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WIPP Update

for the

Radioactive and Hazardous Materials Committee

New Mexico Legislature

by

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Providing an independent technical analysis of the Waste Isolation Pilot Pla
a federal transuranic nuclear waste repository.

Mr. Chairman, Members of the Committee

A great deal has occurred on the WIPP Project since last appearing before your Committee in September 1989.

The following is intended to provide a summary of the status of a number of issues, many of which the Chairman and various other Committee Members have also been involved with as well. It is interesting to note that the oversight work at WIPP that EEG has been conducting for the State of New Mexico began 12 years ago this coming fall.

Public Health implications of the DOE Proposed Land Withdrawal Bill

Principal issues identified in my testimony before the U. S. Senate, Committee on Energy and Natural Resources and the U. S. House of Representatives, Subcommittee on Energy and the Environment, Committee on Interior and Insular Affairs and the Subcommittee on Energy and Power, Committee on Energy and Commerce.

1. Failure to establish a ceiling on the amount of TRU waste that can be brought to WIPP prior to demonstrating compliance with EPA Standards for safe disposal. The DOE 6/13/90 Record of Decision noted that the Supplement to the WIPP Environmental Impact Statement would permit up to 10% (80,000 drums). DOE has not stated where they would take these TRU wastes if WIPP does not meet the Standards in late 1994.

2. Self-regulation by DOE. While the bill provides for external oversight by groups such as EEG, the determination whether the DOE facility meets the EPA Standards would be

made by DOE. EPA would not be authorized to make a regulatory determination whether DOE had met the Standards. Many of the environmental contamination problems at the DOE waste generating sites appear to stem from such self-regulation.

3. No provision to delegate authorization to prevent mining after decommissioning.

4. Failure to support necessary road funding for Congressional authorization and appropriation as agreed in the NM/DOE Consultation and Cooperation Agreement.

The total amount of CH-TRU waste that has been identified by DOE for experiments in support of performance assessment is 4,500 drum-equivalents (0.5%). That amount should be regarded as an upper limit until completion of the demonstration of compliance with Standards for safe disposal.

Since DOE has indicated a need to obtain data on the rates of gas generation, and the most-likely date to begin shipments is still unknown, EEG has urged DOE since mid-1989 to begin measuring gas at the generating sites to avoid any delay in obtaining the information. Hence, we believe DOE could be obtaining data now for performance assessment.

<u>Problems with the proposed experiments that have yet to be resolved include:</u>

1. Successful seals of the alcoves to be able to measure gas produced through radiolysis, organic decomposition, and anoxic corrosion of the waste, as well as corrosion of the steel drums.

2. Identification of a site to perform the solubility tests of the transuranics with brine since WIPP was not designed to permit sampling of plutonium contaminated liquid samples.

3. While DOE wishes to use waste from Rocky Flats and INEL for these experiments, DOE estimates that January 1991 is the earliest before waste at those locations can be transferred from drums to bins and characterized for the experiments.

4. Construction of new CH-TRU waste shipping containers since the 15 TRUPACTS that were constructed do not appear to be certifiable by NRC.

5. Availability of processed waste other than compacted waste to conduct experiments.

6. Date of availability of the data for performance assessment.

7. Calculation of the unacceptable level of gas generation through consequence analysis scenarios of a gas pressurized repository.

We believe that analyses and experiments to address the prevention of gas generation and the dissipation of gas after being produced will be more helpful and should receive top priority. The most important issue to be resolved before one can dispose of waste will probably be the determination of any required waste form modification in order to meet the EPA standards. The decision will be dependent on the ability to predict room dynamics that address the interdependence of gas and brine quantities and rates and will be determined by analyses of models and not by experiments. DOE recently estimated that the decision to reprocess may take 3 to 5 years.

We see no reason for the emplacement of 13,500 drums (1.5%) in two rooms as recommended by EPA before demonstrating compliance with 40 CFR 191, since neither justification nor analyses have been provided by DOE. The parameters identified by EPA to be studied (room deformation, brine inflow, gas inflow from the rock, temperature, humidity, porosity and permeability) do not require waste. Such monitoring will not represent actual repository conditions until after the decisions on waste-form modification, backfill and repository design changes have been made.

RH-TRU Waste Experiments

Since DOE has not identified any need for experiments with Remote Handled Transuranic (RH-TRU) waste, none should be permitted. Although RH-TRU waste has been slated for disposal at WIPP since 1978, a shipping container for that purpose has yet to be built.

