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COMMENTS BY
NEW MEXICO ATTORNEY GENERAL
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TO THE
WASTE ISOLATION PILOT PLANT SUBCOMMITTEE
OF THE
NATIONAL ADVISORY COUNCIL
FOR ENVIRONMENTAL POLICY AND TECHNOLOGY
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This subcommittee has the important task of helping the Environmental Protection Agency ("EPA") to put flesh on the bones of the statute that Congress passed. These comments discuss criteria for review of the Department of Energy ("DOE") Test Plan¹ and Retrieval Plan² under the Waste Isolation Pilot Plant Land Withdrawal Act, Pub. L. 102-579, that Congress passed late in 1992 (the "WIPP Act").

Briefly, we submit that EPA should undertake an initial completeness review of a test plan and retrieval plan and should reject the filings if DOE has not supplied materials that, at least in form, respond to the review criteria. Such action is appropriate here.

The proposed review criteria are as follows;

Test plan review criteria:

1. DOE must specify definite compliance standards to which test data are directly relevant.

¹DOE, Test Phase Plan for the Waste Isolation Pilot Plant, (DOE/WIPP 89-011), March 1993 ("Test Plan").

²DOE, Waste Retrieval Plan for the Waste Isolation Pilot Plant (DOE/WIPP 89-022), March 1993 ("Retrieval Plan").



2. DOE must specify the data to be obtained, and a sensitivity study must show that such data are important.
3. DOE must show that its experimental design will yield data that represent the waste inventory and have sufficient data quality.
4. DOE must show that the tests are feasible and conform with safety requirements.
5. DOE must provide a realistically supported schedule.

Retrieval plan review criteria:

1. DOE must describe all possible risks to retrievability.
2. DOE must present plans to resolve any impediments to retrieval.
3. DOE must identify one or more post-test storage sites.

We have reviewed a draft of EPA's Option Papers for Evaluating the Test and Retrieval Plans ("EPA Option Papers"). The discussion that follows selects from among the listed options the particular criteria that best fulfill EPA's mission under the WIPP Act.

(a) Factual background

We start with the basic fact that we are not starting fresh, with a clean slate. DOE has been studying WIPP's future compliance or noncompliance with radioactive waste disposal standards for some years. DOE has previously proposed plans for on-site tests with radioactive waste, and these plans have been criticized or defended

based on their relevance to the forthcoming compliance assessments. The type of arguments which are acceptable in supporting or attacking a test plan have become pretty clear in the process.

In mid-1992, the National Academy of Sciences WIPP Panel reported on DOE's 1990 bin and alcove test plan, stating: "The panel has not been convinced by the scientific rationale, as presented, for the underground gas generation tests. In particular, the plan to conduct a large number of expensive bin tests and to terminate the experiments after five years has no discernible scientific basis."³ Concurrently, a Sandia National Laboratories review proposed reductions in the scale of bin tests from approximately 140 bins to only 24 bins, and Sandia suggested that the bin tests may not be warranted at all if the test waste cannot be adequately characterized. Sandia also concluded that "an alcove test is not a cost-effective way to gather post-closure gas generation information."⁴

Congress took these scientific criticisms into account in the WIPP Act. One representative who has studied WIPP for several years, Mike Synar, said on the House floor that DOE's test plans had been "a pretext for opening WIPP" and that "serious questions

³Letter Report by Panel on Waste Isolation Pilot Plant, Board on Radioactive Waste Management, June 1992, at 1 ("NAS WIPP Panel Report").

⁴Sandia National Laboratories, FY92 Review of the WIPP Gas Generation Program, May 21, 1992 draft, at 6.

remain about the legitimacy of the DOE's testing program." Therefore, he said, Congress had placed EPA in a position to oversee any tests at WIPP and "to make sure that this new EPA role is not a rubber stamp for DOE."⁵ As Congressman John Spratt said, DOE "will have to answer these questions" raised by the NAS WIPP panel "and answer them to the satisfaction of the Environmental Protection Agency before testing can begin."⁶

Three principles govern EPA's oversight of testing under the WIPP Act.

First, EPA must reach an independent judgment on issues involving tests with waste.

Second, the judgments to be reached are scientific ones. Congress required that any "experiments will provide data that are directly relevant to a certification of compliance with the final disposal regulations or to compliance with the Solid Waste Disposal Act."

Third, the burden of proof is on DOE. DOE must present "a detailed description of how the test phase activities will provide information directly relevant to a certification of compliance with the final disposal regulations or to compliance with the Solid

⁵Cong. Rec. July 21, 1992, at H6302, 6303.

