

WASTE ISOLATION PILOT PLANT  
BLUE RIBBON PANEL

REPORT OF  
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**WASTE ISOLATION PILOT PLANT  
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**Executive Summary**

The Waste Isolation Pilot Plant (WIPP) Blue Ribbon Panel was established by the Secretary of Energy to advise the Secretary on various aspects of the WIPP program for the disposal of transuranic (TRU) wastes. Specifically, the Blue Ribbon Panel was to advise the Secretary of the Panel members' independent views of the concept and timing of the proposed WIPP Performance Assessment and Operations Demonstration Test Phase and the proposed validation plan for the certification of TRU waste generated at the Department's Rocky Flats Plant.

My observations and recommendations are provided under each of the individual subject headings. My general conclusions appear at the end of each section, and are collected here for the reader's convenience.

**A. WIPP Test Phase: Performance Assessment and Operations Demonstration**

An Operations Demonstration is necessary to provide information and experience to enable a determination to be made of whether the WIPP facility, with its associated waste management system, is suitable for use as a permanent disposal facility. Upon satisfying applicable statutory and regulatory responsibilities, and verifying the operational readiness of the WIPP facility, DOE should immediately commence the Operations Demonstration. TRU wastes must be shipped to support commencement of experiments, using actual waste emplaced in the WIPP facility, which are necessary to support the completion of the WIPP Performance Assessment and to develop practical experience in the operation of the TRU waste management system. The Operations Demonstration should continue after completion of waste emplacement for the experimental program until such time as a determination of the suitability of all aspects of the waste management system operation can be made in accordance with defined acceptance criteria.

**B. Rocky Flats TRU Waste Certification Program Validation Plan**

DOE should immediately implement a validation program of the Rocky Flats Plant wastes which have been certified to the WIPP Waste Acceptance Criteria. This should be accomplished by conducting an independent evaluation at the Idaho National Engineering Laboratory, through its Stored Waste Examination Pilot Plant, of a representative random sample of Rocky Flats Plant certified wastes currently in storage in Idaho to

verify the contents of those waste packages to the criteria under which those wastes were certified. Concurrently, an audit should be done of the Rocky Flats Plant certification process to evaluate the adequacy of the certification process and to recommend appropriate corrective actions, if any. Both of these programs should be accomplished by experienced operators and quality assurance personnel who have not been previously associated with the Rocky Flats Plant and with the participation, in an advisory role, of designated representatives of each of the states of Colorado, New Mexico and Idaho.

### **C. Systems Integration**

DOE should establish an administrative mechanism to ensure the interaction of and coordination among the various DOE offices, contractors and subcontractors involved in all aspects of the WIPP program so that coordinated policy decisions can be made with the knowledge of the implications those decisions could have on various aspects of the program and so that those decisions can be implemented in a consistent and timely manner. The recently created DOE WIPP Task Force may be able to accomplish the systems and task integration necessary as long as it is appropriately staffed and given sufficient authority. In addition to DOE Headquarters personnel on the WIPP Task Force, a mechanism should be established, perhaps through topically-oriented Advisory Committees to the Task Force, to assure that the broad perspective of experienced operating personnel at each site and the principal contractors responsible for engineering and technical activities can be evaluated and considered in the decision-making process. The WIPP Task Force should also be responsible for considering and responding to the comments made by reputable groups involved in the WIPP evaluation process (e.g., National Research Council's WIPP Panel, Environmental Evaluation Group) and ensuring that the adoption of appropriate recommendations are implemented in an integrated manner.

### **D. Regulatory Requirements**

A comprehensive review of all statutory and regulatory requirements applicable to the WIPP program should be conducted to ensure that all requirements are identified and integrated to ensure compliance or the timely preparation of requests for such regulatory exemptions as may be appropriate and technically justifiable because of the unique nature of the WIPP program. This analysis is necessary not only to evaluate the suitability of the WIPP program to begin operations but throughout the duration of the WIPP program as well. A high priority task should be to establish editorial and technical consistency on all substantive matters between the various regulatory submittals that have been prepared.

Fundamentally, both DOE and EPA are responsible for implementing national policy regarding the proper disposal of TRU waste. Neither agency can shirk its statutory responsibilities, but both must recognize that their responsibilities in this area are joint and not severable.

DOE and EPA must ensure, in the context of the WIPP project, that the responsibility for safe, permanent disposal of TRU wastes and the requirements of Parts 191 and 268 are reconciled. It is not in the nation's best interest for TRU waste, safe though it may be in temporary storage, to remain in that state ad infinitum because of a failure of government agencies to work together to develop a facility that can safely, permanently dispose of TRU wastes.

#### **E. Waste Acceptance Criteria**

The WIPP Waste Acceptance Criteria is but one of the criteria to which the waste generators must ensure that the TRU waste is packaged. These requirements should be integrated so that a single certification process that meets all criteria can be conducted and a single, comprehensive waste manifest completed. Ambiguous requirements should be clarified and all related documentation revised accordingly. The need to acknowledge that correct waste management is an important priority must be inculcated at all waste generating sites.

A monitoring system should be installed at WIPP to ensure that the containers as received meet the WAC and RCRA criteria that may be applicable. WIPP should also have the capability to repackage or otherwise disposition any drums received that do not meet the applicable criteria.

#### **F. Project Documentation**

DOE should establish, at a minimum, two Public Document Rooms, one in Albuquerque or Carlsbad, New Mexico, and one in Washington, D.C., in which all documents associated with the WIPP project would be located to facilitate review of those documents by the public, regulatory agencies (both state and federal), and the various DOE offices and their contractors and subcontractors. The WIPP project is an important national effort of great technical and political complexity; it is critical to informed decision-making that documentation of WIPP-related issues be made available for scrutiny.

#### **G. Continuing Oversight**

An independent advisory body, such as the WIPP Blue Ribbon Panel, should be charged with the responsibility of evaluating (1) the response to and implementation of recommendations made by the WIPP Blue Ribbon Panel members which are adopted by the Secretary, and (2) the Rocky Flats Plant waste certification validation plan, once it is developed, and the results of the validation program upon its completion.

Please refer to the associated report for the analysis upon which these conclusions are based.

**REPORT OF ROBERT W. BISHOP, ESQ.  
MEMBER  
WASTE ISOLATION PILOT PLANT BLUE RIBBON PANEL**

**I. WASTE ISOLATION PILOT PLANT BLUE RIBBON PANEL**

On August 11, 1989, Secretary of Energy James D. Watkins announced the establishment of a Blue Ribbon Panel to review the plans of the U. S. Department of Energy (DOE) for experiments and operational tests at the Waste Isolation Pilot Plant (WIPP) regarding the disposal of transuranic (TRU) wastes. Specifically, the Blue Ribbon Panel was to be responsible for providing an independent, technical review of WIPP operational issues relating to the concept and timing of the proposed WIPP Performance Assessment and Operations Demonstration Test Phase and the proposed validation of the certification of TRU wastes generated at the DOE Rocky Flats Plant for disposal at WIPP. The Panel consisted of five members: three members were nominated by the Governors of Colorado, Idaho and New Mexico, and two members were appointed by Admiral Watkins. The responsibility of the Panel members was to evaluate the information provided by DOE representatives, contractors and such other individuals and groups as each Panel member might determine appropriate and to each submit an independent report to DOE of our individual conclusions and recommendations, which would then be used as input to DOE's decisions concerning WIPP activities.

