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U.S. Nuclear Waste Technical Review Board  
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UNITED STATES  
NUCLEAR WASTE TECHNICAL REVIEW BOARD  
2300 Clarendon Boulevard, Suite 1300  
Arlington, VA 22201

June 2, 2016

**Re: Freedom of Information Act Request (May 9, 2016)**

The U.S. Nuclear Waste Technical Review Board (Board) has received your emailed request for information under the Freedom of Information Act (FOIA). Specifically, your request for "Meeting Minutes of the Board Business Meetings held during Calendar Years 2013, 2014 and 2015."

In response to your request attached are the Board's responsive documents with some redactions. All of the minutes marked "draft" have been approved and adopted.

Thank you for your inquiry. There is no fee required for processing your request.

Sincerely,

A handwritten signature in blue ink, appearing to read "Debra L. Dickson", is positioned above the printed name.

Debra L. Dickson  
Director of Administration

Attached:

- Meeting Minutes 2013 - 2015



UNITED STATES  
NUCLEAR WASTE TECHNICAL REVIEW BOARD  
2300 Clarendon Boulevard, Suite 1300  
Arlington, VA 22201

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**Minutes of Business Meeting  
Wednesday, April 17, 2013**

Marriott Courtyard  
480 Columbia Point Drive  
Richland, WA 99352  
509-942-9400

*Board members attending:*

Rodney Ewing, Chairman  
Steve Becker  
Sue Clark  
Gerald Frankel  
Kenneth Peddicord  
Mary Lou Zoback

Jean Bahr  
Susan Brantley  
Efi Foufoula-Georgiou  
Linda Nozick  
Paul Turinsky

*Staff members attending:*

Nigel Mote, Executive Director  
Debra Dickson, Director of Administration  
Bruce Kirstein, Senior Professional Staff  
Daniel Metlay, Senior Professional Staff  
Karyn Severson, Dir. of External Affairs

Linda Coultry, Meeting Planner  
William Harrison, System Administrator  
Bret Leslie, Senior Professional Staff  
Gene Rowe, Senior Professional Staff

Dr. Roberto Pabalan also attended the meeting. Prior to the meeting, Dr. Pabalan had been appointed to a position on the Board's Senior Professional Staff, effective April 28, 2013. He attended the meeting in advance of joining the staff as part of his orientation.

- 1. Chairman's Welcome and Other Comments** – Chairman of the Board, Dr. Rodney Ewing opened the meeting at 8:00 a.m. He welcomed everyone to the meeting and introduced three new staff members, Bret Leslie, Debra Dickson and Roberto Pabalan. He gave each of the new staff an opportunity to introduce themselves to the Board and the staff.

The meeting continued with an announcement by the Executive Director, Nigel Mote, regarding the passing of a previous member of the Board's senior professional staff, Mr. David Diodato. Mr. Mote circulated the obituary and death announcement and advised the meeting attendees of a pending "celebration of life" that would be held in honor of Mr. Diodato. He advised that additional information would be forthcoming.

The Chairman indicated that he wanted to start planning the schedule for Board meetings and Board reports further in advance than had been done in the past year or so and said he wanted to develop and maintain a rolling 18-month forward plan. He reminded the staff and Board members of the Board's statutory mandate to provide reports to Congress and the Secretary of Energy at least twice each year, and said he believed that planning further ahead would facilitate the Board achieving

this. He noted that, in the past few years, the Board had produced a number of white papers which had originally been intended as the bases for Board reports but not all of the intended Board reports had been produced. In developing the forward plan, he said he wanted to focus particularly on identifying reports and other activities that would result in reports and papers to meet the Board's mandate and inform the public.

The Chairman updated the Board on the sequestration that had recently been enacted and its impact on the Board's activities.

2. **Overview of Meeting Agenda and Adoption of Previous Minutes** - The Chairman reviewed the agenda items for the remainder of the day. He asked if there were comments, questions, or concerns regarding the October 2012 minutes. There were none expressed. The minutes were accepted.
3. **Comments on Public Meeting and the Poster Session** – The Chairman asked the Board members and staff to provide brief comments regarding their personal perspectives of the public meeting and the poster session held on Tuesday, April 16<sup>th</sup>. Board members and staff generally agreed that the speakers' presentations were informative. Some of the other comments made were as follows:
  - Dr. Peter Lyons' presentation and overview of the *Administration's Response to Recommendations of the Blue Ribbons Commission on America's Nuclear Future* was very useful in informing the Board of the actions DOE was planning in response to the recommendations of the BRC, and his comments on DOE's budget request for 2014 were particularly timely.
  - Board members noted that the panel presentation and discussions on the Department of Energy's technology development programs on waste forms had a good range of viewpoints and was very beneficial.
  - There were comments that the poster session was excellent. Board members and staff recommended that consideration be given to holding similar sessions at future meetings.
  - It was noted that Mr. Picha's presentation on the complex-wide overview of the Department of Energy's Office of Environmental Management was an informative overview, although it did not cover the scope or level of detail the Board had expected. In particular, it did not deal with the issue of classification of DOE wastes, which is an issue of concern to the Board.
  - It was generally agreed that the information provided by Carol Jantzen and David Peeler in their respective presentations demonstrated impressive progress on the Savannah River National Laboratory's programs and initiatives. Concern was expressed, however, that the work being planned in preparation for processing the tank wastes at Hanford did not appear to take full advantage of the experience that had been gained dealing with similar wastes at Savannah River Site.
4. **Review of Current Board Reports/Staff Analyses and Other Documents** – The Chairman commented on the significant number of reports, whitepapers, and factsheets on the agenda for discussion. As many of the documents had previously been circulated to the Board members and staff for review and comment, he suggested that it was not necessary to include the full versions of all reports and papers in the briefing books and proposed that this be taken into account in preparing the briefing books for future Board meetings.



- **Report on the Department of Energy Legacy Management's (LM) Activities to Archive and Preserve Records from the Yucca Mountain Project (YMP)** – Dr. Dan Metlay presented a summary of the draft report to Congress and the Department of Energy on LM's activities to archive and preserve records from the YMP. Following discussion, the Board agreed that the report should be considered final and sent to DOE-LM, without the recommendations, for review of the factual content. DOE-LM should be requested to provide a response within two weeks and, following revision to take account of any comments provided by DOE-LM, the report should be sent for production of electronic and printed versions for distribution.
  - **Deep Borehole Factsheet and Letter to Department of Energy** – Dr. Mary Lou Zoback discussed the deep borehole factsheet and requested that suggestions, comments, and edits to the factsheet be provided to her and/or Karyn Severson within two weeks.
  - **Report on Department of Energy (DOE) owned Spent Nuclear Fuel (SNF)** – Mr. Mote discussed the status of the Board report being prepared on the management and disposal of DOE-owned SNF. Extensive comments, revisions and edits had been submitted to the contractor in March, 2013 and additional comments were to be submitted by April 19. Following discussion, it was agreed that, when the next draft of the report was received from the contractor, work to finalize the report should be done in-house with a view to having the report finalized for publication in the third quarter of 2013.
  - **Report on the Board's Survey of National Programs** – Dr. Metlay proposed that updating of the Survey Report on the status of waste programs around the world should be deferred. He said that a number of changes were likely to take place in the next few months in some of the national programs included in the report and it would be best to prepare the update to take account of these changes. Following discussion, it was agreed both to postpone the update until later in 2013 and to post the updated report on the Board's website as a living document that is updated further as appropriate, with the date of the latest revision clearly identified.
5. **Executive Lunch** – A working executive lunch was attended by the Board members, with the Executive Director, the Director of External Affairs, and the Director of Administration in attendance for discussion of the Board's status of funds report for fiscal year 2013, the implications of the Continuing Resolution and Sequestration and the status of the fiscal year 2014 Congressional Budget Request. Following discussion of these points, the three staff members left the lunch.
6. **Review of Current Board/Staff Analyses and Document Development (continued)**
- **History of and Future NUWASTE Activities** – Mr. Gene Rowe presented an overview of the work that had been performed using NUWASTE, including reports and factsheets that been drafted but not finalized. Following discussion, it was agreed that the draft report "Overview of LWR Fuel Cycle Waste Management Options for the United States Nuclear Program using NUWASTE" should be reviewed and edited within the staff and then provided for review by the Board. It was also agreed that the work done by Mr. Rowe on the implications of repackaging spent nuclear fuel from large storage containers would provide an excellent basis for the Board to arrange a workshop on this issue. Actions were placed to start preparations for the workshop and it was agreed that this should be discussed further at the Board planning meeting to be held on August 6 and 7, 2013.

## 7. Updates

- **Trip Reports** – Dr. Jean Bahr provided an overview of “ABC Salt III”, the third U.S.-German workshop on actinide and brine chemistry in a salt repository, that was held in Santa Fe, NM, on April 15 and 16, 2013. Dr. Ewing noted that other trip reports were provided in the Board members’ and staffs’ briefing books. He advised all to take time to review the reports.
- **Court and Regulatory Activities** – Dr. Metlay provided an update on the status of the legal actions that are still before the courts related to the Department of Energy’s (DOE) decision to withdraw the Yucca Mountain license application.
- **Congressional Activities** – Ms. Karyn Severson presented an overview of Dr. Ewing’s April 11, 2013 testimony before the Subcommittee on Energy and Water Development of the House Committee on Appropriations. She also discussed key points in the President’s 2014 budget request for the Department of Energy and other legislative issues.
- **Stock Act and Public Financial Disclosure Reporting** – Ms. Debra Dickson presented an overview of the Stock Act and the new requirements for reporting and filing public financial disclosure reports. Board Members and Staff were advised of the deadline to submit their annual reports.

## 8. Upcoming External Conferences and Meetings – Board members and staff reviewed the dates and topics for the upcoming meetings and conferences.

- International High-Level Radioactive Waste Management Conference, Albuquerque, NM - April 2013
- National Transportation Stakeholders’ Forum Annual Meeting, Buffalo, NY – May 2013
- Symposium on the Packaging and Transportation of Radioactive Material 2013, San Francisco, CA – August 2013
- Symposium on Scientific Basis for Nuclear Waste Management XXXVII, Barcelona, Spain, September 29 – October 3, 2013

Mr. Mote asked Board members and staff to advise Ms. Linda Coultry of other conferences and meetings that are relevant to the Board’s activities so that they can be added to the meeting calendar.

## 9. Future Meetings Board Meetings – Discussions were held regarding the projected Board meetings and trips for the next 18 months. Dr. Metlay advised that after the meeting was adjourned, during dinner, he would give a presentation to the Board members and staff regarding the agenda and logistical matters for the upcoming trip in June, 2013. The following trips were briefly discussed:

- Technical Meetings and Facility Tours, Sweden and France, June 10 – 21, 2013
- Board Planning Meeting, Ann Arbor, MI – August 2013
- Workshop, Public Meeting, and Board Business Meeting, Washington, DC – November 2013
- Board Public and Business Meetings, Spring 2014 - Details and specific dates to be determined.

## 10. Meeting Adjournment -The meeting was adjourned at approximately 6:15 pm.



UNITED STATES  
NUCLEAR WASTE TECHNICAL REVIEW BOARD  
2300 Clarendon Boulevard, Suite 1300  
Arlington, VA 22201

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**Minutes of Board Planning Meeting  
August 6 – 7, 2013**

Marriott Courtyard  
3205 Boardwalk Drive  
Ann Arbor, MI 48108

*Board members attending:*

Rodney Ewing, Chairman  
Steven Becker  
Sue Clark  
Gerald Frankel  
Kenneth Peddicord  
Mary Lou Zoback

Jean Bahr  
Susan Brantley  
Efi Foufoula-Georgiou  
Linda Nozick  
Paul Turinsky

*Staff members attending:*

Nigel Mote, Executive Director  
Debra Dickson, Director of Administration  
Administrator  
Bruce Kirstein, Senior Professional Staff  
Daniel Metlay, Senior Professional Staff  
Staff  
Gene Rowe, Senior Professional Staff  
Affairs

Linda Coultry, Meeting Planner  
William Harrison, System

Bret Leslie, Senior Professional Staff  
Roberto Pabalan, Senior Professional

Karyn Severson, Dir. of External

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**Day One – August 6, 2013**

- 1. Chairman's Welcome and Meeting Overview** – Chairman of the Board, Dr. Rodney Ewing, opened the meeting at 8:30 a.m. He welcomed everyone and described the meeting purpose and objectives, which were primarily to: (1) continue orientation of the new Board members;  
(2) conduct strategic planning; (3) plan the November 2013 workshop, and (4) discuss possible dates and topics for future Board meetings and site visits.
- 2. Adoption of Previous Minutes** – The Chairman commented on the minutes from the April 17, 2013, Board Business Meeting. He recommended that the minutes be revised to reflect the discussion on a potential site visit to China. All the Board members in attendance affirmed that they had reviewed the minutes, and no comments, questions, or concerns regarding the minutes were expressed. The minutes were then accepted subject to the above revision.

