



Department of Energy

Carlsbad Area Office
P. O. Box 3090
Carlsbad, New Mexico 88221

October 24, 1996

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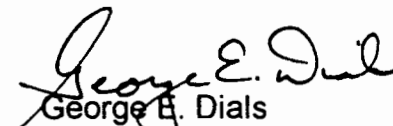
Honorable Gary Johnson
Governor
State of New Mexico
State Capitol Building
Santa Fe, NM 87503

Dear Governor Johnson:

The National Research Council recently released its National Academy of Sciences (NAS) report on "The Waste Isolation Pilot Plant: A Potential Solution for the Disposal of Radioactive Waste." The report is a benchmark study regarding the viability of the WIPP project, and I know you will be interested in the complete document.

In addition, enclosed are the supporting documents issued at the NAS news conference held October 23, 1996, in Carlsbad. If you have any questions concerning the report or the Waste Isolation Pilot Plant, please feel free to contact me at (505) 234-7300.

Sincerely,


George E. Dials
Manager

Enclosures (2)



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NATIONAL ACADEMY OF SCIENCES NATIONAL ACADEMY OF ENGINEERING INSTITUTE OF MEDICINE

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Date: Oct. 23, 1996
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EMBARGOED: NOT FOR PUBLIC RELEASE BEFORE NOON MDT/2 P.M. EDT WEDNESDAY, OCT. 23

**RADIATION FROM PROPOSED NEW MEXICO WASTE SITE
UNLIKELY TO EXCEED U.S. PROTECTION STANDARDS**

CARLSBAD, N.M. – Human exposure to radiation from nuclear waste in a proposed underground disposal site in Southeastern New Mexico is unlikely to exceed U.S. and international radiation protection standards, concludes a report* released today by a committee of the National Research Council. Unless the site – known as the Waste Isolation Pilot Plant or WIPP – is breached by humans sometime in the future, there is no credible, probable mechanism for release of radioactive material into the surrounding environment.

"Scientific analyses indicate that the WIPP repository has the ability to isolate transuranic waste for more than 10,000 years, provided it remains undisturbed by human activity," said committee chair Charles Fairhurst, professor of civil engineering at the University of Minnesota, Minneapolis. "Also, there are ways to engineer the facility – should studies now in progress indicate that they are worthwhile – that could be used to reduce the chances of radioactive releases resulting from human intrusion."

Speculative scenarios of human intrusion should not be used as the sole or primary basis for judging the acceptability of the site, the committee said. The consequences of future drilling or activities at the site should be examined in order to assess ways to reduce its vulnerability, but

(MORE)

*Copies of *The Waste Isolation Pilot Plant: A Potential Solution for the Disposal of Transuranic Waste* are available from the National Academy Press at the mailing address in the letterhead; tel. (202) 334-3313 or 1-800-624-6242. The cost of the report is \$35.00 (prepaid) plus shipping charges of \$4.00 for the first copy and \$.50 for each additional copy. Reporters may obtain copies from the Office of News and Public Information at the letterhead address (contacts listed above).

predictions of what human activities and technologies will be thousands of years from now are highly conjectural and lack scientific foundation.

WIPP is a network of chambers and tunnels excavated in a layer of geologically stable salt more than 2,000 feet below the desert surface. If approved, the federally operated facility would be the nation's first permanent disposal site for transuranic waste, which comprises a variety of radioactive materials such as protective clothing, laboratory equipment, and machine parts that were used to manufacture nuclear weapons. This waste currently is stored in 55-gallon steel drums and wooden boxes at various sites across the nation.

The U.S. Department of Energy (DOE) has been investigating the suitability of WIPP as a transuranic waste repository since the 1970s and plans this month to ask the U.S. Environmental Protection Agency for certification to open and operate the site. In order to get this certification, DOE first must demonstrate that the WIPP facility will comply with federal regulations intended to protect human health and the environment. The Research Council committee believes that DOE should be able to do this if some combination of the following were to occur:

- The projected risk of radiation releases caused by drilling would be much lower if EPA were to re-evaluate its assumption that the frequency of drilling for gas and oil in this area during the past century will continue unchanged for the next 10,000 years. Although drilling for natural gas and oil now occurs in the area surrounding the site, reserves of these resources will be practically exhausted in less than 100 years. While it is possible that drilling could occur for other resources which currently are uneconomical to recover or whose uses are not yet evident, the assumption that the drilling rate will stay the same is arbitrary, highly subjective, and scientifically untestable, the committee said.

- Laboratory and on-site research programs, both in progress and planned, could show that the potential is minimal for some radioactive elements to dissolve in salty ground water and migrate from the facility before they decay to low radiation levels that would not pose increased risk to humans.

