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**Technical Peer Review Report
Report of the Review Panel**

**Requirements for
Disposal of
Remote-Handled
Transuranic Wastes
at the Waste Isolation
Pilot Plant**



ASME International



Institute for Regulatory Science

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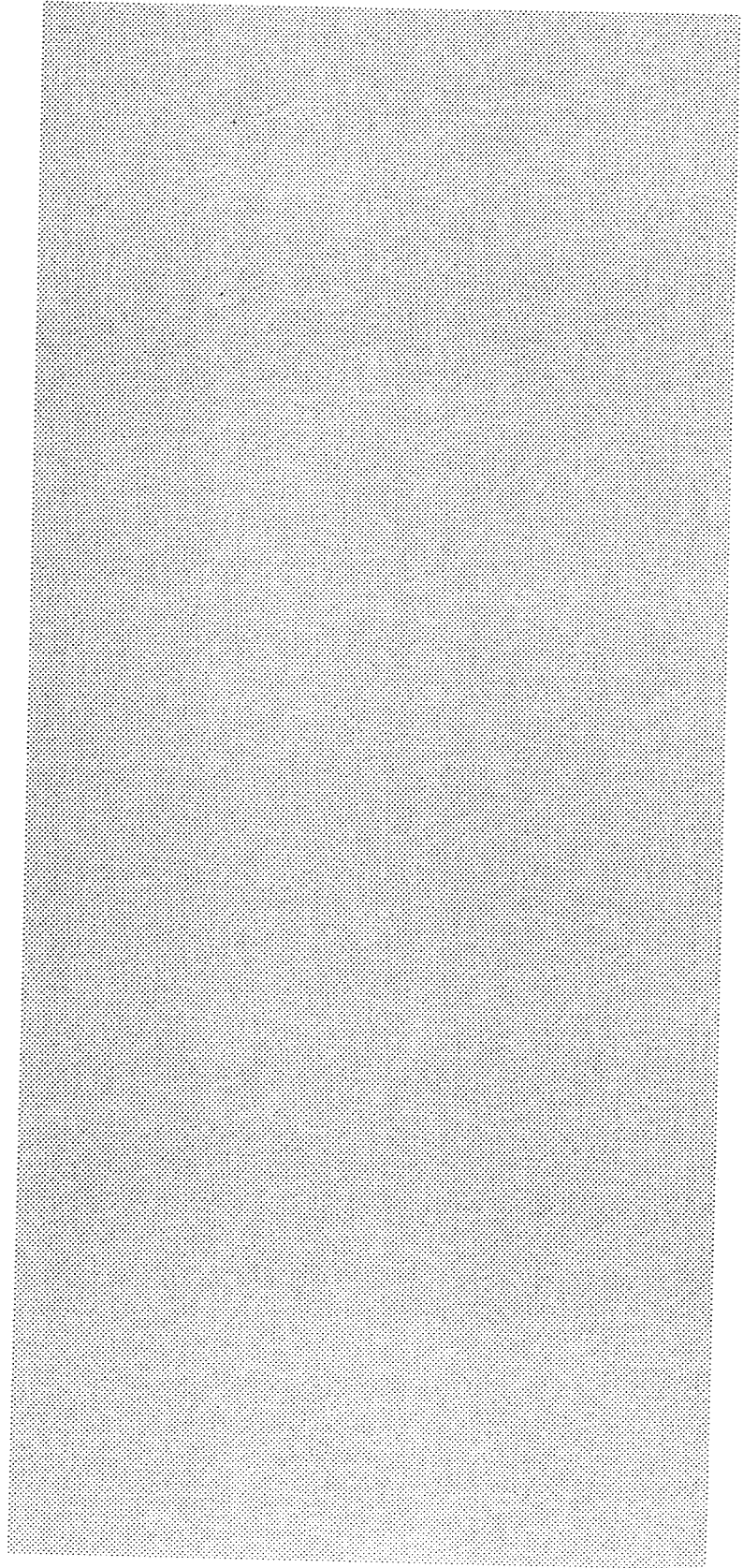
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Preface



This report contains the results of a peer review performed jointly by the American Society of Mechanical Engineers (ASME) and the Institute for Regulatory Science (RSI). Based on a request from the Carlsbad Operations Office of the U.S. Department of Energy (DOE), a Review Panel was established to review the "Requirements for the Disposal of Remote-Handled Transuranic Wastes at the Waste Isolation Pilot Plant."