Operational Demonstration

We do not believe that any TRU waste should be brought to WIPP solely for operational performance demonstration prior to proving that the facility can meet the EPA Standards for safe disposal of transuranic waste (scheduled for late 1994) for the following reasons:

1. There is little technical knowledge or experience to be gained in conducting waste handling activities at WIPP before determining whether it is necessary to modify the waste form or the repository design. Waste packaging, certification, and handling are all occurring at the generating sites. Since 1970, DOE has transported more than

200,000 CH-TRU waste drum-equivalents from the generating sites to INEL.

2. If processing of the waste form is required, a facility would have to be built for this purpose at WIPP, or the waste transported back to Rocky Flats or elsewhere for processing. Therefore, the emplacement of a large number of drums before making the decision on the need to process wastes (e.g., cementation, crushing, incineration, vitrification, etc.) could result in needless transportation and operations related occupational radiation exposure.

3. Until DOE commits to actual waste emplacement conditions including backfill, getters, or other engineering modifications, waste emplacement will not represent actual conditions. And these commitments will need to be based on the results of the 1994 performance assessment.

4. Operational demonstration is unrelated to the demonstration of compliance with the disposal requirements of the EPA Standards.

5. If the scientific experiments with 4,500 drum-equivalents are conducted, it will require more than 100 truck shipments. Unloading more than 300 TRUPACTS and moving the material through the system will provide considerable operational experience.

6. It is important to demonstrate an ability to emplace increasing amounts of waste safely, but we see no purpose to doing it twice, now and when the disposal phase begins.

7. DOE has not identified any need to conduct operational demonstrations at the HLW facility in Nevada and has no plans to do so prior to demonstrating compliance with the

EPA and NRC Standards for disposal. Experiments and operational demonstration with HLW at the Climax Mine in Nevada involved a dozen shipments, which is insignificant compared to the 1,500 planned shipments to WIPP for operational demonstration.

When will WIPP be ready to dispose of TRU waste?

Disposal (with no intent to retrieve) cannot begin until DOE demonstrates compliance with the EPA safety standards (scheduled to occur in late 1994). Such demonstration requires analytical calculations to predict the long-term behavior of the radioactive actinides in returning to the biosphere. Preliminary analyses by Sandia National Laboratory suggest a high likelihood of the need to modify the waste form to either change the rate of gas generation (compaction, shredding) or eliminate the gas (vitrification, incineration or elimination of steel drums) in order to meet the standards. Since it may require several years to design, construct, license, and test such a facility, a decision made in 1993 may not have waste available for shipment until considerably later than 1995. A worst-case scenario prepared by DOE shows the disposal phase for Rocky Flats Plant waste not beginning until 2003.

What needs to be completed?

This Committee should receive full recognition for asking EEG last summer to identify outstanding technical issues remaining prior to opening WIPP. In September 1989 EEG identified 14 scientific stipulations to be met before the first shipment of waste to WIPP. The following have yet to be resolved:

1. Complete the EPA approval of a variance petition of no migration of the mixed wastes slated for WIPP in order to ship representative mixtures of waste for experiments.

2. Publish a report summarizing the status of compliance with Subpart B of the EPA Standards for the human intrusion scenario involving gas and brine. No progress has been reported yet on the Assurance Requirements of the Standard which do not require quantification.

3. Perform the analyses and develop plans for tests designed to prevent and dissipate gas generation from radioactive waste. All estimates indicate that the expected amounts of gas will require engineering modifications to either prevent the generation or to reduce the amount of gas after generation.

4. While progress is being made daily, the facility is not yet operationally ready to receive wastes for the following reasons:

   - The airborne radioactivity detection equipment has not yet been proven capable of detecting radiation underground with the necessary sensitivity.

   - Radiation protection operating procedures have not all been completed and verified.

5. While the Final Safety Analysis Report (Final SAR), has been issued by DOE, it does not include analyses of all safety issues. For example, the safety of the workers during the test phase experiments is scheduled to be addressed in an addendum to the Final SAR in November, 1990. It does not include the safety of long-term disposal (scheduled for December, 1994) nor the operational readiness of the facility to receive waste.

6. While the Supplement to the Environmental Impact Statement (SEIS) has been issued, there are still a number of issues to be resolved and we so informed DOE on April 4, 1990.