3. **Senior Professional Staff Presentations** – Several members of the Board’s senior professional staff presented orientation information to the new Board members.
  - **Major Provisions of the Nuclear Waste Policy Act** – Dr. Metlay presented an overview of the Nuclear Waste Policy Act (NWPA) and discussed the legislative history and related actions that have occurred to date. It was suggested that some of the reports referenced during the presentation be posted on the Board’s website. The suggestion was recorded as an action item for future consideration.
  - **The Nuclear Fuel Cycle and the Implications for Geologic Disposal** – Mr. Mote provided the Board with background on the nuclear fuel cycle and some of the potential implications for geologic disposal.
  - **Waste Management System (Storage, Transportation, and Disposal)** – Mr. Rowe presented information on aspects of the waste management system.
4. **Executive Lunch** – A working executive lunch was attended by the Board members, the Executive Director, the Director of External Affairs, and the Director of Administration. The three staff members provided an overview of the Board’s status of funds for the remainder of fiscal year (FY) 2013 and the budget outlook for FY 2014. Mr. Mote and Ms. Dickson presented alternative methods for recording Board-related work hours. Following discussion of this information, the three staff members left the lunch.
5. **Round-Table Comments on Nuclear Waste Programs in Other Countries** – The Chairman and other Board members discussed insights gained from nuclear waste programs in other countries that can be used to evaluate the technical and scientific validity of DOE’s implementation of the NWPA. It was agreed that Dr. Metlay would draft for Board review a letter on international experience that would be sent to the Chairman of the House Appropriations Subcommittee on Energy and Water Development as follow-up to Dr. Ewing’s testimony before that Subcommittee in April. The Chairman noted that site visits would continue to be constrained by budget considerations. The Chairman asked that those Board members who are interested in a future site visit to China should advise him by email. When such a trip is undertaken, a small delegation would be selected from among the interested members.
6. **Comments on Trip and Meeting Reports**
  - **ABC Salt III Workshop** – Dr. Bahr provided an overview of “ABC Salt III,” the third U.S. - German workshop on actinide and brine chemistry in a salt repository, which was held in Santa Fe, NM, on April 15-16, 2013.
  - **American Nuclear Society International High-Level Radioactive Waste Management Conference** – Drs. Bahr, Peddicord, and Kirstein gave an overview of the conference they attended in Albuquerque, NM on April 29 through May 1, 2013. The theme of the conference was “Integrating Storage, Transportation, and Disposal”

of high-level radioactive waste. The attendees noted that issues discussed at the conference would be appropriate topics for review at a future Board meeting.

- **National Transportation Stakeholders Forum** – Dr. Nozick and Mr. Mote presented highlights from the forum hosted by Department of Energy (DOE) Office of Environmental Management. The forum was held in Buffalo, NY on May 14 - 16, 2013.
- **Peer Exchange on Shaping a Nuclear Future** – Ms. Severson provided an overview of the Energy Communities Alliance peer exchange meeting held in Idaho Falls, ID on June 3 – 4, 2013
- **U.S. Nuclear Infrastructure Council Technical Workshop on DOE Spent Nuclear Fuel** – Dr. Pabalan and Mr. Rowe discussed the technical workshop they attended in Arlington, VA on June 26 – 27, 2013.

## 7. Status of Draft Board Reports

- **Deep Borehole Factsheet** – Dr. Leslie noted that the factsheet was completed in early July and was subsequently posted on the Board's website. The Chairman, Dr. Zoback, and Dr. Leslie presented the factsheet and transmittal letter to DOE.
- **Report on DOE Spent Nuclear Fuel** – Dr. Leslie provided a status report on the draft report on DOE spent nuclear fuel (SNF). He noted that the draft report was given to several staff and Board members for review in June 2013 and that he received comments. He said he is continuing to work on the report and expects to circulate a completed report for staff review by the end of September 2013. He expects that the final report will be ready for publication by the end of 2013.
- **Legacy Management Report** – Dr. Kirstein said that the report was being professionally formatted before being sent out for printing. The report is expected to be printed and published by mid-September 2013.
- **High-Burnup Fuel** – Dr. Pabalan discussed a proposed report on high burn up fuel. It was agreed that the topic would be further reviewed to determine its appropriateness for a future report.
- **Designing a Process for Repository Site Selection; Update of Survey Report; Summary Report** – Dr. Metlay discussed the status of the three reports. He will take the lead in preparing a draft report on the repository site-selection process and will update the "Survey" report on the basis of recent experiences in the United States and abroad. Ms. Severson will take the lead on the Summary Report, which is an archival report covering the Board's work from January 1, 2008, to December 31, 2012, working with Dr. Metlay.



- **Partitioning and Durable Waste Forms** – Drs. Pabalan and Kirstein provided an overview of a proposed report on durable waste forms. It was decided that the report would not be included on the list of reports for 2014, but will be a potential report topic in the future.
- **NUWASTE Factsheets and Report on Analysis of U.S. Program** – Mr. Rowe provided an update on the status of the NUWASTE Factsheets and a report on managing SNF in the United States. The target date for submitting the draft report to the Board members for review is mid-October 2013.
- **Other Potential Reports** – The Board members will give to the Chairman suggestions for potential report topics. Those suggestions will be discussed at the Business meeting in November. Possible report topics discussed during this meeting included the following:
  - Issues Identified at the November 2013 Workshop on Impacts of Canister Design
  - High Level Radioactive Waste Report
  - “WIPP” Report
  - Report on Nuclear Waste – Ethics and Responsibility

**8. Meeting Adjourned** – The Chairman adjourned the meeting at 5:00pm.

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### **Day Two – August 7, 2013**

- 9. Review of Actions from Day One** – The Chairman opened the meeting at 8:30 a.m. He commented on the usefulness of the information provided on the first day.
- 10. Continuation of Senior Professional Staff Presentations** – The meeting continued with more presentations by the senior professional staff.
- **Regulations Related to Nuclear Waste Management and Disposal Experience Gained from the NRC Review of the Yucca Mountain Project (YMP) License Application** – Dr. Leslie reviewed the regulations related to storage, transportation, and disposal of SNF and made observations based on experience gained from the U.S. Nuclear Regulatory Commission’s review of the Yucca Mountain License Application.
  - **Technical Challenges Encountered at Yucca Mountain** – Drs. Leslie and Kirstein presented an overview of the technical, operational, and programmatic challenges encountered by the Yucca Mountain Project and some key Board recommendations to the DOE during site characterization.
  - **The Source Term, Including Near-Field Interactions with the Waste Package and Engineered Barrier Materials** – Dr. Pabalan presented a technical description

of the source term.

**11. Administrative Issues** –The following administrative matters were discussed:

- **Summer Internship Program** – Mr. Mote discussed the Board’s proposed internship program. After consideration, it was agreed that the internship program would not begin until the summer of 2014, contingent on the resources being available.
- **Office of Government Ethics (OGE) Update** – Ms. Dickson provided a review of OGE’s financial reporting requirements to include the Stock Act requirement for interim reporting of specific financial transactions exceeding \$1,000. Ms. Dickson also reviewed the two types of financial reporting requirements.
- **File Sharing Arrangements** – Mr. Harrison provided instructions on how to access and use the Board’s internet-based electronic dropbox and file sharing program. It was agreed that preliminary folders would be created to share resources and staff working documents.

**12. Executive Lunch** – A working executive lunch was attended by the Board members.

**13. Board and Staff Updates** – Board members and staff provided updates on various projects, reports, and activities. The topics discussed included:

- **DOE’s Transportation Planning Project** – Dr. Nozick updated Board members and staff on DOE’s transportation planning project. Drs. Nozick and Dr. Becker will prepare an outline of Board letter report with commentary on DOE report on removal of SNF from stranded sites with observations and recommendations on scope and approach to future activities associated with the transportation of SNF to an Interim Repository and/or Repository.
- **DOE’s Ongoing Technical Work** – Dr. Pabalan provided an overview of various reports regarding DOE’s ongoing activities. He will circulate summaries of DOE’s reports among the Board members and technical staff.
- **DOE’s Reorganization** - Ms. Severson discussed a reorganization by Secretary of Energy Ernest Moniz of DOE’s management and oversight structure, including the realignment of some functions and the creation of several new Secretarial Councils.
- **Yucca Mountain Licensing Litigation** – Dr. Metlay updated Board members and staff on the status of litigation regarding the Yucca Mountain licensing process.
- **Consent-based Program** – Dr. Metlay discussed DOE’s proposed consent-based program and provided an overview of three DOE reports pertaining to the program. He was asked to place the reports in the Board’s web-based drop box.

- **Congressional Activities** – Ms. Severson discussed the status of the Nuclear Waste Administration Act of 2013, which was introduced in the Senate Committee on Energy and Natural Resources. She reiterated that the bill would create an independent federal agency to manage the nuclear waste program. Ms. Severson also provided an update on DOE's progress in implementing its 2013 Strategy for the Management and Disposal of used Nuclear Fuel and High-Level Radioactive Waste.

**14. Workshop on the Impact of Container Designs on the Management and Geologic Disposal of Spent Nuclear Fuel in the U.S.** – Mr. Rowe, Mr. Mote, and Dr. Leslie presented plans and a draft agenda for the proposed workshop to be held in Washington, DC on November 18 and 19, 2013. The Board discussed the benefits of holding such a workshop. In addition to the technical staff providing input for workshop documents, it was agreed that Drs. Nozick, Bahr, and Zoback would assist in reviewing and commenting on the plans for the workshop.

**15. Future Meetings** – The dates and locations for future meetings were discussed. The following dates and locations were agreed upon as target dates for 2014 meetings:

- March 18 – 21, 2014: Public Meeting (Albuquerque, NM)
- August 4 – 8, 2014: Planning Meeting (Location TBD)
- October 27 – 30, 2014: Public Meeting (Washington, DC)

**16. Meeting Adjournment** – The Chairman adjourned the meeting at approximately 5:15pm.



UNITED STATES  
NUCLEAR WASTE TECHNICAL REVIEW BOARD  
2300 Clarendon Boulevard, Suite 1300  
Arlington, VA 22201

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**Minutes of Board Business Meeting  
November 21, 2013**

Embassy Suites Hotel  
1250 22<sup>nd</sup> Street NW  
Washington, DC 20037

*Board members attending*

Rodney Ewing, Chairman	Jean Bahr
Steven Becker	Susan Brantley
Sue Clark	Efi Foufoula-Georgiou
Gerald Frankel	Linda Nozick
Kenneth Peddicord	Paul Turinsky
Mary Lou Zoback	

*Staff members attending*

Nigel Mote, Executive Director	Linda Coultry, Meeting Planner
Debra Dickson, Director of Administration	William Harrison, System Administrator
Bret Leslie, Senior Professional Staff	Daniel Metlay, Senior Professional Staff
Roberto Pabalan, Senior Professional Staff	Gene Rowe, Senior Professional Staff
Karyn Severson, Director of External Affairs	

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- 1. Chairman's Welcome and Meeting Overview** – Chairman of the Board, Dr. Rodney Ewing, opened the meeting at 8:00 a.m. He welcomed everyone and gave an overview of the day's agenda.
  - 2. Adoption of Previous Minutes** – The Chairman inquired whether everyone in attendance had reviewed the minutes. All the Board members and staff in attendance affirmed that they had reviewed the minutes. No comments, questions, or concerns regarding the minutes were expressed. The minutes were accepted.
  - 3. Discussion of Workshop** – The Chairman invited everyone to share his or her main points from the two-day workshop held on November 18<sup>th</sup> and 19<sup>th</sup>. Many of the Board members noted that the topics of the workshop were new for them and the information shared was beneficial. There were several who expressed that the workshop sessions presented an opportunity to continue future discussions with stakeholders on the topics of spent fuel repackaging, transportation, direct disposal, and the overall fuel cycle. It was agreed that the workshop had a diverse group of participants that represented private citizens, industry, non-governmental organizations, regulators, and other federal entities. It was also noted that the format adopted for the workshop had proved to be appropriate and, with fine tuning to suit the particular circumstances, may be suitable for other workshops the Board may decide to hold in future. However, concern was also expressed that the objectives of the workshop may not have been clear to all participants, and this may have reduced the effectiveness of the technical discussion. For

future workshops, it was suggested that three questions could be developed in advance to form the basis for discussion and to keep the focus on the intended subject matter.