Preliminary negotiations between the DOE and New Mexico Environment Department indicated a desire of the New Mexico Environment Department to cosponsor the peer review. Accordingly, there were extensive negotiations between managers of the peer review program and the New Mexico Environment Department (NMED) on the role and responsibilities of cosponsors of the peer review. After considerable discussion within the NMED, based on legal reasons, a decision was made not to cosponsor the peer review. However, the NMED expressly recognized the need for peer review and the credibility of the current peer review program.

Keeping with the ASME Process, the following Review Panel (RP) was appointed by the Peer Review Committee (PRC) of ASME:

Alan S. Corson
Tom A. Hendrickson
M.C. Kirkland
Peter B. Lederman, Chair
James E. Martin
Wade O. Troxell
Richard Wilson

During the period covered by this report, the ASME PRC overseeing the peer review consisted of the following individuals:

Charles O. Velzy, Member of EP, Chair
Ernest L. Daman, Member of EP
Nathan H. Hurt, Member of EP
A. Alan Moghissi, Member of EP, Principal Investigator of the PR Program
Gary A. Benda
Erich W. Bretthauer
Irwin Feller
Robert A. Fjeld

John T. Greeves
William T. Gregory, III
Peter B. Lederman
Jeffrey A. Marqusee
Lawrence C. Mohr, Jr.
Goetz K. Oertel
Glen W. Suter, II

The supporting staff were the following individuals:

Carolyn Davis: Director of Research at the Center for Research and Technology Development of ASME in Washington DC; Administrative Manager of the ASME PRC

Betty R. Love: Executive Vice President, RSI, Columbia, MD; Administrative Manager of the Peer Review Program. During this peer review, Betty Love was also responsible for management of stakeholder participation.

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

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

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

Extensive written material was provided by the DOE to the Technical Secretary at the beginning of the process. The Technical Secretary extracted a draft summary for inclusion in this report. This summary was provided to DOE for review and was revised accordingly. Based on the information provided to the Technical Secretary, the Summary included in this report is an accurate representation of the project. The written material provided by DOE was made available to the members of the Review Panel in advance of the meeting in Carlsbad, NM. The agenda of the meeting in Carlsbad appears in the Appendix of this section.

The RP considered materials provided by the DOE and presentations during the Carlsbad meeting. The RP benefitted from a site visit to the Waste Isolation Pilot Plant on the morning of Monday, July 30, 2001 immediately prior to the

presentations and from presentations during a workshop convened in conjunction with the peer review meeting. At the end of the meeting, the Review Panel met in an executive session and completed its report. The report of the Review Panel was subsequently copy-edited. Consistent with the procedures established by ASME, this report was provided to DOE for identification of potential errors; misunderstandings; and areas of ambiguity; and was revised accordingly.

The completion of this peer review within the rather short time frame could not have been possible without the support of a number of people. The assistance and cooperation of Bryan Howard, Norbert Rempe, and Phil Gregory are appreciated. The cooperation of Dr. Peter Maggiore, Secretary of the New Mexico Environment Department, and the staff of that Department was most helpful during the peer review.

Charles O. Velzy
A. Alan Moghissi

Appendix

**ASME/RSI Peer Review and Workshop
Requirements for Disposal of Remote Handled Transuranic Wastes at the
Waste Isolation Pilot Plant
Carlsbad, NM - July 30 - August 3, 2001**

AGENDA

Monday, July 30, 2001

Waste Isolation Pilot Plant

8:30 a.m. Site Visit

11:30 a.m. Lunch

*Pecos River Village Conference Center
Carousel House, Carlsbad, NM*

**Session 1: Introduction and Regulatory Requirements
Chair: Chuck Wiggins**

1:00 p.m. Welcoming Address

Chuck Wiggins
Mayor Pro Tem of Carlsbad

1:10 p.m. Welcoming Address

Ines Triay
Manager, Carlsbad Field Office

1:20 p.m. Introduction to Panel Workshop

A. Alan Moghissi
Institute for Regulatory Science/ASME

2:00 p.m. NMED Perspective

James Bearzi
New Mexico Environment Department

2:30 p.m. EPA Perspective

Rajani Joglekar
U.S. Environmental Protection Agency

3:00 p.m. Break

**Session 2: DOE Strategy for RH-TRU Waste Disposal
Chair: Betty R. Love**

3:15 p.m. The DOE RH-TRU Waste Characterization Program

Bryan Howard
Los Alamos National Laboratory

4:00 p.m. Discussion Responding to Audience Questions
(Bearzi, Joglekar, Howard)