⁶Cong. Rec., July 21, 1992, at H6305.

Waste Disposal Act" and a "justification for all such activities."
(WIPP Act §5(b)(3), (4)).

Further, under the Administrative Procedure Act EPA must base its decision on materials placed in the administrative record by DOE and others, consider all relevant facts and public comments, and articulate a decision that is consistent and rationally defensible.

(b) Review of Test Plan

In this context, what criteria should EPA use in reviewing and acting upon DOE's Test Plan?

1. Completeness review:

Recommendation: EPA should reject any test plan submission which does not include a sensitivity study of the importance of specific data to a compliance demonstration, a design of experiments to obtain such data, and a realistically supported schedule.

Section 5(b) of the WIPP Act calls upon EPA to conduct an initial review of the DOE submission, to determine whether it constitutes the statutorily-required "detailed description" of how the Test Plan will provide "directly relevant" information and a "justification." We agree with the EPA Option Papers (at 4) in this respect.

The scientific reports on WIPP make clear what the "detailed description" and "justification" must contain. In 1990⁷ and 1991⁸ DOE published "preliminary comparisons" of the projected performance of the WIPP site under the radioactive waste disposal regulation. These are complex studies, comparing possible scenarios for release of radioactive waste from WIPP to the release limits contained in the regulation. A similar preliminary study was released in 1992 concerning compliance with the Solid Waste Disposal Act no-migration provision.⁹

An important component of these analyses is one or more sensitivity studies, which examine how much a compliance demonstration changes when one changes the assumption as to one of the principal factors. For example, in 1991 DOE did a sensitivity study of gas generation, as it may affect compliance with the radioactive waste disposal standard. This study showed that gas generation, in general, is not a very important factor to a compliance demonstration.¹⁰

⁷Preliminary Comparison with 40 C.F.R. Part 191, Subpart B for the Waste Isolation Pilot Plant, December 1990 (SAND 90-2347).

⁸Preliminary Comparison with 40 C.F.R. Part 191, Subpart B for the Waste Isolation Pilot Plant, December 1991 (SAND 91-0893) (the "1991 Preliminary Comparison").

⁹Long-Term Gas and Brine Migration at the Waste Isolation Pilot Plant, Preliminary Sensitivity Analyses for Post-Closure 40 C.F.R. 268 (RCRA), May 1992 (SAND 92-1933) ("Gas and Brine Migration").

¹⁰1991 Preliminary Comparison, vol. 4, at 5-3, 6-1 through 6-5, 6-15.

The 1992 Preliminary Comparison sensitivity analysis has not yet been published. When available, it will undoubtedly contain additional sensitivity studies.

A sensitivity study is the accepted method for demonstrating the importance of specific data. The NAS WIPP panel specifically criticized DOE for neglecting tests of factors which were shown to be important in sensitivity analyses, that is, tests which "can determine the validity of the critical assumptions."¹¹ Those scientists are well aware that some form of sensitivity study points to data which are "directly relevant." Plainly, the need for a sensitivity study would not be satisfied by a bald claim, unsupported by scientific data, that certain information is unknown and may be significant.

The statute also requires a "detailed description of how the Test Plan activities will provide information...." (WIPP Act §5(b)(3)). This clearly calls for an experimental design, from which EPA scientists can independently conclude whether the proposed tests will produce the desired data. Such a design would specify the information sought, describe the methods for conducting the planned tests, contain quality assurance provisions, and demonstrate that such tests will yield valid and usable data for the stated purposes.

¹¹NAS WIPP Panel Report, at 2.

A detailed description of the test methods is also important, because when such a description is attempted, safety and practical constraints become apparent and often cause changes in experimental designs. For instance, DOE previously discovered that it would be required to purge flammable gases from test bins during the tests, destroying the utility of the data.¹² There has been discussion of a pressurized bin design to avoid that requirement,¹³ but we have not seen the design yet, and without it EPA could not determine that useful data can be obtained.

The "detailed description" must include a realistically supported schedule, because without it one cannot tell whether data will be obtainable in time for use in compliance demonstration, which must be submitted by DOE within seven years of the first receipt of transuranic waste. (WIPP Act §8(d)(1)(A)). Obviously, data which are not timely are not relevant.

