Report of the Review Panel

Desirability of performing certain transuranic waste characterization tests

Institute for Regulatory Science

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Preface

This report contains the results of an independent peer review performed by the Institute for Regulatory Science (RSI). Based on a request from Bob Forrest, Mayor of Carlsbad, NM, a Review Panel (RP) was established to independently review the desirability of eliminating certain tests performed for characterization of hazardous waste constituents of transuranic waste. This request was precipitated by an anticipated action of the U.S. Senate mandating the elimination of these tests.

Most of the activities performed by RSI are in cooperation with certain professional societies. Consequently, detailed policies and procedures have been developed and implemented for performing independent peer review and assessment studies. The process requires the formation of a group consisting of individuals with appropriate education, experience, and peer recognition, that oversees the process. Consistent with these requirements, a Commission on Assessments and Reviews (CAR) has been formed. One of the primary tasks of CAR is to approve the qualifications of members of the RP for a specific peer review or assessment and ensure implementation of policies related to conflict of interest.

The members of the CAR are as follows:

Melvin W. Carter, Chair
Erich W. Bretthauer
Ernest L. Daman
Nathan H. Hurt
Peter Maggiore
Lawrence C. Mohr, Jr.
John E. Moore
Goetz K. Oertel
Harold W. Olsen
Charles O. Velzy
Roger P. Whitfield
Richard Wilson

The Principal Technical Secretary of the Peer Review Program at RSI prepared a list of potential members of the RP and provided it to the CAR for review and approval. This list was modified based on the comments of the CAR. Members of the RP approved by the CAR are as follows:

Goetz K. Oertel, Chair
Bruce M. Thomson, Vice Chair
Alan S. Corson
Robert E. Luna
Fritz A. Seiler

In addition, Peter Maggiore was a consultant to the Panel. The supporting staff of the assessment study for this report are as follows:

Betty R. Love: Executive Vice President, RSI; and Administrative Manager of the Peer Review Program.

Sorin R. Straja: Vice President for Science and Technology, RSI; and Principal Technical Secretary.

Michael C. Kirkland: Vice President Southeast Office, RSI, Aiken, SC.

Wren Prather-Stroud: Manager Western Office, RSI, Carlsbad, NM.

Sharon Jones: Director of Training Programs, RSI; Manager of Review Panel Operations.

The biographical summaries of the members of the RP, the CAR, and the technical staff are located at the end of this report.

The letter from Mayor Forrest (see Appendix 1) included three specific questions (review criteria) which were provided to the RP. The Mayor also asked for the principal conclusions of the RP to be available within a rather short time period. Consistent with RSI policy, the RP was instructed to limit its findings and recommendations to technical issues and avoid social; political; and other non-technical considerations.

In preparation for the review, the RSI staff undertook a concerted effort to gather relevant information from a variety of sources as quickly as possible. Primary sources of information included two reports of the National Research Council (NRC 2001, 2002), the research arm of the National Academy of Sciences; the National Academy of Engineering; and the Institute of Medicine. Dr. Matthew Silva, Director of Environmental Evaluation Group, was asked to provide relevant publications.

Several parts of this *Report of the Review Panel* were prepared by the staff of RSI. The *Process for Independent Peer Review and Independent Technical Assessment* describes various aspects of the process used to produce this report. The two subsequent sections—*Waste Isolation Pilot Plant Facility* and *RCRA Waste Characterization*—were prepared by the staff of RSI from peer-reviewed literature. The two other sections—*Legal Requirements* and the text of *U.S. Senate Report and Bill S. 1424*—are reproduced from official documents. Biographical summaries of participants in this peer review were prepared by the staff of RSI and approved by the relevant individuals.

Based on the desire of Mayor Forrest, the RP provided its principal conclusions in a letter (Appendix 2). Subsequently, the *Report of the Review Panel* was completed by the RP and underwent the customary copy editing.

This peer review was performed as a public service with no external funding. The completion of this report could not have been possible without the support of a number of individuals. We greatly appreciate the contribution of members of the CAR and the RP during various phases of preparation of this report.

Goetz Oertel, Chair of the Review Panel
A. Alan Moghissi, President, RSI

Appendix 1

CARLSBAD

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BOB FORREST
MAYOR

JON R. TULLY
CITY ADMINISTRATOR

August 12, 2003

A. Alan Moghissi, Ph.D.
President, Institute for Regulatory Science
5457 Twin Knolls Road, Suite 200
Columbia, MD 21045

Dear Dr. Moghissi:

This letter is to confirm our recent discussion of an issue of prime importance to the remediation of the nation's transuranic waste sites. I hereby request that the institute for Regulatory Science perform an independent peer review based on the following criteria:

1. Is the elimination of the waste confirmation requirements mentioned in U.S. Senate Report 108-105 and Bill S.1424 supported by the recommendations of the National Research Council Report "Improving Operations and Long-Term Safety of the Waste Isolation Pilot Plant?"

2. Is the elimination of the waste confirmation requirements mentioned in U.S. Senate Report 108-105 and Bill S.1424 supported by various statements and other publications of the New Mexico Environmental Evaluation Group?

3. Based on the information presented to the Review Panel, is the permit modification listed under Section 310 of U.S. Senate Bill 1424 technically defensible?

Since time is of the essence, I would appreciate receiving the principal conclusions of the Review Panel no later than August 22, 2003. The full report could follow at a later date.

Sincerely,

Bob Forrest,
Mayor of Carlsbad, New Mexico

Appendix 2

RSI
Institute For Regulatory Science
5457 Twin Knolls Road, Suite 200, Columbia, MD 21045 USA
Phone: 301-596-1700 Fax: 301-596-1707

August 22, 2003

The Honorable Bob Forrest
Mayor of Carlsbad, NM
P.O. Box 1569
Carlsbad, NM 88221

Dear Mayor Forrest:

Thank you for your letter dated August 12, 2003 confirming our verbal agreement on a peer review to be performed by the Institute for Regulatory Science (RSI). In accordance with your request, RSI sought the assistance of the Commission on Assessment and Reviews (CAR) whose membership consists of 12 highly qualified and distinguished individuals. The biographical summaries of the members of the CAR appear in "*Assessment of Desirability of the Formation of a Center of Excellence on Hazardous Materials Management in Carlsbad, New Mexico."* Through the efforts of the CAR, a Review Panel (RP) was formed consisting of the following individuals:

Goetz K. Oertel, Ph.D., Chair
Bruce M. Thomson, Ph.D., Vice Chair
Alan S. Corson
Robert E. Luna, Ph.D.
Fritz A. Seiler, Ph.D.

Additionally, Peter Maggiore served as a consultant to the RP.

Enclosed are the principal conclusions of the RP. The *Report of the Review Panel* will be made available to you as soon as it is completed.

Enclosed also for your information are the biographical summaries of the members of the RP and the consultant.

Sincerely,

A. Alan Moghissi, Ph.D.
President

AAM:brl

Enclosures

DESIRABILITY OF PERFORMING CERTAIN TRANSURANIC CHARACTERIZATION TESTS

PRINCIPAL CONCLUSIONS OF THE REVIEW PANEL

The Review Panel (RP) was asked to respond to three review criteria identified by the Mayor of Carlsbad, NM. During its deliberations, the RP limited its responses to the review criteria entirely to scientific and engineering issues and specifically avoided political, societal, and other non-technical considerations.

The RP reviewed the report *Improving operations and long-term safety of the Waste Isolation Pilot Plant* of the National Research Council (NRC)—the research arm of the National Academy of Sciences, National Academy of Engineering, and the Institute of Medicine. In addition, the RP reviewed a number of documents published by the Environmental Evaluation Group (EEG). The RP has concluded its deliberations, and its report is being copyedited. The RP will review the final draft shortly.

The principal conclusions of the RP are as follows:

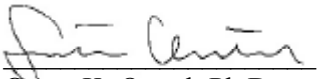
1. Based on careful evaluation of the NRC report, the RP concludes that the elimination of the waste confirmation requirements mentioned in U.S. Senate Report 108-105 and Bill S.1424 is supported by the NRC.

2. It appears that EEG agrees that the current characterization requirements are excessive. It appears that EEG also agrees that monitoring VOCs in underground disposal rooms is sufficient.

3. Based on the information presented to the RP, the permit modification listed under Section 310 of U.S. Senate Bill 1424 is technically defensible. There is no reason to perform waste confirmation tests that: 1) provide insignificant health and safety benefits to the U.S. population;

and 2) pose serious radiological and occupational health and safety risks for the workers performing these tests.

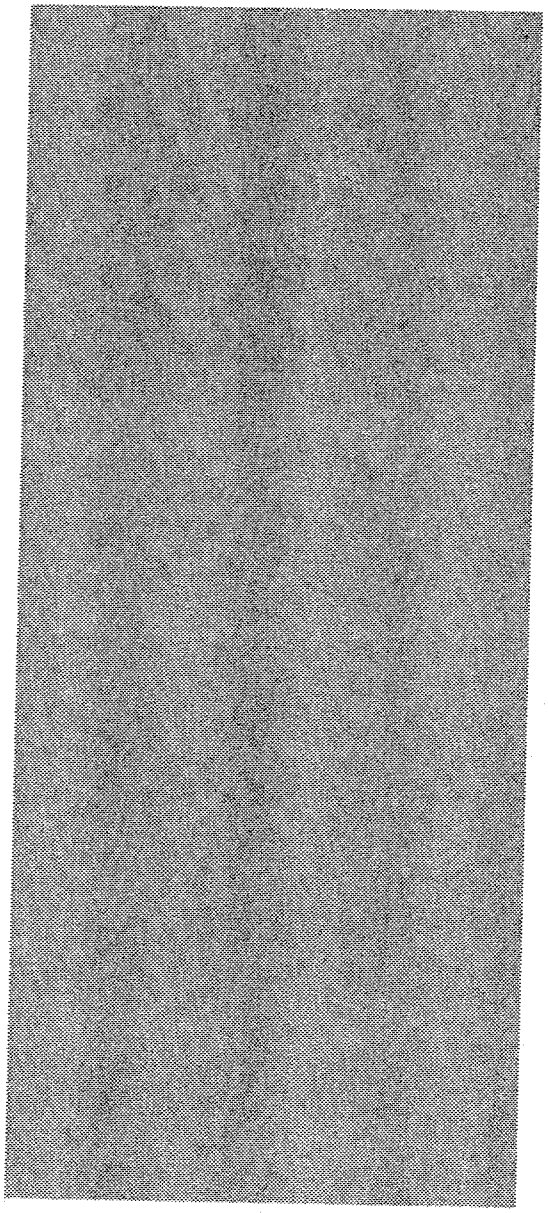
The RP recommends that the Mayor of Carlsbad make available its report to the U.S. Senate Committee for Energy and Water.



Goetz K. Oertel, Ph.D.
Chair of the Review Panel

8-22-2003
Date

Executive Summary



This report contains the results of an independent peer review performed by the Institute for Regulatory Science (RSI) responding to a request from Bob Forrest, Mayor of Carlsbad, NM to critically review a claim included in a Senate Committee report. The Senate language indicated that the National Academy of Sciences and the Environmental Evaluation Group (EEG) had endorsed the elimination of certain tests currently performed to characterize hazardous waste constituents of transuranic (TRU) waste for disposal at the Waste Isolation Pilot Plant (WIPP). Consistent with the tradition of professional societies, RSI relied upon the Commission on Assessments and Reviews (CAR), a group of individuals with appropriate education, experience, and peer recognition, to oversee the assessment process. The CAR approved the qualifications of members of the Review Panel (RP) to evaluate the desirability of eliminating certain tests performed for characterization of hazardous waste constituents of TRU waste. Consistent with the RSI policy, the RP was instructed to limit its findings and recommendations to technical issues and avoid social, political, and other non-technical considerations.

The RP reviewed two relevant reports of the National Research Council (NRC 2001, 2002)—the research arm of the National Academy of Sciences, National Academy of Engineering, and the Institute of Medicine. In addition, the RP reviewed a number of documents published by the EEG, an independent group associated with New Mexico Institute of Mining and Technology.

As the principal facility for disposal of the nation's TRU waste generated as a result of nuclear weapons research, development, and production, WIPP must comply with relevant requirements of the U.S. Environmental Protection Agency (EPA) and New Mexico Environmental Department. Whereas the EPA regulates certain aspects of the radioactivity content of TRU waste, the New Mexico Environment Department regulates the hazardous waste constituents of TRU waste. In addition, WIPP must comply with relevant transportation regulations. Compliance with these requirements is based on certain characterization tests. In general, waste characterization activities include the following, although not all of these techniques are used on each container:

1. Radiography, which is an x-ray technique to determine physical contents of containers
2. Visual examination of opened containers as an alternative way to determine their physical contents or to verify radiography results
3. Headspace-gas sampling to determine volatile organic compounds (VOCs) content of gases in the void volume of the containers
4. Sampling and analysis of waste forms that are homogeneous and can be representatively sampled to determine concentrations of hazardous waste constituents and toxicity-characteristic contaminants of waste in containers
5. Compilation of acceptable knowledge (AK) documentation into an auditable record, including process knowledge and prior sampling and analysis data
6. Non-destructive assay, typically segmented gamma scans and passive/active neutron interrogation, to quantify radionuclides.

Confirmation that the waste complies with the requirement that it is not ignitable, corrosive, or reactive is accomplished by AK or appropriate tests.

The U.S. Senate Bill S.1424 states that waste confirmation for all waste received for storage and disposal be limited to:

1. confirmation that the waste contains no ignitable, corrosive, or reactive waste through the use of either radiography or visual examination of a statistically representative subpopulation of the waste; and

2. review of the Waste Stream Profile Form to verify that the waste contains no ignitable, corrosive, or reactive waste and that assigned Environmental Protection Agency hazardous waste numbers are allowed for storage and disposal by the WIPP Hazardous Waste Facility Permit.