The Panel collectively met on September 11-14, 1989, with representatives of DOE and its major contractors and representatives of the National Research Council's WIPP Panel and the Environmental Evaluation Group (an independent advisory group located in Albuquerque, New Mexico). The Panel also toured the WIPP facility and TRU waste-related activities at the Idaho Nuclear Engineering Laboratory in Idaho Falls, Idaho and the Rocky Flats Plant in Jefferson County, Colorado. The Panel met with additional Department and contractor representatives at a meeting on September 25, 1989, that was called by the Panel to discuss questions that Panel members had identified as a result of the tour and associated presentations and the review of additional material that individual Panel members had requested.

Written material was provided to each Panel member, and Panel members were encouraged to request additional information that they thought might be helpful in their evaluation. In addition, Panel members were encouraged to address any questions they might have to representatives of DOE, contractors associated with the WIPP project, the National Research Council's WIPP Panel or the Environmental Evaluation Group. Changes in certain aspects of the project have apparently already occurred based on questions raised by Panel members during the Panel's investigation. Although this is a positive sign, it also means that a number of observations made by the Panel members in

their individual reports may no longer accurately reflect the status of that matter.

Attachment A is a listing of resource material that I reviewed, either completely or in part as pertinent to the Panel's Charter, to assist me in my understanding of the WIPP Project and to assist me in formulating the recommendations contained in this report. In addition to responding to the responsibilities delineated in the Panel's Charter, I have offered observations and recommendations on other aspects of the WIPP Project that I thought might be beneficial, based on my experience with nuclear matters over the last twenty-five years.

## II. BACKGROUND

### A. The Waste Isolation Pilot Plant

DOE is responsible for managing radioactive waste from defense activities and programs pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, and the Department of Energy Organization Act of 1977. One type of radioactive waste resulting from the production of nuclear weapons is transuranic (TRU) wastes. TRU wastes are materials contaminated with alpha-emitting radionuclides having atomic numbers greater than uranium (i.e., 92) with half-lives longer than 20 years and in concentrations greater than 100 nanocuries per gram. The TRU wastes result primarily from plutonium reprocessing and fabrication, as well as research and development activities at various DOE defense facilities. The wastes exist in a variety of forms, ranging from unprocessed laboratory trash (e.g., tools, glassware and gloves) to solidified sludges from treatment of waste water. Approximately 60% of the TRU wastes also contain hazardous chemical constituents; TRU wastes containing hazardous chemical constituents have physical and radiological characteristics similar to those of TRU wastes that do not contain these constituents. Since 1970, pursuant to a decision of the U. S. Atomic Energy Commission to store TRU waste by methods designed to keep it retrievable for at least 20 years rather than to continue the practice of shallow land burial, TRU wastes have been stored separately from other radioactive wastes produced at defense facilities for permanent emplacement in a geologic repository.

In 1957, a committee of the National Academy of Sciences suggested salt formations as a suitable geologic medium for the permanent disposal of radioactive wastes. Work started in 1975 on a conceptual design for a repository at a site in Eddy County, New Mexico, primarily to dispose of TRU wastes stored in retrievable form at the Idaho National Engineering Laboratory. The disposal facility, denoted the Waste Isolation Pilot Plant (WIPP), was first authorized, and designated as Project 77-13-f, by Public Law 95-183. The Department of Energy National Security and Military Applications of Nuclear Energy Authorization Act of 1980 (Public Law 96-164), enacted on December 29, 1979, authorized the WIPP facility "for the express purpose of providing a research and development facility to demonstrate the safe disposal of radioactive waste resulting from the defense activities and programs of the United States exempted from regulation by the Nuclear Regulatory Commission."

The WIPP site, located in southeastern New Mexico approximately 26 miles southeast of Carlsbad, New Mexico, encompasses 18,960 acres of semi-arid land, all either federal or state land, of which nearly 17,000 acres would be used for buffer zones around the underground repository area.

In terms of geology, the site is in the north-central part of the Delaware Basin, a region in which evaporation in a shallow sea deposited about 3600 feet of evaporites during the Permian Period 280-225 million years ago. The repository would be excavated from a bed of nearly pure salt in the Salado Formation, which is approximately 2000 feet thick, with a mined disposal level 2150 feet below the surface. Although underground dissolution of salt in the region is still an active process, the rate of dissolution is so slow

that the zone of salt considered for the repository is expected to remain unaffected for two to three million years.

In accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA), an environmental analysis was done of the WIPP site and a Draft Environmental Impact Statement (DEIS) published in April 1979. The Final Environmental Impact Statement (FEIS) for the WIPP project, which included responses to comments received from the public and other government agencies, was published in October 1980. The preferred alternative delineated in the FEIS was to continue storing TRU wastes at the Idaho National Engineering Laboratory until a repository is available to receive it and to use the Los Medanos site in southeastern New Mexico for the construction and operation of a facility designed for the disposal of TRU wastes.

On January 28, 1981, DOE issued a Record of Decision on the WIPP project pursuant to the regulations of the Council on Environmental Quality (46 Fed. Reg. 9162). In that decision, DOE analyzed the environmental impacts of the authorized WIPP project and the alternatives thereto as identified in the FEIS. DOE determined that the long-term impact on the human environment resulting from taking no action was unacceptable: leaving the TRU wastes in surface storage could lead to very high radiation exposures both to individuals and the general population as a result of possible future volcanic action or human intrusion after governmental entities no longer controlled the site. DOE concluded that the environmental impacts predicted for the use of the Los Medanos site appeared acceptable for long-term disposal of TRU wastes "with minimal risk of any release of radioactivity to the environment. There was no indication that an alternate site for the demonstration would pose reduced risks." It was concluded that use of that site would solve the unacceptable long-term environmental problem of the surface storage of TRU wastes in the shortest amount of time and avoid the inflationary costs attributable to delay in constructing a facility. In conclusion, the Record of Decision stated that "DOE has weighed the benefits of proceeding with the authorized WIPP project against its potential environmental impacts and costs, and after consideration of the benefits, impacts and costs of reasonably available alternatives, has determined to proceed with the phased construction and operation of the authorized WIPP project." Consistent with NEPA requirements, DOE also stated that any significant new environmental information would be reviewed and the decision to proceed with the phased construction and operation reexamined as appropriate.

Construction of the WIPP project at the Los Medanos site commenced in April 1981. A decision to proceed with full facility construction was announced by DOE in June 1983, following conclusion of the Site and Preliminary Design Validation (SPDV) Program.

A draft Supplement to the Environmental Impact Statement (SEIS) was published in April 1989 to update the environmental record established in 1980 by evaluating the environmental impacts associated with new information, new circumstances, and proposed facility modifications from those originally envisioned. The SEIS documented a major modification to the WIPP schedule: WIPP would operate under a "Test Phase" for approximately five years during which time certain tests and operational demonstrations would be conducted.

The purpose of the Test Phase would be to reduce uncertainties associated with the prediction of natural processes that might affect long-term performance of the underground waste repository to assist in the determination of the ability of WIPP to meet applicable federal standards for the long-term protection of the public and the environment. The operational demonstrations would be conducted to evaluate the ability of the TRU waste management system to certify, package, transport and emplace Yku wastes in the WIPP safely and efficiently. Upon completion of the Test Phase, DOE would determine, based upon a performance assessment, whether WIPP would comply with the U. S. Environmental Protection Agency (EPA) standards for the long-term disposal of TRU wastes (i.e., 40 C.F.R. Part 191, Subpart B). If a determination of compliance is made, WIPP would enter a permanent disposal phase of approximately 20 years to demonstrate the safe disposal of TRU wastes. After completion of waste emplacement, the surface facilities would be decommissioned and the WIPP underground facilities would then serve as the permanent TRU waste repository.