4. **Preparation of the Board Report on the Impact of Canister Designs** – In discussion of the Board report, it was agreed that the objective was to record the issues associated with repackaging and direct disposal, rather than to record the discussion at the workshop. The workshop was designed to inform the Board's report on the impacts of canister design. The main purpose was to inform the Department of Energy, Congress, other stakeholders and the general public of the issues in order to highlight that the current lack of an integrated program may result in problems, or at the very least inefficiencies, in the eventual implementation of a disposal program for SNF.
5. **Board and Staff Photos** – A brief break was taken to allow Board members and staff to gather for group photographs to be taken for posting on the Board's website and individual photographs to be taken for the file in preparation for potential use with Board passport applications.
6. **Comments on Board Public Meeting/Points to be Included in Follow-up Letter to DOE** – There was discussion on the presentations given by DOE representatives at the Board Public Meeting held on November 20, 2013. There was a consensus that the Board was particularly pleased with the initiative presented by the Oak Ridge National Laboratory's Research and Development Staff on the topic of *Integrating Standardization into the Nuclear Waste Management System*. However, it was noted that there appeared to be a trend towards DOE arranging presentations that give high-level overviews of DOE activities as opposed to more detailed technical data on planned work and results of past work. One exception to this was the presentation by Argonne National Laboratory staff on *Ductile-to-Brittle Transition Temperatures for High-Burnup PWR Cladding Alloys* and it was agreed that DOE and the national laboratories should be requested to include more technical detail in their presentations. However, it was also noted that the reason for DOE having made presentations with less detailed information on plans and results may be at least partially because of budget limitations reducing the number of staff who could travel to meetings and the conflict of the dates of the meeting with an industry conference in Charlotte, NC, that was also focused on spent fuel management. The observations shared by the Board members and senior professional staff will be used as the basis for preparing the customary letter to DOE following a Board meeting.
7. **Executive Lunch** – A working executive lunch was attended by the Board members, the Executive Director, the Director of External Affairs, and the Director of Administration. The Director of Administration provided an overview of the Board's status of funds at the end of the fiscal year 2013. The Director of External Affairs gave an overview of congressional activities as they relate to fiscal year 2014 funding, the continuing resolution, and the continuation of the sequestration. The Executive Director gave an update on the number of applications for the vacant nuclear engineer position and the Board's summer internship for 2014. In subsequent discussion, it was agreed that the closing date for applications for both positions should be extended through January 15, 2014<sup>1</sup>, to allow additional time for applications to be received and the positions should be re-advertised. Following discussion of this information, the three staff members left the lunch.
8. **Presentation on Interim Storage Location Analysis: An Update and Next Steps** – Dr. Linda Nozick gave an overview of the analysis she had conducted to investigate the impact of different

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<sup>1</sup> This was later extended further to allow applications to be submitted through January 31, 2014.



variables on the potential routing of SNF transportation operations from utility sites to a centralized storage facility or repository site. She also presented a summary of four potential approaches/options that she and Dr. Steven Becker had developed that could be recommended to DOE as next steps in extending the analysis of transportation routing for SNF being removed from the “stranded sites”. After her presentations, there was discussion on what additional work the Board should undertake in this area, and it was agreed that Drs. Nozick and Becker should draft a letter to DOE recommending a course of action and also consider whether the presentation could be further developed into a Board report.

9. **Update on Status of Report on Management of DOE Spent Nuclear Fuel** – Dr. Bret Leslie gave an update on his preparation of the draft report to DOE and Congress on the management of DOE’s spent nuclear fuel. The final staff draft of the report is expected to be completed early in calendar year 2014.
10. **Status of Draft and Potential Board Reports** – The Board members and senior professional staff gave updates on the following Board reports that are still in the developmental stages:
  - **NUWASTE Report on Analysis of U.S. Program and NUWASTE Factsheets** – Mr. Gene Rowe gave an update on the status of the NUWASTE reports and the NUWASTE Factsheets he proposed to prepare for Board review.
  - **Board Factsheet on Borehole Disposal of SNF and HLW and potential Board Report on DOE’s Exploration of Boreholes for Disposing of Spent Fuel** – Dr. Mary Lou Zoback gave an update on the revisions that had been made to the Borehole Factsheet prior to its transmission to DOE and some of the reactions to the document. She also discussed the possibility of preparation of more extensive Board report on the same topic. The Chairman asked that Drs. Bahr, Brantley, Zoback and Leslie review DOE’s planned research program on deep borehole disposal and recommend a format for responding or commenting on the DOE program for deep borehole disposal—through a formal report, a letter, or other means.
  - **Reports on the Trend to Higher Burnups; Partitioning; and Classification of Radioactive Wastes** – Dr. Roberto Pabalan provided an update on the status of three proposed reports. The three reports covered: (1) the implications of the trend to higher burn-up fuels for spent fuel nuclear management; (2) the implications of nuclear waste partitioning on geologic disposal of high-level waste; and (3) classification of radioactive wastes. There was discussion on the usefulness and viability of each of the reports. It was agreed that work on items 1 and 3 should continue with the goal of producing reports on these topics, but that work on a report on partitioning would not be pursued at the current time.
  - **Update to the Survey Report; Status of the Report on Designing a Process for Repository Site Selection** – Dr. Daniel Metlay provided an update on the status of these two reports.

- **Update on the Board Summary Report** – Ms. Karyn Severson provided an overview and discussion of a draft outline of a Board summary report that captures the Board's work in the period from January 2008 through December 2011.
- 13. Topics for Future Reports, and Factsheets** – The Chairman requested that the Board members and senior professional staff review the list of potential future reports and factsheets provided in the briefing book and to forward any additional ideas for reports to him. He recommended that everyone be cognizant of the importance of timing for drafting the reports.
  - 14. Comments on Trip and Meeting Reports** – Dr. Daniel Metlay provided an overview of his trip to Germany in October. His discussion included a review of the problems that had been encountered following disposal of low-level waste in the Asse facility and the present proposal to retrieve the waste.
  - 15. Future Board Meetings and Trips** – The planned dates and locations for future Board Public Meetings, site visits, and other meetings were reviewed. The schedule for the next Board public and business meetings in the period March 18 to March 20, 2014 was confirmed. This will include a site visit to WIPP at Carlsbad, New Mexico with a Public Meeting and Board Business Meeting to be held in Albuquerque, New Mexico. The other meeting dates for August 4 - 8 and October 27 - 30, 2014 were confirmed with the detailed schedules, locations and agendas to be determined later. There was also a review of the schedule and logistics for the May, 2014, site visit to China by a small delegation from the Board.
  - 16. Wrap Up and Adjournment** – The Chairman thanked everyone for their attendance and contributions to the week's meetings. He adjourned the meeting at 5:35 pm.



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UNITED STATES  
NUCLEAR WASTE TECHNICAL REVIEW BOARD  
2300 Clarendon Boulevard, Suite 1300  
Arlington, VA 22201

**Minutes of Board Business Meeting  
August 5 and 7, 2014**

Marriott Residence Inn  
635 W. Broadway  
Idaho Falls, Idaho 83402

*Board members attending on August 5, 2014*

Rodney Ewing, Chairman	Jean Bahr
Steven Becker	Sue Clark
Gerald Frankel	Linda Nozick
Lee Peddicord	Paul Turinsky
Mary Lou Zoback	

*Staff members attending on August 5, 2014*

Nigel Mote, Executive Director	Elaina Anderson, Staff Intern
Linda Coultry, Meeting Planner	Debra Dickson, Director of Administration
Bret Leslie, Senior Professional Staff	Daniel Metlay, Senior Professional Staff
Daniel Ogg, Senior Professional Staff	Roberto Pabalan, Senior Professional Staff
Gene Rowe, Senior Professional Staff	Karyn Severson, Director of External Affairs

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- 1. Chairman's Welcome and Meeting Overview** – Chairman of the Board, Dr. Rodney Ewing, opened the meeting at 6:30 p.m. He welcomed everyone and recognized Daniel Ogg and Elaina Anderson who had joined the Board staff since the previous Board Meeting. Following the welcome, the Chairman commented on the tour of the Idaho National Laboratory (INL) that had occurred earlier in the day. The Chairman also provided an overview of the agenda for the evening's meeting.
  - 2. Board and Staff Comments on INL Tour** – The Chairman invited the Board and staff members who had participated in the INL tour to summarize the points they considered most important from the facility visits and the discussions during the day. Based on the comments made, it appeared there was consensus that the INL tour was well orchestrated and planned.
  - 3. Briefing on Public Meeting** – Dr. Leslie presented background information for the topics to be discussed at the August 6, 2014, public meeting; he reviewed the agenda for the meeting and discussed the questions that would be addressed by presenters from the Department of Energy (DOE) and the national laboratories.
  - 4. Closing Comments and Adjournment** – The Chairman provided an overview of the remaining agenda for the week. He adjourned the meeting at 8:30 p.m.
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**Continuation of Minutes of Board Business Meeting  
August 7, 2014**

*Board members attending on August 7, 2014*

Rodney Ewing, Chairman	Jean Bahr
Steven Becker	Sue Clark
Efi Foufoula-Georgiou	Gerald Frankel
Linda Nozick	Paul Turinsky
Kenneth Peddicord	Mary Lou Zoback

*Staff members attending on August 7, 2014*

Nigel Mote, Executive Director	Elaina Anderson, Staff Intern
Linda Coultry, Meeting Planner	Debra Dickson, Director of Administration
Bret Leslie, Senior Professional Staff	Daniel Metlay, Senior Professional Staff
Daniel Ogg, Senior Professional Staff	Roberto Pabalan, Senior Professional Staff
Gene Rowe, Senior Professional Staff	Karyn Severson, Director of External Affairs

1. **Call to Order and Opening Comments** – Chairman of the Board, Dr. Rodney Ewing, opened the meeting at 8:05 a.m. and gave an overview of the day's agenda.
2. **Adoption of Previous Minutes** – The Chairman inquired whether everyone in attendance had reviewed the minutes. All the Board members and staff in attendance affirmed that they had reviewed the minutes. No comments, questions, or concerns were expressed by the Board members or staff. The minutes were accepted.
3. **Meeting with U.S. Department of Energy Assistant Secretary for Nuclear Energy** – The Chairman gave an overview of a July 2014 meeting held with the Honorable Peter D. Lyons, the Assistant Secretary for the DOE Office of Nuclear Energy (DOE-NE). The meeting was attended by the Chairman; Board Member, Dr. Paul Turinsky; the Board's Executive Director, Nigel Mote; senior professional staff member, Dr. Roberto Pabalan and Mr. Jeffrey Williams, Director, Nuclear Fuel Storage and Transportation Planning in DOE-NE. The Chairman noted that the meeting had been useful in following up with DOE on a number of important issues identified at the Board's March meeting in Albuquerque. Dr. Ewing said that Dr. Lyons had noted the Board's interest in DOE's work on deep bore-hole disposal and had indicated that Dr. William Boyle was the appropriate point of DOE contact for that subject.
4. **Update on report on Management and Disposal of DOE Spent Nuclear Fuel (SNF)** – Dr. Bret Leslie made a presentation on progress towards completing the report on the management and disposal of DOE SNF. The presentation included an overview of the sections of the report recording the SNF inventories at DOE sites and the status of the storage facilities. There was extensive discussion and comments from the Board members and staff regarding the recommendation section of the report and

how that information should be conveyed. Dr. Leslie requested that suggestions be forwarded to him by email; he also noted that he had e-mailed copies of the sections of the report concerned with the four main sites where DOE fuel is stored sans analyses and recommendations to DOE and Navy staff and was awaiting their comments.

5. **Comments on the Board Public Meeting and Suggestions for Follow-up Letter** – The Chairman invited the Board and staff to share their views on the presentations and the discussion from the public meeting held the previous day. The general Board and staff consensus was that the staff from the Office of Environmental Management (DOE-EM), the Idaho National Laboratory and Hanford had done an impressive job of conveying technical information and operational details on DOE activities. Staff from the DOE Office of Nuclear Energy had responded to the Board's requests for information in their presentations but without the same thoroughness and level of detail. In keeping with the Board's standard practice, formal comments regarding the public meeting were to be recorded in letters to DOE-EM and DOE-NE. The Board agreed that the DOE and INL staff who took part in planning and conducting the tour should be recognized and thanked in follow-up letters. Mr. Daniel Ogg was designated as the staff lead in drafting the letter.
6. **Review of Report on Implications of SNF Dry-Storage Canister Designs** – Mr. Nigel Mote provided an update on the status of the draft report on the implications of SNF dry-storage canister size for the radioactive waste management system. The presentation included a review of the format and content of the draft report. There was discussion following the presentation to address whether the report will include formal recommendations from the Board and, if so, whether they should be kept at a high level or be more detailed. It was agreed that work on the report should continue on the assumption that recommendations would be included and a formal decision regarding whether to include them would be made as the report moves towards completion.
7. **Lunch and Swearing-In** – The Chairman adjourned the meeting for the lunch break and for the Board to hold an Executive Session. Before the meeting resumed, five Board members who had been reappointed were sworn in. The members were the Chairman, Dr. Rodney Ewing, and Drs. Sue Clark, Linda Nozick, Paul Turinsky, and K. Lee Peddicord. The oath of office was administered by a local Idaho District Court Judge.
8. **Update on Designing a Process for Repository Site Selection Report** – Dr. Daniel Metlay provided an update on the draft report on *Designing a Process for Repository Site Selection*. There was discussion about the general organization of the report. Dr. Metlay requested that Board and staff email him comments and suggestions regarding the organization and content of the report. He noted that a draft of the full report will be ready for Board review in early October.
9. **Update on Summary Report** – Ms. Karyn Severson provided an update on the draft report that covers the Board's activities from January 1, 2008, through December 31, 2012. She noted that the substance of the report is complete with final work being done on the report's glossary and appendices. The Chairman said that the draft report should be circulated to the Board for one final review before publication. Ms. Severson noted that she anticipates publication mid-to-late October, 2014.
10. **NUWASTE Reports** – Mr. Rowe provided an update on the status of two NUWASTE reports: the system description; and the analysis of alternative scenarios for managing SNF in the United States.