Furthermore, the U.S. Senate Bill S.1424 states that compliance with the disposal room performance standards of the Waste Analysis Plan shall be demonstrated exclusively by monitoring airborne volatile organic compounds in underground disposal rooms in which waste has been emplaced until panel closure.

The Review Panel (RP) was asked to respond to three review criteria identified by the Mayor of Carlsbad, NM. During its deliberations, the RP limited its responses to the review criteria entirely to scientific and engineering issues and specifically avoided political, societal, and other non-technical considerations.

After careful review of documents provided to the RP and appropriate deliberations, the RP provided three Findings and one Recommendation. The principal conclusions of the RP are as follows:

1. Based on careful evaluation of the two relevant NRC reports, the RP concludes that the elimination of the waste confirmation requirements mentioned in U.S. Senate Report 108-105 and Bill S.1424 is supported by the NRC.

2. It appears that EEG agrees that the current characterization requirements are excessive. It appears that EEG also agrees that monitoring VOCs in underground disposal rooms is sufficient.

3. Based on the information presented to the RP, the permit modification listed under Section 310 of U.S. Senate Bill 1424 is technically defensible. There is no reason to perform waste confirmation tests that: 1) provide insignificant health and safety benefits to the U.S. population; and 2) pose serious radiological and occupational health and safety risks for the workers performing these tests.

The RP recommends that the Mayor of Carlsbad make available its report to the U.S. Senate Committee for Energy and Water.

Peer Review Process

INTRODUCTION

There is a large degree of consensus within the technical community on basic criteria for acceptability of scientific information. However, the implementation of these criteria requires a reasonably detailed process for identification of the status of scientific information and for the establishment of reliability of the information regardless of its status.

The formation of the Institute for Regulatory Science (RSI) was based on the notion that societal decisions must be based on best available science (BAS). The implementation of the BAS concept required a systematic evaluation of various aspects of scientific information. Consequently, a hierarchy of scientific information and classification of scientific information was developed.

CLASSIFICATION OF SCIENTIFIC INFORMATION

The scientific information was classified into six categories as follows (Moghissi 1996):

Category Ia - Scientific Laws: This class consists of information that is clearly and unambiguously accepted by the scientific and engineering community.

Category Ib - Applied Science: This class consists of application of scientific laws to specific areas. Much of the engineering and many other areas of applied sciences such as industry and commerce fall into this class.

Category IIa - Extrapolated Science: Much of the contested areas of science falls into this class. This category is based on extrapolation of scientific laws beyond their accepted applicability.

Category IIb - Technical Judgement: In many cases, little or no scientific or engineering information is available and the decision maker must rely upon the judgement of qualified individuals.

Category IIIa - Speculation: This class is information that is based on speculation.

Category IIIb - Pseudo Science: Sometimes called "junk" science, this class is clearly based on information which contradicts basic scientific principles.

Similarly, the reliability of scientific information was categorized into four groups as follows:

Group I - Personal Opinion: This group is entirely unreliable unless it is based on the third or fourth group in this grouping system.

Group II - Gray Literature: This group consists of government reports, reports by private organizations, and all other information that has not been subjected to independent peer review. The reliability of this group is questionable.

Group III - Peer-Reviewed Information: This group is the most reliable information. It is based on an assessment of the information by those who are peers to the investigators and are independent of those who have a stake in the outcome of the review.

Group IV - Consensus-Processed Information: This group is particularly applicable to Category IIa and Category IIb of the scientific information. It is based on the notion that information falling into those classes is likely to be contested, and as additional knowledge is gained, the contested area may move to Category Ib or even Category Ia of the classification system. However, the collective wisdom of a profession can be used to reach a conclusion which has a high probability to be correct. For example, in a contested area of mechanical engineering, the collective judgement of the mechanical engineers, as represented by the American Society of Mechanical Engineers (ASME), is the most efficient method to reach a consensus on the likely answer.

PEER REVIEW VS TECHNICAL ASSESSMENT

Peer review consists of a critical evaluation of a product consisting of a document, a study, a program, a technology, a strategy, or any other topic

by a group of individuals who—by virtue of their education, experience, and acquired knowledge—are qualified to be peers to the author of the subject that is being reviewed. In effect, the peers are asked to judge an existing, and partially or entirely completed activity. In its simplest form, peer review responds positively or negatively to the question: Is the claim of the author valid?

In contrast to peer review, a technical assessment guides the requester to a pathway that leads to a decision. In most cases, technical assessments provide detailed information on how an objective can be achieved. Instead of answering a question positively or negatively, an assessment provides a technical judgement on the approach, direction, and implementation of an issue.

PRINCIPLES OF PEER REVIEW AND TECHNICAL ASSESSMENT

Independent peer review, independent technical assessment, and the consensus process are key ingredients of acceptability of scientific information. A peer is an individual who is able to perform the project—or the segment of the project that is being reviewed—with little or no additional training or learning.

Recognizing that peer review constitutes the core of acceptability of scientific and engineering information, virtually all professional societies of scientists and engineers have instituted formal procedures for peer review for their activities. The peer review program of the RSI was developed as a result of its joint efforts with the ASME. The reports of the peer reviews resulting from this program have been published by ASME/RSI (1997, 1998, 1999, 2000, 2001a, 2001b, 2001c, 2002a, 2002b, 2002c, 2002d, 2002e, 2003a, 2003b) and RSI (1998, 2002, 2003).

The most important requirements for independent peer review or independent technical assessment are as follows:

Principle 1: *The selection of members of the review or assessment panel and the outcome of the review or assessment must result from the consensus of a group rather than the decision of an individual.*

This principle implies that all decisions dealing with selection of reviewers and the review must be made collectively by a group of qualified individuals rather than a single individual. Consequently, the RSI process uses the Commission on Assessment and Reviews (CAR) for the appointment of Panels who in turn perform the assessment or the review. Although individuals are involved in the identification of peer reviewers and their nomination, ultimately CAR makes the final decision. Wherever necessary, the CAR decides to change the makeup of the panels, thus demonstrating the necessary oversight.

Principle 2: *Clear and unambiguous policies must be provided to ensure that conflict of interest is avoided.*

The issue of conflict of interest is normally addressed by having each panel member sign a conflict-of-interest form certifying that the individual has no conflict of interest. However, this approach leaves the judgement entirely to the reviewer.

An independent peer review or independent technical assessment process requires clear policies indicating what constitutes a conflict of interest. The CAR relies upon the general conflict-of-interest policies of professional societies resulting in the policy: *Those who have a stake in the outcome of the review or assessment may not act as panel members or participate in the selection of panel members.*

Principle 3: *The findings and recommendations of the review or assessment panel must address unambiguous and clear questions (sometimes called criteria or lines of inquiry) identified by the sponsoring agency.*

Various terms are used in describing review or assessment criteria. These include criteria, questions, and lines of inquiry. During the evolution of the RSI process, much skepticism resulted from the past practice in which panel members had a free reign in addressing any issue. A properly-managed independent peer review or assessment should be based on clearly-identified criteria. These criteria must be technically reasonable and must respond to the needs of the manager.

Principle 4: *The findings and recommendations responding to the assessment or review criteria must be critical, constructive, professional, and collegial rather than adversarial.*

An important and hereto under-emphasized principle is an appreciation of the reason for peer review or assessment. A peer review or an assessment is intended to assist the managers in their decision process. Therefore, the outcome should be helpful to the decision makers rather than being confrontational.

Principle 5: *The participation of appropriately-selected stakeholders significantly enhances the credibility and acceptability of the results of peer review or assessment study.*

The participation of those who are personally impacted by a decision; those who must deal with it during the course of their occupation; and all others who have an interest in the outcome of the peer review or an assessment is desirable. Experience indicates that a properly-managed program of stakeholder participation can avoid the sometimes disorderly and chaotic conditions that can result from such participation. Also, the experience gained during this program indicates that a properly-designed and properly-conducted review or assessment will enhance the acceptance of the decision.

THE PROCESS

The structure of the peer review or technical assessment process established by RSI consists of a tiered system. The process is overseen by the CAR. The review or assessment of specific topics is performed by Review Panels (RPs) or Assessment Panels (APs).

Commission on Assessments and Reviews

The CAR oversees the peer review and assessment studies. Its members are chosen on the basis of their education, experience, and peer recognition. An attempt is made to ensure that all needed technical competencies and diversity of technical views are represented in the CAR.

As the overseer of the entire process, the CAR enforces all relevant policies, including compliance with professional and ethical requirements. A key function of the CAR is the approval of the appointment of members of RPs or APs for a specific project.

Panels

The review of a project, a document, a technology, or a program is performed by a panel consisting of a small group of highly-knowledgeable individuals. Upon the completion of their task, the panel is disbanded. The selection of panel members is based on the competencies required for the specific assignment. The same process is used for the formation and operation of Assessment Panels. The number of individuals in a panel depends upon the complexity of the subject to be reviewed or assessed. The selection of a panel member is based on the totality of that individual's qualifications. However, there are several generally-recognized and fundamental criteria for assessing qualifications of a panel member as follows:

1. **Education:** A minimum of a B.S. degree and preferably an advanced degree in an engineering or scientific field is required for any candidate.

2. **Experience:** In addition to education, the individual must have significant experience in the area that is being evaluated.

3. **Peer recognition:** Election to office of a professional society; serving on technical committees of scholarly organizations; and similar activities are considered to be a demonstration of peer recognition.

4. **Contributions to the profession:** The contributions to the profession may be demonstrated by publications in peer-reviewed journals. In addition, patents, presentations at meetings where the papers were peer-reviewed, and similar activities are also considered to be contributions to the profession.

5. **Conflict of Interest:** One of the most complex and contested issues is a set of subjects collectively called conflict of interest. The ideal panel member is an individual who is intimately familiar with the subject and yet

has no monetary interest in it. The guiding principle for conflict of interest is as follows:

Those who have a stake in the outcome of the review or assessment may not act as a panel member or participate in the selection of panel members.

Institute for Regulatory Science

RSI is a not-for-profit organization chartered under section 501(c)3 of the Internal Revenue Service. It is dedicated to the idea that societal decisions must be based on the best available scientific and engineering information. According to the RSI mission statement, peer review or assessment is the foundation of the best available scientific and engineering information. Consequently, RSI has promoted peer review or assessment within government and industry as the single most important measure of reliability of scientific and engineering information. In its activities, RSI seeks the cooperation of scholarly organizations. Historically, a large number of RSI activities have been performed in cooperation with professional societies. RSI is located in the Washington, D.C. Metropolitan Area with offices in Carlsbad, NM and Aiken, SC.

Project Summary

WASTE ISOLATION PILOT PLANT FACILITY

INTRODUCTION

The Waste Isolation Pilot Plant (WIPP) is the principal facility for the disposal of the nation's transuranic (TRU) radioactive waste generated as a result of over 50 years of nuclear weapons research, development, and production. The selection of the WIPP site followed a lengthy search and extensive studies for the identification of a site for disposal of TRU wastes (NRC 1983, 1984). These efforts led to the selection of a 41-km^2 (16-mi^2) site, 26 mi (42 km) east of Carlsbad, NM. Following studies conducted during the 1950s of geological formations stable enough to contain wastes for thousands of years, the National Research Council (NRC 1957) identified deep geologic isolation in salt as a most desirable disposal mode for radioactive waste. Experiments conducted on salt mines revealed that there were no technical difficulties with waste disposal in salt (NRC 1984). The Carlsbad site was selected by the U.S. Department of Energy (DOE) because the deep salt beds located there are expected to provide the necessary stability for waste disposal. The site and the region surrounding it had been studied for many years, and mineral exploration of both potash and hydrocarbon deposits provided additional knowledge regarding the geology of the region. The U.S. Geological Survey and other agencies assisted DOE in identifying the New Mexico location for the repository. The salt deposit at this site, known as the Salado Formation, is a minimum of 2,000 ft (610 m) thick and located at a depth of 1,000-2,000 ft (305-610 m).

Salt allows significant deformation without fracturing. The Salado Formation is regionally extensive, and includes continuous beds of salt without complicated structures. The DOE identified the following four advantages of the site:

1. The salt deposit is in a stable geological area with little seismic activity, assuring the stability of a waste repository for thousands of years.
2. Salt deposits indicate the absence of flowing fresh water which could move waste to the surface. Water, if it had been or were present, would have dissolved the salt beds.

3. Salt is relatively easy to mine.
4. Rock salt exhibits a characteristic mechanical behavior (creep) that makes it an excellent host for waste isolation. In response to excavation-induced stress changes, salt slowly flows (or creeps), to close the mined openings. Creep closure starts immediately and continues until the salt has regained its original density and stress distribution. Salt formations tend to slowly and progressively fill mined areas and safely seal radioactive waste from the environment.

Geological data were collected from the WIPP site and surrounding area to evaluate its suitability as a radioactive waste repository. These data were collected principally by the DOE; the DOE's predecessor agencies; the U.S. Geological Survey; the New Mexico Bureau of Mines and Mineral Resources; and private organizations engaged in natural resource exploration and extraction. The DOE analyzed the data and has stated that the site is suitable for long-term isolation of radioactive waste.

The geology of the WIPP site has specific advantages identified by the DOE against potentially adverse environmental impacts. At the depth of the WIPP repository, the salt will slowly encapsulate the buried waste in the stable rock. Salt rock also shields radioactivity, providing a protection similar to that of concrete. Waste placed in the excavation at WIPP is expected to be encapsulated and all waste-filled spaces closed over a period of 75-200 years. The waste disposal depth of 2,150 ft (650 m) is close enough to the surface to make access reasonable.

Subsequent to the investigation of the subsurface geology, the DOE selected the Salado Formation as the site of the WIPP repository for the following reasons:

1. The Salado halite units have low permeability to fluid-flow, which impedes groundwater-flow into and out of the repository.
2. It is regionally widespread.
3. It includes continuous halite beds without complicated structure.
4. It is deep with little potential for dissolution.
5. It is close enough to the surface that access is reasonable.
6. It is largely free of mobile groundwater, as compared to existing mines and other potential repository sites.