#### **B. Agreements with the State of New Mexico**

In April 1981, the State of New Mexico filed suit against DOE concerning the acquisition of additional technical information and resolution of a number of controversial issues. The State of New Mexico's concerns included (1) that the final decision to commence construction and operation of WIPP should not be reached until the results of the SPDV tests were available, (2) that the State of New Mexico be provided with the opportunity to address and resolve off-site state government concerns prior to the decision to commence with construction, (3) that the State of New Mexico be entitled to enter into a binding and enforceable Consultation and Cooperation Agreement with DOE, and (4) that the withdrawal provisions of the Federal Land Policy and Management Act be complied with, including public hearings to be held before decisions were made to withdraw lands from the public domain for the WIPP project. In July, 1981, a Stipulated Agreement was executed by the State of New Mexico and DOE to address these issues. An Agreement for Consultation and Cooperation between the Department of Energy and the State of New Mexico on the Waste Isolation Pilot Plant was executed simultaneously and revised a number of times through April 1988. In December 1982, a Supplemental Stipulated Agreement was executed to address the state's off-site concerns regarding state liability, emergency response preparedness, independent monitoring of WIPP by the State, and upgrading and repair of state highways. A 1987 modification to the Agreement for Consultation and Cooperation limited TRU waste receipt to 15 percent prior to there being a demonstration of compliance with EPA disposal standards contained in 40 C.F.R. 191, Subpart B.

#### **C. Environmental Evaluation Group**

In 1978, the State of New Mexico established the Environmental Evaluation Group (EEG), with funds provided by DOE, to be responsible for conducting an independent technical evaluation of WIPP. The National Defense Authorization Act, Fiscal Year 1989, assigned EEG to the New Mexico Institute of Mining and Technology. Of particular pertinence to the Blue Ribbon Panel's investigation were reports EEG-40, 41 and 42 and EEG's Interim Evaluation of

Quantities of Transuranic Waste to be Brought to WIPP for Performance Assessment and Operational Demonstration, dated July 9, 1989 (Refs. 55-58).

#### **D. National Research Council**

The National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine, was asked in March 1978 by DOE to "review the scientific and technical criteria and guidelines for designing, constructing and operating a waste isolation pilot plant for isolating radioactive wastes from the biosphere." An interim report was issued in 1983 and a final report, Review of the Scientific and Technical Criteria for the Waste Isolation Pilot Plant (WIPP), was issued by the National Research Council Commission on Physical Sciences, Mathematics, and Resources' Board on Radioactive Waste Management, Panel on the Waste Isolation Pilot Plant (hereinafter referred to as the "National Research Council's WIPP Panel"), in 1984.

Subsequently, the National Research Council's WIPP Panel was requested to review DOE's draft plan for conducting certain experimental and operational tests (Ref. 8). On July 19, 1989, the National Research Council's WIPP Panel issued its observations and recommendations on that plan.

#### **E. WIPP Operational Prerequisites**

Prior to initiation of the Test Phase, which necessarily involves the emplacement of TRU waste at the WIPP facility, the following actions must be accomplished: (1) land withdrawal, either administrative or legislative, completed; (2) a final Safety Analysis Report for the facility approved; (3) a Resource Conservation and Recovery Act (RCRA) No-Migration Variance Petition granted by EPA; (4) a Certificate of Compliance issued by the U. S. Nuclear Regulatory Commission (NRC) for TRUPACT II (the container in which the TRU waste will be shipped to the WIPP facility); (5) the Supplement to the Final Environment Impact Statement (SEIS) completed and DOE's Record of Decision issued; and (6) the Secretary must determine that the facility is ready to begin operations. Pursuant to the agreements with the State of New Mexico, the facility must also be in compliance with the requirements of 40 C.F.R. Part 191, Subpart A - Environmental Standards for Management and Storage.

Prior to commencement of operations following the Test Phase, the facility must be in compliance with 40 C.F.R. Part 191, Subpart B - Environmental Standards for Disposal, which includes the completion of a performance assessment and other demonstrations of the capability of the facility to meet certain radiological limits for 1,000 years after disposal and for 10,000 years after disposal.

At the time of this report, the following is the status of the required actions: both administrative and legislative land withdrawal proceedings are pending; the final Safety Analysis Report is expected to be issued in late October 1989 and approved in January 1990; the No-Migration Variance Petition was filed in February 1989, and EPA review is expected to be completed in January 1990 and action on the petition is expected in April 1990; the TRUPACT II Certificate of Compliance was issued on August 30, 1989; the final SEIS

is scheduled for issuance in mid-January 1990, and the Record of Decision is scheduled to be issued in February 1990. Completion on these activities on this schedule would support a Secretary's decision on WIPP readiness on or about June 1, 1990, and if that decision is to proceed, the facility could begin the Test Phase on or about July 1, 1990.

### III. PROGRAM APPRAISAL

#### A. WIPP Test Phase: Performance Assessment and Operations Demonstration

##### Background

In April 1989, DOE issued its "Draft Plan for the Waste Isolation Pilot Plant Test Phase: Performance Assessment and Operations Demonstration" (DOE/WIPP 89-011) (hereinafter referred to as the "Draft Plan"). The Draft Plan, and a subsequent Addendum dated June 16, 1989, details the process whereby scientific and technical data will be collected that DOE has determined to be necessary for it to be able to make a decision on whether to designate the WIPP facility as a permanent repository for TRU waste. The Test Phase is described as having two objectives: (1) determination of compliance, through development of a performance assessment, with EPA regulations contained in 40 C.F.R. Part 191, Subpart B, and (2) completion of an operations demonstration to evaluate the safety and effectiveness of the TRU waste management system's ability to emplace TRU waste in the WIPP facility at the designed rate.

The Draft Plan describes a two-part program. Part One covers the first three years and concludes at a holdpoint where results will be evaluated and a determination made whether to proceed with Part Two, which would involve conducting any additional necessary tests. DOE has concluded that, consistent with its goal of minimizing the amount of waste emplaced while still being able to conduct a technically valid operations demonstration, it would limit the amount of waste emplaced in Part One to not exceed 3% of WIPP's capacity. As described in the Draft Plan, this would entail the emplacement of approximately 22,600 drums of contact-handled (CH) waste and three canisters of remote-handled (RH) waste. (CH wastes are those in which the dose rate at the surface of the waste package is not greater than 200 mR/hr; RH wastes are those with a dose rate at the surface of the waste package that is greater than 200 mR/hr, but not greater than 1000 R/hr).

In addition to being evaluated by the WIPP Blue Ribbon Panel, the Draft Plan has also been critically analyzed by the National Research Council's WIPP Panel and the Environmental Evaluation Group.