These elements -- a sensitivity study concerning the data in issue, an experimental design, and a realistically supported schedule -- are essential to EPA's review. Without such information, independent scientific review is not possible, and an EPA ruling approving a test plan could not be defended on judicial review, because there would be no basis for such a decision. EPA

¹²A. Lappin and M. Molecke, Memorandum of Record, April 17, 1991.

¹³Test Plan, at 5-63 through 5-64.

should refuse to conduct a review if DOE does not provide it the information to work with.

EPA should reject the Test Plan that DOE has submitted. DOE's Test Plan fails to identify the data that DOE purports to need, fails to establish that any particular data are important to a compliance assessment, omits any experimental design, fails to show what data can be obtained from tests, and fails to show that the data will be technically defensible for use in a compliance assessment. In addition, there is no schedule showing when the data will be available. EPA scientists cannot judge the merits of DOE's proposal, because they have not been given the information on which to reach a judgment. Therefore, under statutory standards in §5(b) of the WIPP Act EPA should reject the Test Plan.

2. Review criteria: More should be said about the criteria for determining whether data are "directly relevant," since other test plans may be presented. Five elements are included in the concept of "directly relevant."

(i) Compliance standards:

Recommendation: DOE must specify definite legal or regulatory compliance standards to which test data assertedly are directly relevant.

First, the underlying compliance standards must be clear. There must be final radioactive waste disposal regulations or definite criteria for compliance with the Solid Waste Disposal Act (or "RCRA"). It is not possible to show that data are directly relevant to compliance without a definition of compliance. Thus, DOE must answer such questions as:

1. What hazardous waste disposal standards are used to judge the need for test data, given that the RCRA no-migration rules are established on a site-specific basis¹⁴ and have not been determined for WIPP? DOE has not specified the standards in its Test Plan.

2. What RCRA permitting standards are used, given that standards under 40 C.F.R. Part 264 X for miscellaneous units must be established for each site in the permitting process?¹⁵ DOE has not said.

¹⁴40 C.F.R. §268.6; EPA, No-Migration Variances to the Hazardous Waste Land Disposal Prohibitions: A Guidance Manual for Petitioners, draft, July 1992, at 6, 8, 9.

¹⁵40 C.F.R. §§264.600-03; see EPA, Hazardous Waste Miscellaneous Units, 52 Fed. Reg. 46946, 46948, 46951 (Dec. 10, 1987).

3. What radioactive waste disposal standards are used, since 40 C.F.R. Part 191 is under repromulgation?¹⁶ DOE recognizes the problem but provides no solution.¹⁷

(ii) Sensitivity study:

Recommendation: DOE must support its claim that test data are directly relevant by (a) specifying the particular data sought to be obtained, which must be unknown, and (b) demonstrating by a sensitivity study that, within the range of values established by present information, one value results in compliance, and another value results in noncompliance. The sensitivity study may not employ unsupported simplifying assumptions as to other factors material to a determination of sensitivity.

Next, there must be a sensitivity study with respect to specific data, showing the importance of the data to a determination of compliance. To consider this need, one needs an overview of the compliance process. Compliance with the radioactive waste disposal regulation is to be demonstrated by an elaborate performance assessment process, which involves identifying possible release scenarios, ascertaining their probabilities, and determining their consequences, based on modeling of the behavior of the repository. Methods of proving compliance with RCRA are less certain but may be similar. A proper

¹⁶See 58 Fed. Reg. 7924 (Feb. 10, 1993).

¹⁷Test Plan, at 2-3.

sensitivity study under the radioactive waste disposal regulation or RCRA would address a truly unknown factor in the behavior of the repository. It would establish a reasonable range of values for this factor based on present knowledge. It would then carry out the performance assessment process, using values at the extremes of that range. If, using one value, the performance assessment showed compliance, and another value showed noncompliance, the study would show that the performance assessment is sensitive to the value of that factor.

As DOE acknowledges in its Technical Needs Assessment Document, the latest available (1991) sensitivity study of a performance assessment under the radioactive waste disposal regulations shows that gas generation in general is not an important factor affecting the outcome of the performance assessment.¹⁸ DOE acknowledges that such studies indicate that "gas production within the repository may not warrant the proposed scope of gas-generation experiments presented in this document."¹⁹ Thus, based on present information, data about gas generation are not directly relevant to a demonstration of compliance with 40 C.F.R. 191.

¹⁸DOE, Gas Generation and Source-Term Programs: Technical Needs Assessment for the Waste Isolation Pilot Plant Test Phase, Dec. 1992 ("TNAD"), at 1-6 through 1-7, 1-18 through 1-19; see 1991 Preliminary Comparison, vol. 4, at 5-3, 6-1 through 6-5, 6-15.