Another of the favorable aspects of subsurface geology at the WIPP site is that the groundwater hydrology in the immediate proximity is characterized by geologic strata with low transmissivity and low hydrologic gradients.

WASTE PROCESSING STEPS AT WIPP

The handling and disposal of Contact-Handled (CH) TRU wastes at WIPP involve the following series of steps:

1. A waste shipment arrives at WIPP by truck. Each truck is capable of carrying up to three TRU Packaging Transport Model IIs (TRUPACT-IIs).
2. After an initial security inspection, a radiological survey, and a shipping documentation review, the truck is parked near the Waste Handling Building (WHB) for additional inspection and radiological survey. A forklift is used to transfer each TRUPACT-II from the trailer, through an air lock, and into the WHB, where it is placed in an area called a TRUDOCK, which is used by workers to unload the waste from the TRUPACT-IIs.
3. Radiological surveys are conducted to confirm that waste containers have not sustained damage during shipment or waste container removal.
4. At the TRUDOCK, an overhead crane is used to remove the waste containers from each TRUPACT-II and place them on a facility pallet.
5. A forklift moves the loaded facility pallet to the conveyance loading car at the waste handling shaft. The conveyance loading car is used to load the facility pallet onto the waste hoist.
6. The waste hoist descends 2,150 ft (705 m) to the WIPP repository.
7. An underground transporter pulls the loaded facility pallet off the hoist onto the transporter bed and moves the waste to the appropriate disposal room where a forklift removes the waste containers from the facility pallet and places them in the disposal area. Containers may be stacked three high in the disposal area.
8. Bags of magnesium oxide are placed on top of the stack of containers to serve as backfill. The magnesium oxide will control the solubility of radionuclides and is an added measure of assurance for long-term repository performance.

CONTAINER MANAGEMENT PRACTICES

Containers are to be managed in a specified manner that does not result in spills or leaks. Containers are required to be closed at all times, unless waste is being placed in the container or removed. Because containers at WIPP contain radioactive waste, safety concerns require that containers be continuously vented to obviate the buildup of gases within the container. These gases could result from radiolysis, which is the breakdown of moisture by radiation. The vents are filtered to enable any potential generated gas to escape while particulate matter is retained. Derived waste containers are kept closed at all times unless waste is being added or removed.

Containers with residual liquids

Defense production facilities are prohibited from shipping liquid wastes in the containers sent to the WIPP. In no case is the total residual liquid allowed to equal or exceed 1% (by volume) of the waste container. Consequently, calculations made to determine the secondary containment as required by regulations are based on 10% of 1% of the volume of the containers, or 1% of the largest container, whichever is greater.

Description of containers

Waste containers are to be in good condition prior to shipment from the generator sites, i.e., containers will be of high integrity, intact, and free of surface contamination above established limits. This condition is to be verified upon receipt of the waste at WIPP. Containers are vented through filters, allowing any gases that are generated by radiolytic and microbial processes within a waste container to escape, thereby preventing overpressurization or development of conditions within the container that would lead to the development of ignitable, corrosive, reactive, or other characteristic wastes.

The volatile organic compounds (VOC) in the headspace of waste containers are limited to maximum allowable VOC room-averaged headspace concentration limits specified in the permit. There are no maximum allowable headspace gas concentration limits for individual containers, as some containers can exceed these values as long as container headspace averages in a disposal room do not.

Containers for CH TRU mixed waste will be either 55-gal (208-L) drums arranged singly in 7-packs; 85-gal (321-L) drums arranged singly in 4-packs; 100-gallon drums arranged singly or as three-packs; ten-drum overpacks (TDOP) either as overpacks or direct-loaded; or standard waste boxes (SWBs). Following is a summary description for each container type.

Standard 55-gallon drums: These drums meet the requirements for U.S. Department of Transportation specification 7A regulations. A standard 55-gal (208-L) drum has a gross internal volume of 7.4 ft^3 (0.208 m^3). One or more filtered vents (as described in Permit Section M1-1d(1)) is to be installed in the drum lid or body to prevent the escape of any radioactive particulate matter and to eliminate any potential for pressurization. Standard 55-gal (208-L) drums are constructed of mild steel and may also contain rigid, molded polyethylene (or other compatible material) liners.

Standard Waste Boxes (SWBs): One or more filtered vents are to be installed in the standard waste box lid or body to prevent the escape of any radioactive particulate matter and to eliminate any potential of pressurization. SWBs have an internal volume of 66.3 ft^3 (1.88 m^3).

One hundred-gallon drums: A 100-gal (379-L) drum has a gross internal volume of 13.4 ft^3 (0.39 m^3). One or more filtered vents are installed in the drum lid or body to prevent the escape of any radioactive particulate matter and to eliminate potential pressurization. These drums are constructed of mild steel and may also contain rigid, molded polyethylene (or other compatible material) liners. These drums may be used as overpacks or may be direct-loaded.

Ten-Drum Overpack: The TDOP is a metal container, similar to a SWB, and is certified to be noncombustible. It is a welded-steel cylinder, approximately 74 in (1.9 m) high and 71 in (1.8 m) in diameter with a gross internal capacity of 160 ft^3. The maximum loaded weight of a TDOP is limited to 6,700 lbs (3,040 kg). A bolted lid on one end is removable; sealing is accomplished by clamping a neoprene gasket between the lid and the body. Filter ports are located near the top of the TDOP. One or more filtered vents are installed in the ten-drum overpack lid or body to prevent the escape of any radioactive particulate matter

and to eliminate any potential for pressurization. A TDOP may contain up to ten standard 55-gal (208-L) drums or one SWB. The TDOPs may be used to overpack drums or SWBs containing CH TRU mixed waste. The TDOP may also be direct-loaded with waste items that are too large to fit into the standard 55-gallon (208-L) drum; the 85-gallon drum; or the SWB.

Eighty-five gallon drums: The 85-gal (321-L) drum overpack is to be used primarily for overpacking contaminated 55-gal (208-L) drums at the WIPP facility. The 85-gal (321-L) drums may be direct-loaded with CH TRU-mixed waste and may be used to collect derived waste. One or more filtered vents are to be installed in the 85-gal (321-L) drum lid or body to prevent the escape of any radioactive particulate matter and to eliminate any potential of pressurization.

Container compatibility: All containers are made of steel, and some will contain rigid, molded polyethylene liners. Requirements to conduct compatibility studies include container materials to assure that containers are compatible with the waste.

RCRA WASTE CHARACTERIZATION

INTRODUCTION

There are certain waste characterization requirements for the radioactive content of transuranic (TRU) waste mandated by the U.S. Environmental Protection Agency (EPA). Compliance with characterization requirements of TRU waste for disposal at the Waste Isolation Pilot Plant (WIPP) is accomplished on a waste stream basis (i.e., waste material generated from a single process or activity that is similar in material, physical form, isotropic make-up, and hazardous constituents) and also on a container basis. Defense production facilities assign the waste stream identifier for each container of waste that is shipped. The waste designation is selected from one of three broad categories of solid wastes: Homogenous Solids, Soil/Gravel, and Debris Wastes (NMED 1999). In addition, a number of sub-categories are assigned to the wastes. Characterization and analysis methods vary for each category and subcategory of waste.

The Waste Analysis Plan (WAP), which is part of the Permit (DOE 1997b), describes waste characterization activities that a TRU waste generator/storage site must complete before shipping waste to WIPP for disposal. These activities include test methods; details of planned waste sampling and analysis processes; a description of the waste shipment screening and verification process; and a description of the quality assurance/quality control program. Before WIPP manages, stores, or disposes of Contact-Handled (CH) TRU mixed waste from a generator/storage site, the site is required to characterize waste in accordance with WAP requirements. For each container of waste destined for disposal, defense production facilities provide the WIPP operators with a written characterization summary known as a Waste Stream Profile Form (WSPF).

Waste characterization based on 40 CFR 194

Waste characterization, as mandated by the Resource Conservation and Recovery Act (RCRA); and as described in 40 CFR 194 (EPA 1998) requires that a system be in place to track and control the inventory of

waste components to assure that limits associated with the components are not exceeded. The waste components to be tracked and controlled, and the associated limits, are set by a Performance Assessment (PA) conducted by the U.S. Department of Energy (DOE) to show that the WIPP complies with the performance criteria of 40 CFR 191 (EPA 1993). The waste components and the limits, all of which are total inventory limits at repository closure, are presented in the WIPP Compliance Certification Application (CCA).

ORIGIN OF CH TRU WASTE AND ITS ACCEPTANCE CRITERIA AT WIPP

The TRU mixed wastes that are shipped to the WIPP originate at DOE generator/storage sites and contain both radiological and hazardous waste constituents. The DOE and EPA agreed that, of the hundreds of radionuclides present within these wastes, only ten are important for the WIPP performance assessment: ^{241}Am, ^{244}Cm, ^{137}Cs, ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{241}Pu, ^{90}Sr, ^{233}U, and ^{234}U. Of these ten, ^{234}Sr, ^{233}U, and ^{137}Cs are important for Remote-Handled (RH) but not for CH waste streams.

Major types of operations generating waste

Examples of the major types of operations that generate this waste include the following:

Production of nuclear products: This category includes reactor operation; radionuclide separation or finishing; and weapons fabrication and manufacturing. The majority of the TRU mixed wastes were generated by weapons fabrication and radionuclide separation or finishing processes. More specifically, wastes resulting from this category consist of residues from chemical processes; air and liquid filtration; casting; machining; cleaning; product quality sampling; analytical activities; and maintenance and refurbishment of equipment and facilities.

Plutonium recovery: These wastes are residues from the recovery of plutonium-contaminated molds; metals; glass; plastics; rags; salts used in electro-refining; precipitates; firebrick; soot; and filters.

Research and development: This group includes a variety of hot-cell or glovebox activities that often simulate full-scale operations described above, producing similar TRU mixed wastes. Other types of R&D projects include metallurgical research; actinide separations; process demonstrations; and chemical and physical properties determinations.

Decontamination and decommissioning: Facilities and equipment that are no longer needed or usable are decontaminated and decommissioned, resulting in TRU mixed wastes consisting of scrap materials; cleaning agents; tools; piping; filters; plexiglass; gloveboxes; concrete rubble; asphalt; cinder blocks; and other building materials. These materials are expected to be the largest category by volume of TRU mixed waste to be generated in the future.

The TRU mixed wastes that are to be shipped to the WIPP facility for disposal have been placed into waste categories based on their physical and chemical properties (Table 1). The waste generating processes can be described in five general categories:

1. Wastes (such as combustible waste) that result from cleaning and decontamination activities in which items such as towels and rags become contaminated both with hazardous waste constituents and radioactivity. In these cases, the hazardous waste and the radioactive constituent are intimately mixed, both on the rag or towel used for cleaning and as residuals on the surface of the object being cleaned. These waste forms are not homogeneous in nature; however, they are generated in a fashion that ensures that the hazardous and radioactive contaminants coexist throughout the waste matrix.

2. Wastes generated when materials which contain metals and metal ions believed to exhibit the toxicity characteristic (EPA 1996b) become contaminated with radioactivity as the result of plutonium operations (leaded rubber, some glass, and metal waste are typical examples). These materials may also become contaminated with solvents during decontamination or plutonium recovery activities.

3. A class of plutonium processes where non-metallic objects are used and become contaminated with radioactive materials. These objects

are subsequently cleaned with solvents to recover plutonium. Surfaces of the objects (such as graphite, filters, and glass) are contaminated with both radioactive and hazardous constituents.

4. Waste-generating processes involving foundry operations where impurities are removed from plutonium. These impurities may result in the deposition of toxicity characteristic (EPA 1996b) metals and metal ions.

5. In all of the process waste categories in the second half of Table 1, the hazardous and radioactive constituents are physically mixed together as a result of the treatment process. In these wastes, the release of any portion of the waste matrix will involve both the hazardous and the radioactive waste components, because the treatment process generates a relatively homogeneous waste form.

Table 1. Summary of waste generation processes and waste forms.

Waste Category	Hazardous Waste Codes	Description of Processes	Description of Waste Form
Combustibles	F001, F002, F003, D008, D019	Cloth and paper wipes are used to clean parts and wash down gloveboxes. Wood and plastic parts are removed from gloveboxes after they are cleaned. Lead may occur as shielding tape or as minor noncombustible waste in this category.	Materials such as metals may retain traces of organics left on surfaces that were cleaned. Waste may remain on the cloth and paper that was used for cleaning or for wiping up spills.
Graphite		Graphite molds, which may contain impurities of metals, are scraped and cleaned with solvents to remove the recoverable plutonium.	Surfaces may retain residual solvents. Lead may be used as shielding or may be an impurity in the graphite.
Filters	F001, F002	Filters are used to capture radioactive particulate in air streams associated with numerous plutonium operations and to filter particulate from aqueous streams.	Filter media may retain organic solvents that were present in the air or liquid streams.

Table 1. (cont'd)

Waste Category	Hazardous Waste Codes	Description of Processes	Description of Waste Form
Benelex® and Plexiglas®	F001, F002, D008	Materials are used in gloveboxes as neutron absorbers. The glovebox assembly often includes leaded glass. All surfaces may be wiped down with solvents to remove residual plutonium.	Surfaces may retain residual solvents from wiping operations. Leaded glass may also be present.
Firebrick and Ceramic Crucibles	F001, F002, F005, D006, D007, D008	Firebrick is used to line plutonium processing furnaces. Ceramic crucibles are used in plutonium analytical laboratories. Both may contain metals as surface contaminants.	Metals deposited during plutonium refining or analytical operations could remain as residuals on surfaces. Surfaces may retain residual solvents.
Leaded Rubber	D008	Leaded rubber includes lead oxide impregnated materials such as gloves and aprons.	The leaded rubber could potentially exhibit the toxicity characteristic.
Metal	F001, F002, D008	Metals range from large pieces removed from equipment and structures to nuts, bolts, wire, and small parts. Many times, metal parts will be cleaned with solvents to remove residual plutonium.	Solvents may exist on the surfaces of metal parts. The metals themselves potentially exhibit the toxicity characteristic.
Glass	F001, F002, D006, D007, D008, D009	Glass includes Raschig rings removed from processing tanks, leaded glass removed from gloveboxes, and miscellaneous laboratory glassware.	Solvents may exist as residuals on glass surfaces and in empty containers. The leaded glass may exhibit the toxicity characteristic.
Inorganic Wastewater Treatment Sludge	F001-F003, D006-D009, P015	Sludge is vacuum filtered and stabilized with cement or other appropriate sorbent prior to packaging.	Traces of solvents and heavy metals may be contained in the treated sludge which is in the form of a solid dry monolith, highly viscous gel-like material, or dry crumbly solid.