##### Observations and Recommendations

###### Performance Assessment

Fundamentally, there appears to be broad consensus that in situ testing with actual TRU wastes is necessary to validate design concepts and models to be used for the Performance Assessment and to complement past, current and future laboratory testing. I concur. The only way in which laboratory simulation and small-scale tests can be determined to provide a reasonable representation of real conditions is to validate them in the actual environment they are meant to simulate. When system performance over a 10,000 year period is to be examined, a critical factor in the analysis is the ability to

ascertain and minimize the degree of uncertainty in the calculations. A great deal is known about the geologic formation in which WIPP is located and the characteristics and effects of TRU wastes, but potentially significant uncertainties remain. A major uncertainty is the rate and volume of gases generated as a result of bacterial action, as byproducts of metal corrosion, and as the volatile products of radiolysis. The duration of the time period, and the complexity of chemical and radiological reactions that may occur, require the use of realistic rather than ostensibly conservative estimates because it may be that what were expected to be conservative assumptions are not, in fact, conservative. The planned experiments are not required to demonstrate regulatory compliance but rather to reduce uncertainties associated with the waste form and the response of the physical environment to the emplacement of those wastes.

As to the particulars of the planned laboratory tests, bin-scale tests and alcove tests, their timing, priority and detailed procedures, I have no opinion: the Draft Plan does not detail the purpose, protocol and evaluation process of these tests, but I do not believe it to be appropriate to attempt to definitively establish at a fixed point in time what must by necessity be an evolving, iterative process. For example, significant questions remain concerning the volume and rate of gas generated through decomposition of the wastes and the containers, and the effect of that gas generation on repository performance. It may even be that room-scale tests containing a sufficient volume of TRU waste to ensure homogeneity of the constituents will be necessary to perform an effective experiment.

Under the present schedule, data from some of the experiments (e.g., those associated with different types and configurations of backfill material) will not be available in time to support the Performance Assessment development. I do not believe that is a fundamental flaw in the Test Phase, because the regulatory criteria may be able to be satisfied without the need to adopt engineering enhancements which might otherwise be desirable. Those enhancements may be as simple as segregating the drums, based on their content codes, to separate nitrogen-generating wastes from those that will generate primarily hydrogen and carbon dioxide. Or, it may be that all of the wastes emplaced during the experimental program and the operations demonstration (which could be as much as 165,000 cubic feet), and all of that currently in storage (approximately 2,300,00 cubic feet), may have to be unpacked, treated in some way, and repacked with attendant costs and occupational exposures. These effects could be massive. The experimental program can provide valuable results regarding the potential benefit or detriment associated with various engineering enhancements or waste form modifications that may be determined to be necessary to meet facility criteria. If regulatory criteria cannot be satisfied without those enhancements, a decision must be made at that time regarding those modifications which should be instituted. Additional experiments may need to be conducted, based on those enhancements having been implemented, to be able to justify facility operation.

The experimental program appears to be well thought-out and should result in the achievement of two complementary goals: the validation, or modification as may be appropriate, of the understanding of the chemical, radiological, and geological phenomena of import to this project; and the reduction of

uncertainties in the evaluation of the project's ability to meet the required criteria. However, DOE should describe the uncertainties that each test is designed to address and when results are anticipated to be available. The key is to ensure that the tests are designed to reduce the uncertainties associated with the critical parameters. These experiments should begin as soon as possible to provide the maximum amount of useful data to support the conduct of the Performance Assessment and to evaluate what engineering enhancements or additional experiments, if any, may be necessary or desirable.

I fully expect the experimental program to generate data that will help to narrow the analytical uncertainties associated with the project, and it may well suggest the need for further experiments in an iterative fashion to provide data necessary to support a decision of whether the WIPP facility is suitable for operation. Although I appreciate the need to establish some reasonable parameters, I would strongly resist the imposition of definitive limits which would preclude the flexibility necessary to ensure that the experiments are properly conducted and result in the most meaningful data. At this point, it is impossible to know when enough will be known regarding waste and repository performance. I do not believe that the Nation has the luxury of waiting until we know all that we wish we knew about everything that could affect this project.

#### Operations Demonstration

The Operations Demonstration is characterized in the Draft Plan as that portion of the Test Phase which begins at the conclusion of the shipments necessary to support the experimental program and ends with a period of demonstrated capability to handle and emplace waste at the facility's design rate of 60 shipments per month.

In fact, the Operations Demonstration portion of the Test Phase really begins with the shipment and receipt of the first shipment of TRU waste for the experimental program. Shipments of waste for the experimental program will be made from both the Rocky Flats Plant and the Idaho National Engineering Laboratory and thus will provide the first practical experience of the operation of the TRU waste management system. Consequently, I do not consider the Test Phase to have a segregatable segment entitled the Operations Demonstration; rather, I would separate the Operations Demonstration into two phases. The first phase would consist of the management and emplacement of TRU wastes necessary to conduct the experiments to support the development of a viable Performance Assessment (including those wastes that may be necessary to support alcove or room-scale tests that may be determined to be necessary), with the second phase being such additional shipments as may be necessary to further evaluate the waste management system and facility operation.

Regarding the conduct of the Operations Demonstration, criteria should be established for each phase of the waste management system operation whereby it can be concluded, when the criteria is met, that no further experience in that phase is necessary. Although RH wastes comprise a small fraction of the total amount of TRU waste and shipments, I believe that a demonstrated

capability to safely handle RH waste should be a prerequisite to the Secretary's decision of operational readiness of the facility. It would be a mistake to wait too long to derive experience with the waste management system such that any modifications would end up being on the critical path for WIPP operation, but it would also be a mistake to completely staff and train personnel to be able to handle full system design through-put and be forced to have that trained cadre wait months or years from their time of training and operational experience until the repository begins full-scale operation.

After the initial campaign of shipments necessary to support the experimental phase, it should be determined what, if any, and when additional experience is necessary to accomplish the independent purpose of waste management system operational viability. Achieving the right balance should be the responsibility of operating personnel on an iterative basis, with the ramp-up rates of the number of shipments adjusted accordingly, as developments affecting the facility's schedule occur. Within the constraint of the 3 percent of the WIPP facility volume now specified in the Draft Plan, there is an ample margin for sufficient wastes to be transported to demonstrate the viability of the system. This would include such additional amounts as may be appropriate to validate the system after modifications to the system have been made as a result of lessons learned from earlier experience.

The relatively small volume associated with a maximum amount of waste that would be emplaced under the Draft Plan (i.e., 3 percent) is not likely to cause a significant perturbation in facility long-term performance if the results of the experiments lead to a determination that the wastes to be emplaced at WIPP (and perhaps only the 97 percent of the wastes that had not yet been emplaced in WIPP at that point) must be modified, segregated, repacked or in some other way managed to meet the applicable performance criteria. All of the wastes emplaced as part of the Operations Demonstration that are not associated with the experiments will not be backfilled -- thus, the wastes could be reconfigured for segregation purposes and/or backfill material added even once the waste was emplaced. This would further reduce the likelihood that those wastes would have to be retrieved.

Retrieval of the wastes emplaced, whether required for waste reconfiguration and/or the addition of engineering enhancements or because a determination is made that WIPP is not a suitable disposal facility, can be accomplished if necessary. This has been demonstrated by the performance of a very well-planned and executed mock retrieval exercise that validated the ability of the facility to retrieve emplaced wastes (Ref. 59). It has been estimated that the costs of retrieval for the full amount of the wastes emplaced in the Operations Demonstration (i.e., up to 3 percent) would be in the range of \$1 million. Concurrent with the development of the criteria that will be used to determine what waste management experience beyond that associated with the experimental program is needed, DOE should develop a contingency plan on how and where it would deal with wastes that might have to be retrieved after having been emplaced as part of the Operations Demonstration, including those wastes associated with the experimental program.

