person owning or operating an existing facility for treatment, storage, or disposal of hazardous waste obtain a permit from the EPA or an authorized state. Because issuance of a finally effective permit can require several years, §3005(e) allows facilities to operate under "interim status." As noted earlier, the WIPP is now in a regulatory hiatus since neither the EPA nor the State can presently assert RCRA jurisdiction over radioactive mixed waste in New Mexico. The options being considered to deal with this dilemma are as follows:

- Permitting by New Mexico following EPA authorization. To obtain authority to regulate WIPP, New Mexico will need to modify its regulatory program to include radioactive mixed waste and apply to the EPA for mixed waste authorization by July 1, 1989. If New

Mexico receives authorization by this date, the question of obtaining interim status authorization would be resolved. This option would be the most acceptable politically because WIPP would not be operating as an "unpermitted" facility. It would also remove potential problems other states might have in shipping waste to an "undesignated" facility in the context of 40 CFR §262.20. Further, it would accomplish DOE's commitment to full RCRA compliance at the WIPP.

- Permitting by the EPA under a Congressional mandate. The EPA does not have authority to implement and enforce federal RCRA requirements in authorized states like New Mexico unless those requirements derive from the 1984 HSWA. Thus, the EPA's interpretation is that mixed waste in New Mexico is not subject to regulation until the State receives EPA authorization. Under this option, the WIPP land withdrawal bill would legislatively mandate that the EPA regulate the WIPP until the State receives mixed waste authorization.
- WIPP qualification for interim status under State law prior to the State receiving EPA mixed waste authorization. This option has been referred to as the "Nevada approach" under which Nevada and Colorado agreed that the Nevada Test Site qualified as a "designated facility" for the receipt of radioactive mixed waste from the DOE Rocky Flats Plant even though Nevada was not authorized by the EPA to regulate mixed waste. The EPA did not object to this arrangement between the two states. This option would bring the WIPP into compliance with New Mexico interim status requirements.
- Proceed as though the WIPP does not require interim status until New Mexico receives mixed waste authorization. This option consists of (1) accepting the EPA's interpretation that radioactive mixed waste is not yet a regulated hazardous waste in New Mexico, and (2) opening the WIPP for operation as soon as other issues (TRUPACT certification, land withdrawal, completion of a Supplementary Environmental Impact Statement, etc. are resolved). Under this option, the WIPP would undertake good faith compliance with federal and State interim status standards. This option would be highly controversial in the public arena as it would allow WIPP to operate as a "unpermitted" hazardous waste management facility. It also might not be acceptable to states in which DOE facilities shipping waste to the WIPP are located.

LAND DISPOSAL RESTRICTIONS

The land disposal restrictions contained in the 1984 RCRA amendments may pose a significant obstacle to emplacement of radioactive mixed waste in the WIPP. The options discussed in this paper are based on the underlying assumption that the land disposal restrictions apply to a majority of the radioactive mixed waste generated and/or stored at DOE facilities which will be shipping waste to the

WIPP. Thus, the options include combined approaches that address the land disposal restrictions in the context of both the generator sites and the WIPP facility. There are five primary approaches, or combinations thereof, to resolving the land disposal restriction issue. They are as follows:

1. "No-Migration" Exemption Petition. A no migration exemption is available under §3004(d) of RCRA if it can be demonstrated to the EPA "to a reasonable degree of certainty, that there will be no migration of hazardous constituents from the disposal unit . . . for as long as the wastes remain hazardous." Petitions to allow the land disposal of prohibited waste are governed by 40 CFR §268.6. Granting such a petition would mean that DOE generator sites could ship to and have placed in the WIPP hazardous waste constituents of radioactive mixed waste that would otherwise be prohibited from land disposal. A no-migration exemption petition has recently been prepared and submitted to EPA headquarters.

2. Designate Radioactive Mixed Waste as a "Newly Listed" Waste. The schedule for land disposal prohibition determinations mandates the EPA to review all hazardous waste identified or listed as of November 8, 1984 [RCRA §3004(g)(A)]. The "newly listed" waste provision of RCRA is contained in §3004(g)(4) which provides that EPA must make land disposal restriction determinations (i.e., set treatment standards) for any (new) waste listed or identified after November 8, 1984 within six months of such identification or listing. If the schedule is not met, there is no provision for the automatic imposition of land disposal restrictions on newly listed waste.

The legislative history does not indicate that mixtures of wastes containing radionuclides and chemicals listed or characterized as hazardous under RCRA (radioactive mixed waste) were considered by the Congress in enacting the HSWA. Radioactive mixed wastes were also generally ignored by the EPA in its promulgation of a complex series of land disposal restriction rules. In fact, regulation of radioactive mixed waste does not derive from the HSWA at all. Thus, it could be argued that these wastes are not expressly subject to the land disposal restriction "hammer dates" established by the 1984 amendments. In fact, there are no regulations pertaining to mixed waste *per se* although a number of states are formulating some mixed waste rules.