- The consequences of drilling or other human intrusion at WIPP could be substantially reduced if DOE plans called for placing the waste in individually sealed rooms to prevent gas and fluid

(MORE)

flow within the facility and/or for sealing the repository with a mixture of crushed salt and minerals having chemical characteristics that "trap" certain radioactive isotopes.

The committee's report is one of a series prepared by the Research Council since 1978 in response to a request from DOE for an independent review of scientific and technical issues related to designing, constructing, and operating a pilot plant for isolating radioactive wastes from the biosphere.

The National Research Council is the principal operating agency of the National Academy of Sciences and the National Academy of Engineering. It is a private, non-profit institution that provides science and technology advice under a congressional charter.

The study was funded by the U.S. Department of Energy. A committee roster follows.

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ch:d,l

NATIONAL RESEARCH COUNCIL
Commission on Geosciences, Environment, and Resources
Board on Radioactive Waste Management

Committee on the Waste Isolation Pilot Plant

Charles Fairhurst¹ (*chair*)
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Department of Civil and Mineral Engineering
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Vice President for Research and Development
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Study Director

¹ Member, National Academy of Engineering

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NATIONAL RESEARCH COUNCIL
Commission on Geosciences, Environment, and Resources
Board on Radioactive Waste Management

Committee on the Waste Isolation Pilot Plant

*The Waste Isolation Pilot Plant: A Potential Solution for
the Disposal of Transuranic Waste*

Public Briefing

Oct. 23, 1996 • 11 a.m. - noon MDT/1 p.m. - 2 p.m. EDT
Room 105, Pecos River Village & Conference Center
411 Muscatel Ave., Carlsbad, N.M.

Participants

Charles Fairhurst (*chair*), T. W. Bennett Professor of Mining Engineering and Rock Mechanics, department of civil engineering, University of Minnesota, Minneapolis

Sue B. Clark, assistant professor of chemistry, department of chemistry, Washington State University, Pullman

Rodney C. Ewing, Regents Professor, department of earth and planetary sciences, University of New Mexico, Albuquerque

Thomas A. Zordan, president, Zordan Associates Inc., and senior project manager, ICF Kaiser Engineers, Pittsburgh

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For Immediate Release

DOE Statement Concerning the National Research Council's WIPP Report Carlsbad, NM, October 23

"We are very pleased with the National Research Council's report on the Waste Isolation Pilot Plant (WIPP). The report validates the WIPP project as a viable solution for permanently and safely disposing of radioactive transuranic waste generated in our national defense work. The report confirms that the WIPP has the ability to isolate radioactive waste for thousands of years, providing the site is sealed and undisturbed. We are also heartened by the Council's confidence in the DOE's ability to scientifically demonstrate that any radionuclide release in the future from the WIPP will be within allowable limits.

"This independent validation by the National Research Council is the product of 18 years of study. The DOE has worked hard to ensure that public health, safety, and environmental needs are met in this important challenge to the nation's radioactive waste cleanup work. We are anxious to move forward with this independent, external confirmation of our work."

**George E. Dials
DOE Carlsbad Area Office
Waste Isolation Pilot Plant**

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For Immediate Release

DOE Views National Research Council Report As Positive, Supportive of WIPP Project

CARLSBAD, N.M., October 23 – The National Research Council's report on the Waste Isolation Pilot Plant (WIPP) validates the project as a viable solution for the permanent, safe disposal of defense-generated radioactive transuranic waste, the U.S. Department of Energy (DOE) announced.

Contents of the report, titled "*The Waste Isolation Pilot Plant: A Potential Solution For the Disposal of Transuranic Waste,*" were released today during a press conference hosted by four members of the study committee. The report states that the proposed underground repository has the ability to isolate radioactive waste for thousands of years.

"Despite the nominal possibility of human intrusion into the proposed repository, the committee is confident in its judgement that DOE should be able to demonstrate that radionuclide releases at the WIPP will be within the limits allowed by the Environmental Protection Agency," the report states. "The associated health risks are likely to be well below the levels allowed under international standards."

George E. Dials, manager of the DOE's Carlsbad Area Office, which oversees the WIPP and National Transuranic programs, said that the recommendations of the report are of paramount importance "because the National Research Council is neither anti- nor pro-WIPP, but rather a group made up of top-notch scientists who have spent the past 18 years evaluating the WIPP project," he said. "They have compiled a report that accurately examines the WIPP as a permanent solution to the radioactive waste disposal problem."