¹⁹TNAD, at 1-18.

DOE concluded in the 1991 sensitivity study that the variables that are important for a performance assessment include radionuclide solubilities, borehole permeabilities, Salado permeability, and retardation factors -- most of which are the subject of current studies by DOE which do not require emplacement of waste at WIPP.²⁰

Further, in examining current sensitivity studies, EPA must consider the status of the performance assessment on which they are based. Performance assessment is still at a rudimentary stage. DOE has not yet modeled several aspects of the WIPP site's behavior. Therefore, a sensitivity analysis based on the current state of performance assessment may produce a false result. DOE itself states that its 1991 performance assessment presents only preliminary results, because the modeling system and data base are incomplete, conceptual model uncertainties are not fully included, final scenario probabilities are undetermined, and for other reasons.²¹ For instance, creep closure of the Salado Formation is not modeled at all,²² even though it is clearly an element of repository behavior and is expected to interact with gas generation.²³ DOE's recent study of compliance with the long-term

²⁰1991 Preliminary Comparison, vol. 4, at 6-15.

²¹1991 Preliminary Comparison, vol. 1, at ES-4.

²²1991 Preliminary Comparison, vol. 2, at 4-1; Test Plan at 3-26.

²³TNAD, at 1-19; Test Plan, at 3-24.

no-migration standard under RCRA says "[d]efensible analyses of gas migration will require including available models of salt creep and developing conceptual and computational models for pressure-dependent fracturing of anhydrite marker beds."²⁴ At present DOE has merely made unsupported simplifying assumptions as to these factors. However, a factor which may appear to be critical to compliance, using such assumptions, may not be critical at all once those assumptions are replaced with actual values. EPA should require that the performance assessment be refined beyond the rudimentary level, and all material factors be represented by actual values, before it may be asserted to show a need for experiments with radioactive waste.²⁵

Before EPA can assess the need to obtain specified data, DOE must answer questions such as these:

1. What are the major unknowns which are important to a compliance determination under the radioactive waste disposal regulations and RCRA? What is being done to resolve these unknowns? Factors such as the completeness of scenario selection, radionuclide solubility, the Culebra groundwater flow model, and radionuclide retardation factors now seem to be important to a

²⁴Gas and Brine Migration, at 1-11.

²⁵Thus, concerning Issue 5 in the EPA Option Papers we agree that EPA must give specific consideration to non-waste tests in determining whether all material factors are reflected by actual values.

compliance demonstration.²⁶ Room closure remains to be modeled.²⁷ How can it be claimed now that gas generation data are needed, when these other major factors have not been ascertained? DOE has not explained, and DOE clearly has the burden of proof.

2. Does a gas generation model exist, in such form that EPA's scientists can examine it? Have so-called "uncertainties" in the gas generation model been identified? In fact, much lab work remains to be done, according to DOE's Technical Needs Assessment Document,²⁸ and other work must be done to identify the characteristics of the present and future waste inventories which the gas generation model is supposed to describe.²⁹ The gas generation model is not available for review. Ranges of unknown values as to gas generation rate and potential which are important to compliance have not been established. Thus, at present, DOE does not know what so-called uncertainties it may wish to reduce.

3. Do sensitivity studies indicate the importance of the gas generation data that DOE supposedly wants to obtain? Since DOE does not know what data it wants to obtain, it can hardly know the importance of such data. No such sensitivity studies exist. Thus, there can be no claim that particular gas generation data are

²⁶1991 Preliminary Comparison, vol. 4, at 6-15.

²⁷Test Plan, at 3-24 through 3-27.

²⁸TNAD, at 3-4 through 3-13.

²⁹Test Plan, at 3-39, 4-15, 5-68.

important to the result of a performance assessment. The only sensitivity study of gas that DOE has released -- the one in the 1991 Preliminary Comparison -- shows that gas in general is not important.³⁰ And all of DOE's sensitivity studies to date contain many simplifying assumptions, which make them inadequate to support a judgment on the importance of experimental data -- and DOE admits this.³¹

(iii) Experimental design:

Recommendation: DOE must set forth and justify its experimental design, inter alia, by a statistical showing, that specific data to be obtained from the experiments will be representative of the pertinent characteristics of the waste inventory to be disposed and will satisfy sufficiently stringent standards of data quality so that it can be used in a compliance demonstration under the standard in issue.