The most recent drafts of the reports had been included in the briefing books for the meeting for information but not for detailed review. Following discussion of the reports, it was agreed that Mr. Rowe should put priority on finalizing the system description and take account of staff comments in preparing a version ready for Board review to be included in the briefing book for the October 2014 Board meeting.

11. **Implications of the Trend to Higher Fuel Burnup on SNF Management**– Dr. Roberto Pabalan presented an overview of the sections of a report on high burnup fuel that have been drafted. He indicated that the title of the report had been revised to better indicate the content of the document. The Chairman noted that the Board was not planning to issue a report on this subject in the near future but commented that it was useful to monitor the information available on high burnup fuel and have it compiled. This was both because it would be appropriate for the Board to issue a report on the implications of the trend towards higher burnup when the available information warranted it and because in the interim it was a useful internal resource. There was discussion about the report's regulatory tone as well some of its technical terminology. Dr. Pabalan noted that he will continue to work on the report to address the comments and suggestions made during his presentation but it was agreed this was not to be given high priority compared with other work.
12. **A Primer on Commingling** – Ms. Elaina Anderson presented a primer on the background and history of commingling defense wastes and commercial SNF. The presentation led to a discussion on the draft report on commingling reportedly being prepared by DOE. There was general consensus that the Board members and staff looked forward to the release of DOE's report on the topic.
13. **Update on Deep Borehole Disposal** – Dr. Mary Lou Zoback provided an update on the status of DOE's examination of deep borehole disposal. Following her attendance at the January 2014 workshop, she participated in a conference call on the topic. Dr. Zoback noted that she will remain engaged with DOE to follow their efforts in exploring the topic.
14. **Update on the Fall 2014 Board Meeting and Tour of Savannah River Site (SRS)** – Mr. Daniel Ogg gave a presentation on the schedule and agenda for the October 2014 tour of the Savannah River Site and the Board Public meeting. He discussed the layout of the SRS and identified the specific areas of the site that would be visited during the tour. Additionally, he provided a review of the topics DOE had been asked to address during the Board Public meeting.
15. **Future Meetings for 2015** – The Chairman reviewed the schedule for the Board meetings to be held in 2015. He noted that the Spring 2015 meeting dates are February 24 – 26, 2015, and the summer meeting is scheduled for June 23 – 25, 2015. He noted that the topics and locations for the meetings are still being considered.
16. **Update on the Board Delegation Meetings in China** - Dr. Ewing discussed the Board delegation trip to China. He noted that the technical exchanges between the Board and the Chinese officials were of value to the Board and its review of DOE activities. He pointed out that there was a full range of Chinese scientists that engaged in the exchange. The Board will continue to explore whether engaging in future international technical exchanges will be of benefit to the Board's review activities.

- 17. Comments on Trip and Meeting Reports** – The Chairman noted that the briefing book contained several trip and meeting reports and recommended that the Board members and staff review each of the reports.
- 18. Meeting Adjournment** – Dr. Ewing thanked everyone for their attendance and contributions to the week's meetings. He adjourned the meeting at 5:45pm.



UNITED STATES  
NUCLEAR WASTE TECHNICAL REVIEW BOARD  
2300 Clarendon Boulevard, Suite 1300  
Arlington, VA 22201

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**Minutes of Board Business Meeting  
March 18 and 20, 2014**

Marriott Hotel  
2101 Louisiana Blvd., NE  
Albuquerque, New Mexico

*Board members attending on March 18, 2014*

Rodney Ewing, Chairman	Jean Bahr
Steven Becker	Sue Clark
Efi Foufoula-Georgiou	Gerald Frankel
Linda Nozick	Paul Turinsky
Mary Lou Zoback	Susan Brantley

*Staff members attending on March 18, 2014*

Nigel Mote, Executive Director	Linda Coultry, Meeting Planner
Debra Dickson, Director of Administration	William Harrison, System Administrator
Bret Leslie, Senior Professional Staff	Roberto Pabalan, Senior Professional Staff
Gene Rowe, Senior Professional Staff	Karyn Severson, Director of External Affairs

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- 1. Chairman's Welcome and Meeting Overview** – Chairman of the Board, Dr. Rodney Ewing, opened the meeting at 8:55 a.m. He welcomed everyone and gave an overview of agenda for the two days of the Business meeting, noting that the Board public meeting was held on the intervening day.
  - 2. Adoption of Previous Minutes** – The Chairman inquired whether everyone in attendance had reviewed the minutes. All the Board members and staff in attendance affirmed that they had reviewed the minutes. No comments, questions, or concerns regarding the minutes were expressed. The minutes were accepted.
  - 3. Administrative and Personnel Updates** – The Chairman gave an update on administrative and personnel matters to include:  
[REDACTED]  
(2) filling a vacant position on the senior professional staff; and  
(3) the recent selection of an intern for the Board's inaugural summer internship position.
  - 4. Discussion of Board Letter Following the November 2013 Workshop and Meeting** – The Chairman reported on his meeting with DOE Assistant Secretary Dr. Pete Lyons to present and discuss the Board's customary follow-up letter that had been sent to DOE-NE after the November 2013 Workshop and Public Meeting. He indicated that, in retrospect, some of the points made in the letter were not central to the Board's areas of concern and suggested that future letters should be focused more clearly on those areas. This was agreed.

5. **Commenting on DOE Public Draft Documents** – The Chairman noted that there had been an increase in the number of requests from DOE for the Board to review drafts of reports and other documents, in some cases during the public comment period. He noted that the Board's role is to review activities undertaken by DOE, rather than reports, and that, in some cases, comments provided on draft reports and other documents might be considered to comprise input to DOE's programs, potentially resulting in a conflict of interest for the Board in reviewing subsequent DOE activities. The Chairman thus suggested that the Board should only provide comments on DOE reports and other documents as part of its broader review of DOE activities. In line with that principle, the Board discussed the appropriate level of involvement for four DOE documents:
  - a. **DOE Cask Demonstration Project Test Plan** – The Board agreed that it would be inappropriate to review the Test Plan as an individual activity but should prepare a letter to DOE Assistant Secretary Lyons providing comments on DOE's broader R&D program related to extended storage of high-burnup SNF. Dr. Roberto Pabalan was tasked with preparing a draft letter based on the record prepared by Dr. Kenneth Peddicord of the comments provided by Board members and staff on the Cask Demonstration Project Test Plan.
  - b. **DOE Disposal Options Study** – The Board also agreed that it would not be appropriate to comment at this time on the report on this study. Initial comments had been made to DOE on the results of the study in the Board's letter on issues from the November 2013 Board meeting in Washington, DC and no additional response was considered necessary. The Board may decide to provide additional comments to DOE when further reports, or the results of additional work in this area, are available .
  - c. **DOE Deep Borehole Study** – The Board agreed that it was appropriate to continue to review the work being done by DOE, the National Laboratories and others on this topic; however, no formal comments will be provided to DOE on the October 2013 report prepared by Sandia National Laboratories.
  - d. **DOE Project Plan for Assessment of Standardized Canisters** – The Board agreed that this work was at too early a stage to warrant providing formal comments but will review the results of the first year's assessment when they are available and may provide comments at that time.
6. **Presentation on Salt as a Geologic Medium for a SNF/HLW Repository** – Dr. Pabalan gave a presentation that addressed *Salt as a Geologic Medium for a SNF/HLW Repository* ahead of the public meeting the following day that would include a number of presentations on this issue. The presentation addressed the pros and cons of salt and the current knowledge gaps involved with using the medium. Dr. Pabalan also provided an update on DOE activities related to salt as a host rock for a geologic repository.
7. **Discussion of Draft Report on DOE SNF** – Dr. Bret Leslie made a presentation on the scope of the draft report on DOE's management of its spent nuclear fuel. During discussion he provided an overview of the context for the report; a summary of the recommendations to be included in the

report; the basis for the proposed recommendations; an overview of the next steps; and a tentative schedule for completing the report.

8. **NUWASTE** - Mr. Gene Rowe gave a presentation on the Board's Nuclear Waste Assessment System for Technical Evaluation (NUWASTE) tool. During the presentation he described the original objectives and foundations for developing the tool along with an overview of its previous applications. The presentation centered on a factsheet presenting the results of reprocessing some of the SNF in the US inventory. In discussion, the Board questioned the appropriateness of using the term "reprocessing" as the title of the factsheet when it was primarily presenting the results of analysis of the US SNF management system using NUWASTE. Following discussion about how use of NUWASTE pertains to the Board's mandate, the Chairman asked that all members and staff consider how NUWASTE can be used to support the Board's activities.
9. **Future Board Meetings** - There was a review of the upcoming Board meetings and other activities for the remainder of 2014 and into 2015. The dates and lead points of contact for the remaining Board meetings and trips in 2014 were reiterated. Dr. Sue Clark confirmed that the logistics for the trip to China in May 2014 were being finalized without any major concerns. Dr. Bret Leslie confirmed that he, along with Dr. Paul Turinsky, will be the lead points of contact for the August 2014 meeting in Idaho Falls, ID. The Chairman summarized the tentative plans for the October 2014 meeting in Augusta, GA and noted that the survey of Board members' availabilities indicated that the best time for the Board's spring meeting in 2015 would be the week of February 23 to 27, 2015. He asked all Board members and staff to keep those dates clear for the meeting.
10. **Planning Discussion: "The Year Ahead":**
  - a. **Update on DOE and NRC Activities Related to Licensing Yucca Mountain** - Dr. Bret Leslie gave an update on DOE and NRC activities related to licensing Yucca Mountain as a repository. He indicated that there are currently no related DOE activities that the Board should review but said that he and the other staff will continue to monitor the situation.
  - b. **Update on Ongoing DOE Activities Related to SNF and HLW Management** - Dr. Pabalan presented an overview of the DOE-NE Office of Fuel Cycle Technologies FY2014 Research and Development Programs.
  - c. **Outlook for Nuclear Waste Legislation and Other Congressional Actions** - Ms. Karyn Severson gave an overview of current legislative activities that pertain to the area of nuclear waste management. She noted that there is little likelihood that there will be any major relevant legislative activities for the remainder of the year in either the House or Senate. However, she noted that there appeared to be better prospects than in recent years for appropriations bills to move forward as scheduled.

Discussion of planning international activities was held over to the second day of the meeting when Dr. Daniel Metlay would be present.



**11. Future Board Reports** – There was discussion of one potential Board report that had been discussed at previous Board meetings, with discussion of other Board reports in preparation held for discussion on the second day of the meeting.

a. **Letter Report on Storage-Location Analysis/Update on DOE Modeling Effort** –

Drs. Linda Nozick and Steven Becker provided an overview of a routing analysis tool being developed by Vanderbilt University for DOE. DOE had arranged a demonstration of the tool for some Board members and staff, including demonstration of the impact of changing various operations and demographic parameters pertaining to routing of SNF/HLW shipments between facilities. Drs. Nozick and Becker noted that the tool was still under development but would potentially provide DOE with useful input to the routing analysis it will need to perform as the basis for developing a transportation program for SNF and HLW. They said they will continue to monitor its development and will provide future updates to the Board.

**12. Wrap-Up and Adjournment** – The Board reviewed the agenda for the public meeting scheduled for March 19, 2014, and discussed the agenda for the continuation of the business meeting which was scheduled to resume on March 20, 2014. The meeting was adjourned at 4:45pm.