The decision of how much experience in waste system management is necessary beyond that gained with the wastes emplaced for the experimental phase is, at heart, a risk/benefit equation. It is my conclusion that the risk, both in terms of cost and occupational radiation exposure for emplacing wastes up to the 3 percent maximum, are reasonably balanced against the benefit of ensuring that the system works in a timely fashion. Any necessary modifications can be made in time to support facility operation. I believe the 3 percent limit established in the Draft Plan is not unreasonable, but that the decision should be made, and periodically reconsidered, by operating personnel as to how much experience (in addition to that gathered in the experimental phase) is necessary and appropriate, up to the 3 percent limit. The fundamental decision should be how to gain the maximum experience, at the opportune time, with the minimum amount of waste. The waste volume utilized should be as small as possible so that the cost, both economic and in terms of human resources, of retrieval is as small as possible if it is subsequently determined that the wastes must be repackaged or that the WIPP project is not viable, but the waste volume must be large enough to validate system operability. It should not be arbitrarily set in advance but rather be the responsibility of the WIPP management staff to accomplish on a timely basis against the criteria established in advance. Evaluating performance against criteria of acceptability determined in advance is a good management practice.

### General Conclusion

An Operations Demonstration is necessary to provide information and experience to enable a determination to be made of whether the WIPP facility, with its associated waste management system, is suitable for use as a permanent disposal facility. Upon satisfying applicable statutory and regulatory responsibilities, and verifying the operational readiness of the WIPP facility, DOE should immediately commence the Operations Demonstration. TRU wastes must be shipped to support commencement of experiments using actual waste emplaced in the WIPP facility which are necessary to support the completion of the WIPP Performance Assessment and to develop practical experience in the operation of the TRU waste management system. The Operations Demonstration should continue after completion of waste emplacement for the experimental program until such time as a determination of the suitability of all aspects of the waste management system operation can be made in accordance with defined acceptance criteria.

## **B. Rocky Flats Plant TRU Waste Certification Program Validation Plan**

### Background

Consistent with the WIPP Waste Acceptance Criteria (WAC), each DOE facility that generates TRU waste is required to establish its own waste certification program and associated quality assurance plan. Particular questions have been raised concerning the validity of the waste certification program conducted at the Rocky Flats Plant, and that concern was heightened by a Federal Bureau of Investigation (FBI) search of that facility begun on June 16, 1989, as part of a U. S. Department of Justice investigation.

Evaluation of a validation plan of the Rocky Flats Plant certification program was one of the primary responsibilities assigned to the WIPP Blue Ribbon Panel.

At the Panel's meeting with DOE and contractor representatives in Idaho on September 13, 1989, a proposed validation plan was discussed. At the Panel's subsequent meeting held on September 25, 1989, it became clear that the proposed validation plan was designed to evaluate the Rocky Flats Plant certified wastes to criteria other than those used in the certification process at Rocky Flats Plant and thus was preordained to conclude that the Rocky Flats certification program was inappropriately executed. Consequently, it would not satisfy the goal of determining whether the Rocky Flats Plant certification process had been correctly performed. An alternative validation plan was received on October 19, 1989, which was too late for the detailed evaluation and interaction with staff that such an important matter requires.

### Observations and Recommendations

The primary purpose of the validation plan should be to determine whether the Rocky Flats Plant certification program was correctly administered and that the wastes evaluated in accordance with that program were correctly certified. Whatever validation program is adopted, it should have the following attributes: (1) it should be conducted by independent, technically qualified personnel in such a manner as to minimize occupational exposure, both to the radiological and the hazardous constituents contained within the waste drums; (2) it should be planned so as to minimize costs and system disturbance; (3) it should avoid additional transportation of the wastes if possible; (4) it should minimize the generation of additional wastes during the conduct of the validation program; (5) it should be conducted in a timely fashion to remove the cloud of suspicion associated with the Rocky Flats Plant certification program, or, if the program were flawed, to be able to identify discrepancies so that they can be corrected in a timely fashion; and (6) it should be conducted with comparable equipment calibrated to equivalent standards so as not to invalidate the Rocky Flats Plant certification program merely because of advances in technology that have occurred since the time those wastes were certified.

Separately, there may be value in reexamining, with currently available, more sensitive equipment, wastes previously certified by the Rocky Flats Plant and those wastes certified prior to the change in the concentration criteria of TRU wastes from 10 nanocuries per gram to 100 nanocuries per gram in accordance with DOE Order 5820.2A. It appears likely that a significant amount of the waste determined to be TRU waste could, in accordance with the revised criteria, be appropriately classified as either low-level radioactive waste, hazardous waste or mixed waste (rather than TRU or TRU-mixed waste). It may be possible to accomplish this reanalysis at the same time the validation program of the Rocky Flats Plant certification process is undertaken, but the purpose of the different evaluations should not be compromised. The purpose of the validation program is to determine whether the Rocky Flats Plant certification program was correctly administered, whereas the purpose of the second program is to evaluate the waste with more sensitive equipment and to different criteria. The two programs may be able to be applied simultaneously, but the results should be separately evaluated.

Further, the implementation of either of these programs may provide a reasonable opportunity to evaluate the hazardous constituents within the TRU waste. That analysis can be very important to verify the process knowledge otherwise used in determining the presence and amount of hazardous constituents in the TRU waste and may provide empirical data that could be very important to the completion of the Performance Assessment and the No-Migration Variance Petition. DOE does not advocate the opening of a large number of containers merely to conduct this analysis, but an evaluation should be undertaken of an appropriate sample size and sampling technique that could provide additional, and probably very important, data while minimizing the exposure to these materials to the individuals conducting the evaluation. Use of available technology (e.g., head gas sampling evaluated by gas chromatography/mass spectrometry) and techniques could significantly reduce personnel exposures while ensuring that the wastes are properly characterized.

### General Conclusion

DOE should immediately implement a validation program of the Rocky Flats Plant wastes which have been certified to the WIPP Waste Acceptance Criteria. This should be accomplished by conducting an independent evaluation at the Idaho National Engineering Laboratory, through its Stored Waste Examination Pilot Plant, of a representative random sample of Rocky Flats Plant certified wastes currently in storage in Idaho to verify the contents of those waste packages to the criteria under which those wastes were certified. Concurrently, an audit should be done of the Rocky Flats Plant certification process to evaluate the adequacy of the certification process and to recommend appropriate corrective actions, if any. Both of these programs should be accomplished by experienced operators and QA personnel who have not been previously associated with the Rocky Flats Plant and with the participation, in an advisory role, of designated representatives of each of the states of Colorado, New Mexico and Idaho.

## C. Systems Integration

### Background

Early in the Panel's investigation, it became obvious that there was an institutional lack of communication among the various DOE offices involved in the WIPP project and the various contractors who were tasked with specific work product responsibilities by those offices. Examples abound and range from the inconsequential to the very consequential. For instance, operating personnel at the Rocky Flats Plant had not informed those individuals responsible for conducting the WIPP Performance Assessment about the nature of compaction to be accomplished at the Rocky Flats Plant; the compaction of the TRU wastes could directly affect criticality and gas generation calculations, both of which are critical parameters in evaluating WIPP facility performance.