Next, EPA must determine that the proposed experiments will generate usable data for the purpose claimed, i.e., will be "directly relevant" scientifically to the performance assessment. Such a finding should be based on a statistical showing that, within stated limits of confidence, data generated in a test of a sample will stand for the characteristics of the total waste

³⁰See note 18.

³¹See notes 21-24.

population. DOE has not done this. Such a showing is difficult, because the existing waste population is variegated and has been characterized at varying levels of detail, and characterization must be redone to an undetermined extent.³² Further, most of the waste destined for WIPP has not been generated; thus, assumptions must be made as to its characteristics.³³ In addition, bin tests using mixtures of waste may not yield clear data.³⁴ Moreover, DOE has provided essentially no discussion of its quality assurance procedures, which EPA must independently review and approve for adequacy.

Before EPA could decide that tests will generate useful data, it would need the answers to questions such as these:

1. DOE says that the bin test waste will not be statistically representative of any existing or future waste inventory.³⁵ Therefore, what is the value of data about gas generated by such waste? There is no indication that the data will have any value.

³²Test Plan, at 3-38 through 3-39, 4-14 through 4-17, 5-68 through 5-69.

³³Test Plan, at 3-38 through 3-39.

³⁴TNAD, at 3-12, 3-26 through 3-28, 3-33.

³⁵TNAD, at 3-32.

2. Until DOE develops characterization methods for bin and alcove test waste, and establishes how it will characterize the existing waste inventory and will describe the future waste which does not yet exist, how can it claim that the tests will give useful data about waste disposal? Based on present information, none of these characterization issues has been solved.³⁶ Moreover, quality assurance is not discussed.

3. DOE's Technical Needs Assessment Document describes numerous problems interpreting bin test data, attributable to the complexity of the gas generation mechanisms and the complex mixtures of test waste, and it says that the tests will not provide "absolute mechanistic confirmation" of the gas generation model.³⁷ Doesn't this mean that DOE does not expect any usable data from the bin tests? There is no basis to conclude otherwise.

4. DOE has said in the Test Plan that "good agreement" between bin test and modeling results will "enhance confidence" in the model.³⁸ How will the so-called "agreement" be identified, how much agreement will be "good agreement," and by what percentage will confidence be "enhanced"? Such claims are normally based on a statistical analysis, but we have seen no such analysis. Nor is

³⁶TNAD, at 3-34; see notes 32 and 33.

³⁷TNAD, at 3-26.

³⁸Test Plan, at 5-63.

there discussion of quality assurance procedures to be applied to test data.

(iv) Feasibility:

Recommendation: DOE must demonstrate that the proposed experiments are feasible within the time frame specified for them, in that all equipment designs, operational designs, and experimental plans exist, are workable, and conform with applicable health, safety and environmental requirements.

Further, EPA must find that the tests are feasible, within the limitations of available equipment and necessary safety measures. EPA could hardly determine that "the experiments will provide data that are directly relevant" (WIPP Act §5(d)(2)) unless it determined that the tests can be run. Thus, EPA must examine the proposed procedures for each step of the experiments, including test waste characterization, existing and future waste inventory characterization, waste transportation, bin humidification, gas purging, depressurization, brine insertion and removal, brine solidification, post-test characterization of brine and solids, and other stages. DOE has not furnished a description of such procedures.

Before EPA can assess the feasibility of the experiments discussed in the Test Plan, it needs DOE's answers to questions such as:

1. What are the waste characterization procedures for bin waste and alcove test waste, and how long does it take to perform such characterization? DOE says only that more rigorous characterization than used to date in loading test bins may be required.³⁹ Characterization of test waste in six bins has taken many months, and there is no way to tell whether characterization for the new Test Plan can be achieved in any realistic time frame.

2. Can waste be transported in pressurized bins? The current NRC certification for TRUPACT-II containers excludes bins under pressure.⁴⁰

3. How will the moisture content in humid bins be maintained at a level below 1% free liquids,⁴¹ which is the limit of the water content of transportable waste? DOE has not explained.

4. How will DOE avoid the need to purge the bins of flammable gases, a requirement which would have prevented DOE from

³⁹TNAD, at 3-34, 3-49.

⁴⁰Nuclear Regulatory Commission, Certificate of Compliance No. 9218, Aug. 30, 1989, §5(b)(1).

⁴¹Retrieval Plan, at 4-11.

obtaining useful data from wet bin tests?⁴² So far, there is no answer to this question.