5:00 p.m. Adjournment

**ASME/RSI Peer Review and Workshop
Requirements for Disposal of Remote Handled Transuranic Wastes at the
Waste Isolation Pilot Plant
Carlsbad, NM - July 30 - August 3, 2001**

AGENDA

Tuesday, July 31, 2001

*Pecos River Village Conference Center
Carousel House, Carlsbad, NM*

**Session 3: Review of DOE Submission
Chair: Bryan Howard**

8:00 a.m.	RH Inventory and Compliance Impacts	Joe Harvill Westinghouse TRU Solutions
8:45 a.m.	Repository Performance	M. Kathryn Knowles Sandia National Laboratory
9:45 a.m.	Break	

**Session 4: Review of DOE Submission (Cont'd)
Chair: Bryan Howard**

10:00 a.m.	Application of Acceptable Knowledge for RH-TRU Waste	Bob Kehrman Westinghouse TRU Solutions
11:00 a.m.	Characterization Objectives and NDA/NDE Measurement Systems	Dan Taggart Los Alamos National Laboratory
12:00 p.m.	Lunch	

**Session 5: Placing RH-TRU Waste in Perspective
Chair: Phil Gregory**

1:00 p.m.	Summary: RH-TRU: Small Volume-Large Impact	Ines Triay, CBFO
2:00 p.m.	Summary: NAS/NRC: WIPP Report	Werner Lutze Center for Radioactive Waste Management
2:30 p.m.	Discussion Responding to Audience Questions (Triay, Lutze)	
3:00 p.m.	Break	

**ASME/RSI Peer Review and Workshop
Requirements for Disposal of Remote Handled Transuranic Wastes at the
Waste Isolation Pilot Plant
Carlsbad, NM - July 30 - August 3, 2001**

AGENDA

Tuesday continued

Session 6: Risk Issues
Chair: Joe Harvill

3:15 p.m.	Risk Assessment of Intrusive RH Waste Characterization Methods	Fritz Seiler Sigma Five Associates
4:00 p.m.	Risk/Cost-Impact Analysis for Intrusive RH Waste Characterization Methods	Louis Restrepo OMICRON
4:30 p.m.	Discussion Responding to Audience Questions (Seiler, Restrepo)	
5:00 p.m.	Adjournment	

Wednesday, August 1, 2001

*Pecos River Village Conference Center
Carousel House, Carlsbad, NM*

Session 7: Regulatory Experience
Chair: M. Kathryn Knowles

8:00 a.m.	Application of 40 CFR 260, 262, and 264 to RH-TRU Mixed Waste Characterization	Matt Strauss Clay Associates
9:00 a.m.	Application of 40 CFR 191/194 to RH-TRU Waste Characterization	John Bartlett SC&A
9:45 a.m.	Break	

Session 8: Stakeholders
Chair: A. Alan Moghissi

10:00 a.m.	Discussion Responding to Audience Questions and Statements by Stakeholders Addressing Peer Review Criteria	
12:00 p.m.	Lunch	
1:00 p.m.	Discussion Responding to Audience Questions and Statements by Stakeholders Addressing Peer Review Criteria	
4:00 p.m.	Adjournment	

**ASME/RSI Peer Review and Workshop
Requirements for Disposal of Remote Handled Transuranic Wastes at the
Waste Isolation Pilot Plant
Carlsbad, NM - July 30 - August 3, 2001**

AGENDA

*Wednesday continued
Lyndam Hotel, Albuquerque, NM*

6:00 p.m. Executive Session

Thursday, August 2, 2001

Lyndam Hotel, Albuquerque, NM

Executive Session

8:00 a.m. Writing of the Report (*ASME Review Panel Members only*)