## Observations and Recommendations

At best, this results in an inefficient way to address significant problems, particularly when dealing with issues of a complex nature associated with a major project like the WIPP project. Frequently the result can be counterproductive activity. An additional deleterious result can be the lack of cross-fertilization between professionals and the resulting lack of different perspectives and insight which could hamper the development of innovative solutions to problems. In my judgment, the WIPP project and its associated waste management system cannot be managed correctly if engineering, technical and operating personnel are not responsible for interacting frequently with each other and with DOE staff. It is encouraging that DOE has recently established an interdisciplinary WIPP Task Force to oversee WIPP-related activities, and I advocate that it be provided with the responsibility, and sufficient authority, to ensure that the integration of these important activities occurs promptly.

In addition, there does not appear to be any on-going process to take advantage of the insight provided by independent groups evaluating aspects of the WIPP project or to respond to comments made at Congressional hearings (e.g., Ref. 10) and other types of relevant communications. This is not to imply that the observations and recommendations of the National Research Council's WIPP Panel, the Environmental Evaluation Group or even of the Blue Ribbon Panel itself should be blindly adopted, or categorically rejected either. There is evidence that at least some of these reports have been evaluated (e.g., Ref. 50). However, there does not seem to be an established policy that such a review and analysis should always be conducted. A mechanism should be established for those observations and recommendations to be carefully considered -- by technical, engineering and operating personnel, and staff who have policy perspective and responsibility -- for the value that such independent insights might provide. The results of those evaluations should be documented and a response provided to the issuing organization.

The WIPP project has completed its construction phase and now is poised to begin operations under the Test Phase. Therefore, a start-up team should be assembled, perhaps under the auspices of the WIPP Task Force, to ensure that the necessary transition is accomplished in a coordinated fashion (e.g., ensuring that all documents and plans reflect the as-built configuration). The team should be headed by an individual with major project start-up experience and include representatives of the Albuquerque Operations Office, the WIPP Project Office, the DOE Office of Environmental Safety & Health, the DOE Office of General Counsel, and operations personnel from the waste generating sites. This group must also have the authority commensurate with its responsibilities to ensure the safe and timely commencement of operations under the Test Phase.

## General Conclusion

DOE should ensure that coordination takes place among the various DOE offices, contractors and subcontractors involved in all aspects of the WIPP program so that coordinated policy decisions can be made with the knowledge of the implications those decisions could have on various aspects of the

program and so that those decisions can be implemented in a consistent and timely manner. The recently created DOE WIPP Task Force may be able to accomplish the systems and task integration necessary, as long as it is appropriately staffed and given sufficient authority. In addition to DOE Headquarters personnel on the WIPP Task Force, a mechanism should be established, perhaps through topically-oriented Advisory Committees to the Task Force, to assure that the broad perspective of experienced operating personnel at each site and the principal contractors responsible for engineering and technical activities can be evaluated and considered in the decision-making process. The WIPP Task Force should also be responsible for considering and responding to the comments made by reputable groups involved in the WIPP evaluation process (e.g., National Research Council's WIPP Panel, Environmental Evaluation Group) and ensuring that the adoption of appropriate recommendations are implemented in an integrated manner.

#### **D. Regulatory Requirements**

##### Background

EPA regulations contained in 40 C.F.R. Part 191, Subpart A - Environmental Standards for Management and Storage, and Subpart B - Environmental Standards for Disposal, which were adopted in 1985, are the fundamental regulatory requirements that the WIPP facility must meet. The requirements of Subpart A are also mandated as a condition of the Stipulated Agreement between DOE and the State of New Mexico. Basically, Subpart A imposes a requirement that DOE operate the facility such as to provide reasonable assurance that the combined annual dose equivalent to any member of the public in the general environment resulting from discharges of radioactive material and direct radiation from such management and storage shall not exceed 25 mrem to the whole body and 75 mrem to any critical organ. Subpart B establishes individual protection requirements such that any member of the public in the accessible environment will not, for 1,000 years after disposal, receive a dose to exceed 25 mrem to the whole body or 75 mrem to any critical organ from the undisturbed performance of the disposal system and containment requirements for cumulative releases of radionuclides to the accessible environment for 10,000 years after disposal, with associated assurance requirements. Although disposal facilities are required to install permanent markers, records, and other passive institutional controls to indicate the danger of the wastes disposed of and their location, no contribution from active institutional controls for more than 100 years after disposal may be assumed in the analysis.

Subpart B requires that a performance assessment be conducted, which is an analysis that identifies the processes and events that might affect the disposal system, examines the effects of these processes and events on the performance of the system and estimates the cumulative releases of radionuclides caused by all significant processes and events, considering all associated uncertainties. Those estimates are then incorporated into an overall probability distribution of cumulative release that is measured against the EPA criteria. The EPA standards, both in the regulations, in the supplementary information associated with the final rule, and in the Draft Environmental Impact Statement associated with the final rule, are replete

with qualifications associated with the lack of specificity and technical justification because of the long time periods involved and the very nature of the events and processes that can take place during that time which create substantial uncertainties in projecting, and attempting to assure, system performance. In recognition of those uncertainties, both Subpart A and Subpart B contain provisions allowing for the issuance of alternate standards or substitute provisions, based upon appropriate analysis and explanations, as may be necessary to achieve the goals of the regulations. It is not clear whether legal analysis has been undertaken and advice provided regarding interpretation of the regulatory requirements and their application to the WIPP facility, as well as possible courses of action available.

### Observations and Recommendations

It is possible, notwithstanding the best efforts of the most competent professionals available, that a demonstration of the ability of the facility to meet these criteria cannot be justified with the requisite level of certainty. EPA's own analyses demonstrate that a bedded salt formation is clearly a preferable geologic repository for radioactive waste, and the WIPP facility has attributes superior to those analyzed by EPA in reaching that conclusion.

It is also clear that the Part 191 requirements were based primarily on an analysis of the radiological constituents and waste forms associated with high-level radioactive waste. Because of the unique characteristics of TRU waste and because the WIPP facility is located in what EPA has determined to be a geologically superior type of formation, EPA should be closely involved in the experimental program and the development of the Performance Assessment to assure that the data collected and analyses performed satisfy EPA, both with respect to the established criteria and to the development of technical justification that may be required for seeking administrative modification of those requirements as may be appropriate for the WIPP facility. As the National Research Council's WIPP Panel observed, "[t]he primary goal of 40 CFR 191 is to ensure that a repository poses no significant health risk to the public; the standards set for compliance represent EPA's best estimate of what is required to achieve this goal. To date, however, these standards have never been applied to a specific repository." (Ref. 49, App. B). The National Research Committee's WIPP Panel further stated that "[t]he Panel believes that the above-mentioned primary goal can best be achieved by focusing performance assessment activities on demonstrating that the WIPP repository will be safe, i.e., pose no significant risk to the public health and safety, rather than by an uncritical, formal adherence to compliance with the current EPA standard" (emphasis in original). I agree.

Because approximately 60% of the TRU waste to be emplaced at WIPP contains hazardous wastes regulated under the Solid Waste Disposal Act, the Resource Conservation and Recovery Act of 1976, and the Hazardous and Solid Waste Amendments Act of 1984, the provisions of 40 C.F.R. Part 268 must be addressed. These regulations provide, inter alia, that a petition must be filed with EPA "demonstrating, to a reasonable degree of certainty, that there will be no migration of hazardous constituents from the disposal unit . . . for as long as the wastes remain hazardous." Such a petition, commonly referred to as the

**"No-Migration Variance Petition,"** was filed in February 1989. As was recommended for addressing Part 191 requirements, DOE should work closely with EPA to address Part 268 requirements and ensure that the application of those requirements to the WIPP facility is justifiable in terms of the unique nature of the TRU wastes being disposed of at WIPP and because of the fundamental purpose of the WIPP program.