5. What is the status of the so-called Type 2 bin? The Type 2 bin is the proposed means to accommodate gas under pressure and brine-inundated waste.⁴³ This pressure vessel is critical to most of the proposed bin tests. Plainly, several safety issues arise as to a vessel which will contain radioactive waste and explosive gases underground and will accommodate the transfer of radioactive liquids. The design has not been disclosed.

6. How will brine in inundated bins be dealt with after tests? DOE recognizes that waste inundated with brine can neither be disposed of nor transported but has not chosen a method to solve the problem.⁴⁴

7. How will post-test characterization of brine and waste in bins be carried out? Sandia has said that the ability to conduct post-test chemical analysis of the liquids and solids in

⁴²A. Lappin and M. Molecke, Memorandum of Record, April 17, 1991.

⁴³Test Plan, at 5-63 through 5-64; TNAD, at 3-43, A-11.

⁴⁴Retrieval Plan, at 4-11; DOE, TRU Waste Acceptance Criteria for the Waste Isolation Pilot Plant (WIPP/DOE-069, Rev. 3), Jan. 1989, at 22.

the bins is necessary to its Test Plan.⁴⁵ How and where such analyses of radioactive materials will be conducted is unexplained.

8. As for the alcove tests, can gas be contained and sampled in the alcoves? DOE states that an alcove gas barrier and gas management and sampling system must be designed, fabricated and tested.⁴⁶ EPA needs to know that effective systems exist before concluding that valid data will be obtained. DOE has not provided such information.

9. What are the characterization procedures for the existing and future waste inventory, and how long will it take to perform such characterization? These are massive tasks, essential for use of test data, but no description of methods has been provided.⁴⁷

(v) Schedule:

Recommendation: DOE must set forth a realistically supported schedule for all phases of preparation for and conduct of tests, retrieval of test waste, and incorporation of test data

⁴⁵Sandia National Laboratories, FY92 Review of the WIPP Gas Generation Program, draft, May 21, 1992, at 6; Memorandum, R.C. Lincoln to P.J. Higgins, Jr., June 15, 1992, at 18.

⁴⁶Test Plan, at 5-72.

⁴⁷Test Plan, at 3-38 through 3-39, 4-14 through 4-15, 5-68 through 5-69.

in compliance determinations, which schedule shall conform with applicable legal requirements.

Last, before EPA could approve a test plan DOE must show that data can be obtained in time to incorporate in a performance assessment. Under §8(d)(1) of the WIPP Act DOE must apply for certification of compliance within seven years of the introduction of transuranic waste at WIPP. Thus, DOE must be able to generate test data and incorporate it into a compliance demonstration within seven years. In addition, the existing no-migration determination expires on November 14, 2000, and all waste must be retrieved by that date.⁴⁸ The WIPP Act contains its own retrieval deadline in §8(d)(2). DOE must show that the test data can be obtained within this window of time. The Test Plan contains no such showing. The only time chart in the Test Plan is specifically said not to be a schedule.⁴⁹

Before EPA could approve testing, it would need answers to questions like these:

1. What further lab work and modeling must DOE do before the experiments can be designed,⁵⁰ and how long will it

⁴⁸EPA, Notice of Final No-Migration Determination, 55 Fed. Reg. 47700, 47721, Nov. 14, 1990.

⁴⁹Test Plan, at 1-17 (Fig. 1-7).

⁵⁰See TNAD, at 3-4 through 3-13.

take? At present the gas generation model is not available for review; presumably, it must be refined and uncertainties identified before tests can be designed.

2. How long will it take DOE to prepare the actual experimental plans,⁵¹ which DOE has not prepared? DOE does not tell us.

3. How long will it take DOE to design characterization procedures for bin and alcove test waste and to identify methods to characterize the waste inventory?⁵² DOE does not say.

4. How long will it take DOE to make necessary modifications to the Type 1 bin experimental setup, design and fabricate the Type 2 bins and the associated systems, design and fabricate brine insertion and removal systems, develop post-test waste characterization systems, design and install the alcove gas barrier and sampling systems, and complete a Final Safety Analysis Report?⁵³ For these and other necessary tasks referred to in DOE documents, DOE provides no schedule.

⁵¹Test Plan, at ii.

⁵²TNAD, at 3-38, 4-14, 5-69.

⁵³Test Plan, at 5-63 through 5-64, 5-72; Retrieval Plan, at 2-9; TNAD, at A-11.