Table 1. (cont'd)

Waste Category	Hazardous Waste Codes	Description of Processes	Description of Waste Form
Organic Liquid and Sludge	F001, F003	Organic liquids such as oils, solvents, and lathe coolants are immobilized through the use of various solidification agents or sorbent materials.	Solvents and metals may be present within the matrix of the solids created through the immobilization process.
Solidified Liquid	F001, F003, D006, D008	Liquids that are not compatible with the primary treatment processes and have to be batched. Typically these liquids are solidified with portland or magnesium cement.	Solvents and metals may be present within the matrix of the solids created through the immobilization process.
Inorganic Process Solids and Soil	F001, F002, F003, D008	Solids that cannot be reprocessed or process residues from tanks, firebrick fines, ash, grit, salts, metal oxides, and filter sludge. Typically solidified with portland or gypsum-based cements.	Solvents and metals may be present within the matrix of the solids created through the immobilization process.
Pyrochemical Salts	D007	Molten salt is used to purify plutonium and americium. After the radioactive metals are removed, the salt is discarded.	Residual metals may exist in the salt depending on impurities in the feedstock.
Cation and Anion Exchange Resins	D008	Plutonium is sorbed on resins and is eluted and precipitated.	Feed solutions may contain traces of solvents or metals depending on the preceding process.

Categories of TRU mixed waste

TRU mixed wastes from the above operations are listed by defense production facilities as belonging in one of three broad Summary Category Groups. The characterization is based on the final physical form of the wastes as follows:

Summary category group S3000—homogeneous solids: These wastes include a minimum of 50% (by volume) solid inorganic process residues such as inorganic sludge, salt waste, and pyrochemical salt waste—but exclude soil. Other waste streams are included in this Summary Category Group based on the specific waste stream types and final waste form. This Summary Category Group is expected to contain toxic metals and spent solvents.

Summary Category Group S4000—Soils/Gravel: This Category is assigned to waste streams containing at least 50% (by volume) soil and gravel. This Summary Category Group is expected to contain toxic metals and is also further categorized by the amount of debris included in the matrix.

Summary Category Group S5000—Debris Wastes: These are heterogenous wastes that are at least 50% (by volume) materials that exceed 2.36 inch (60 mm) particle size and that are manufactured objects; plant or animal matter; or natural geologic materials. Smaller particles may be considered debris if they are manufactured objects and if they do not belong to S3000 or S4000. Examples of S5000 waste include gloves; hoses; aprons; floor tile; insulation; plastic; rubber; wood; paper; cloth; and biological materials.

The most common RCRA-regulated hazardous constituents in TRU mixed waste

1. **Metals and metal ions:** Some of the TRU mixed waste to be emplaced in the WIPP facility contains toxic metals contained in EPA hazardous waste codes D004 through D011 (EPA 2000). Cadmium, chromium, lead, mercury, selenium, and silver are present in discarded tools and equipment; solidified sludge; cemented laboratory liquids; and waste from decontamination and decommissioning activities. A large percentage of the waste consists of lead-lined gloveboxes; leaded rubber gloves and aprons; lead bricks and piping; lead tape; and other lead items. Lead, because of its radiation-shielding applications, is the most prevalent toxicity-characteristic metal present.

2. **Halogenated volatile organic compounds:** Some of the TRU mixed waste to be emplaced in the WIPP facility contains spent

halogenated volatile organic compound (VOC) solvents listed as EPA hazardous waste numbers F001 through F005 (EPA 2000). Tetrachloroethylene; trichloroethylene; methylene chloride; carbon tetrachloride; 1,1,1-trichloroethane; and 1,1,2-trichloro-1,2,2-trifluoroethane (EPA hazardous waste codes F001 and F002) are the most prevalent halogenated organic compounds identified in TRU mixed waste that may be managed at the WIPP facility during the Disposal Phase. These compounds are commonly used to clean metal surfaces prior to plating, polishing, or fabrication; to dissolve other compounds; or as coolants. Because they are highly volatile, only small amounts typically remain on equipment after cleaning or, in the case of treated wastewater, in the sludge after clarification and flocculation. Radiolysis may also generate halogenated volatile organic compounds.

3. **Non-halogenated volatile organic compounds:** Xylene, methanol, and n-butanol are the most prevalent nonhalogenated VOCs in TRU mixed waste that may be managed at the WIPP facility. Like the halogenated VOCs, they are used as degreasers and solvents and are similarly volatile. The same analytical methods that are used for halogenated VOCs are used to detect the presence of nonhalogenated VOCs.

Prohibited Items

The TRU mixed waste forms describe both radioactive and hazardous characteristics exhibited by the wastes. The Permit Treatment, Storage, and Disposal Facility Waste Acceptance Criteria (TSDF-WAC) places limits on the waste that can be shipped to the WIPP facility based on the characteristics of the waste form. The following TRU mixed wastes are prohibited at the WIPP facility:

1. Liquid waste which includes residual liquid in the container in excess of what is reasonably achievable by pouring, pumping, and/or aspirating; liquid in the internal container in excess of 1 inch (2.5 cm) of liquid in the bottom of the container; or total residual liquid in any payload container (e.g., 55 gallon drum or standard waste box) in excess of 1% (by volume) of that container
2. Pyrophoric materials, such as elemental potassium
3. Hazardous wastes not occurring as co-contaminants with TRU wastes

4. Wastes incompatible with backfill; seal and panel closures materials; container and packaging materials; shipping container materials; or other wastes
5. Wastes containing explosives or compressed gases
6. Wastes with polychlorinated biphenyl (PCB) concentration of 50ppm (50 mg/kg) or more
7. Wastes exhibiting the characteristic of ignitability, corrosivity, or reactivity (EPA Hazardous Waste Numbers D001, D002, or D003)
8. Any waste container that does not have VOC concentration values reported for the headspace
9. Any waste container which has not undergone either radiographic or visual examination
10. Any waste container from a waste stream which has not been preceded by an appropriate, certified Waste Stream Profile Form

Before accepting a container holding TRU mixed waste, WIPP operators audit the radiography or visual examination (VE) data records of the generator/storage sites to verify that the container holds no unvented compressed gas, and that residual liquid does not exceed 1% (volume) in any payload container. Radiography tapes are to be selected randomly for at least 1% of containers received at the WIPP, at which time they are reviewed and compared to radiographic data forms. If waste does not include at least 50% of any given category by volume, characterization shall be performed using the waste characterization process required for the category constituting the greatest volume of waste for that waste stream. To ensure the integrity of the WIPP facility, waste streams identified as containing incompatible materials or materials incompatible with waste containers are not to be shipped to the WIPP unless they are treated to remove the incompatibility.

Waste generated as a result of waste container handling and processing activities at the WIPP facility are known as “derived” wastes. Because derived wastes can contain only those RCRA-regulated materials present in the waste from which they were derived, no additional characterization of the derived waste is required for disposal purposes. In other words, generator/storage site characterization data as well as knowledge of the processes at the WIPP facility will be used to identify and characterize hazardous waste and hazardous constituents in derived waste.

TRU waste, by definition, must contain 100 nCi/g or more of transuranic elements of waste, which means that the radioactive component of the waste will always be present within the waste in significant concentrations. The TSDF-WAC limitations and restrictions are provided to ensure that any waste form received at the WIPP facility is stable and can be managed safely. One benefit of waste form restrictions—such as no liquids—is that they limit the kinds of releases that could occur to those that would be readily detectable through visual inspection (i.e., large objects that fall out of ruptured containers) or through the use of radiation monitoring—either locally or within the adjacent area—to detect materials that have escaped from containers.

Releases and spills

Some waste forms only contain radioactive contamination on the surface, because they are not the result of a treatment process or are not porous in form. These include glass, leaded rubber, metals, graphite, ceramics, firebricks, and plastics. In theory, a hazardous waste release could occur if the interiors of these materials became exposed and were involved in a release or spill. Such an occurrence is not likely during operations, because no activities are planned or anticipated that would result in the breaking of these materials to expose fresh surfaces. The WIPP facility will handle only sealed containers of waste and derived waste. The practice of handling sealed containers minimizes the opportunity for releases or spills. For the purposes of safety analysis, it was assumed that releases and spills during operations occur by either of two mechanisms: 1) surface contamination; and 2) accidents. Regardless of how the release occurs, the nature of the waste and the processes that generated it is such that the radioactive and hazardous components are intimately mixed. A release of one without the other is not likely, except for releases of VOCs from containers. Surface contamination is the only credible source of contamination external to the containers during normal operations. Surface contamination is assumed to be caused by waste management activities at the generator site that result in the contamination of the outside of a waste container. Contamination would most likely consist of particulate matter (dirt or dust) that would be deposited during generator-site handling/loading activities. This contamination may not be detected by visible inspections. Surface contamination is monitored upon

arrival at the WIPP facility through the use of swipes and radiation monitoring equipment, as specified in the WIPP Permit (NM Hazardous Waste Regulations, Title 20; NMED 1999). Detection using radioactivity is very sensitive and allows for the detection of contamination that may not be visible on the surface of the container. This exceeds the capability required by the RCRA, which is generally limited to inspections that detect only visible evidence of spills or leaks. Releases can occur from accidents, and those that occur within the waste handling process are assumed to result in the release of radioactive contaminants and VOCs. Radioactive releases are detectable using surface-sampling (swipe) techniques. The most common RCRA-regulated hazardous constituents in TRU mixed waste to be managed at the WIPP facility consist of: metals; halogenated volatile organic compounds; and non-halogenated volatile organic compounds.

WASTE STREAM IDENTIFICATION

Waste characterization activities at generator/storage sites include the following, although not all of these techniques will be used on each container:

1. Radiography, which is an x-ray technique to determine physical contents of containers
2. Visual examination (VE) of opened containers as an alternative way to determine their physical contents or to verify radiography results
3. Headspace-gas sampling to determine VOC content of gases in the void volume of the containers
4. Sampling and analysis of waste forms that are homogeneous and can be representatively sampled to determine concentrations of hazardous waste constituents and toxicity-characteristic contaminants of waste in containers
5. Compilation of acceptable knowledge (AK) documentation into an auditable record, including process knowledge and prior sampling and analysis data
6. Non-destructive assay, typically segmented gamma scans and passive/active neutron interrogation, to quantify radionuclides for 40 CFR 194 waste characterization compliance

Auditable records allow DOE operators to conduct a systematic assessment, analysis, and evaluation of generator/storage site compliance with the WAP and the Permit. Waste analysis parameters to be characterized include confirmation of physical form; presence of toxicity characteristic contaminants; and exclusion of prohibited items. The characterization techniques used by generator/storage sites include AK, which incorporates confirmation by headspace-gas sampling and analysis; radiography; and homogeneous waste sampling and analysis. All confirmation and characterization activities are to be performed in accordance with the WAP. The analytical requirements are specified by the analytical method being used such as Fourier Transform Infrared Spectroscopy, and Gas Chromatography/Mass Spectrometry.

Waste analysis parameters characterized for the 40 CFR 194 (EPA 1998) characterization program are quantity of metals; quantities of cellulosics; plastics; and rubber; quantity of free water; and a list of ten radionuclides. The characterization techniques used by generator/storage sites for these parameters also include AK and radiography as well as non-destructive assay.

Radiography

Radiography techniques have been developed by DOE to aid in the examination and identification of containerized waste. There are specific requirements that relate to radiography methods used at respective facilities. A radiography system typically consists of: 1) an X-ray-producing device; 2) an imaging system; 3) an enclosure for radiation protection; 4) a waste container handling system; 5) an audio/video recording system; and 6) an operator control and data acquisition station.

Although these six components are required, it is expected that there will be some variation within a given system between sites. The radiography of a waste container is recorded by an audio/videotape or equivalently non-alterable media and is maintained as a non-permanent record. The estimated waste material parameter and weights should be determined by compiling an inventory of waste items, residual materials, and packaging materials. Containers whose contents prevent full examination to the extent expected for the radiography technique and waste form, are subject to visual examination.

Visual examination

As an additional quality control (QC) check on radiography, or in lieu of radiography, the waste container contents are verified directly by visual examination. The visual examination consists of a semi-quantitative and/or qualitative evaluation of the waste container contents, and is recorded on audio/videotape. Visual examination is performed on a statistically determined portion of waste containers to verify the results of radiography. This verification includes use of the Waste Matrix Code; waste material parameter weights; and the assurance of the absence of prohibited items.

Visual examination includes describing the contents of a waste container, and estimating or measuring the weight of the contents. The description identifies the discernible waste items, residual materials, packaging materials, and waste material parameters. Estimated weights are established through the use of historically-derived waste weight tables and an estimation of the waste volumes.

Headspace-gas sampling and analysis

Headspace-gas sampling is performed on waste containers that are in compliance with the container temperature equilibrium requirements (i.e., 72 h at 18°C or higher). Waste containers designated as summary category S5000 (Debris waste) are sampled for headspace gas a minimum of 142 d after packaging. Waste containers designated as Summary Categories S3000 (Homogenous solids) and S4000 (Soil/gravel) are sampled a minimum of 225 d after packaging. This drum-age criteria ensures that the drum contents have reached 90% of steady state concentration within each layer of confinement to allow a representative sample to be taken (NMED 1999.) Two types of headspace-gas sampling protocols may be employed: 1) the manifold headspace-gas sampling protocol, and 2) the direct canister headspace-gas sampling protocol.