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"The DOE has addressed many of the issues and analyses recommended in the report," said Dials. "This data is included as part of the Performance Assessment, which is included in the Compliance Certification Application that will be submitted to the Environmental Protection Agency. This information and analyses give added confidence that the WIPP will provide long-term protection of public health and the environment, from both the radioactive and hazardous chemical components of the disposed waste."

The National Research Council is the principal operating agency of the National Academy of Sciences and the National Academy of Engineering. It is a private, nonprofit institution that provides science and technology advice under a congressional charter.

The WIPP is designed to permanently dispose of radioactive transuranic waste left from the research and production of nuclear weapons. Located in southeastern New Mexico, 26 miles east of Carlsbad, project facilities include disposal rooms excavated in an ancient, stable salt formation, 2,150 feet (almost half a mile) underground. Transuranic waste consists of clothing, tools, rags, and other disposable items contaminated with trace amounts of radioactive elements, mostly plutonium.

The National Transuranic Program administers generation/storage site plans for storing, characterizing, packaging, transporting, and disposing of transuranic waste. Defense-generated transuranic waste is temporarily stored at more than 10 major generator/storage sites and several small quantity sites nationwide.

The WIPP is scheduled to begin waste disposal operations in November 1997, pending EPA approval.

STATEMENT

CHARLES FAIRHURST

Chair, Committee on the Waste Isolation Pilot Plant

**Public briefing to release the new National Research Council report:
*The Waste Isolation Pilot Plant: A Potential Solution
for the Disposal of Transuranic Waste***

Oct. 23, 1996

Good morning, ladies and gentlemen — and good afternoon to those of you joining us from Washington, D.C., for the release of this National Research Council study concerning the Waste Isolation Pilot Plant. Here with me are several other members of the committee: Sue Clark, assistant professor of chemistry at Washington State University; Rod Ewing, Regents Professor in the department of earth and planetary sciences at the University of New Mexico; and Tom Zordan, senior project manager for ICF Kaiser Engineers.

This report was prepared by our committee, which was first formed in 1978 by the National Research Council, the chief operating arm of the National Academy of Sciences and the National Academy of Engineering. The committee was established to provide independent scientific and technical evaluations of the U.S. Department of Energy's research at the Waste Isolation Pilot Plant — also known as "WIPP."

The essence of the WIPP Committee's report is contained in the Executive Summary on pages 1 through 6. I will paraphrase these pages as follows, starting with the second full paragraph on page 3.

Provided it is sealed effectively and remains undisturbed by human activity, the Committee finds that the WIPP repository has the ability to isolate TRU waste for more than 10,000 years. The geologic stability and isolation capability of the Salado Formation, which consists of bedded salt, are the primary factors leading to this finding.

The only known possibilities of serious release of radionuclides appear to be from poor seals or some form of future human activity that results in intrusion into the repository. The Committee anticipates that the consequences of such human intrusion can be reduced based on available engineering design options and on improved understanding to be obtained from ongoing scientific studies. I will come back to these points later.

We then note that EPA compliance regulations do not directly take account of the fact that any radionuclide releases at WIPP would be predominantly in non-potable water. This greatly reduces the risk of human exposure compared to a similar release in potable water.

Taking into account considerations such as I have just outlined, together with detailed studies described in the report, the Committee concludes that:

Based on available scientific evidence, the only probable threat to satisfactory isolation performance of the repository is the possibility of disturbance by human activity, deliberate or unintentional, that could compromise the integrity of the repository. Engineering methods are available, if needed, to reduce the consequences of human intrusion to acceptable levels.

Thus, *[h]uman exposure to radionuclide releases from transuranic waste disposed in WIPP is likely to be low compared to U.S. and international standards.*

We also recommend that *[s]peculative scenarios of human intrusion should not be used as the sole or primary basis on which to judge the acceptability of WIPP.* While we believe that it is valuable to assess the consequences of human intrusion in order to design a repository that is "robust" in the face of intrusion, attempting to assess technologies thousands of years into the future and to predict the frequency of intrusion is highly conjectural and lacks scientific foundation. Pages 3, 4, and 5 of the Executive Summary outline more specific comments and observations.

I would like to draw your attention to the last two paragraphs on page 5, noting that our report was prepared without benefit of any information contained in the DOE Compliance Certification Application that is about to be submitted to the Environmental Protection Agency; and, the need to continue analyses and experiments particularly with regard to actinide solubilities in brine, formation and transport of colloids, and retardation of radionuclides in the Culebra formation above the Salado salt.

Results of these studies could reduce uncertainties about the long-term performance of WIPP, eliminate concern over other issues, and be valuable in judging the cost-effectiveness of various waste isolation procedures at WIPP.