5. How long will it take DOE to characterize test waste for bins and alcoves? It took months to characterize the first six bins. DOE says that characterization procedures may be made even more rigorous.⁵⁴ Possibly the first six bins must be re-characterized. Certainly the remaining bins must be carefully characterized. How long will this take? DOE does not provide a schedule.

6. What is the duration of the proposed bin and alcove tests? Clearly, EPA could not approve tests without knowing that sufficient time is available to generate scientifically defensible data, but no schedule is given.

7. What time must be allowed for waste retrieval? Such time must be set aside prior to the legal deadlines for waste removal. Presumably, testing would not be possible during this period. DOE has not provided an estimate of this time period.

(c) Review of Retrieval Plan

1. Completeness review:

Recommendation: EPA should reject any retrieval plan submission which does not describe all contemplated waste handling and emplacement which may affect retrievability, contain plans to

⁵⁴TNAD, at 3-34, 3-49.

deal with all risks to retrieval, and identify a post-test storage site.

The WIPP Act also calls upon EPA to make a preliminary determination as to the completeness of the Retrieval Plan. Section §5(c) says that the Retrieval Plan "shall set forth a detailed plan for the removal of transuranic waste emplaced at WIPP during the test phase, if such removal is required under any provision of this Act." EPA may approve the plan only if it determines that "it will provide for satisfactory retrieval of all transuranic waste" under §5(d)(2). Section 8(d)(2) says that, if EPA has not certified compliance with the disposal regulations within 10 years from the first introduction of radioactive waste, retrieval must be initiated, and waste shall be removed from the State within one year. Therefore, a completeness review ought to ask whether the Retrieval Plan responds to these statutory requirements.

The statutory standard is strict. EPA is not to approve a plan which merely outlines how retrieval might be achieved -- if all goes well. Rather, EPA is called upon to find that the plan "will provide for satisfactory retrieval." Thus, the plan must contemplate the realistic possibility that all may not go well and must show how retrieval will be achieved nevertheless.

The Retrieval Plan must include a "detailed" discussion of all the waste emplacement and handling procedures which would be allowed if EPA approved the Test Plan. The subject of the plan is "all transuranic waste" which may be "emplaced" pursuant to the test plan; thus, any circumstances of waste handling and emplacement which may bear on retrieval must be considered. DOE's Retrieval Plan does not do this. For example, there is no description of Type 2 bins, brine handling, or alcove test procedures.⁵⁵

The Retrieval Plan must deal with all credible risks of non-retrieval. The plan must explain how, despite such risks, the waste will be removed, as the statute requires. Thus, there must be a plan to remove radioactive waste released in handling accidents. There must be a plan to remove radioactive waste entrapped by a roof fall or similar accident. Another possible event impairing retrieval is the unavailability of an out-of-State storage site; a plan must be provided to remove the waste in such event. If one of the scenarios involving irretrievability is deemed not to be a credible event, there must be scientific justification of such a judgment, addressed to the full time span during which waste may be emplaced and all types of waste emplacement permissible under the Test Plan. The existing Retrieval Plan contains no such information.

⁵⁵See Test Plan, at 5-63 through 5-64, 5-72.

The statute requires that the waste be removed from the State. (WIPP Act §8(d)(2)(C)(ii)). Thus, the Retrieval Plan must provide for such removal. Since the waste must go somewhere, the Retrieval Plan must identify the storage site to which it will go. DOE has provided no such information.

Since the Retrieval Plan does not contain the information necessary for EPA to commence review, EPA should reject the submission.

2. Review criteria: Since there may be a revision and resubmission, it is helpful to outline the criteria by which a more complete retrieval plan may be judged.

(i) Waste emplacement description:

Recommendation: DOE shall describe all test phase operations at WIPP with transuranic waste which involve any risk that the waste may not be retrievable on the terms and schedule established by P.L. 102-579.

A "detailed plan for the removal" of waste which will provide for "satisfactory retrieval of all transuranic waste emplaced during the test phase" (WIPP Act §§5(c), 5(d)(2)(B)) must explain how transuranic waste may be brought to WIPP, handled, and emplaced, and for how long, so that EPA can independently determine

whether DOE has considered all risks of irretrievability of such waste. Such a plan would answer questions such as these:

1. What testing procedures (including bin emplacement, pressurization, brine insertion, gas sampling, depressurization, brine removal, brine solidification, bin removal, overpacking, alcove drum emplacement, alcove sealing, alcove gas sampling, alcove unsealing and drum removal) are contemplated? To date DOE has not provided a full description of all contemplated procedures which might affect the retrievability of waste.