The WIPP Final Safety Analysis Report (FSAR) and the Supplement to the Environmental Impact Statement (SEIS) also address environmental issues. Because of the evolutionary nature of the WIPP project, and particularly the developing understanding of the physical phenomena and geologic characteristics associated with the WIPP facility in the recent past, many of the documents that have been prepared and issued to address a variety of statutory and regulatory requirements (including the FSAR, SEIS and No-Migration Variance Petition) do not accurately reflect the current knowledge; they are being evaluated on the basis that they correctly represent the facts, yet they are different in significant respects (e.g., the assumptions associated with and the evaluation of consequences of hazardous chemical releases). Many of these documents were prepared by different individuals or groups to satisfy specific requirements and it appears that there was, and potentially still is, little interaction between those groups, which only exacerbates the problem.

#### General Conclusions

A comprehensive review of all statutory and regulatory requirements applicable to the WIPP program should be conducted to ensure that all requirements are identified and integrated to ensure compliance, or timely requests are prepared for such regulatory exemptions as may be appropriate and technically justifiable because of the unique nature of the WIPP program. This analysis is necessary not only to evaluate the suitability of the WIPP program to begin operations but throughout the duration of the WIPP program as well. A high priority task should be to establish editorial and technical consistency on all substantive matters between the various regulatory submittals that have been prepared.

Fundamentally, both DOE and EPA are responsible for implementing national policy regarding the proper disposal of TRU waste. Neither agency can shirk its statutory responsibilities, but both must recognize that their responsibilities in this area are joint and not severable. DOE and EPA must ensure, in the context of the WIPP project, that the responsibility for safe, permanent disposal of TRU wastes and the requirements of Parts 191 and 268 are reconciled. It is not in the Nation's best interest for TRU waste, safe though it may be in temporary storage, to remain in that state ad infinitum because of a failure of governmental agencies to work together to develop a facility that can safely, permanently dispose of TRU wastes.

## **E. Waste Acceptance Criteria**

### **Background**

The WIPP Waste Acceptance Criteria (WAC) establish limits for the physical, radiological, and chemical composition of the TRU waste that is to be emplaced at the WIPP facility. The primary objectives of the WAC are to ensure that all TRU wastes are packaged so that handling and subsequent disposal are performed safely and that the repository is able to isolate the waste from the environment in accordance with regulatory requirements. These criteria were developed so that TRU waste generators could design their waste processing systems such that the waste packages will be acceptable for geologic disposal in an embedded salt environment.

The WAC is established and administered by the Waste Acceptance Criteria Certification Committee (WACCC). In addition to establishing and modifying the WAC as it may deem appropriate, WACCC is responsible for reviewing and approving certification plans and associated quality assurance plans at all TRU waste generating and storage sites. WACCC is also responsible for conducting field audits to ensure that plans and programs associated with WAC are properly implemented. The WACCC is comprised currently of seven individuals, one of whom is required by the WACCC charter to have a formal QA background. All members of the WACCC are associated with the WIPP project: none of the waste generating facilities are directly involved in the formulation or modification of the WAC or the policies of the WACCC other than through applying to the WACCC for approval of their certification process and for supporting an annual audit conducted by the WACCC.

The WAC was developed from the perspective of disposal facility constraints. Different, and in some cases more stringent criteria, must be applied to the waste to meet the requirements of the TRUPACT II waste container, the U. S. Department of Transportation (DOT) and EPA regulations, and regulations of the State of New Mexico (e.g., no hydrogen generation limit vs. no more than 5 percent generated in a 60 day period; no criteria for flammable organics vs. 500 parts per million). For example, there apparently is a significant volume of TRU wastes that are certified to the WAC but do not meet the TRUPACT II criteria. Further, there is no evidence that the limitations imposed by the agreements with the State of New Mexico have been recognized in the WAC. (See Ref. 12, page 5).

### **Observations and Recommendations**

I have a number of observations concerning the WAC and its implementation. First, the various criteria imposed (e.g., WAC, DOT and EPA regulations, TRUPACT II) should be integrated into a single set of criteria and a comprehensive data collection form developed that would satisfy all applicable requirements. Further, it does not appear that the need to determine the presence and amount of hazardous constituents has been evaluated from either a technical (i.e., to support the Performance Assessment development) or legal perspective. The WACCC should ensure that the appropriate data is collected during the certification process to support a determination that the criteria had been complied with (e.g., sampling the drum head space for

volatile organic compounds to ensure that the hazardous waste constituents are properly characterized to comply with EPA requirements). Second, there appears to be very little communication between waste generators, who might be able to learn from one another's experience, and those individuals who are involved in other aspects of the WIPP project (e.g., the scientists and engineers conducting the Performance Assessment); a result is that the interpretation given to the WAC by the WACCC may be dramatically different than that assumed by other individuals associated with the WIPP project. Third, whenever changes are made to the WAC or to the implementation of the WAC (e.g., the conclusion to allow, as a matter of course, free liquids up to 1 percent by volume), they must be immediately communicated to the individuals responsible for conducting the Performance Assessment and to those individuals who are responsible for assuring that the facility meets applicable regulatory requirements. Fourth, there are a number of instances where the criteria established in the WAC, and accompanying QA criteria, include phrases such as meeting "applicable" requirements without any guidance on how that determination should be made, by whom, and in reference to what. Fifth, various of the guidance documents appear to be internally inconsistent (e.g., Ref. 36 relies in its analysis on the use of a corrosive-resistant inner liner to satisfy the pertinent criteria, yet in Ref. 37 the use of corrosion-resistant liners is only recommended; Ref. 36 concludes that radioactive mixed wastes will be packaged, transported and disposed of in a manner "more stringent than regulations applying to other types of toxic substances," yet no technical justification is given for that conclusion: that issue is subject to considerable doubt, which is the focus of the petition filed with the EPA under Part 268). Sixth, there are a number of specific provisions that suggest additional consideration should be given to revising the WAC to include experience garnered to date (e.g., the requirement that labels be affixed to individual waste packages does not require that the labels be located in a manner that would aid in the quality assurance, transportation, receipt and emplacement operations -- for example, requiring labels to be located on the top and bottom and 120 degrees apart on the exterior sides of the drum). These are not critical issues, but they can have a dramatic effect on the ability of the program to function smoothly.

With respect to the operations of the WACCC, I have the following observations. First, once the WAC is established, the WACCC functions primarily in a quality assurance (QA) role, yet only one of its members is required to be experienced in QA activities and there is no requirement for any of the WACCC members to have operational experience. Second, it does not appear that the WACCC, in its QA role, is independent of line management, which experience suggests is a necessary attribute to ensure the independence of QA-related conclusions. Third, the audits of the generating facilities are conducted annually on an announced basis; experience suggests that more valuable audit insight could be achieved by conducting unannounced audits at a random frequency. Fourth, there apparently has not been any effort by the WACCC to evaluate trends that may be present in the individual site certification processes to be able to determine equipment degradation or any programmatic or personnel weaknesses; under the current system, a significant number of records are not required to be retained past a subsequent WACCC audit, nor is there any intent to retain package-specific records (e.g., routine assays and inspections, non-conformance reports) post-emplacment

that might facilitate problem resolution if one were to occur during facility operation.