Once the headspace gas sample has been collected in accordance with the Hazardous Waste Facility Permit (HWFP) requirements, the sample is taken to a laboratory for analysis. The laboratory analyzes the sample using the allowable methods in the HWFP and reports the concentration

of all analytes on the target analyte list. In addition, the presence of any tentatively identified compounds (TICs) observed during the analysis is reported.

Sampling and analysis of homogenous solids and soil/gravel

The methods used to collect samples of TRU mixed waste classified as homogenous solids and soil/gravel from waste containers, are designed to ensure that the samples are representative of the waste from which they are taken. A sufficient number of samples are collected to adequately represent the waste being sampled. For those waste streams defined as Summary Category Groups S3000 or S4000, debris that may also be present within these wastes need not be sampled. Samples of retrievably stored waste containers are collected using appropriate coring equipment or other EPA-approved methods to collect a representative sample. Newly-generated wastes that are sampled from a process as they are generated may be sampled using EPA-approved methods—including scoops and ladles—that are capable of collecting a representative sample.

The QC requirements for sampling homogenous solids and soil/gravel include: collecting co-located samples from cores or other sample types to determine precision; equipment blanks to verify cleanliness of the sampling and coring tools and sampling equipment; and analysis of reagent blanks to ensure that reagents, such as deionized or high-pressure liquid chromatography (HPLC) water, are of sufficient quality.

Once the homogeneous solid or soil/gravel sample has been collected in accordance with the HWFP requirements, the sample is taken to a laboratory for analysis. The laboratory analyzes the sample using the allowable methods in the HWFP and reports the concentration of all analytes on the target analyte list. In addition, the presence of any TICs observed during the analysis is reported.

Acceptable knowledge

This characterization technique incorporates confirmation by headspace-gas sampling and analysis; radiography; and homogeneous waste sampling

and analysis. Both RCRA regulations and the New Mexico Hazardous Waste Management Regulations (NMED 1997) authorize the use of AK in appropriate circumstances by waste generators—or treatment, storage, or disposal facilities—to characterize hazardous waste. Acceptable knowledge is described by the EPA (EPA 1994) as an alternative to sampling and analysis; it can be used to meet all or part of the waste characterization requirements under the RCRA. AK includes a number of techniques used to characterize TRU mixed waste, such as process knowledge; records of analysis acquired prior to RCRA; and other supplemental sampling and analysis data (EPA 1994). AK is used in TRU mixed waste characterization activities in three ways:

1. To delineate TRU mixed waste streams
2. To assess if TRU mixed heterogeneous debris wastes exhibit a toxicity characteristic (NMED 1997)
3. To assess if TRU mixed wastes are listed (NMED 1997)

TRU mixed waste streams are evaluated by applicable provisions of the AK process prior to management, storage, or disposal by the Permittees at the WIPP. TRU mixed waste management AK information defines waste categorization schemes and terminology; provides a breakdown of the types and quantities of TRU mixed wastes that are generated and stored at the site; and describes how wastes are tracked and managed at the site—including historical and current operations. Information related to TRU mixed waste certification procedures and the types of documentation (e.g., waste profile forms) used to summarize AK are also provided. The amount and type of supplemental AK information required from generator/storage sites is site-specific and cannot be mandated, but sites collect information as appropriate to support required AK information.

The AK written record includes a summary that identifies all sources of waste characterization information used to delineate the waste stream. For each TRU mixed waste stream, the generating sites compile all process information and data supporting the AK used to characterize that waste stream. The type and quantity of supporting documentation will vary by waste stream, depending on the process generating the waste and site-specific requirements imposed by the DOE.

STATISTICAL METHODS USED IN SAMPLING AND ANALYSIS

Generator/storage sites use statistical methods to: 1) select waste containers for visual inspection; 2) select retrievably-stored waste containers for totals analysis; 3) set the upper confidence limit; and 4) apply control charting for newly-generated waste stream sampling. Statistical sampling techniques are not currently employed in waste characterization activities employed for 40 CFR 194 (EPA 1998) compliance.

Selecting waste containers for visual examination

As a QC check on the radiographic examination of waste containers, a statistically-selected portion of the certified waste containers is opened and visually examined. The data from visual examination is used to verify the matrix parameter category, waste material parameter weights, and absence of prohibited items, as determined by radiography. The data obtained from the visual examination can also be used to determine—with acceptable confidence—the percentage of miscertified waste containers from the radiographic examination. Miscertified containers are those that radiography indicates meet the WIPP Waste Acceptance Criteria and Transuranic Package Transporter-II Authorized Methods for Payload Control, but visual examination indicates do not meet these criteria. Participating sites initially use an 11% miscertification rate to calculate the number of waste containers that are visually examined until a site-specific miscertification rate has been established.

The site-specific miscertification rate is applied initially to each Summary Category Group to determine the number of containers in that Summary Category Group requiring visual examination. However, a Summary Category Group-specific miscertification rate is determined when either six months have passed since radiographic characterization commenced on a given Summary Category Group or at least 50% of a given Summary Category Group has undergone radiographic characterization, whichever occurs first. The Summary Category Group is then subject to the visual examination requirements of this reevaluated Summary Category Group-specific miscertification rate to ensure that the entire Summary Category Group is appropriately characterized. The site-specific miscertification rate is reassessed annually.

Statistical sampling and analysis of homogeneous solids and soil/gravels for totals

The statistical approach for characterizing retrievably-stored homogeneous solids and soil/gravel waste using sampling and analysis relies on using acceptable knowledge to segregate waste containers into relatively homogeneous waste streams. Once segregated by waste stream, random selection and sampling of the waste containers followed by analysis of the waste samples are performed to ensure that the resulting mean contaminant concentration provides an unbiased representation of the true mean contaminant concentration for each waste stream.

Preliminary estimates of the mean concentration and variance of each RCRA-regulated contaminant in the waste are used to determine the number of waste containers to select for sampling and analysis. The preliminary estimates are made by obtaining a preliminary number of samples from the waste stream or from previous sampling from the waste stream. Preliminary estimates are based on samples from a minimum of five waste containers. Samples collected to establish preliminary estimates that are selected, sampled, and analyzed in accordance with applicable provisions of the Waste Analysis Plan (WAP) are used as part of the required number of samples to be collected.

The calculated total number of required waste containers can then be randomly sampled and analyzed. Waste container samples from the preliminary mean and variance estimates may be counted as part of the total number of calculated required samples if and only if:

1. there is documented evidence that the waste containers for the preliminary estimate samples were selected in the same random manner as is chosen for the required samples.
2. there is documented evidence that the method of sample collection in the preliminary estimate samples were identical to the methodology to be employed for the required samples.
3. there is documented evidence that the method of sample analysis in the preliminary estimate samples was identical to the analytical methodology employed for the required samples.
4. there is documented evidence that the validation of the sample analyses in the preliminary estimate samples was comparable to the

validation employed for the required samples. In addition, the validated samples results should indicate that all sample results were valid according to the analytical methodology.

Upon collection and analysis of the preliminary samples, or at any time after the preliminary samples have been analyzed, the generator/storage site may assign hazardous waste codes to a waste stream. For waste streams with calculated upper confidence limits below the regulatory threshold, the site must collect the required number of samples if the site intends to establish that the constituent is below the regulatory threshold.

Statistical headspace gas sampling and analysis

If a waste stream meets the conditions for representative headspace gas sampling, then headspace-gas sampling of that waste stream may be done on a randomly-selected portion of containers in the waste stream. The minimum number of containers that are sampled is determined by taking an initial VOC sample from 10 randomly-selected containers. These samples are analyzed for all the target analytes.

The mean and standard deviation calculated after sampling *n* containers is then used to calculate a UCL_{90} for each of the headspace gas VOCs.

Control charting for newly-generated waste stream sampling

Significant process changes and process fluctuations associated with newly-generated waste are determined using statistical process control (SPC) charting techniques. These techniques require historical data for determining limits for indicator species, and subsequent periodic sampling to assess process behavior relative to historical limits. SPC is performed on waste prior to solidification or packaging for ease of sampling. If the limits are exceeded for any toxicity characteristic parameter, the waste stream can be recharacterized, and the characterization can be performed according to procedures required in the WAP.

A Shewhart control chart (Gilbert 1987) is a control chart for statistical means that is used for checking whether current data are consistent with

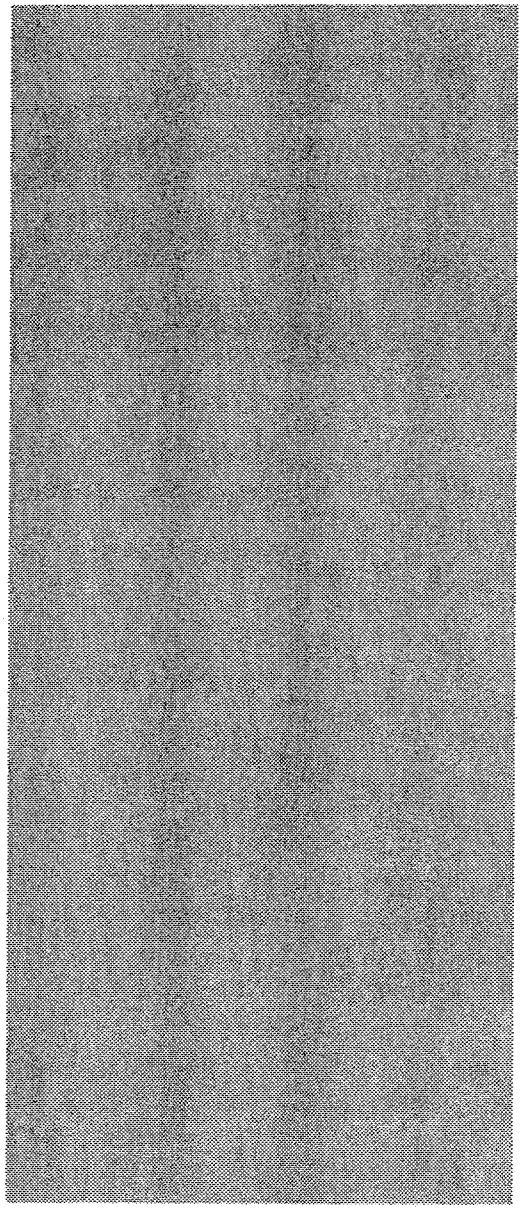
past data and whether shifts or trends in means have occurred. If a current sample mean from the process lies within the limits, the process is said to be "in control," or consistent with historical data. If the current mean exceeds the limits, the process has likely changed from historical periods. Logical sets of historical data to be used for the construction of limits in this application are the data from the initial characterization of the waste stream, if available; from characterization of a different lot of the waste stream; or from a retrievably-stored waste stream of the same type from the same process. At a minimum, the logical set includes ten representative sample values collected and analyzed from the newly-generated waste stream. The data used for construction of the limits is justified. The underlying assumptions for control charts are that the data are independent and normally-distributed with constant mean μ and constant variance σ^2. The statistical tests for normality can be conducted and data transformation to normality performed, if necessary. Transformations should take place prior to any calculations that use the data.

Each limit is constructed such that there is a 90% confidence that the true mean does not exceed a limit. One-sided control limits are used because once a waste stream has been determined to be RCRA-hazardous and the limit exceedance of interest is on the lower side—that is when the process may become nonhazardous. Likewise, once a waste stream has been determined not to be RCRA-hazardous and the limit exceedance of interest is on the upper side—that is when the process may become RCRA-hazardous. Whether or not exceeding the limit would result in a change in the RCRA-hazardous nature of the waste stream depends on how close the observed control limits are to RCRA limits.

Current process data are collected and averaged for comparison to the control limit for the mean. The collection period and number of samples included in the average are dependent on the waste stream characteristics. A small number of samples will reflect more of the process variability and there will be more limit exceedances. If two or three samples are collected for the mean in the required annual (or batch) sampling of a relatively homogeneous waste stream, limit exceedances may not occur. If the waste stream is less homogeneous, it will be necessary to collect more samples to meet the required confidence limit. Periodically, it will be

necessary to update the control limit for a process. An update that includes all historical data is performed if there is no evidence of a trend in the process or a shift in the mean for the process. If there has been a shift in the mean, only more recent data that reflect the shift are used. Control limits shall be based on at least ten data points that are representative of the process and do not exhibit outliers or a trend with time.

Legal Requirements



INTRODUCTION

The Waste Isolation Pilot Plant project was authorized in 1979 (PL96-164) as a research and development activity to demonstrate the safe disposal of radioactive waste originating from the U.S. nuclear weapons program. This and several other laws and regulations have resulted in the construction and operation of the Waste Isolation Pilot Plant (WIPP) as a unique facility for the disposal of transuranic (TRU) waste.

TRU waste is defined as a waste containing alpha-emitting isotopes of transuranic elements equal to or in excess of 100 nCi/g of waste. The half-lives of the isotopes of these elements must be greater than 20 years.

Much of the TRU waste contains chemical constituents subject to the regulations of the Resource Conservation and Recovery Act (RCRA) and the New Mexico Hazardous Waste Act. TRU wastes that contain both chemical and radioactive waste are referred to as TRU mixed waste. According to RCRA, WIPP is required to have a hazardous waste permit to receive waste containing hazardous waste constituents. The State of New Mexico has adopted the relevant RCRA regulations by reference and thus is authorized to issue hazardous waste permits. WIPP received a permit (NMED 1999) on October 27, 1999 for contact-handled (CH) waste, defined as having a surface radiation dose rate not greater than 200 mrem/h (2 mSv/h). TRU waste having a greater dose rate than 200 mrem/h (2 mSv/h) is defined as Remote Handled (RH) TRU Waste.