Finally, and I now refer to page 6 of the report's executive summary, *[p]rovided the WIPP repository is sealed effectively and undisturbed by human activity, the Committee knows of no credible or probable scenario for release of radionuclides. For the WIPP repository disturbed by future human activity, the Committee has noted three ways in which confidence in the performance of the repository could be increased:*

(1) Reconsideration of the prescribed human intrusion scenario now required by EPA for WIPP; (2) favorable information from the experimental programs that I mentioned above; and, (3) implementation of available engineering options in the repository.

The Committee believes that some combination of the these three considerations will very probably be sufficient to allow DOE to demonstrate that a WIPP repository will keep radionuclide release within acceptable levels for the disturbed case.

That concludes my opening comments. We will be pleased to answer your questions.

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WIPP Backgrounder

DOE's Positions on Recommendations Made by National Research Council

Recommendation:

Speculative scenarios of human intrusion should not be used as the sole or primary basis on which to judge the acceptability of WIPP (and, by extension, any geological repository).

DOE's Position:

DOE agrees. Concerns about the possibility of human intrusion as a result of drilling and mining activities (e.g., deep well fluid injection, potash mining) are addressed in the DOE's Compliance Certification Application that will go to the U.S. Environmental Protection Agency. For example, the DOE has evaluated the use of engineered barriers to provide added assurance that no radioactivity will move beyond the WIPP disposal boundary.

Recommendation:

The committee recommends that the DOE develop, in parallel with the complex Performance Assessment models, simpler versions that provide a more transparent, traceable path from the model inputs to the predicted releases.

DOE's Position:

The DOE agrees that simplified models are useful tools for conveying a basic understanding of the proposed repository system. The Compliance Certification Application should be based on a system model that includes the full suite of relevant processes. However, the DOE does in fact use a simplified Performance Assessment tool (Repository Integration Model) in order to conduct sensitivity analyses of Performance Assessment parameters.

Recommendation:

The Performance Assessment should be used to determine what [waste] characterization is required.

DOE's Position:

The DOE agrees that Performance Assessment can be used to define requirements for waste characterization and potentially eliminate unnecessary criteria. To assess repository effectiveness, Performance Assessment results indicate that detailed information on waste components is not needed.

Recommendation:

Room and panel seals via backfill are relatively well-defined engineering procedures for improving the isolation process. In this regard, compartmentation is recommended by the committee to provide effective seals to eliminate hydrological communication between the waste-filled rooms.

DOE's Position:

Based on Sandia National Laboratory's analyses, it is not necessary that rooms be isolated to assure compliance with Environmental Protection Agency standards. The DOE does include panel closures in the Compliance Certification Application analysis, but the impact of additional room seals is not significant nor necessary to regulatory compliance as a result of short-term brine releases to the surface during a human intrusion event (e.g., drilling, mining).

Recommendation:

Potential releases to the Dewey Lake Red Beds, which are less conductive than the Culebra, but contain some potable water, is recommended for further study.

DOE's Position:

The analyses contained in the Compliance Certification Application indicate that the contaminated brine from an intrusion borehole would not generate enough pressure to rise to the Dewey Lake formation.

Recommendation:

Neither the probability nor the effects on the repository from nearby injection of water or brine (e.g., deep well fluid injection) have been evaluated in detail by the committee, nor has the DOE published an analysis of this issue. A comprehensive analysis of the risks and consequences of this scenario should be completed and documented.

DOE's Position:

DOE recently completed these analyses, and the impacts were shown to be negligible on the performance of the repository.

Recommendation:

Reevaluation of the probability and/or consequences assigned to the highly speculative scenarios of human activities may reduce the estimated risk of radionuclide release.

DOE's Position:

DOE reexamined probabilities and consequences for human intrusion scenarios based on current mining and drilling practices around the WIPP site. The results of this analysis are incorporated in the Compliance Certification Application.

Recommendation:

Experimental and field programs in progress or planned may show key parameters (e.g., actinide transport) are well within the range required to reduce the impacts of human activities on radionuclide releases substantially.

DOE's Position:

Experimental and field programs to investigate important parameters have been completed and the results are included in the Performance Assessment for the Compliance Certification Application. These include parameters related to molecular-sized radioactive particle solubility, formation and migration.

Recommendation:

The implementation of available engineering options (e.g., compartmentation, treated backfill), which have not been considered in published DOE analyses, could reduce the consequences of human intrusion.

DOE's Position:

DOE completed an Engineering Alternatives report in 1996. It considers a large number of activities that could provide additional assurance against the consequences of human intrusion. As a result of these and other analyses, the DOE has decided to use magnesium oxide as a backfill to control disposal room chemistry (e.g., lower actinide solubility) and provide added assurance of regulatory compliance.

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