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**Continuation of Minutes of Board Business Meeting  
March 20, 2014**

*Board members attending on March 20, 2014*

Rodney Ewing, Chairman	Jean Bahr
Steven Becker	Susan Brantley
Sue Clark	Efi Foufoula-Georgiou
Gerald Frankel	Linda Nozick
Paul Turinsky	Kenneth Peddicord
Mary Lou Zoback	

*Staff members attending on March 20, 2014*

Nigel Mote, Executive Director	Linda Coultry, Meeting Planner
Debra Dickson, Director of Administration	William Harrison, System Administrator
Bret Leslie, Senior Professional Staff	Daniel Metlay, Senior Professional Staff
Roberto Pabalan, Senior Professional Staff	Gene Rowe, Senior Professional Staff
Karyn Severson, Director of External Affairs	

1. **Call to Order and Opening Comments** – Chairman of the Board, Dr. Rodney Ewing, opened the meeting at 8:30am and gave an overview of the day's agenda.
2. **Comments on the Board Public Meeting** - The Chairman invited the Board and staff to share their views on the presentations and the discussion from the public meeting held the previous day. The general consensus was that, although the presentations were informative with impressive technical content, there appeared to be a lack of coordination between the DOE labs in their work in the areas discussed, including in the development and testing of their various models. The Board's formal comments from the public meeting will be recorded in a letter to DOE in accordance with the Board's usual practice. Dr. Pabalan was tasked with preparing a draft of the letter for staff review, followed by Board review.
3. **Discussion of Draft Board Report on Implications of SNF Dry-Storage Canister Designs** - Mr. Rowe provided an update on the preparation of the draft Board Report on *Impacts of Dry-storage Canister Designs on the Future Handling, Storage, Transportation, and Geologic Disposal of Spent Nuclear Fuel in the United States*. In discussion, the Board members and staff acknowledged that developing a comprehensive report that is both technical and comprehensible by the nontechnical person is a challenging task. Mr. Rowe indicated that he expected to complete the full draft for staff review by the end of April. Allowing a month for staff review and incorporation of comments, the report should be available for Board review by early June.
4. **Planning Discussion: "The Year Ahead" (Continued from the first day of the meeting)** - Dr. Metlay gave an overview of recent activities in SNF and HLW management and disposal in other countries. He indicated that developments in Belgium and Switzerland may make it appropriate for

delegations from the Board to meet with the implementers in those countries, and visit the facilities being developed, in the next few years.

## 5. Future Board Reports (Continued from the first day of the meeting):

- a. **Designing a Process for Repository Site Selection** – Dr. Metlay provided an update on the progress of the draft report on *Designing a Process for Repository Site Selection*. He also gave an overview of the site selection process—to include how the technical and social aspects of the process are considered. He indicated that he expected to have the draft report completed for inclusion in the briefing books for the August Board meeting.
- b. **Survey Report** – Dr. Metlay provided an update on the progress of updating the Survey of National Programs report. He noted that work on the draft report is progressing but the timing of the update will need to take account of developments in some key countries. He indicated he expected to have the information he needed in time to complete the draft of the updated report by the end of the fiscal year.
- c. **Trend to Higher SNF Burnups** – Dr. Pabalan discussed the status of his draft report and noted that he expected to have a draft report for Board members' review by early August.
- d. **NUWASTE Report on Analysis of U.S. Program** – Mr. Rowe inquired on whether the topic of the NUWASTE Report on Analysis of U.S. Program is relevant given the time that has passed since the inception of the idea for the report and the absence of DOE's work to which the report is relevant. The Board and staff agreed that the report should be completed and issued as a Board report. In response to the Chairman, Mr. Rowe confirmed that he was also resuming work on a report to demonstrate the scope and capabilities of NUWASTE and indicated that these two reports would be given priority following work to complete the "canister" report. He expected to have both reports drafted in time for them to be included in the briefing book for the August Board meeting following staff review.
- e. **Summary Report** – Ms. Karyn Severson provided an update on the draft report that covers the Board's activities from January 1, 2008, to December 31, 2012. She noted that the expected completion date for the staff's review is May, 2014, with subsequent Board review to follow incorporation of staff comments.
- f. **New Approach for Reviewing Future Reports** – The Executive Director, Mr. Nigel Mote proposed to the group a new approach to review Board reports and documents. With the new approach, a team of two senior professional staff and two Board members would be assigned responsibility for completing the initial review of a report, in sequence. Review by the full Board would then follow the initial review by the smaller team. He suggested this approach would both streamline the review process and be more economical with Board members' time. It was agreed that this should be tried for the reports currently in preparation.

## 6. Potential Topics for Future Board Reports or Factsheets:

- a. **Factsheet or Report on Location of SNF and HLW Storage Sites** – Dr. Mary Lou Zoback suggested the Board should prepare a report or a factsheet on the location of SNF and HLW storage facilities in the U.S. and the quantities of SNF and/or HLW stored at each site. Following discussion of how such a report or factsheet would fit the Board's legislative mandate, it was agreed that the Board should consider whether it would be appropriate to incorporate the data into future Board reports.
- b. **Partitioning** – Dr. Pabalan updated the Board on the status of preparation of a draft report on partitioning and noted that work on this topic is currently on hold. He reported that he has consolidated the information collected by the staff into the background sections for a report but, until DOE resumes work on the potential use of partitioning in the management of SNF, there was no basis for completing the remaining sections of the report.
- c. **Classification of Radioactive Wastes** – Dr. Pabalan reported that he had completed the sections of a report on classification of wastes that represented a primer for the Board to be provided in advance of a Board meeting when this was a topic to be addressed by DOE. Mr. Mote noted that DOE had been asked to include this as a topic for the previous two or three Board meetings but each time it had been held over for a future meeting.

## 7. Other Possible Future Activities – The Chairman invited the Board and staff to offer suggestions for future Board activities. Two suggestions were offered:

- a. Workshop to explore the differences between the performance of repositories in different potential disposal media, including granite, clay/shale, tuff and salt, according to the waste form or forms being disposed of.
- b. Workshop on the site selection process.

## 8. Comments on Trip and Meeting Reports – The following trip and meeting reports were reviewed and briefly discussed:

- a. **DOE Fuel Cycle Technologies Annual Review Meeting** - The meeting was attended by Drs. Peddicord and Pabalan, November 5 – 7, 2013.
- b. **Electric Power Research Institute – Extended Storage Collaboration Program Meeting** - The meeting was attended by Dr. Turinsky and Mr. Mote, December 3 – 5, 2013.
- c. **DOE Deep Borehole Meeting** – The meeting was attended by Dr. Mary Lou Zoback, January 7, 2014.
- d. **Institute of Nuclear Materials Management – Spent Fuel Seminar** – The seminar was attended by Mr. Mote, January 13 – 15, 2014.

- e. **Nuclear Regulatory Commission (NRC) with the Nuclear Energy Institute (NEI) - Public Meeting on Material Degradation** – The meeting was attended by Dr. Pabalan, January 24, 2014.
  - f. **Nevada Legislative Committee Meeting on High Level Radioactive Waste** – The meeting was attended by Mr. Mote, February 21, 2014.
  - g. **Energy Communities Alliance Meeting** – The meeting was attended by Ms. Karyn Severson, February 27, 2014.
  - h. **NRC/DOE Public Meeting on the Cask Demonstration Project** – The meeting was attended by Dr. Pabalan, March 6, 2014.
  - i. **NRC Regulatory Information Conference** – The conference was attended by Dr. Bret Leslie, March 11 – 13, 2014.
9. **Meeting Adjournment** – The Chairman thanked everyone for their attendance and contributions to the week's meetings. He adjourned the meeting at 4:30pm.
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UNITED STATES  
NUCLEAR WASTE TECHNICAL REVIEW BOARD  
2300 Clarendon Boulevard, Suite 1300  
Arlington, VA 22201

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**Minutes of Board Business Meeting  
October 28 and 30, 2014**

Augusta Marriott Hotel  
2 Tenth Street  
Augusta, GA 20901

*Board members attending on October 28, 2014*

Rodney Ewing, Chairman	Jean Bahr
Steven Becker	Susan Brantley
Efi Foufoula-Georgiou	Paul Turinsky
Mary Lou Zoback	

*Staff members attending on October 28, 2014*

Nigel Mote, Executive Director	Jayson Bright, IT Systems Administrator
Linda Coultry, Meeting Planner	Debra Dickson, Director of Administration
Bret Leslie, Senior Professional Staff	Daniel Metlay, Senior Professional Staff
Daniel Ogg, Senior Professional Staff	Roberto Pabalan, Senior Professional Staff
Gene Rowe, Senior Professional Staff	Karyn Severson, Director of External Affairs

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- 1. Chairman's Welcome and Meeting Overview** – Chairman of the Board, Dr. Rodney Ewing, opened the meeting at 6:30 p.m. and welcomed everyone. [REDACTED]

[REDACTED] He also recognized Jayson Bright who had joined the Board staff since the previous Board meeting as the IT Systems Administrator. Following those announcements, the Chairman reported on a meeting held the previous evening with business leaders, members of the community, and members of the staffs of a number of elected officials at the local, state and national levels. The meeting was attended by the Chairman, the Executive Director, the Director of External Affairs, and Daniel Ogg, of the Board's senior professional staff. The Chairman noted that the meeting was informative in that it allowed the Board participants to hear about the issues that are of importance to local stakeholders.

- 2. Briefing on Public Meeting** – Daniel Ogg reiterated some of the information the Board and Staff gleaned during the tour of the Savannah River Site earlier in the day. He also presented background information for the topics to be discussed at the October 29, 2014, public meeting; he reviewed the agenda for the meeting and discussed the questions that would be addressed by presenters from the Department of Energy (DOE).
- 3. Closing Comments and Adjournment** – The Chairman adjourned the meeting at 7:40 p.m.
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**Continuation of the Board Business Meeting  
October 30, 2014**

*Board members attending on October 30, 2014*

Rodney Ewing, Chairman	Jean Bahr
Susan Brantley	Efi Foufoula-Georgiou
Gerald Frankel	Paul Turinsky
Kenneth Peddicord	Mary Lou Zoback

*Staff members attending on October 30, 2014*

Nigel Mote, Executive Director	Jayson Bright, IT Systems Administrator
Linda Coultry, Meeting Planner	Debra Dickson, Director of Administration
Bret Leslie, Senior Professional Staff	Daniel Metlay, Senior Professional Staff
Daniel Ogg, Senior Professional Staff	Roberto Pabalan, Senior Professional Staff
Gene Rowe, Senior Professional Staff	Karyn Severson, Director of External Affairs

1. **Call to Order and Opening Comments** – Chairman of the Board, Dr. Rodney Ewing, opened the meeting at 8:00 a.m. and gave an overview of the focus for the day's business meeting.
2. **Adoption of Previous Minutes** – The Chairman inquired whether everyone in attendance had reviewed the minutes. All the Board members and staff in attendance affirmed that they had reviewed the minutes. No comments, questions, or concerns were expressed by the Board members or staff. The minutes were accepted.
3. **Meetings with U.S. Department of Energy Assistant Secretaries** – The Chairman reported on meetings held on October 10, 2014, with Dr. Peter D. Lyons, Assistant Secretary for the DOE Office of Nuclear Energy (DOE-NE) and on October 23, 2014, with Mr. Mark Whitney, Acting Assistant Secretary for Environmental Management (DOE-EM) to discuss the Board letters to DOE and recommendations following the August Board meetings in Idaho Falls, ID. The Chairman attended the meeting with Dr. Lyons via teleconference, with the Board's Executive Director Nigel Mote and senior professional staff members Bret Leslie and Karyn Severson attending in person. Other DOE-NE participants included Mr. Jeffrey Williams, who attended in person, and Dr. William Boyle, and Mr. Andy Griffith who joined the meeting by teleconference. The Chairman noted that the DOE representatives did not offer any considered response to the Board's recommendations discussed during the meeting.

The Chairman also attended the meeting with Mr. Mark Whitney by teleconference, with the Board's Executive Director, Mr. Nigel Mote, the Director of External Affairs, Karyn Severson, and Dr. Bret Leslie attending in person. Five additional DOE-EM staff also attended the meeting in person. The Chairman noted that the meeting with Mr. Whitney was productive and included a meaningful exchange of information between the DOE and Board participants concerning the issues raised in the Board's letter to DOE-EM and the recommendations. The Chairman commented that, at the conclusion of the meeting with Mr. Whitney, he and his staff indicated that they intended to provide a formal written response to the Board's recommendations.

4. **Comments on the Visit to Facilities at the Savannah River Site and the Board Public Meeting** – The Chairman invited the Board and staff to share their views on the site visit and the presentations and discussion at the public meeting held the previous day. The general Board and staff consensus was that the staff from the Savannah River Site had done an impressive job of conveying technical information and operational details on DOE activities at the Savannah River Site, as well as responding directly to the questions presented by the Board prior to the public meeting. Some of the topics that were consistent in the Board and staff comments included the commendable focus conveyed by the site's staff on getting the job done; the attention paid to integration of the site's operations, and the potential for the Savannah River Site to be a model for other DOE-EM sites. SNF Other Board and staff comments related to DOE's need to address specific bottlenecks in the site's operations, the negative impact of funding constraints, and the need for transparency regarding DOE's newly established Corporate Board.

Following the discussion of Board and staff comments, the Chairman proposed a new approach for drafting the letter to DOE, recording the key points from the meeting and the Board's recommendations. He indicated that it was intended to shorten the time taken to finalize the letter and provide it to DOE. He asked the staff to prepare a list of key points and recommendations during the lunch break that would form the basis of the letter to DOE. Then, immediately following the Board's Executive Lunch, this could be discussed by the Board and staff to ensure that it correctly reflected the Board's intentions, with the result that this should avoid some of the review cycles sometimes needed to finalize Board letters.