The enactment of the WIPP Land Withdrawal Act (WIPP/LWA 1992) resulted in permanent withdrawal and transfer of the administration of federal land for the site from the U.S. Department of Interior to the DOE. This law mandated that the U.S. Environmental Protection Agency (EPA) certify the DOE's compliance with EPA's relevant, generally applicable environmental standards for radioactive materials. Subsequently, the EPA (1996a) issued the criteria to be used in certifying compliance. In response, the DOE provided the EPA with appropriate documents; model; and evaluations of the geology, hydrology, and climate as well as projected performance of the entire disposal system, including the mined repository, shaft seals, panel closures, borehole plugs, and mine backfill. Finally, the

EPA (1998) certified that the WIPP met all of the criteria required for the disposal of TRU waste.

The WIPP/LWA limited the amount and types of TRU wastes that can be emplaced at WIPP. The limits include the following:

1. The volume WIPP capacity is limited to 1.75 x 10^5 m^3 (6.2 x 10^6 ft^3) total TRU waste.
2. No more than 5% (by volume) of RH-TRU waste may have a surface dose rate in excess of 100 rem/h (1Sv/h).
3. No RH-TRU waste may have a surface dose rate in excess of 1,000 rem/h (10 Sv/h).
4. RH-TRU waste containers shall not exceed 23 Ci/L (851 GBq/L) maximum activity level averaged over the volume of the container.
5. The total radioactivity of RH-TRU waste shall not exceed 5.1 MCi (188.7 Gbq).
6. Of the allowed waste disposal volume of 1.75 x 10^5 m^3 (6.2 x 10^6 ft^3), the Consultation and Cooperation Agreement with the State of New Mexico limits the volume of RH-TRU waste to 7,080 m^3 (250,000 ft^3).

The 41 km^2 (16 mi^2) area under DOE's jurisdiction at WIPP is deemed sufficient to ensure that at least 1 mi. (1.6 km) of intact salt exists laterally between the waste disposal area and the accessible environment, and also to ensure that no permanent residences will be established in close proximity to the facility.

BRIEF WIPP CHRONOLOGY

1957 National Research Council recommended salt as host rock, identified areas to investigate, and identified favorable siting criteria

1974 Atomic Energy Commission selected site near Carlsbad for exploratory work

1979 Congress authorized WIPP for research and development for safe disposal of defense-generated radioactive waste

1980 DOE issued Final Environmental Impact Statement (FEIS)

1981 DOE issued Record of Decision

1981 DOE began construction of WIPP Exploratory Shaft

1985 EPA issued 40 CFR 191—radioactive waste disposal standards applicable to WIPP

1986 EPA stated facilities must comply with Resource Conservation and Recovery Act (RCRA) for disposal of mixed (hazardous and radioactive) waste

1990 New Mexico was authorized by EPA to regulate mixed waste

1990 DOE issued first Supplemental Environmental Impact Statement (SEIS)

1991 DOE submitted Parts A and B of the RCRA Permit Application to New Mexico

1992 WIPP Land Withdrawal Act permanently segregated land for WIPP and gave EPA regulatory authority to certify WIPP compliance to 40 CFR 191.

1995 DOE submitted revised RCRA Permit Application to New Mexico Environment Department

1996 EPA issued 40 CFR 194, compliance criteria in February

1996 DOE submitted 84,000 page Compliance Certification Application to EPA

1998 DOE issued SEIS II in January

1998 EPA certified WIPP ready for disposal

1998 New Mexico Environment Department issued draft hazardous waste facility permit (HWFP) for disposal of transuranic mixed waste

1999 First shipment non-mixed waste in March

1999 New Mexico Environment Department issued Hazardous Waste Facility Permit

2000 First shipment of mixed waste in September

EPA'S CRITERIA FOR WIPP CERTIFICATION

Criteria for certification and re-certification of WIPP were published in final form by the EPA (1996a). These criteria were detailed and contained specific requirements related to the radioactivity content of TRU waste. In its regulations, EPA provided requirements not only for quality assurance and characterization but also specific requirements for expert judgement and peer review. Although EPA's certification and re-certification do not apply to radioactive waste constituents of TRU waste, the description of peer review requirements may be useful as they can be advantageously used also for hazardous waste constituents. The following are excerpts from EPA's regulations:

"§ 194.27 Peer review.

(a) Any compliance application shall include documentation of peer review that has been conducted, in a manner required by this section, for:

(1) Conceptual models selected and developed by the Department;

(2) Waste characterization analyses as required in § 194.24(b); and

(3) Engineered barrier evaluation as required in § 194.44.

(b) Peer review processes required in paragraph (a) of this section, and conducted subsequent to the promulgation of this part, shall be conducted in a manner that is compatible with NUREG-1297, "Peer Review for High-Level Nuclear Waste Repositories," published February 1988. (Incorporation by reference as specified in § 194.5.)

(c) Any compliance application shall:

(1) Include information that demonstrates that peer review processes required in paragraph (a) of this section, and conducted prior to the implementation of the promulgation of this part, were conducted in accordance with an alternate process substantially equivalent in effect to NUREG-1297 and approved by the Administrator or the Administrator's authorized representative; and

(2) Document any peer review processes conducted in addition to those required pursuant to paragraph (a) of this section. Such documentation shall include formal requests, from the Department to outside review groups or individuals, to review or comment on any information used to support compliance applications, and the responses from such groups or individuals."

The packaging of waste at the originating sites; transport to the site; transport vehicles; and disposal of heat-generating waste are beyond the scope of this study and are not dealt with in this report.

The health and safety consequences of the postulated repository failure mechanisms appear to be so minimal that simplifications in design may be justified, and cost-effectiveness studies should be carried out to determine whether they would be acceptable. However, the probability and the consequences of potentially rapid flow of brine solutions containing radionuclides, through more permeable formations, have not been completely determined. Once these have been resolved, conventional safety considerations (e.g., number of shafts and packaging of waste for highway transport) might determine the optimum design.

Relaxation of the WIPP waste acceptance criteria (e.g., elimination of the incineration of some of the waste at the Process Experimental Pilot Plant (PREPP) facility and removal of the requirement for the use of steel-case overpack of the wooden boxes) may also have minimal consequences.

PUBLIC LAW 102-579
THE WASTE ISOLATION PILOT PLANT LAND WITHDRAWAL ACT

as amended by Public Law 104-201
(H.R. 3230, 104th Congress)

SECTION I. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the "Waste Isolation Pilot Plant Land Withdrawal Act".

(b) TABLE OF CONTENTS.—

SEC. 2. DEFINITIONS.

For purposes of this Act:
(1) ADMINISTRATOR.—The term "Administrator" means the Administrator of the Environmental Protection Agency.
(2) AGREEMENT.—The term "Agreement" means the July 1, 1981, Agreement for Consultation and Cooperation, as amended by the November 30, 1984 "First Modification", the August 4, 1987 "Second Modification", and the March 18, 1988 "Third Modification" or as it may be amended after the date of enactment of this Act between the State and the United States Department of Energy as authorized by section 213(b) of the Department of Energy National Security and Military Applications of Nuclear Energy Authorization Act of 1980 (Pub. L. 96-164; 93 Stat. 1259, 1265).
(3) CONTACT-HANDLED TRANSURANIC WASTE.—The term "contact-handled transuranic waste" means transuranic waste with a surface dose rate not greater than 200 millirem per hour.
(4) DECOMMISSIONING PHASE.—The term "decommissioning phase" means the period of time beginning with the end of the disposal phase and ending when all shafts at the WIPP repository have been back-filled and sealed.
(5) DISPOSAL.—The term "disposal" means permanent isolation of transuranic waste from the accessible environment with no intent of recovery, whether or not such isolation permits the recovery of such waste.
(6) DISPOSAL PHASE.—The term "disposal phase" means the period of time, during which transuranic waste is disposed of at WIPP, beginning with the initial emplacement of transuranic waste underground for disposal and ending when the last container of transuranic waste, as determined by the Secretary, is emplaced underground for disposal.
(7) DISPOSAL REGULATIONS.—The term "disposal regulations" means the environmental regulations for the disposal of spent nuclear fuel, high-level radioactive waste, and transuranic waste under section 8.
(8) EEG.—The term "EEG" means the Environmental Evaluation Group for the Waste Isolation Pilot Plant referred to in section 1433 of the National Defense Authorization Act, Fiscal Year 1989 (Pub. L. 100-456; 102 Stat. 1918, 2073).
(9) ENGINEERED BARRIERS.—The term "engineered barriers" means backfill, room seals, panel seals, and any other manmade barrier components of the disposal system.

(10) HIGH-LEVEL RADIOACTIVE WASTE.—The term "high-level radioactive waste" has the meaning given such term in section 2(12) of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10101(12)).

(11) NO-MIGRATION DETERMINATION.—The term "No-Migration Determination" means the Final Conditional No-Migration Determination for the Department of Energy Waste Isolation Pilot Plant published by the Environmental Protection Agency on November 14, 1990 (55 Fed. Reg. 47700), and any amendments thereto, pursuant to the Solid Waste Disposal Act (42 U.S.C. 6901 et seq.).

(12) REMOTE-HANDLED TRANSURANIC WASTE.—The term "remote-handled transuranic waste" means transuranic waste with a surface dose rate of 200 millirem per hour or greater.

(13) RETRIEVAL.—The term "retrieval" means the removal of transuranic waste and the container in which it has been retained and any material contaminated by such waste from the underground repository at WIPP.

(14) SECRETARY.—The term "the Secretary" means the Secretary of Energy.

(15) SPENT NUCLEAR FUEL.—The term "spent nuclear fuel" has the meaning given such term in section 2(23) of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10101(23)).

(16) STATE.—The term "the State" means the State of New Mexico.

(17) SUPPLEMENTAL STIPULATED AGREEMENT.—The term "Supplemental Stipulated Agreement" means the Supplemental Stipulated Agreement Resolving Certain State Off-Site Concerns Over WIPP, dated December 27, 1982, to the Stipulated Agreement Between DOE and the State in *State of New Mexico ex rel. Bingaman v. DOE*, Case No. CA 81-0363 JB (D. N. Mex.), dated July 1, 1981.

(18) TRANSURANIC WASTE.—The term "transuranic waste" means waste containing more than 100 nanocuries of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years, except for—

(A) high-level radioactive waste;

(B) waste that the Secretary has determined, with the concurrence of the Administrator, does not need the degree of isolation required by the disposal regulations; or

(C) waste that the Nuclear Regulatory Commission has approved for disposal on a case-by-case basis in accordance with part 61 of title 10, Code of Federal Regulations.

(19) WIPP.—The term "WIPP" means the Waste Isolation Pilot Plant project authorized under section 213 of the Department of Energy National Security and Military Applications of Nuclear Energy Authorization Act of 1980 (Pub. L. 96-164; 93 Stat. 1259 1265) to demonstrate the safe disposal of radioactive waste materials generated by atomic energy defense activities.
(20) WITHDRAWAL.—The term "Withdrawal" means the geographical area consisting of the lands described in section 3(c).

SEC. 3. LAND WITHDRAWAL AND RESERVATION FOR WIPP.

(a) LAND WITHDRAWAL, JURISDICTION, AND RESERVATION.—

(1) LAND WITHDRAWAL.—Subject to valid existing rights, and except as otherwise provided in this Act, the lands described in subsection (c) are withdrawn from all forms of entry, appropriation, and disposal under the public land laws, including without limitation the mineral leasing laws, the geothermal leasing laws, the material sale laws (except as provided in section 4(b)(4) of this Act), and the mining laws.

(2) JURISDICTION.—Except as otherwise provided in this Act, jurisdiction over the Withdrawal is transferred from the Secretary of the Interior to the Secretary.

(3) RESERVATION.—Such lands are reserved for the use of the Secretary for the construction, experimentation, operation, repair and maintenance, disposal, shutdown, monitoring, decommissioning, and other authorized activities associated with the purposes of WIPP as set forth in section 213 of the Department of Energy National Security and Military Applications of Nuclear Energy Authorization Act of 1980 (Pub. L. 96-164; 93 Stat. 1259, 1265), and this Act.

(b) REVOCATION OF PUBLIC LAND ORDERS.—Public Land Order 6403 of June 29, 1983, as modified by Public Land Order 6826 of January 28, 1991, and any memoranda of understanding accompanying such land orders, are revoked.

(c) LAND DESCRIPTION.—

(1) BOUNDARIES.—The boundaries depicted on the map issued by the Bureau of Land Management of the Department of the Interior, entitled "WIPP Withdrawal Site Map," dated October 9, 1990, and on file

with the Bureau of Land Management, New Mexico State Office, are established as the boundaries of the Withdrawal.

(2) LEGAL DESCRIPTION AND MAP.—Within 30 days after the date of the enactment of this Act, the Secretary of the Interior shall—

(A) publish in the Federal Register a notice containing a legal description of the Withdrawal; and

(B) file copies of the map described in paragraph (1) and the legal description of the Withdrawal with the Congress, the Secretary, the Governor of the State, and the Archivist of the United States.

(d) TECHNICAL CORRECTIONS.—The map and legal description referred to in subsection (c) shall have the same force and effect as if they were included in this Act. The Secretary of the Interior may correct clerical and typographical errors in the map and legal description.

(e) WATER RIGHTS.—This Act does not establish, nor may any provision be construed to establish, a reservation to the United States with respect to any water or water rights. Nothing in this Act shall affect any water rights acquired by the United States prior to the date of enactment of this Act. The United States may apply for and obtain water rights for purposes associated with this Act only in accordance with the substantive and procedural requirements of the laws of the State.

SEC. 4. ESTABLISHMENT OF MANAGEMENT RESPONSIBILITIES.

(a) GENERAL AUTHORITY.—The Secretary shall be responsible for the management of the Withdrawal, consistent with the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.), this Act, and other applicable law, and shall consult with the Secretary of the Interior and the State in discharging such responsibility.

(b) MANAGEMENT PLAN.—

(1) DEVELOPMENT.—Within 1 year after the date of the enactment of this Act, the Secretary, in consultation with the Secretary of the Interior and the State, shall develop a management plan for the use of the Withdrawal until the end of the decommissioning phase.

(2) PRIORITY OF WIPP-RELATED USES.—Any use of the Withdrawal for activities not associated with WIPP shall be subject to such conditions and restrictions as may be necessary to permit the conduct of WIPP-related activities.