5:00 p.m. Adjournment

Friday, August 3, 2001

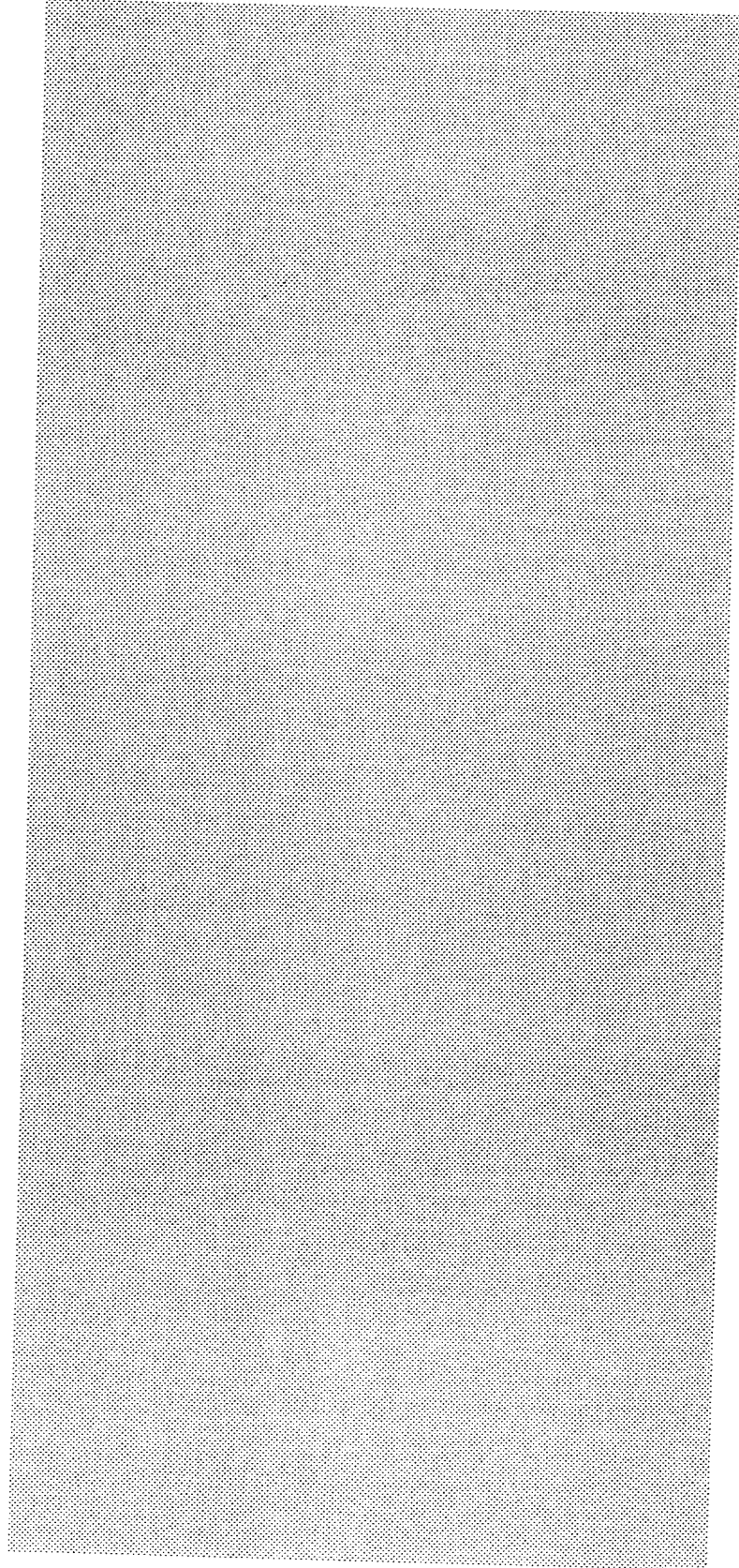
Lyndam Hotel, Albuquerque, NM

Executive Session

8:00 a.m. Writing of the Report (*ASME Review Panel Members only*)

5:00 p.m. Adjournment

Peer Review Process



INTRODUCTION

There is consensus within the technical community on the definition, process, and key criteria for the acceptability of peer review. Peer review consists of a critical evaluation of a topic by individuals who—by virtue of their education, experience, and acquired knowledge—are qualified to be peers of an investigator engaged in a study. 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 American Society of Mechanical Engineers (ASME), also known as ASME International, has over a century of experience in peer review. Consistent with its mission and tradition, ASME recently established a peer review program devoted to the technologies supported by the Office of Science and Technology of the U.S. Department of Energy (DOE). This program is performed in cooperation with the Institute for Regulatory Science (RSI). The reports of the peer reviews resulting from this program have been published (ASME 1997, 1998, 1999, 2000).

PEER REVIEW PROCESS

The structure of the peer review process established by the ASME/RSI team consists of a tiered system. For each specific area of technology, the entire process is overseen by a Peer Review Committee (PRC). The review of specific topics is performed by Review Panels (RPs).

Peer Review Committee

The PRC is a standing committee formed to oversee peer review for one particular program in an agency. 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 PRC. The members of the PRC must be approved by the Board on Research and Technology Development of the Council on Engineering of the ASME. The PRC includes an Executive Panel (EP) that is responsible for the day-to-day operation of the PRC. Except for the EP, membership in the ASME is not required for appointment to the PRC. As the overseer of the entire peer review process, the PRC enforces all relevant ASME policies, including compliance with professional and

ethical requirements. A key function of the PRC is the approval of the appointment of members of RPs for a specific project.