5. **Update on report on Management and Disposal of DOE Spent Nuclear Fuel (SNF)** – Dr. Bret Leslie made a presentation on the work done to revise and complete the report on the management and disposal of DOE SNF. The presentation included an overview of the sections of the report that had been revised since his previous presentation on the draft report. Dr. Leslie also gave a detailed review of the recommendations included in the draft report. The Board and staff provided comments and suggestions regarding the revised recommendations. Following the Board and staff comments, the Chairman designated a team to review the next iteration of the report. Dr. Leslie was tasked with providing a final draft of the report to the entire Board and staff by December 20, 2014. The designated review team members are senior professional staff members Daniel Ogg and Karyn Severson and Board members Paul Turinsky and Gerald Frankel.
6. **NUWASTE Report** – Mr. Rowe provided an update on the status of the NUWASTE system description report. He reviewed the revisions made since his previous presentation during the August 2014 Board meeting. Following discussion of the report, the Chairman designated a report review team. The team included Dr. Roberto Pabalan and Ms. Karyn Severson from the senior professional staff and Board members Dr. Linda Nozick and Dr. Efi Foufoula-Georgiou. It was agreed that Mr. Rowe would revise the report based on the comments made during the meeting and send the revised draft to the review team for review and comment. He was tasked with providing a final draft of the report to the full Board and staff by December 20, 2014.
7. **Executive Lunch and Staff Working Lunch** – The Board and staff participated in working lunches. The Executive Director, Director of External Affairs, and Director of Administration briefly attended the executive lunch with the Chairman and Board members to discuss the Board's status of funds as well as the Board's internship program for 2015 and recruitment of a spent nuclear fuels engineer.

The Board staff participated in a working lunch to collectively develop a list of key points and recommendations to be included in the follow-up letter to DOE-EM from the site visit and public meeting held on the two days prior to the meeting.

8. **Discussion Points for Follow-up Letters to DOE** – Mr. Daniel Ogg gave a presentation on the key points developed by the senior professional staff for the follow-up letter to DOE-EM. Following discussion, it was agreed that Mr. Ogg would prepare the draft letter to include the comments discussed and then forward to the Board for comment and review. The Chairman requested that the draft of the letter following staff review be forwarded to the Board members for review by November 21, 2014.
9. **Review of Report on Implications of SNF Dry-Storage Canister Designs** – Mr. Nigel Mote provided an update on the status of the draft report on the implications of SNF dry-storage canister size for the radioactive waste management system. He discussed the revisions that have been made to the report since the August 2014 update. The update included a review of the most current content of the draft report, including two levels of recommendations that could be included. Following discussion of the recommendations, it was agreed that the draft report to be provided for full Board review should include both levels of recommendation but whether or not both would be included in the final report would be determined during that review. The Chairman assigned a review team for the draft report. The team included Dr. Roberto Pabalan, Dr. Daniel Metlay, and Mr. Gene Rowe from the senior professional staff, plus Dr. Kenneth Peddicord and Dr. Jean Bahr from the Board. Mr. Mote was tasked with providing a final draft of the report to the full Board and staff by December 20, 2014.
10. **Discussion of Recent Events Relevant to the Board's Activities** – There were four staff presentations on recent events relevant to Board activities:
  - a. **Nuclear Regulatory Commission (NRC) Licensing Process** – Dr. Daniel Metlay presented an overview of the various steps involved in the NRC licensing process and where the recent release of the Yucca Mountain Safety Evaluation Report Volume 3, on the post-closure performance of the Yucca Mountain repository, fits into the process
  - b. **NRC Waste Confidence/Continued Storage** – Dr. Bret Leslie discussed the release of the NRC Final Rule on Continued Storage of SNF in September 2014, which overtakes the Waste Confidence Rulings issued previously by the NRC to support long-term storage of SNF in dry-storage canisters at utility sites.
  - c. **Resignation of NRC Chairman** – Ms. Karyn Severson discussed the potential implications of the recent resignation of the NRC Chairman.
  - d. **Release of *Disposal Options Report* by DOE-NE** – Dr. Bret Leslie gave an outline of the key points from the DOE report released the week prior to the meeting on disposal options for high-level waste and spent nuclear fuel. The report was prepared by a team led by DOE-NE and recommends that DOE pursue disposal of cooler defense-related SNF, including naval SNF, and high-level radioactive waste (HLW) from defense activities separately from other DOE SNF and HLW and commercial SNF. Following discussion, the Chairman recommended that the Board conduct a formal review of the scientific and technical issues related to the report and record its comments in a letter report to DOE. He indicated that he wanted to streamline production of the report to demonstrate that the



Board can “fast track” the preparation of short Board reports when appropriate. He indicated that Dr. Roberto Pabalan would take the lead on drafting the report with support from Dr. Daniel Metlay. He asked the Board members to review the DOE report and provide comments to Drs. Pabalan and Metlay by November 17, 2014, with a target for sending the final version of the Board’s letter report in early January 2015.

11. **Future Meetings** – The Chairman gave an update on the dates, topics, and locations for the 2015 Board meetings. He noted that the spring 2015 meeting will be a business meeting held in Atlanta, GA, on February 25 and 26, 2015, with travel days on February 24 and 28, 2015. He confirmed that the dates for the summer 2015 meeting are June 23 through 25, 2015 with travel days on June 22 and 26, 2015. The location and topic for the summer meeting are still to be determined. The fall 2015 meeting is scheduled to be held in the Washington, DC area during the week of October 19, 2015 with the number of days in the week and the topic for the meeting to be determined.
12. **Update on Report on Designing a Process for Repository Site Selection** – Dr. Daniel Metlay provided an update on the draft report on *Designing a Process for Repository Site Selection*. He discussed the most recent changes to the report following his August 2014 presentation. Following the presentation, there was a brief discussion on how to properly convey the non-linear filtering process in the report. Dr. Metlay noted that he welcomed any suggestions that would help clarify how to present the process in a figure in the report and asked that suggestions be sent to him via email. Subsequently, the Chairman assigned Board members Dr. Susan Brantley, Dr. Mary Lou Zoback, and Dr. Steven Becker, plus staff member Mr. Daniel Ogg, to complete the initial review of the report. The Chairman tasked Dr. Metlay with providing a final draft of the report to the full Board and staff by December 20, 2014.
13. **Discussion on Topics for Future Board Activities, Meetings, Reports, Factsheets, and Workshops** – The Board members and staff reviewed previously identified topics that were proposed by the senior professional staff for potential areas of focus in the coming year. Following the discussion, the Board agreed that a suitable topic for the summer 2015 meeting would be the transportation of SNF and HLW. There was support for arranging a workshop on deep borehole disposal for the fall 2015 meeting, but this was left for further consideration as more information becomes available on DOE’s plans to demonstrate the deep borehole disposal concept.
14. **Trip and Meeting Reports** – The Chairman reminded the Board and staff to review the trip and meeting reports included in the briefing books.
15. **Meeting Adjournment** – Dr. Ewing thanked everyone for their attendance and contributions to the week’s meetings. He adjourned the meeting at 5:00 pm.





UNITED STATES  
NUCLEAR WASTE TECHNICAL REVIEW BOARD  
2300 Clarendon Boulevard, Suite 1300  
Arlington, VA 22201

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**Minutes of Board Business Meeting**  
**February 25 – 26, 2015**  
Georgian Terrace Hotel  
659 Peachtree Street NE  
Atlanta, GA

*Board members attending on February 25, 2015*

Rodney Ewing, Chairman	Jean Bahr
Susan Brantley	Allen Croff
Efi Foufoula-Georgiou	Gerald Frankel
Linda Nozick	Paul Turinsky
Kenneth Peddicord	Mary Lou Zoback

*NOTE: Steven Becker was unable to attend due to weather-related travel difficulties*

*Staff members attending on February 25, 2015*

Nigel Mote, Executive Director	Jayson Bright, IT Systems Administrator
Linda Coultry, Meeting Planner	Debra Dickson, Director of Administration
Bret Leslie, Senior Professional Staff	Daniel Metlay, Senior Professional Staff
Daniel Ogg, Senior Professional Staff	Roberto Pabalan, Senior Professional Staff
Gene Rowe, Senior Professional Staff	Karyn Severson, Senior Professional Staff

1. **Chairman's Welcome and Meeting Overview** – Chairman of the Board, Dr. Rodney Ewing, opened the meeting at 8:30am. He welcomed everyone and introduced Allen Croff, who was newly appointed to the Board and had been sworn in by the Chairman. Following the welcome, the Chairman commented on the main points from the meeting held on January 23, 2015 with the Department of Energy (DOE) Assistant Secretary for Environmental Management to discuss the content of the Board's letter following the October 2014 technical visit to the Savannah River Site and the public meeting in Augusta GA. The Chairman noted that the DOE staff was well prepared for the meeting and the tone of the meeting had been positive. Finally, Dr. Ewing suggested that in the future, the Board post the follow-up letters to DOE on the Board website concurrently with him meeting with the appropriate DOE official to discuss the letter.
2. **Adoption of Previous Minutes** – The Chairman noted that he had reviewed the minutes and had no corrections to note. He inquired whether the Board and staff members had any corrections to the minutes. There were none noted. No additional comments, questions, or concerns were expressed by the Board members or staff. The minutes were accepted.
3. **Updates on Recent Events** - The following updates were presented to the Board and staff:
  - a. **Separate Repository Proposed for DOE Nuclear Waste** - Dr. Bret Leslie presented information on DOE disposal options that DOE is considering and could be available without requiring amendments to the Nuclear Waste Policy Act.

- b. **Private Proposal for a Consolidated Interim Storage Facility** - Ms. Karyn Severson provided an overview of a Texas-based commercial entity's intentions to submit a license application to the U.S. Nuclear Regulatory Commission (NRC) to develop a volunteer storage site for spent nuclear fuel. The Company asserted that licensing its planned facility will not require changes to the Nuclear Waste Policy Act.
  - c. **Potential Congressional Actions Related to Nuclear Waste** - Ms. Severson provided an update on potential draft nuclear waste legislative proposals that have been discussed on Capitol Hill. She noted that any changes to the Nuclear Waste Policy Act would have implications for the Board. Ms. Severson said that she will continue to keep the Board and staff abreast of relevant congressional activity.
- 4. **Discussion and Review of Draft Report on Designing a Process for Repository Site Selection** – Dr. Daniel Metlay presented an overview of his draft report on designing a process for repository site selection. He discussed the purpose of the report as well as the anticipated outcome in publishing the report. Additionally, he discussed the report's methodology, the evidence used to draft the report, and the report's framework, analysis, and findings. He then discussed the reviewers' comments and the efforts he had made to address the comments in the most recent draft of the report. Subsequent to the overview, there was an extensive group discussion regarding revisions to the report's findings. During the discussion, it was agreed that Dr. Metlay will revise the report's title and executive summary. Additionally, at the Chairman's direction, he acknowledged that the revised draft will include figure captions although these additions will not be considered precedent-setting for future standard with Board reports as each future report will be considered on a case by case basis. Finally, the Chairman instructed Dr. Metlay to send the revised draft to Drs. Frankel, Zoback, Nozick, and Brantley by March 2, 2015. Dr. Metlay was also instructed to schedule and arrange a video teleconference to discuss the revised version of the report no later than March 13, 2015.
- 5. **Board Executive Lunch** - The Executive Director and Director of Administration briefly attended the Board members' working lunch to discuss the Board's status of funds, the Board's internship program for 2015, recruitment of a spent nuclear fuels engineer, and the Stanford in Government Fellows Program for 2015. After discussing the aforementioned items, the Executive Director and Director of Administration departed the lunch.
- 6. **Presentation of Draft Report on the Nuclear Waste Assessment System for Technical Evaluation (NUWASTE)** – Mr. Rowe discussed the most recent changes that have been made to the draft report after having considered Board members' comments and suggested edits. Mr. Rowe inquired whether the Board would consider releasing the report as a staff report as opposed to a Board report given an assumption that there is some ambiguity in whether the report falls within the scope of reviewing DOE activities. It was agreed that the document would be released as a Board report and it would be released in conjunction with the Board's canister report since the NUWASTE tool is used to make calculations that are referenced in the canister report. It was also agreed that the NUWASTE code would not be released for use by others. Mr. Rowe was instructed to conduct a review of the NUWASTE description report to ensure that no information included in the report violate any of the limitations of the US nuclear export control system. The deadline for the review is no later than March 13, 2015. Additionally Mr. Rowe was instructed to revise the introduction of the

NUWASTE analysis of the US nuclear program. He was asked not include the pie diagrams that are in the most recent version of the draft report. Finally, Mr. Rowe confirmed that when the final report is released it will have all of the non-public references available in a folder on the Board's website. The revised draft of the introduction will be forwarded to the Chairman, Dr. Foufoula, Mr. Croff, Dr. Pabalan, and Ms. Severson for further review and comment no later than March 6, 2015.