2. What is the schedule for tests and retrieval? Since many of the factors that impinge on retrievability, such as the useful life of test rooms and the availability of post-test storage, are time-sensitive, a schedule is essential. In addition, the statute requires that retrieval be achieved within one year. (WIPP Act §8(d)(2)(C)(ii)). DOE has no schedule.

(ii) Plans to deal with risks of irretrievability:

Recommendation: DOE shall describe each scenario that may cause transuranic waste emplaced during the test phase not to be retrievable on the terms and schedule established by P.L. 102-579. For each such scenario DOE shall set forth a plan to resolve the impediment to retrievability which will reduce the risk of irretrievability below a credible level.

To assure "satisfactory retrieval of all transuranic waste emplaced" a retrieval plan must discuss each possible scenario preventing retrieval of any of the waste. The possible adverse effects upon retrievability and plans to reverse such consequences must be set forth, so that EPA can independently determine that, despite possible accidents and unplanned events, retrieval on the statutory terms and schedule will be obtained.⁵⁶

Each risk of non-retrieval must be reduced below the level of a credible risk before EPA can determine that the plan "will provide for satisfactory retrieval." Thus, either there must be an assured solution to each irretrievability risk identified, or EPA must determine that such an occurrence, preventing retrieval, has a likelihood that is less than credible. As guidance, DOE orders require a safety analysis report to discuss any possible accident which has an annual likelihood in excess of one in 1,000,000.⁵⁷ That standard can be applied here.

The requirement that a retrieval plan account for all credible risks of irretrievability will call for answers to questions such as these:

⁵⁶The EPA Option Papers suggest, at Issue 6A, that a discussion of potential accidents and remedies is required, and we agree.

⁵⁷DOE Order AL 5481.1B, Jan. 27, 1988, at I-9.

1. What events may occur during the test phase and adversely affect the retrievability of the waste? Among the possible events are bin or drum handling and transportation accidents, bin or drum fires and explosions, room collapse, loss of equipment headroom, and the like. Another possible event impairing retrieval is the unavailability, or delay in availability, of an alternative storage site outside the State. The Retrieval Plan at present scarcely deals with such issues.

2. What is DOE's plan to deal with the consequences of each retrieval-impairing event? A retrieval plan must demonstrate the ability to remove all waste from WIPP in accordance with the statutory schedule despite the possible occurrence of waste spills, roof falls, unavailability of alternative storage, and any other credible risks. DOE has not provided such plans.

3. How likely are such retrieval-impairing events? If DOE has no plan to deal with one or more retrieval-impairing events, it must establish that such an event is not a credible possibility. For example, if DOE contends that room collapse is not a credible risk, it should demonstrate that the likelihood that the test rooms and alcoves will not remain stable for the duration of the tests, including the time required to characterize waste, introduce waste, conduct tests, dismantle the equipment, find another location to accept the waste, and remove the waste, is less

than a credible risk. No such demonstration has been furnished by DOE. As a further example, if DOE believes that there is no credible risk that alternative storage for the waste will not be available when needed, it must support such a judgment with a thorough assessment of the risk. This has not been done.

(iii) Post-test storage site:

Recommendation: DOE shall identify one or more locations to be used for storage of test waste after retrieval and shall show that such location or locations collectively shall have sufficient capacity to store such waste when needed, shall be legally permitted to receive such waste at such time, and shall have no other obstacles to receipt of such waste.

To demonstrate that the waste will be taken outside the State, as the statute requires, a retrieval plan must identify one or more post-test storage sites outside the State and show that they will be legally and otherwise capable of receiving the waste. EPA could scarcely find that DOE has presented a plan that "will provide for satisfactory retrieval" (WIPP Act §5(d)(2)(B)) if it did not know where the waste will go. DOE must answer the questions:

1. Where specifically will the waste go upon retrieval? It is not sufficient for DOE to state broadly that it will find a place for the waste. DOE to date has refused to identify the post-test storage site.

2. What are the credible risks of obstacles to use of that site, what are the solutions to those obstacles, and what is the likelihood that timely solutions will not be achieved? Given the obvious complexity of finding or building a safe storage location, preparing an environmental impact statement, obtaining a RCRA storage permit, and securing other approvals,⁵⁸ it is simply unrealistic to believe that "satisfactory retrieval" will take place smoothly. DOE has not addressed this issue.

⁵⁸Retrieval Plan, at 7-2 through 7-3.