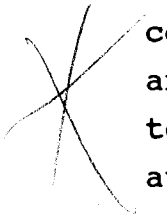
7. Technical concerns on the ability to get meaningful data in a timely manner from alcove tests need to be addressed.

8. Purchase the existing mineral lease at the site.

9. Aid the State in designating "Preferred Routes" as specified by the U. S. Department of Transportation (49 CFR 177.825).

10. If measurements of gas production from CH-TRU wastes cannot begin at WIPP this year, and results are needed as soon as possible, conduct some tests at the generating sites. Gas measurements were made at INEL in 1984 and 1989.

11. EEG needs to receive the validation plans for Rocky Flats Plant and the other waste generators to provide assurance that waste from the generating sites does meet the acceptance criteria for WIPP. The system relies on self certification and measurements by the generators with an annual visit by the WIPP Waste Acceptance Criteria Committee to review their procedures. Unfortunately, the last WIPP audits of RFP and Idaho National Engineering Lab (INEL) occurred in January 1989 and are not scheduled again until January 1991 -- a 2 year interval. We are pleased that audits are beginning again and Dr. Channell is today at LLRL with the Waste Acceptance Criteria Committee.



The amount of plutonium recently reported in the air ventilation duct work at the Rocky Flats Plant (RFP) is 28 kilograms. Since the transuranic waste from RFP scheduled to be shipped to WIPP contains 7.5 grams Pu/drum, the duct work appears to contain the equivalent plutonium found in

3700 drums of RFP WIPP waste. That is not much different than the amount of plutonium in the 4500 drums (0.5%) requested by DOE for bin and alcove experiments during the first five years.

While there are no data on the particle size distribution of the plutonium in the RFP ducts, the amount of inhalable plutonium at RFP appears comparable to the maximum amount of 21 kilograms of inhalable plutonium that could be present in the 2 million cubic feet of TRU waste (290,000 drums) to be shipped to WIPP from RFP over the next 25 years. And two-thirds of that waste has yet to be generated.

While this plutonium will probably be recovered and not shipped to WIPP, the comparison is intended to provide a perspective on the need of a plan (which is not available) to create confidence that the measurements of TRU waste for WIPP are correct through a formal system of verification.

12. State of New Mexico must receive a delegation of authority from EPA to regulate mixed waste shipments for WIPP and then approve DOE Part B Application.

13. Publish plans for alternate storage and disposal of wastes brought to WIPP during first five years if the facility does not meet EPA Standards for disposal.

14. Complete NEPA documentation for the Los Alamos National Laboratory in order to ship waste from that facility.

Explosive Impact of Acetone in CH-TRU Waste

The question was raised at a May 29, 1990 hearing in Santa Fe on the potential explosive impact of acetone in the CH-TRU waste

during the storage phase at WIPP. Dr. Matthew Silva, who joined EEG this past March, is investigating this issue and we will be issuing his report in the very near future.

Routing Designation

Dr. Anthony Gallegos and Dr. James Channell have developed an analysis of the transportation routes and Dr. Gallegos testified to the NM Environmental Improvement Board in April 1990. It is expected that routes should be designated by EIB in the near future.

Review and Evaluation

We have provided extensive comments to DOE on:

- Final Safety Analysis Report.
- Final Supplement to the Environmental Impact Statement.
- Various revisions of the Decision Plan for first receipt of wastes.
- Operational readiness of the facility to receive waste.
- Program Plan for Pretest Characterization of WIPP Experimental Waste.

Roof Fall in Experimental Area

A slab of rock weighing approximately 118 tons (50 to 60 feet long, 18 feet wide, 18 to 24 inches thick) fell from the ceiling in six year old, 18 foot wide, experimental room A-2. According to DOE, no entries by workers to room A-2 have occurred for the past three months. Separations of the various interbeds above the ceiling have been observed in the mine and extensive rock bolting has been made by DOE to prevent such slabbing. Rooms A-1, A-2, A-3, B and other portions of the experimental area have not been rock bolted. The incident clearly shows the importance of rock bolting and follow-up to insure no degradation of their efficacy for both the 33 foot wide waste rooms and the main drifts and haulageways which must remain open for 30 years.

EEG Reports

The following reports have been issued by EEG since September 1989.