7. **Yucca Mountain Safety Evaluation Report** – Dr. Bret Leslie provided a description of the NRC's safety evaluation report. During his presentation he discussed the NRC staff's findings and conditions of construction authorization for Yucca Mountain as well as the next steps for the NRC as it pertains to the Yucca Mountain licensing process.
8. **Update on Revisions to the Board's IT Systems** – Mr. Jayson Bright gave a presentation on the status of upgrading the Board's information systems infrastructure. He gave a high-level overview of the results of an independent assessment of the Board's IT systems. Mr. Bright discussed the steps that will be taken to address the recommendations and outcomes of the assessment. He gave an overview of planned improvements to the Board's IT infrastructure to include redesigning the Board's website. Mr. Bright noted that the target date for completing the first phase of the IT improvements is no later than September 30, 2015.
9. **Meeting Adjournment** – The meeting was adjourned at 4:30pm. The Board members then proceeded to a group photo session to include the new Board member.

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**Continuation of Minutes of Board Business Meeting  
February 25 – 26, 2015**

*Board members attending on February 26, 2015*

Rodney Ewing, Chairman	Jean Bahr
Susan Brantley	Allen Croff
Efi Foufoula-Georgiou	Gerald Frankel
Linda Nozick	Paul Turinsky
Kenneth Peddicord	Mary Lou Zoback

*NOTE: Steven Becker was unable to attend due to weather-related travel difficulties*

*Staff members attending on February 26, 2015*

Nigel Mote, Executive Director	Jayson Bright, IT Systems Administrator
Linda Coultry, Meeting Planner	Debra Dickson, Director of Administration
Bret Leslie, Senior Professional Staff	Daniel Metlay, Senior Professional Staff
Daniel Ogg, Senior Professional Staff	Roberto Pabalan, Senior Professional Staff
Gene Rowe, Senior Professional Staff	Karyn Severson, Senior Professional Staff

1. **Call to Order** – Chairman of the Board, Dr. Rodney Ewing, opened the meeting at 8:05 a.m. and reviewed the day's agenda. Following an overview of the agenda, the Chairman indicated that the 2016 spring meeting would be held during the week of February 15, 2016. He asked the Board

members to note the date and try to keep the week clear so that they could attend. Following that, the meeting proceeded.

2. **Review on Trip and Meeting Reports** - The Chairman reminded the group that there were several trip reports included in the printed briefing book. He also noted that the reports are available on-line. The Chairman suggested that the Board and staff read all of the reports given that some of the reports will not be discussed during the meeting. The following reports were discussed during the meeting:
  - a. **Report of Presentation at January 2015 INMM SNF Symposium** – Mr. Nigel Mote reported on the INMM SNF symposium that he and Mr. Daniel Ogg attended in January 2015.
  - b. **Deep Borehole Disposal Workshop** – Dr. Mary Lou Zoback reported on the deep borehole workshop she attended in Albuquerque, NM in November 2014.
3. **Presentation on Board Letter Report on Review of DOE Disposal Options** – Dr. Roberto Pabalan presented the key points from the DOE October 2014 *Disposal Options* Report and discussed the Board's letter to DOE in response to the report. Dr. Pabalan also indicated how he had dealt with comments provided by the Board and staff in revising the draft letter report to DOE. During his presentation he pointed out the specific reviewers' comments that were included in the revised letter report as well as those not included. He discussed the rationale he used in selecting which comments to adopt in the draft letter. Subsequent to Dr. Pabalan's presentation, the Board discussed which format would be the most effective format for recording comments on the DOE report, including recasting the letter report as a full Board report with a cover letter to the Secretary of Energy and to Congress. At the conclusion of the discussion, the Chairman instructed Dr. Pabalan to revise the draft letter report to take account of the comments he had received prior to and at the meeting, and to indicate where he would propose to include illustrations, call outs, text boxes and any other inserts in converting the draft to a Board report. Following consideration of the revised draft, the Board would determine whether the Board's comments were best presented as a letter report or a full Board report. The revised draft is due to the Board members for review and comment by March 13, 2015. If the Board decides to proceed with completion of a Board report, the target date for production of the printed version is April 30, 2015.
4. **Update on Draft Report on Management and Disposal of DOE Spent Nuclear Fuel** – Dr. Bret Leslie presented an update on the current status of his draft report on DOE's management of spent nuclear fuel. During his presentation he discussed the recommendations that are included in the current version of the draft report. Following his presentation, there was discussion on how the review team could better approach the formal review of the draft report. At the conclusion of the discussion it was agreed that Dr. Leslie will complete the report and send it for review to Mr. Daniel Ogg, Ms. Karyn Severson, Dr. Paul Turinsky and Dr. Gerry Frankel, prior to sending out to the full Board for review.
5. **Presentation and Discussion on Streamlining the Preparation of Board Documents and the Effectiveness of Board Activities** – Prior to Mr. Nigel Mote's presentation, the Chairman discussed the importance of expediently producing Board documents. He also discussed the implications of the Board's delay in publishing reports, letters, and other documents. Subsequent to the Chairman's opening statements, Mr. Mote presented a number of suggestions for improving the process for



production of Board reports and correspondence that came from discussion of this issue by the staff. This was followed by a brief discussion of how the preparation of Board documents could be streamlined and how the Board's activities could be focused to maximize their effectiveness. The Chairman indicated that time limitations precluded extended discussion of these issues but said that they should be included in the agenda for the June 2015 Board business meeting or the October 2015 Board business meeting for further discussion.

6. **Lunch** – The Chairman adjourned the meeting for a lunch break. The Board members held an Executive Lunch working session.
7. **Implications of the Use of Large Dry Storage Casks for the Spent Nuclear Fuel** – Mr. Nigel Mote provided an update on the current status of the report, including the revisions that had been completed and the additional text and other items to be inserted in completing the draft report. He noted, in particular, that the completed draft would include information from NRC and DOE documents that added information on activities such as indefinite SNF storage at reactor sites and estimated radiation doses to operators during repackaging. He indicated that he expected to send the completed draft to the initial review team by April 10, 2015.
8. **Future Board Meetings:**
  - a. **Summer Meeting** – The Chairman reminded the Board and staff that the dates for the summer 2015 meeting were June 23 to 25, 2015 and confirmed that the meeting will be held in Denver, CO. Dr. Linda Nozick agreed to be the Board member to act as the lead for planning the meeting with Mr. Daniel Ogg of the senior professional staff. Following that, Mr. Ogg discussed the tentative agenda for the meeting. He noted that the topic of the meeting will be those relevant to transportation of spent nuclear fuel and high level radioactive waste. Mr. Ogg gave an overview of the tentative agenda. Subsequent to Mr. Ogg's discussion of the agenda, there was agreement to forego the planned visit to the Transportation Technology Center. As an alternative to the site visit, June 23rd will be dedicated to reviewing and finalizing reports.
  - b. **Fall Meeting** – The Chairman noted that the Board's Fall Meeting for 2015 would be focused on deep borehole disposal and possibly include both a workshop and a public meeting. He reminded the Board members and staff that the dates for the meeting were October 20 through 22, 2015 in Washington, DC. The staff leads for the meeting will be Drs. Bret Leslie and Daniel Metlay and the Board member lead will be Dr. Mary Lou Zoback.
  - c. **Winter Meeting** – It was reiterated that the winter meeting will be held during the week of February 15, 2016 in Knoxville, TN with a site visit to the Oak Ridge National Laboratory.
9. **Potential Topics for Board Review** – Mr. Daniel Ogg gave a brief overview of the list of potential topics to consider for Board review. He explained to the Board members how the topics were organized in the briefing books. Ms. Karyn Severson noted that the topics were selected based upon DOE's current activities. The Chairman suggested that the Board members review the list of proposed activities included in the Briefing Book to ascertain those that could have the most significant impact



on the Board's review of DOE activities. The Board members were asked to send comments and recommendations to Dr. Bret Leslie and Mr. Daniel Ogg no later than March 6, 2015. Based upon the responses received, Dr. Leslie and Mr. Ogg were tasked with preparing at least two detailed recommendations to send to the Board no later than April 10, 2015.

- 10. Webcasting Future Meetings** – Mr. Daniel Ogg presented information on various options for webcasting future Board meetings. The presentation included a summary of the costs associated with webcasting as well as information on the various webcasting options that are available. Mr. Ogg concluded the discussion with a list of pros and cons associated with using webcasting technology. The Chairman suggested that the staff explore the available options and advise when the Board will begin webcasting its meetings. Mr. Ogg noted that he will explore webcasting options for the upcoming meeting in June.
- 11. Adjournment** – The Chairman thanked everyone for their contributions to the meeting. The meeting was adjourned at 3:15pm.



UNITED STATES  
NUCLEAR WASTE TECHNICAL REVIEW BOARD  
2300 Clarendon Boulevard, Suite 1300  
Arlington, VA 22201

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**Minutes of Board Business Meeting**  
**June 23 - 25, 2015**  
Denver Marriott West  
1717 Denver West Boulevard  
Denver, CO

Board members attending on June 23, 2015

Rodney Ewing, Chairman	Steven Becker
Susan Brantley	Allen Croff
Gerald Frankel	Linda Nozick
Paul Turinsky	Kenneth Peddicord

*NOTE: Efi Fousoula-Georgiou and Jean Bahr were unable to attend due to travel-related delays.  
Mary Lou Zoback was unable to attend due to a scheduling conflict.*

Staff members attending on June 23, 2015

Nigel Mote, Executive Director	Jayson Bright, IT Systems Administrator
Nicolette Brannan, Stanford Intern	Margaret Butzen, Staff Intern
Linda Coultry, Meeting Planner	Debra Dickson, Director of Administration
Robert Einziger, Senior Professional Staff	Bret Leslie, Senior Professional Staff
Daniel Metlay, Senior Professional Staff	Daniel Ogg, Senior Professional Staff
Roberto Pabalan, Senior Professional Staff	Karyn Severson, Senior Professional Staff

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- 1. Chairman's Welcome and Meeting Overview** – Chairman of the Board, Dr. Rodney Ewing opened the meeting at 7:20 p.m. and welcomed everyone. He recognized the Board's summer interns, Margaret Butzen and Nicolette Brannan. He gave Margaret and Nicolette an opportunity to introduce themselves to the group. Following their brief introductions, the Chairman asked Mr. Daniel Ogg to brief the group on the activities scheduled for the remainder of the week.
  - 2. Briefing on Public Meeting** – Mr. Daniel Ogg presented background information for the topics to be discussed at the June 24, 2015 public meeting; he reviewed the agenda for the meeting and discussed the questions that would be addressed by presenters from the Department of Energy (DOE). He also gave a brief summary about the presentations representatives from the DOE staff were scheduled to provide on Thursday, June 25, 2015 prior to the start of the Board business meeting.
  - 3. Closing Comments and Adjournment** – The Chairman adjourned the meeting at 8:15 p.m.
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**Continuation of Minutes of Board Business Meeting  
June 23 - 25, 2015**

*Board members attending on June 25, 2015*

Rodney Ewing, Chairman	Jean Bahr
Steven Becker	Susan Brantley
Allen Croff	Efi Foufoula-Georgiou
Gerald Frankel	Linda Nozick
Kenneth Peddicord	Paul Turinsky

*NOTE: Mary Lou Zoback was not able to attend the meeting due to a scheduling conflict.*

*Staff members attending on June 25, 2015*

Nigel Mote, Executive Director	Jayson Bright, IT Systems Administrator
Nicolette Brannan, Stanford Intern	Margaret Butzen, Staff Intern
Linda Coultry, Meeting Planner	Debra Dickson, Director of Administration
Robert Einziger, Senior Professional Staff	Bret Leslie, Senior Professional Staff
Daniel Metlay, Senior Professional Staff	Daniel Ogg, Senior Professional Staff
Roberto Pabalan, Senior Professional Staff	Karyn Severson, Senior Professional Staff

1. **Presentation and Demonstration** – Dr. Erica Bickford from the Department of Energy and Dr. Mark Abkowitz from Vanderbilt University gave a presentation and demonstration on a transportation assessment tool under development—*Stakeholder Tool for Assessing Radioactive Transportation (START)*. This presentation was made at the Board business meeting rather than in the public meeting because of concern in DOE that some of the information in the START system was considered Official Use Only and not appropriate for demonstration in a public meeting. During the presentation and demonstration, the Board members and staff expressed significant interest in the tool and posed several questions to the presenters. Dr. Bickford provided a URL link to a website that would allow the Board and staff to gain access to the tool to learn more about its development and capabilities.
2. **Call to Order** – Chairman of the Board, Dr. Rodney Ewing, opened the meeting at 8:30 a.m., after the DOE participants vacated the room; he then reviewed the day's agenda. Following an overview of the agenda, the Chairman reported on a meeting held prior to the release of the Board's *Report on Evaluation of Technical Issues Associated with the Development of a Separate Repository for U.S. Department of Energy-Managed High-Level Radioactive Waste and Spent Nuclear Fuel*. The meeting was attended by the Chairman, Drs. Daniel Metlay and Bret Leslie of the Board's senior professional staff. The DOE staff in attendance included the Secretary of Energy Ernest Moniz, Dr. Monica Regalbuto, Mr. John Kotek, Ms. Mary Louise Wagner, and Dr. Franklin Orr. The Chairman noted that one significant point made by DOE leadership during the meeting was that they were focused on drilling a 5-kilometer deep bore hole by October 2, 2016. Dr. Daniel Metlay noted that the level of seniority of the DOE staff in attendance could be viewed as an indication of the importance DOE placed on the meeting topic. The Chairman noted that in general he was pleased with the meeting discussion and thanked everyone for their work and contributions to completing the report and facilitating the pre-publication meeting with the DOE representatives. Following that, Ms. Karyn Severson gave an overview of recent legislative updates pertaining to nuclear waste disposal and other matters pertinent to the Board's review of DOE activities. She also noted that the July 9<sup>th</sup> hearing before the Senate Energy Committee on nuclear waste legislation had been postponed until August 4<sup>th</sup>.