(3) NON-WIPP RELATED USES.—The management plan developed under paragraph (1) shall provide for the maintenance of wildlife habitat and shall provide that the Secretary may permit such non-WIPP related uses of the Withdrawal as the Secretary determines to be appropriate, including domestic livestock grazing and hunting and trapping in accordance with the following requirements:

(A) GRAZING.—The Secretary may permit grazing to continue where established before the date of the enactment of this Act, subject to such regulations, policies, and practices as the Secretary, in consultation with the Secretary of the Interior, determines to be necessary or appropriate. The management of grazing shall be conducted in accord with applicable grazing laws and policies, including—

(i) the Act entitled "An Act to stop injury to public grazing lands by preventing overgrazing and soil deterioration, to provide for their orderly use, improvement, and development, to stabilize the livestock industry dependent upon the public range, and for other purposes," approved June 28, 1934 (43 U.S.C. 315 et seq., commonly referred to as the "Taylor Grazing Act");

(ii) title IV of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1751 et seq.); and

(iii) the Public Rangelands Improvement Act of 1978 (43 U.S.C. 1901 et seq.).

(B) HUNTING AND TRAPPING.—The Secretary may permit hunting and trapping within the Withdrawal in accordance with applicable laws and regulations of the United States and the State, except that the Secretary, after consultation with the Secretary of the Interior and the State, may issue regulations designating zones where, and establishing periods when, no hunting or trapping is permitted for reasons of public safety, administration, or public use and enjoyment.

(4) DISPOSAL OF SALT TAILINGS.—The Secretary shall dispose of salt tailings extracted from the Withdrawal that the Secretary determines are not needed for backfill at WIPP. Disposition of such tailings shall be made under sections 2 and 3 of the Act of July 31, 1947, (30 U.S.C. 602, 603; commonly referred to as the "Materials Act of 1947").

(5) MINING.—

(A) IN GENERAL.—Except as provided in subparagraph (B), no surface or subsurface mining or oil or gas production, including slant drilling from outside the boundaries of the Withdrawal, shall be permitted

at any time (including after decommissioning) on lands on or under the Withdrawal.

(B) EXCEPTION.—Existing rights under Federal Oil and Gas Leases No. NMNM 02953 and No. NMNM 02953C shall not be affected unless the Administrator determines, after consultation with the Secretary and the Secretary of the Interior, that the acquisition of such leases by the Secretary is required to comply with the final disposal regulations.

(c) CLOSURE TO PUBLIC.—If during the land withdrawal made by section 3(a) the Secretary determines, in consultation with the Secretary of the Interior, that the health and safety of the public or the common defense and security require the closure to the public use of any road, trail, or other portion of the Withdrawal, the Secretary may take whatever action the Secretary determines to be necessary to effect and maintain the closure and shall provide notice to the public of such closure.

(d) MEMORANDUM OF UNDERSTANDING.—The Secretary and the Secretary of the Interior shall enter into a memorandum of understanding to implement the management plan developed under subsection (b). Such memorandum shall remain in effect until the end of the decommissioning phase.

(e) SUBMISSION OF PLAN.—Within 1 year after the date of the enactment of this Act, the Secretary shall submit the management plan developed under subsection (b) to the Congress and the State. Any amendments to the plan shall be submitted promptly to the Congress and the State.

SEC. 6. TEST PHASE ACTIVITIES.

(a) STUDY—The following study shall be conducted:

(1) IN GENERAL.—Within 3 years after the date of the enactment of this Act, the Secretary shall complete a study on remote-handled transuranic waste in consultation with affected States, the Administrator, and after the solicitation of views of other interested parties.

(2) REQUIREMENTS OF STUDY.—Such study shall include an analysis of the impact of remote-handled transuranic waste on the performance assessment of WIPP and a comparison of remote-handled transuranic waste with contact-handled transuranic waste on such issues

as gas generation, flammability, explosiveness, solubility, and brine and geochemical interactions.

(3) PUBLICATION.—The Secretary shall publish the findings of such study in the Federal Register.

(b) PERFORMANCE ASSESSMENT REPORT.—

(1) IN GENERAL.—The Secretary shall publish a performance assessment report as necessary to demonstrate the long-term performance of WIPP. Each such report shall be provided to the State, the Administrator, the National Academy of Sciences, and the EEG for their review and comment.

(2) RESPONSES BY SECRETARY TO COMMENTS.—If, within 120 days of the publication of a performance assessment report under paragraph (1), the State, the Administrator, the National Academy of Sciences, or the EEG provide written comments on the report, the Secretary shall submit written responses to the comments to the State, the Administrator, the National Academy of Sciences, and the EEG, and to other appropriate entities or persons after consultation with the State, within 120 days of receipt of the comments.

SEC. 7. DISPOSAL OPERATIONS.

(a) TRANSURANIC WASTE LIMITATIONS.—

(1) REM LIMITS FOR REMOTE-HANDLED TRANSURANIC WASTE.—

(A) 1,000 REMS PER HOUR.—No transuranic waste received at WIPP may have a surface dose rate in excess of 1,000 rems per hour.

(B) 100 REMS PER HOUR.—No more than 5 percent by volume of the remote-handled transuranic waste received at WIPP may have a surface dose rate in excess of 100 rems per hour.

(2) CURIE LIMITS FOR REMOTE-HANDED TRANSURANIC WASTE.—

(A) CURIES PER LITER.—Remote-handled transuranic waste received at WIPP shall not exceed 23 curies per liter maximum activity level (averaged over the volume of the canister).

(B) TOTAL CURIES.—The total curies of the remote-handled transuranic waste received at WIPP shall not exceed 5,100,000 curies.

(3) CAPACITY OF WIPP.—The total capacity of WIPP by volume is 6.2 million cubic feet of transuranic waste.

(b) REQUIREMENTS FOR COMMENCEMENT OF DISPOSAL OPERATIONS.—The Secretary may commence emplacement of transuranic waste underground for disposal at WIPP only upon completion of—

(1) the Administrator's certification under section 8(d)(1) that the WIPP facility will comply with the final disposal regulations;

(2) the acquisition by the Secretary (whether by purchase, condemnation, or otherwise) of Federal Oil and Gas Leases No. NMNM 02953 and No. NMNM 02953C, unless the Administrator determines under section 4(b)(5) that such acquisition is not required; and

(3) the 30-day period beginning on the date on which the Secretary notifies Congress that the requirements of section 9(a)(1) have been met.

SEC. 8. ENVIRONMENTAL PROTECTION AGENCY DISPOSAL REGULATIONS.

(a) REINSTATEMENT.—

(1) IN GENERAL.—Except as provided in paragraph (2), the disposal regulations issued by the Administrator on September 19, 1985, and contained in subpart B of part 191 of title 40, Code of Federal Regulations, shall be in effect.

(2) EXCEPTIONS.—Paragraph (1) shall not apply to—

(A) the 3 aspects of sections 191.15 and 191.16 of such regulations that were the subject of the remand ordered in Natural Resources Defense Council, Inc. v. United States Environmental Protection Agency, 824 F.2d 1258 (1st Cir. 1987); and

(B) the characterization, licensing, construction, operation, or closure of any site required to be characterized under section 113(a) of Public Law 97-425.

(b) ISSUANCE OF REGULATIONS.—

(1) IN GENERAL.—Subject to the limitation in paragraph (2), the Administrator shall issue, not later than 6 months after the date of the enactment of this Act, final disposal regulations. Such regulations shall be issued in a rulemaking proceeding conducted under section 553 of title 5, United States Code, except that sections 556 and 557 of such title shall not apply.

(2) LIMITATION.—The regulations required by this subsection shall not be applicable to the characterization, licensing, construction, operation,

or closure of any site required to be characterized under section 113(a) of Public Law 97-425.

(c) ISSUANCE OF CRITERIA FOR CERTIFICATION OF COMPLIANCE WITH DISPOSAL REGULATIONS.—

(1) PROPOSED CRITERIA.—Not later than 1 year after the date of the enactment of this Act, the Administrator shall, by rule pursuant to section 553 of title 5, United States Code, propose criteria for the Administrator's certification of compliance with the final disposal regulations, and sections 556 and 557 of such title shall not apply.

(2) FINAL CRITERIA.—Not later than 2 years after the date of the enactment of this Act, the Administrator shall, by rule pursuant to section 553 of title 5, United States Code, issue final criteria for the Administrator's certification of compliance with the final disposal regulations, and sections 556 and 557 of such title shall not apply.

(d) DISPOSAL REGULATIONS.—

(1) APPLICATION FOR COMPLIANCE.—Within 30 days after the date of the enactment of the Waste Isolation Pilot Plant Land Withdrawal Amendment Act, the Secretary shall provide to Congress a schedule for the incremental submission of chapters of the application to the Administrator beginning no later than 30 days after the date of the submittal of the schedule. The Administrator shall review the submitted chapters and provide requests for additional information from the Secretary as needed for completeness within 45 days of the receipt of each chapter. The Administrator shall notify Congress of such requests. The schedule shall call for the Secretary to submit all chapters to the Administrator no later than October 31, 1996. The Administrator may at any time request additional information from the Secretary as needed to certify, pursuant to paragraph (2), whether the WIPP facility will comply with the final disposal regulations.

(2) CERTIFICATION BY ADMINISTRATOR.—Within 1 year of receipt of the application under paragraph (1), the Administrator shall certify, by rule pursuant to section 553 of title 5, United States Code, whether the WIPP facility will comply with the final disposal regulations, and sections 556 and 557 of such title shall not apply.

(3) JUDICIAL REVIEW.—Judicial review of the certification of the Administrator under paragraph (2) shall not be restricted by the provisions of section 221 c. of the Atomic Energy Act of 1954 (42 U.S.C. 2271(c)).

(4) LIMITATION.—Any certification of the Administrator under paragraph (2) may only be made after the full application has been submitted to the Administrator under paragraph (1).

(e) CONFLICT RESOLUTION.—If the State disagrees with the Secretary's application under subsection (d)(1)(A), the State may invoke the conflict resolution provisions of the Agreement.

(f) PERIODIC RECERTIFICATION.—

(1) BY SECRETARY.—Not later than 5 years after the initial receipt of transuranic waste for disposal at WIPP, and every 5 years thereafter until the end of the decommissioning phase, the Secretary shall submit to the Administrator and the State documentation of continued compliance with the final disposal regulations.

(2) CONCURRENCE BY ADMINISTRATOR.—The Administrator shall, not later than 6 months after receiving a submission under paragraph (1), determine whether or not the WIPP facility continues to be in compliance with the final disposal regulations. A determination under this paragraph shall not be subject to rulemaking or judicial review.

(g) ENGINEERED AND NATURAL BARRIERS, ETC.—The Secretary shall use both engineered and natural barriers and any other measures (including waste form modifications) to the extent necessary at WIPP to comply with the final disposal regulations.

SEC. 9. COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS.

(a) IN GENERAL.—

(1) APPLICABILITY.—Beginning on the date of the enactment of this Act, the Secretary shall comply with respect to WIPP, with—

(A) the regulations issued by the Administrator establishing the generally applicable environmental standards for the management and storage of spent nuclear fuel, high-level radioactive waste, and transuranic radioactive waste and contained in subpart A of part 191 of title 40, Code of Federal Regulations;

(B) the Clean Air Act (40 U.S.C. 7401 et seq.);

(C) the Solid Waste Disposal Act (42 U.S.C. 6901 et seq.);

(D) title XIV of the Public Health Service Act (42 U.S.C. 300f et seq.; commonly referred to as the "Safe Drinking Water Act");

(E) the Toxic Substances Control Act (15 U.S.C. 2601 et seq.);

(F) the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. 9601 et seq.);

(G) all other applicable Federal laws pertaining to public health and safety or the environment; and

(H) all regulations promulgated, and all permit requirements, under the laws described in subparagraphs (B) through (G).

With respect to transuranic mixed waste designated by the Secretary for disposal at WIPP, such waste is exempt from treatment standards promulgated pursuant to section 3004(m) of the Solid Waste Disposal Act (42 U.S.C. 6924(m)) and shall not be subject to the land disposal prohibitions in section 3004(d), (e), (f), and (g) of the Solid Waste Disposal Act.

(2) PERIODIC OVERSIGHT BY ADMINISTRATOR AND STATE.—The Secretary shall, not later than 2 years after the date of the enactment of this Act, and biennially thereafter, submit documentation of continued compliance with the laws, regulations, and permit requirements described in paragraph (1) to the Administrator, and, with the law described in paragraph (l)(C), to the State.

(3) DETERMINATION BY ADMINISTRATOR OR STATE.—The Administrator or the State, as appropriate, shall determine not later than 6 months after receiving a submission under paragraph (2) whether the Secretary is in compliance with the laws, regulations, and permit requirements described in paragraph (1) with respect to WIPP.

(c) DETERMINATION OF NONCOMPLIANCE DURING DISPOSAL PHASE AND DECOMMISSIONING PHASE.—

(1) DETERMINATION BY THE ADMINISTRATOR.—If the Administrator determines at any time during the disposal phase or decommissioning phase that the WIPP facility does not comply with any law, regulation, or permit requirement described in subsection (a)(1), the Administrator shall request a remedial plan from the Secretary describing actions the Secretary will take to comply with such law, regulation, or permit requirement.

(d) SAVINGS PROVISION.—The authorities provided to the Administrator and to the State pursuant to this section are in addition to the enforcement authorities available to the State pursuant to State law and to the Administrator, the State, and any other person, pursuant to the Solid Waste Disposal Act (42 U.S.C. 6901 et seq.) and the Clean Air Act (40 U.S.C. 7401 et seq.).

SEC. 10. SENSE OF CONGRESS ON COMMENCEMENT OF EMPLACEMENT OF TRANSURANIC WASTE.

It is the sense of Congress that the Secretary should complete all actions required under section 7(b) to commence emplacement of transuranic waste underground for disposal at WIPP not later than November 30, 1997, provided that before that date all applicable health and safety standards have been met and all applicable laws have been complied with.