EEG-42 Chaturvedi, Lokesh, Evaluation of the DOE Plans for Radioactive Experiments and Operational Demonstration at WIPP, September, 1989.

EEG-43 Kenney, Jim W., John C. Rodgers, Jenny B. Chapman, and Kevin J. Shenk, Preoperational Radiation Surveillance of the WIPP Project by EEG, 1985-1988, January 1990.

EEG-44 Greenfield, Moses A., Probabilities of a Catastrophic Waste Hoist Accident at the Waste Isolation Pilot Plant, January 1990.

EEG PRESENTATIONS AND MEETINGS

Date	Individual	Subject	Location
6/25/90	Bartlett	Operational Considerations at WIPP, Health Physics Society	Anaheim, CA
6/7-8/90	Neill/ Chaturvedi	NAS WIPP Panel	Irvine, CA
5/30/90	Neill	Rotary Club	Carlsbad
5/24/90	Neill	State Meeting/DOE	Washington, DC
5/23/90	Chaturvedi	EPA Public Meetings	Albuquerque
5/16/90	Neill	WIPP Forum	Carlsbad
5/8/90	Neill	WIPP Land Withdrawal Legislation U.S. House of Representatives, Sub-Committee on Energy and the Environment and the Subcommittee on Energy & Commerce	Washington, DC
5/1/90	Channell	NRC meeting on TRUPACT	Washington, DC
5/1/90	Channell	Working draft 2 of 40 CFR Part 191 U.S. EPA Office of Radiation Programs	Washington, DC
4/26/90	Gallegos	Test Plan for Performance Assessment, NM Radioactive Waste Consultation Task Force	Las Vegas
	Chaturvedi	WIPP Issues & Activities, NM Radioactive Waste Consultation Task Force	Las Vegas

4/26/90	Neill	WIPP Land Withdrawal Legislation, Committee on Energy & Natural Resources U.S. Senate	Washington, DC
4/25/90	Channell	Nuclear Waste Disposal UTEP	El Paso, TX
4/12/90	Neill/ Gallegos	Public Transportation Hearings, TVI	Albuquerque
4/9/90	Gallegos	Risk Analysis on Transport of CH-TRU wastes to WIPP on Supplemental Stipulated agreement identified routes. NM Environmental Improvement Board	Santa Fe
4/9/90	Gallegos/ Channell	Risk analysis of the transport of contact handled TRU wastes to WIPP through selected highway routes in using Radtran IV, Environmental Improvement Board.	Santa Fe
3/30/90	Channell	Possible release of radionuclides to the environment from interception of a pressurized brine reservoir at WIPP. NM Tech	Socorro
3/23/90	Channell	EEG views on Environmental Radiation protection standards for management and disposal of spent nuclear fuel high-level transuranic radioactive wastes (40 CFR 191) to Advisory Committee on Nuclear Waste (ACNW) of NRC.	Washington, DC
3/5-7/90	Neill/ Chaturvedi	NAS/WIPP Panel Meeting	Washington, DC
3/1/90 2/28/90 2/27/90	Kenney	Reactivity of Acids, Basics, Organics. Carlsbad Fire Department	Carlsbad
2/22/90	Neill	NRC/DOE TRUPACT Meeting	Rockville, MD

2/22/90	Neill	DOE States Meeting	Washington, DC
2/15/90	Neill/ Chaturvedi	Briefing on WIPP for DOE Headquarters Personnel	Washington, DC
2/13/90	Neill	Seminar, UNM Political Science Department	Albuquerque
1/29/90	Neill	UNM Lecture, Radioactive Waste Management, Civil Engineering Department	Albuquerque
1/29/90	Neill	UNM Lecture, Economics Department	Albuquerque
12/12-13/89	Neill	WIPP Panel Meeting	Half Moon Bay, CA
11/27/89	Neill	Radioactive & Hazardous Materials Committee	Santa Fe
11/26-30/89	Channell	MRS Conference	San Francisco, CA
11/13/89	Neill	Ahearne Committee Meeting	Amarillo, TX
11/13-15/89	Channell	Blue Ribbon Panel Meeting	Denver, CO
11/10/89	Neill	Chamber of Commerce	Santa Fe
11/5-9/89	Chaturvedi/ Gallegos	Migration '89	Monterey, CA
11/2-3/89	Bartlett	Wintergreen Conference Health Physics Society	New Port News, VA