Review Panels

The review of a project, a document, a technology, or a program is performed by a RP consisting of a small group of highly-knowledgeable individuals. Upon the completion of their task, the RPs are disbanded. The selection of reviewers is based on the competencies required for the specific review assignment. The number of individuals in a RP depends upon the complexity of the subject to be reviewed. The selection of a reviewer is based on the totality of that individual's qualifications. However, there are several generally-recognized and fundamental criteria for assessing qualifications of a reviewer. These are as follows:

- 1. Education and relevant experience:** A minimum of a B.S. degree and preferably an advanced degree in an engineering or scientific field is required for any peer reviewer. In addition, the reviewer must have significant experience in the area that is being reviewed.
- 2. Peer recognition:** Election to an office of a professional society, serving on technical committees of scholarly organizations, and similar activities are considered to be a demonstration of peer recognition.
- 3. Contributions to the profession:** 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.
- 4. Conflict of Interest:** One of the most complex and contested issues in peer review is a set of subjects collectively called conflict of interest. The ideal reviewer is an individual who is intimately familiar with the subject and yet has no monetary interest in it. Despite this apparent difficulty, the ASME and similar organizations have successfully performed peer review without having a real or an apparent conflict of interest. The guiding principle for conflict of interest is as follows: *An individual who has a personal stake in the outcome of the review may not act as a reviewer or participate in the selection of reviewers.*

Due to the multidisciplinary nature of many projects reviewed by the ASME/RSI team, rapid identification of qualified peer reviewers and their availability to

participate in the review process are key ingredients for a successful program. The process used for the identification of reviewers is multifaceted. The Administrative Manager of the Peer Review Program receives recommendations from sources within ASME; previous members of the RP; sister societies; other organizations and individuals; the DOE; DOE contractors; and others. However, the selection of peer reviewers is entirely based on criteria identified by ASME. The details of various aspects of peer review, including conflict of interest, can be found in ASME *Manual for Peer Review* (ASME 2000) and the *Associated Procedures* (RSI 2000).

COOPERATION WITH OTHER PROFESSIONAL SOCIETIES

The ASME is a large professional engineering society having in excess of 125,000 members. Although the predominant discipline of the members is mechanical engineering, there are members who—by virtue of their education, training, or experience—are competent in other disciplines. The Council on Engineering includes divisions ranging from classical mechanical engineering (design, heat transfer, and power) to solar engineering; environmental engineering; and safety and risk analysis. Despite the diverse competency within the ASME, it is recognized that on occasion it will become necessary to peer review activities which include disciplines that are outside the areas of competency of the ASME and its members. These disciplines may include geology, hydrology, toxicology, and ecology. Consequently, ASME has reached formal and informal agreements with its sister societies to identify qualified reviewers in areas outside of those covered by the membership of ASME.

PERFORMING ORGANIZATIONS

The Center for Research and Technology Development of ASME manages a number of scientific and engineering activities, including peer review for the Office of Science and Technology (OST). Because of ASME's conscious effort to maintain a small in-house staff, it relies upon other organizations to provide detailed project management services in its research, development, and similar activities. Accordingly, ASME and RSI joined forces in a collaborative effort to perform the peer review for OST. While the ASME staff in Washington, DC provides the staff support for the PRC, the detailed management and staff support for the RPs is provided by RSI.

American Society of Mechanical Engineers

As one of the largest professional engineering societies, ASME has a long and distinguished history. Its activities are carried out primarily by members who volunteer their time in support of engineering and scientific advancement. For obvious reasons, ASME also has a paid staff to manage the day-to-day operations of such a large professional society. The ASME has a detailed structure for its operation consisting of councils, boards, divisions, and committees. The Council on Engineering has 38 divisions, including: Environmental Engineering; Solid Waste Processing; Nuclear Engineering; and Safety Engineering and Risk Analysis. The Council on Codes and Standards develops ASME codes and standards that are the backbone of many industries—including power production—worldwide. The Council on Codes and Standards is also responsible for the development of standards for activities such as certification of incinerator operators. The ASME was a founding member of the American Association of Engineering Societies and a founding member of the American National Standards Institute.

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 is the foundation of the best available scientific and engineering information. Consequently, RSI has promoted peer review 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 ASME. RSI is located in the Washington, DC, Metropolitan Area.