Radioactive mixed waste could qualify as "newly listed" hazardous waste in two basic ways: (1) through EPA response to a petition by the governor of a state under RCRA §3001(c), or (2) through a petition filed under 40 CFR §260.20 which provides that "any person may petition the Administrator for the promulgation, amendment, or appeal of any regulation under this Act." The EPA could, of course, undertake rulemaking for including a "newly listed" waste on its own initiative.

Both legal and technical arguments can be made that radioactive mixed wastes were not considered by Congress when it adopted the land disposal restriction program, that the "unique" properties of this waste have not really been considered by the EPA, and that these wastes should be identified and listed as a separate waste type or category. It can be anticipated that such a new rulemaking process would require considerable time given the complexities of radioactive mixed waste management.

3. Establish a New "Effective Date" for Generators; Obtain a No-Migration Exemption for WIPP. This option is predicated on persuading the EPA to classify radioactive mixed waste as a "newly listed" waste. As previously discussed, the EPA would have at least six months to set treatment standards and establish an "effective date" after which radioactive mixed waste could no longer be land disposed without meeting the treatment standards.

The two-year nationwide variance (to November 8, 1988) granted by the EPA to small quantity generators, solvents generated from CERCLA response actions, certain other solvent waste, and dioxin-containing waste would not offer any advantages to DOE generator sites. This is because the variance for these wastes is two years beyond the effective date that would otherwise apply--November 8, 1986. However, by exercising the "newly listed" waste option, the "effective date" would be much later than the effective date established under the two-year nationwide variance provision. Also, if a new effective date were established for "newly listed" radioactive mixed waste, an additional two-year nationwide variance might be available under RCRA §3004(h)(2).

During the period preceding the new "effective date" for newly listed radioactive mixed waste, the DOE would be in the process of obtaining a no-migration exemption for the WIPP. The intent would be to obtain the exemption prior to the "new" effective date of the land disposal restrictions applicable to radioactive mixed waste being generated by or stored at various DOE facilities.

4. Variance from the Treatment Standard. Variances from a treatment standard established under land disposal restriction regulations are available where a petitioner can demonstrate to the EPA that the specified treatment technology is inappropriate for the particular waste. The demonstration must show that the physical or chemical properties of the waste differ significantly from waste analyzed in developing the treatment standard. It must also be demonstrated that the waste cannot be treated to the levels established or by the specified treatment methods. The petition must propose an alternative treatment method and standard and, if approved, the new treatment standard must be met before the waste can be land disposed. Since the applicant is required to comply with all land disposal restriction requirements

during the petition review process, a no-migration exemption for the WIPP would still be required.

5. Treatment to Meet the Standards. Treatment of restricted TRU mixed wastes to meet the 40 CFR Part 268 treatment standards is a viable alternative in cases where treatment capacity is available and when the act of treating the waste will not cause unacceptable radiation exposures. This compliance approach, however, is complicated by several factors.

As described above, it is not apparent that EPA evaluated radioactive mixed wastes when the agency established 40 CFR Part 268 treatment standards or when the agency identified the Best Demonstrated Available Technology (BDAT) for specific restricted wastes. The result is that treatment standards and BDAT determinations may not be appropriate for waste mixtures. For example, the specified BDAT for organic solvent wastes is incineration, yet there is only very limited nation-wide capacity for the incineration of organic solvents mixed with a radioactive component.

Waste characterization requirements of 40 CFR Part 268 also pose difficulties in regard to mixed waste treatment. The regulations require demonstration of attainment of the standard after treatment by laboratory analyses. As described below, performance of the necessary sampling and analyses of treatment residues may not be possible for mixed wastes.

WASTE CHARACTERIZATION

The RCRA regulations (40 CFR 264.13) require that sufficient detailed information on physical and chemical characteristics of the hazardous waste be known to treat, store, or dispose of the waste without endangering human health or the environment. Typically, detailed analyses of representative waste samples are required, although information may be obtained from knowledge of processes or published reports on waste generated by similar processes. The owner or operator of an off-site disposal facility such as WIPP must inspect and, if necessary, analyze each waste shipment to insure that the waste shipped is the waste described in the accompanying manifest. A detailed waste analysis plan must be developed for the facility which describes the parameters for which each hazardous waste will be analyzed and the rationale for the selection of these parameters. The plan must also describe the frequency with which the initial analysis of waste will be reviewed or repeated to ensure that the analysis is accurate and up to date.