SEC. 11. MINE SAFETY.

(a) MINE SAFETY AND HEALTH ADMINISTRATION.—The Mine Safety and Health Administration of the Department of Labor shall inspect WIPP not less than 4 times each year and in the same manner as it evaluates mine sites under the Federal Mine Safety and Health Act of 1977 (30 U.S.C. 801 et seq.), and shall provide the results of its inspections to the Secretary. The Secretary shall make the results of such inspections publicly available and shall take necessary actions to ensure the prompt and effective correction of any deficiency, including suspending specific activities as necessary to address identified health and safety deficiencies.

(b) BUREAU OF MINES.—The Bureau of Mines of the Department of the Interior shall prepare an annual evaluation of the safety of WIPP.

SEC. 12. BAN ON HIGH-LEVEL RADIOACTIVE WASTE AND SPENT NUCLEAR FUEL.

The Secretary shall not transport high-level radioactive waste or spent nuclear fuel to WIPP or emplace or dispose of such waste or fuel at WIPP.

SEC. 13. DECOMMISSIONING OF WIPP.

The Secretary shall develop a plan for the management and use of the Withdrawal following the decommissioning of WIPP or the termination of the land withdrawal. The Secretary shall consult with the Secretary of

the Interior and the State in the preparation of such plan and shall submit such plan to the Congress.

SEC. 14. SAVINGS PROVISIONS.

(a) CAA AND SWDA.—Except for the exemption from the land disposal restrictions described in section 9(a)(1), no provision of this Act may be construed to supersede or modify the provisions of the Clean Air Act (42 U.S.C. 7401 et seq.) or the Solid Waste Disposal Act (42 U.S.C. 6901 et seq.).

(b) EXISTING AUTHORITY OF EPA AND STATE.—No provision of this Act may be construed to limit, or in any manner affect, the Administrator's or the State's authority to enforce, or the Secretary's obligation to comply with—

(1) the Clean Air Act (42 U.S.C. 7401 et seq.);

(2) the Solid Waste Disposal Act (42 U.S.C. 6901 et seq.), except that the transuranic mixed waste designated by the Secretary for disposal at WIPP is exempt from the land disposal restrictions described in section 9(a)(1); or

(3) any other applicable clean air or hazardous waste law.

SEC. 15. ECONOMIC ASSISTANCE AND MISCELLANEOUS PAYMENTS.

(a) 14-YEAR AUTHORIZATION.—There are authorized to be appropriated to the Secretary for payments to the State $20,000,000 for each of the 14 fiscal years beginning with fiscal year 1998. The authorization of appropriations for funds for payments to the State under the preceding sentence shall be separate from any authorization of appropriations of funds for WIPP.

(b) SUBSEQUENT AUTHORIZATIONS.—There are authorized to be appropriated to the Secretary, for payments to the State for any fiscal year after the last fiscal year to which subsection (a) applies, such sums as the Congress may, by law, authorize to be appropriated.

(c) INFLATION ADJUSTMENT.—

(1) IN GENERAL.—In the case of any fiscal year after the first fiscal year to which subsection (a) applies, the dollar amount specified in such subsection shall be increased or decreased, as the case may be, by an amount equal to—

(A) such dollar amount; multiplied by

(B) the inflation increase or decrease determined under paragraph (2).

(2) CALCULATION OF INFLATION INCREASE OR DECREASE.—For purposes of paragraph (1), the inflation increase or decrease for any fiscal year is the percentage (if any) by which the inflation index for the preceding fiscal year is greater than or less than, as the case may be, the inflation index for the fiscal year prior to the first fiscal year to which subsection (a) applies.

(3) INFLATION INDEX.—For purposes of paragraph (2), the inflation index for any fiscal year is the average of the Consumer Price Index (as published by the Department of Labor) for the 12 months in such fiscal year.

(d) ELIGIBLE ASSISTANCE.—A portion of the payments under this section—

(1) shall be made available to units of local government in Lea and Eddy counties in the State; and

(2) may also be provided for independent environmental assessment and economic studies associated with WIPP.

SEC. 16. TRANSPORTATION.

(a) SHIPPING CONTAINERS.—No transuranic waste may be transported by or for the Secretary to or from WIPP, except in packages—

(1) the design of which has been certified by the Nuclear Regulatory Commission; and

(2) that have been determined by the Nuclear Regulatory Commission to satisfy its quality assurance requirements. The determination under paragraph (2) shall not be subject to rulemaking or judicial review.

(b) NOTIFICATION.—In addition to activities required pursuant to the Supplemental Stipulated Agreement, prior to any transportation of transuranic waste by or for the Secretary to or from WIPP, the Secretary shall provide advance notification to States and Indian tribes through whose jurisdiction the Secretary plans to transport transuranic waste to or from WIPP.

(c) ACCIDENT PREVENTION AND EMERGENCY PREPAREDNESS.—

(1) TRAINING.—

(A) IN GENERAL.—In addition to activities required pursuant to the Supplemental Stipulated Agreement, the Secretary shall, to the extent provided in appropriation Acts, provide technical assistance and funds for the purpose of training public safety officials, and other emergency responders as described in part 1910.120 of title 29, Code of Federal Regulations, in any State or Indian tribe through whose jurisdiction the Secretary plans to transport transuranic waste to or from WIPP. Within 30 days of the date of the enactment of this Act, the Secretary shall submit a report to the Congress and to the States and Indian tribes through whose jurisdiction the Secretary plans to transport transuranic waste on the training provided through fiscal year 1992.

(B) ONGOING TRAINING.—If determined by the Secretary, in consultation with affected States and Indian tribes, to be necessary and appropriate, training described in subparagraph (A) shall continue after the date of the enactment of this Act until the transuranic waste shipments to or from WIPP have been terminated.

(C) REVIEW OF TRAINING.—The Secretary shall periodically review the training provided pursuant to subparagraph (A) in consultation with affected States and Indian tribes. The training shall also be reviewed by the Occupational Safety and Health Administration, and the National Institute for Occupational Safety and Health, for compliance with part 1910.120 of title 29, Code of Federal Regulations.

(D) COMPONENTS OF TRAINING.—The training shall cover procedures required for the safe routine transportation of transuranic waste, as well as procedures for dealing with emergency response situations, including—

(i) instruction of government officials and public safety officers in procedures for the command and control of the response to any incident involving the waste;

(ii) instruction of emergency response personnel in procedures for the initial response to an incident involving transuranic waste being transported to or from WIPP;

(iii) instruction of radiological protection and emergency medical personnel in procedures for responding to an incident involving transuranic waste being transported to or from WIPP; and

(iv) a program to provide information to the public about the transportation of transuranic waste to or from WIPP.

(2) EQUIPMENT.—The Secretary shall enter into agreements to assist States through monetary grants or contributions in-kind, to the extent provided in appropriation Acts, in acquiring equipment for response to an incident involving transuranic waste transported to or from WIPP.

(d) TRANSPORTATION SAFETY PROGRAMS.—The Secretary shall, to the extent provided in appropriation Acts, provide in-kind, financial, technical, and other appropriate assistance to any State or Indian tribe through whose jurisdiction the Secretary plans to transport transuranic waste to or from WIPP, for the purpose of WIPP-specific transportation safety programs not otherwise addressed in this section. These programs shall be developed with, and monitored by, the Secretary.

(e) SANTA FE BYPASS.—No transuranic waste may be transported from the Los Alamos National Laboratory to WIPP until—

(1) an amount of funds sufficient to construct the Santa Fe bypass has been made available to the State;

(2) the Santa Fe bypass has been completed; or

(3) the Administrator has made the certification required under section 8(d)(1)(B).

(f) STUDY OF TRANSPORTATION ALTERNATIVES.—

(1) IN GENERAL.—The Secretary shall conduct a study comparing the shipment of transuranic waste to the WIPP facility by truck and by rail, including the use of dedicated trains, and shall submit a report on the study in accordance with paragraph (2). Such report shall include—

(A) a consideration of occupational and public risks and exposures, and other environmental impacts;

(B) a consideration of emergency response capabilities; and

(C) an estimation of comparative costs.

(2) REPORT.—The report required in paragraph (1) shall be submitted to the Congress not later than 1 year after the date of the enactment of this Act.

(g) EMERGENCY RESPONSE MEDICAL TRAINING.—

(1) DETERMINATION OF SECRETARY.—If the Secretary determines that emergency response medical training for incidents involving transuranic waste being transported to or from WIPP is inadequate, the Secretary shall take immediate action to correct the inadequacies and, if necessary, suspend transportation of such transuranic waste. If the State disagrees with the Secretary's determination under

this paragraph, the State may invoke the conflict resolution provisions of the Agreement.

(2) STATE ADVISORY GROUP.—The Secretary shall encourage the Governor of the State to appoint, within 30 days after the date of the enactment of this Act, an advisory group of health professionals and other experts in the field to review emergency response medical training programs for incidents involving transuranic waste being transported to or from WIPP. If such advisory group is established—

(A) its purpose shall be to review, within 60 days after its establishment and annually thereafter, the Department of Energy's emergency response medical training programs for incidents involving transuranic waste being transported to or from WIPP, and to report its findings to the State, the Secretary of Labor, acting through the Occupational Safety and Health Administration, and the Secretary; and

(B) the Secretary shall review the findings of the advisory group in consultation with the Secretary of Labor, acting through the Occupational Safety and Health Administration.

SEC. 17. ACCESS TO INFORMATION.

(a) IN GENERAL.—The Secretary shall—

(1) provide the State, the National Academy of Sciences, and the EEG with free and timely access to data relating to health, safety, or environmental issues at WIPP;

(2) provide the State and the EEG with preliminary reports relating to health, safety, or environmental issues at WIPP; and

(3) to the extent practicable, permit the State and the EEG to attend meetings relating to health, safety, or environmental issues at WIPP with expert panels and peer review groups.

(b) EVALUATION AND PUBLICATION.—The State, the National Academy of Sciences, and the EEG may evaluate and publish analyses of the Secretary's plans for test phase activities, monitoring, transportation, operations, decontamination, retrieval, performance assessment, compliance with Environmental Protection Agency regulations, decommissioning, safety analyses, and other activities relating to WIPP.

(c) CONSULTATION AND COOPERATION.—The Secretary shall consult and cooperate with the EEG under the terms of Contract No. DE-AC04-89AL53309 in the performance of its responsibility to conduct

an independent technical review and evaluation of WIPP under section 1433 of the National Defense Authorization Act, Fiscal Year 1989 (102 Stat. 2073).

SEC. 18. JUDICIAL REVIEW OF EPA ACTIONS.

A civil action for judicial review of any final action of the Administrator under this Act may be brought only in the United States Court of Appeals for the Tenth Circuit or for the District of Columbia, and shall be brought not later than the 60th day after the date of such final action.

SEC. 19. TECHNOLOGY STUDY.

Within 3 years after the date of the enactment of this Act, the Secretary shall submit to the Congress a study reviewing the technologies that are available and that are being developed for the processing or reduction of volumes of radioactive wastes. The study shall include an identification of technologies involving the use of chemical, physical, and thermal (including plasma) processing techniques.

SEC. 20. STATEMENT FOR PURPOSES OF PUBLIC LAW 96-164.

For purposes of subsection (c) of section 213 of the Department of Energy National Security and Military Applications of Nuclear Energy Authorization Act of 1980 (Pub. L. 96-164; 93 Stat. 1265), this Act shall be considered to amend such section.

SEC. 21. CONSULTATION AND COOPERATION AGREEMENT.

Nothing in this Act shall affect the Agreement or the Supplemental Stipulated Agreement between the State and the United States Department of Energy except as explicitly stated herein.

SEC. 22. BUY AMERICAN REQUIREMENTS.

(a) COMPLIANCE WITH BUY AMERICAN ACT.—No funds appropriated or transferred pursuant to this Act may be expended by an

entity unless the entity agrees that in expending the assistance the entity will comply with sections 2 through 4 of the Act of March 3, 1933 (41 U.S.C. 10a-10c, popularly known as the "Buy American Act").

(b) PURCHASE OF AMERICAN-MADE EQUIPMENT AND PRODUCTS.—

(1) IN GENERAL.—In the case of any equipment or product that may be authorized to be purchased with financial assistance provided under this Act, it is the sense of the Congress that entities receiving the assistance should, in expending the assistance, purchase only American-made equipment and products.

(2) NOTICE TO RECIPIENTS OF ASSISTANCE.—In providing financial assistance under this Act, the Secretary shall provide to each recipient of the assistance a notice describing the statement made in paragraph (1) by the Congress.

SEC. 23. AUTHORIZATIONS OF APPROPRIATIONS.

(a) FOR ADMINISTRATOR.—

(1) IN GENERAL.—There are authorized to be appropriated to the Administrator for the purpose of fulfilling the responsibilities of the Administrator under this Act, $10,000,000 for fiscal year 1992, $12,000,000 for fiscal year 1993, $14,000,000 for fiscal year 1994, and such sums as may be necessary for fiscal years 1995 through 2001.

(2) REPORT.—The Administrator shall, not later than September 30, 1993, and annually thereafter, issue a report to the Congress on the status of and resources required for the fulfillment of the Administrator's responsibilities under this Act.

(b) TRANSFERS FROM SECRETARY TO ADMINISTRATOR AND SECRETARY OF LABOR.—The Secretary is authorized to transfer from amounts appropriated for environmental restoration and waste management for fiscal years 1992 and 1993, and (to the extent approved in appropriation Acts) for fiscal years 1994 through 2001, such sums as may be necessary to fulfill the responsibilities of the Administrator under this Act and the Secretary of Labor under, paragraphs (4) and (6) of section 6(b).

(c) ACQUISITION OF LEASEHOLD.—There are authorized to be appropriated to the Secretary such sums as may be necessary to acquire the Federal Oil and Gas Leases No. NMNM 02953 and No. NMNM 02953C.

Approved October 30, 1992.
Amended September 23, 1996.