In addition, I would make the following general observations. First, each site apparently develops its own three-digit "content code." It would seem to facilitate quality assurance activities, as well as waste emplacement and possible retrieval, for a uniform set of content codes to be developed for the general categories that are not likely to change and for each site to have the ability to use a defined block of numbers for any necessary additional site-specific content codes. Finally, DOE Order 5820.2A requires that radioactive and mixed wastes be managed in a manner that minimizes the generation of such wastes, yet it is apparent that little thought has been given at the Rocky Flats Plant, and presumably at other DOE production facilities, to conducting their operations in a manner that would minimize radioactive and mixed waste generation and would manage whatever wastes are generated in an integrated manner to minimize the handling of these materials; systems integration is clearly necessary if DOE's goal of effective waste management are to be achieved.

As currently envisioned, there would be no receipt inspection of TRU waste packages at WIPP other than a visual inspection for external package deterioration and both a radiation and surface contamination survey. Thus, once the wastes have been packaged and certified, there would be no further evaluation conducted (e.g., to determine if void spaces were created due to settling during transit; to determine if condensation during storage resulted in an increased amount of free liquid) even though conceivably these wastes could have been in surface storage for up to 20 years. This may not meet RCRA requirements. Further, the WIPP facility's only current capability to treat waste drums that are found to be not acceptable upon receipt is to overpack them.

### General Conclusions

The WIPP Waste Acceptance Criteria is but one of the criteria to which the waste generators must ensure that the TRU waste is packaged. These requirements should be integrated so that a single certification process that meets all criteria can be conducted and a single, comprehensive waste manifest completed. Ambiguous requirements should be clarified and all related documentation revised accordingly. The need to acknowledge that correct waste management is an important priority must be inculcated at all waste generating sites.

A monitoring system should be installed at WIPP to ensure that the containers as received meet the WAC and RCRA criteria that may be applicable. WIPP should also have the capability to repackage or otherwise disposition any drums received that do not meet the applicable criteria.

## **F. Project Documentation :**

### **Observations and Recommendations**

In the course of the investigation by the Blue Ribbon Panel, individual Panel members requested a number of documents that were referenced in other project-related documents or were otherwise pertinent to this investigation. In my experience, DOE and contractor personnel were, without exception, very willing to supply all documents requested. However, with the best of intentions, it frequently became a laborious process to locate where certain of the documents resided so that copies or excerpts could be made. The difficulty of that task strongly suggests that many of the documents that could be helpful to various DOE offices and contractors themselves in pursuing specific topics were not readily available to them and, in fact, they may not have known of their existence or how to obtain them if their existence was identified.

In a similar fashion, the need for individuals or groups not directly responsible for the WIPP project (e.g., National Resource Council's WIPP Panel, Environmental Evaluation Group) and regulatory agencies whose responsibilities affect the WIPP project (e.g., EPA, DOT, NRC), to say nothing of interested members of the media and general public, could be beneficially addressed by having all applicable documents collected in a central location. This would also be advantageous to DOE offices and contractors directly involved in WIPP and to DOE offices and contractors, as well as other regulatory agencies, involved in other projects (e.g. the high-level radioactive waste disposal facility to be developed in accordance with the provisions of the Nuclear Waste Policy Act of 1982) that might benefit from the knowledge of the lessons learned through the course of the development of the WIPP project.

### **General Conclusion**

DOE should establish, at a minimum, two Public Document Rooms, one in Albuquerque or Carlsbad, New Mexico, and one in Washington, D.C., in which all documents associated with the WIPP project would be located to facilitate review of those documents by the public, regulatory agencies (both state and federal), and the various DOE offices and their contractors and subcontractors. The WIPP project is an important national effort of great technical and political complexity: it is critical to informed decision-making that documentation of WIPP-related issues be made available for scrutiny.

## **G. Continuing Oversight**

### **Observations and Recommendations**

The total time in which the WIPP Blue Ribbon Panel has been involved in conducting its investigation and evaluation has been very limited, primarily because of the necessity of DOE to have the ability to analyze the Panel members' insight in a timely fashion and to implement such modifications to the WIPP program as DOE may deem appropriate based upon that insight. Because

Panel members were, by the press of available time and resources, unable to have all of their inquiries pursued to resolution, it may be beneficial to provide the Panel with an additional opportunity to meet with DOE and contractor representatives at some time in the future to address the Panel members' observations and recommendations. It may also be beneficial for DOE to have an opportunity to interrogate individual Panel members to ensure that their views are understood. In addition, there may be benefit to DOE for the Panel members to consider their colleagues' analyses and reports and determine if, based on that further insight, additional or modified recommendations could be made that may be helpful to DOE.

As described in Section I of this report, one of the defined responsibilities of the Panel was to evaluate and comment upon a proposed validation plan of the Rocky Flats Plant certified waste program. In that a validation plan has not yet been developed, the Panel cannot at this time satisfy that responsibility. However, the Panel member's several observations and comments on the recent draft plan (Ref. 69) may assist DOE in developing an appropriate validation plan. Once a plan is developed and implemented, there may also be advantage to having an independent body, such as the Blue Ribbon Panel, evaluate the results of the validation program to assist DOE in determining what, if any, additional actions would be appropriate with respect to the Rocky Flats Plant certified waste or certification program.

#### General Conclusion

An independent advisory body, such as the WIPP Blue Ribbon Panel, should evaluate (1) the response to and implementation of recommendations made by the Panel members which are adopted by the Secretary, and (2) the Rocky Flat Plant waste certification validation plan, once it is developed, and the results of the validation program upon its completion.

#### IV. OVERALL OBSERVATIONS

The WIPP facility appears to have been well-planned and constructed, and the pride of the individuals responsible for those tasks was evident. It has the hallmarks of a professionally designed and staffed facility. It is well-maintained, organized to have a low ambient noise level and operated in a consistent manner, and is designed to provide sufficient space for planned operations with extra space to facilitate dealing with unexpected situations or subsequent system modifications that may be required.

Even in the short time in which the Panel has been active, it is clear that there are a great number of competent and motivated individuals, both professional and support staff, who are committed to doing their best to do this project correctly. That statement applies at each of the offices that we visited, to both staff and operating personnel, and to government employees and contractors alike. There may be relative strengths and weaknesses among the personnel, but there was no evidence of people being satisfied with doing less than a responsible job, whatever their responsibility might have been. They did not always agree with one another, nor I with them, but that does not diminish my respect for their willingness to tackle a very difficult task.

If WIPP is not determined to be a suitable facility as a geologic repository, it does not appear that it will be for the lack of many individuals doing their best to do the job right.

On February 12, 1980, the President of the United States established a comprehensive program for the management of radioactive waste. In a message to Congress on that date, President Carter observed that "[m]any citizens know and all must understand that this problem will be with us for many years. We must proceed steadily and with determination to resolve the remaining technical issues while ensuring full public participation and maintaining the full cooperation of all levels of government. We will act surely and without delay, but we will not compromise our technical or scientific standards out of haste. I look forward to working with the Congress and the states to implement this policy and build public confidence in the ability of the government to do what is required in this area to protect the health and safety of our citizens." A decade has expired since that call to action was made, and its principles remain apt today, as the recently issued DOE Environmental Restoration and Waste Management Five-Year Plan (Ref. 68) demonstrates. We must find the way to address and resolve these issues without delay.

**WASTE ISOLATION PILOT PLANT**References

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