The EPA Draft Guidance Manual for Hazardous Waste Disposal in Geologic Repositories(6) emphasizes the importance of waste properties that could impact waste mobility or repository stability such as volatility, reactivity, corrosivity, solubility, and susceptibility to transformation. The Guidance Manual recommends that reactive and ignitable wastes be excluded from geologic repositories, and that volatile wastes be excluded unless it can be demonstrated the volatile emissions will be adequately controlled

and will present no threat to human health or the environment. Wastes that are incompatible with repository materials, engineered materials, formation gasses, or other waste components, or which corrode any of those materials, should not be placed in a repository.

The WIPP Waste Acceptance Criteria (WAC) document(7) requires that all waste constituents be manifested and prohibits the inclusion of pressurized gases, explosives, free liquids, or corrosive materials in the wastes sent to WIPP. Waste packages that contain waste forms known or suspected to generate gas such that a combination of pressure and explosive mixtures could eventually affect the integrity of the container must be provided with a pressure relief mechanism.

The WAC also addresses particulates, pyrophoric materials and hazardous chemicals. If more than one percent of the waste matrix consists of particulates less than 10 microns, or if more than 15 weight percent occurs as particles less than 200 microns, the waste must be immobilized. Pyrophoric materials are defined as those which ignite spontaneously under the ambient conditions of shipment to or disposal at WIPP. Nonradioactive pyrophoric

materials must be mixed with chemically stable materials. Pyrophoric radionuclides, when present, must be generally dispersed in the waste and must make up no more than one percent by weight of the waste in each package. The acceptance of nonradioactive hazardous chemical wastes at WIPP is prohibited unless they are present solely as co-contaminants with transuranic waste. Any waste package containing reactive materials must have the appropriate Department of Transportation (DOT) label. TRU-contaminated corrosive materials in the waste must be neutralized, rendered noncorrosive, or packaged to insure the integrity of the container through its design life (20 years).

All information on the physical and chemical characteristics of the waste will be derived from information on the wastes or waste-generating processes provided by the generators. Wastes will be received in two types of containers, lined drums and metal boxes. Containers will not be opened for sampling because of the potential of exposing workers to radiation hazards. In addition, collection of a representative sample from many of the containers would be difficult or impossible due to the form of waste (the waste generally consists of discarded laboratory items, such as glassware, gloves and kimwipes).

The WIPP will comply with the requirements for waste characterization with process knowledge information and manifest data provided by the generators (40 CFR 262.11). The WIPP may not be able to comply fully with the requirements for waste sampling and analysis, which may not conform with RCRA requirements listed in 40 CFR 274.13. However, EPA and state regulatory agencies have latitude to waive portions of these requirements if the applicant can demonstrate that knowledge of the waste generation process is sufficient to ensure adequate characterization of the waste [40 CFR 262.11(c)(2)]. This approach might be successful when applied to wastes that will be treated prior to shipment to WIPP, wastes that are currently generated,

or waste that were generated in the recent past. It may be less effective in dealing with wastes generated in the more distant past, especially in cases where non-radionuclide characteristics were inadequately documented.

In these cases, DOE will be required to negotiate a waiver or variance from the waste analysis requirements. This will likely involve documentation of the necessity of a variance and DOE's knowledge of waste generation processes.

SUMMARY AND CONCLUSIONS

This paper has examined the WIPP's current RCRA compliance status and the major issues in need of resolution with the EPA and the State of New Mexico: interim status authorization; waste characterization; and the land disposal restrictions. A number of options are being pursued individually and simultaneously. DOE's ability to resolve these issues with the regulatory agencies, and to satisfy public concerns, carries major consequences for DOE mixed waste generator and storage sites and will considerably affect the ability of the WIPP to receive radioactive mixed waste within a reasonable time frame.

REFERENCES

- 1.Resource Conservation and Recovery Act (RCRA), 42 U.S.C. 6901 et seq.

- 2.U.S. Environmental Protection Agency (U.S. EPA), State Authorization to Regulate the Hazardous Components of Radioactive Mixed Wastes Under the Resource Conservation and Recovery Act, 51 Fed. Reg. 24504, July 1, 1986.
- 3.U.S. Department of Energy (U.S. DOE) Radioactive Waste; Byproduct Material, 10 CFR Part 962, 52 Fed. Reg. 15937, May 1, 1987.
- 4.Atomic Energy Act of 1954, 42 U.S.C. 2011 et seq.
- 5.U.S. EPA, General Facility Standards, 40 CFR Part 265.
- 6.U.S. EPA, May 29, 1987, (Draft) "Guidance Manual for Hazardous Waste Disposal in Geologic Repositories," Washington, D.C.
- 7.U.S. DOE, 1985, "WIPP Waste Acceptance Criteria" (WIPP-DOE-069, Rev. 2), WIPP Project Office, Carlsbad, New Mexico.