3. **Adoption of Previous Minutes** – The Chairman inquired whether everyone in attendance had reviewed the minutes from the February 2015 business meeting and whether any changes were required. No changes were suggested by the Board and staff; however, the Chairman noted that one change was needed—to add his name as a reviewer of the draft report on *Designing a Process for Repository Site Selection*. Following that, the Board members and staff in attendance affirmed that they had reviewed the minutes. The minutes were accepted with the aforementioned change duly noted.
4. **Update on Draft Report on Management and Disposal of DOE Spent Nuclear Fuel** –Dr. Bret Leslie presented an update on the current status of his draft report on DOE’s management of spent nuclear fuel. During his presentation, he discussed the current timeline for the report review. Dr. Leslie indicated that the draft report was ready for initial review and comments were due to him by July 19, 2015. Following revisions to reflect initial comments, the draft report will be submitted for full Board review by August 14, 2015. The target date for copy editing for final publication is October 2015. The review team includes the Chairman, Dr. Paul Turinsky, Mr. Allen Croff, Dr. Gerry Frankel, Ms. Karyn Severson and Dr. Robert Einziger.
5. **Future Meetings** –
  - a. **February 16 – 18, 2016:** Dr. Robert Einziger gave an overview of the possible agenda and discussion options for the Board’s 2016 winter meeting. The focus of the meeting is *Research and Development on the Performance of Spent Nuclear Fuel during Storage and Transportation*. Dr. Einziger asked the Board and staff to review the proposed agenda included in the briefing books and provide comments to him. He also asked for suggestions for the scope of the tour of the Oak Ridge National Laboratory that will take place prior to the public meeting. There were several preliminary suggestions offered for related technical topics and industry points of contact to consider. The Chairman approved of the draft agenda and asked Dr. Einziger to proceed with planning the meeting.
  - b. **October 20 – 22, 2015:** Dr. Bret Leslie gave an overview of the agenda for the Board’s fall meeting and workshop. The topic for the meeting and workshop is *Deep Borehole Disposal*. Dr. Leslie noted that he has worked with the Chairman, Drs. Mary Lou Zoback, Jean Bahr and Daniel Metlay in preparing the draft agenda for the meeting. As Dr. Leslie reviewed the agenda, there was expressed concern about the number of panels scheduled for the meeting. It was recommended that the planning team ensure there is ample time to contribute information that will enrich the overall outcome of the workshop. There was discussion on how to maximize the use of the panels and better facilitate the interaction within the panel. The Chairman instructed the planning team to reevaluate how the panels will be convened and organized. . Dr. Leslie was asked to compile and review the suggestions and provide the Board and staff members with a list of the speakers and panels members that were identified to participate, the list of questions to be addressed, and his proposal for the Board report on deep borehole disposal. Finally, in an effort to encourage wide participation, Dr. Leslie was asked to disseminate information about the October 2015 workshop on *Deep Borehole Disposal* to appropriate universities and professional associations no later than July 31, 2015.

6. **Discussion of Public Meeting** - The Chairman invited the Board and staff to comment on the public meeting held on Wednesday, June 24, 2015. The Board and staff comments were recorded by Drs. Roberto Pabalan and Bret Leslie to be discussed and summarized during the staff lunch. The consolidated comments will form the basis for the customary follow-up letter to the Department of Energy's Office of Nuclear Energy (DOE-NE).
7. **Board Executive Lunch and Staff Working Lunch** – The Board and staff participated in working lunches. The Executive Director and Director of Administration briefly attended the executive lunch with the Chairman and Board members to discuss the Board's status of funds as well as the Board's recruitment of a technical editor. The staff participated in a working lunch to collectively develop a list of key points and recommendations to be included in the follow-up letter to DOE-NE from the public meeting held on June 24, 2015.
8. **Discussion Points for Follow-up Letters to DOE** – Dr. Bret Leslie gave a presentation on the key points developed by the senior professional staff for the follow-up letter to DOE-NE concerning the public meeting and site visit. Following the presentation and discussion, the Board members agreed that the staff accurately recorded and summarized the main discussion points to be conveyed in the letter. Mr. Daniel Ogg indicated that he would draft the initial letter for Board review. The draft letter is scheduled to be ready for the Board members' review and comment no later than July 13, 2015.
9. **Update on Report on Designing a Process for Repository Site Selection** – Dr. Daniel Metlay provided an update on the draft report, *Designing a Process for Repository Site Selection*. He discussed the latest changes to the report. Collectively, the group approved the revisions to the draft report. There was also discussion and a final consensus on the draft final recommendations that will be included in the final report. Dr. Metlay indicated that he would finalize the changes to the draft report before July 9th, and will resubmit the report to the copy editor for final review and formatting. The report is scheduled to be ready for publication on or before September 30, 2015.
10. **Upcoming International Exchanges and Travel** – The Chairman discussed an international exchange with the Swiss Federal Nuclear Safety Inspectorate (ENSI) scheduled for Friday, October 23rd in Washington, DC after the Board's public meeting and workshop. The Chairman also discussed a proposed Board trip to Belgium and Switzerland in June 2016; he noted that the purpose and focus of the trips are to tour the two countries' repositories and test sites. The agenda, exact dates, and logistics of the trip will be planned to take account of the availability of time in the schedules of the Swiss organizations with whom the delegation plans to meet. Drs. Metlay and Peddicord were designated as lead planners for the trip.
11. **NUWASTE Report** – Mr. Daniel Ogg provided an update on the status of the NUWASTE system description report. Prior to Mr. Ogg's discussion, the Executive Director, Mr. Nigel Mote explained the background of how Mr. Ogg had become the current lead on drafting the report. Following that, Mr. Ogg noted that the current draft had been considered complete at the February 2015 Board meeting; however, since that time, additional comments and suggested revisions had been received and included in the most recent version of the draft report. Mr. Ogg discussed the changes that had been made and provided an overview of the timeline to publish the final report. Mr. Ogg noted that following the Board members' and staff's final review, the final report will be forwarded for copy edit and layout no later than July 24, 2015 with a target of submission for publication by August 7, 2015.



The Chairman noted that the NUWASTE systems description report will be published concurrent with the report on *Implications of SNF Dry-Storage Canister Designs* (Canister Report). The target date for the initial review of the *Canister Report* is July 31, 2015. The review team includes the Chairman, Dr. Jean Bahr, Dr. Lee Peddicord, Dr. Roberto Pabalan and Mr. Daniel Ogg.

**12. Potential Topics for Future Board Review** – Mr. Daniel Ogg gave an overview of the list of potential topics to be considered for Board review. He explained how the senior professional staff selected the proposed topics. He noted that in the selection process, the staff considered whether a proposed topic was within the Board's legislative mandate as well as the topic's priority and value in the Board's review. Following are the topics discussed:

- a. **Deep Borehole Disposal:** Dr. Bret Leslie discussed a proposed report on *Deep Borehole Disposal*. Dr. Leslie reviewed the scope of a proposed report and asked the Board members to review the draft scope. The Chairman asked the Board members to provide comments on the draft outline by July 13, 2015.
- b. **High Burnup Spent Nuclear Fuel Degradation:** Dr. Robert Einziger discussed the scope of a proposed report on *High Burnup Spent Nuclear Fuel Degradation*. The Board members agreed that there would be value in preparing a report on the topic and as such, the Chairman instructed Dr. Einziger to proceed in drafting the outline for the proposed report, and he noted that the report should include aspects related to disposal of these fuels.
- c. **Dry-Storage Canister Degradation:** Mr. Daniel Ogg presented the scope and purpose of a proposed report on *Dry Storage Canister Degradation*. Comments were offered that it may be too early to begin such a report until more information becomes available from industry efforts to gather data and complete modeling studies of the corrosion mechanisms affecting dry-storage canisters. The Chairman agreed that the staff should continue to gather information on the topic and present the proposal again at the October 2015 Board meeting.

The Chairman asked that the Board members review the remaining list of proposed topics included in the Briefing Book to ascertain those that could have the most significant impact on the Board's review of DOE activities. Following that, Mr. Mote asked the Board members to review the format and content of the report outline on *High Burnup Spent Nuclear Fuel Degradation*. He noted that the outline is the standard format proposed by the staff for use in preparing future report outlines. He asked for comments on the proposed format no later than July 17, 2015.

**13. Discussion of Draft Board Input to DOE Request for Information (RFI)** – Mr. Nigel Mote discussed the Board's draft responses to two DOE RFIs on recommendations for infrastructure investments and for work scope developments. Following the presentation, the Board and staff discussed the value in submitting a response to DOE in response to an RFI and all agreed that a formal response to the RFIs should not be pursued and instead, the draft recommendations that would have been presented in the RFI responses should be included in future Board reports.

**14. Adjournment** – The Chairman departed and thanked everyone for their contributions to the meeting. Mr. Mote adjourned the meeting at 4:15pm.



UNITED STATES  
NUCLEAR WASTE TECHNICAL REVIEW BOARD  
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**Minutes of Board Business Meeting  
October 19 and 22, 2015**  
Embassy Suites Hotel  
1250 22<sup>nd</sup> Street, NW  
Washington, DC

Board members attending on October 19, 2015

Rodney Ewing, Chairman	Jean Bahr
Steven Becker	Susan Brantley
Allen Croff	Efi Foufoula-Georgiou
Gerald Frankel	Linda Nozick
Kenneth Peddicord	Paul Turinsky
Mary Lou Zoback	

Staff members attending on October 19, 2015

Nigel Mote, Executive Director	Jayson Bright, IT Systems Administrator
Margaret Butzen, 2015 Staff Intern	Linda Coultry, Meeting Planner
Debra Dickson, Director of Administration	Bret Leslie, Senior Professional Staff
Daniel Metlay, Senior Professional Staff	Eva Moore, Meeting Planner
Daniel Ogg, Senior Professional Staff	Roberto Pabalan, Senior Professional Staff
Karyn Severson, Senior Professional Staff	

*Robert Einziger, Senior Professional Staff, was on official travel and did not attend the meeting.*

- 1. Chairman's Welcome and Meeting Overview** – Chairman of the Board, Dr. Rodney Ewing opened the meeting at 6:30 p.m. and welcomed everyone. He recognized Ms. Eva Moore, a newly hired staff member. The Chairman gave Ms. Moore an opportunity to introduce herself to the group. The Chairman then thanked everyone for their individual work and contributions to planning and organizing the workshop. Dr. Mary Lou Zoback concurred with the Chairman and made a few brief comments.
- 2. Briefing on Workshop** – The Chairman asked Dr. Bret Leslie to brief the group on the logistics and other important details pertaining to the Deep Borehole Workshop. Dr. Bret Leslie gave an overview of the two-day Deep Borehole Disposal Workshop that was scheduled for Tuesday, October 20 and Wednesday, October 21, 2015. During the presentation Dr. Leslie discussed the background of deep borehole disposal, followed by an overview of the topics and panel sessions that would take place during the workshop. Additionally, Dr. Leslie reviewed the logistical movements regarding how each panel group would be assembled and situated throughout the course of the two-day workshop.
- 3. Presentation on Hydrologic Review of Deep Borehole Disposal** – The Board's 2015 staff intern, Margaret Butzen, was invited to give a presentation to the Board and staff members to culminate the work she had done during her internship. During the presentation, Ms. Butzen gave

a summary overview of the deep borehole disposal concept. She discussed the Department of Energy's field test, as well as the location of other deep drilling projects that had been done in areas with crystalline rock. Following the discussion of the field test and drilling projects, Ms. Butzen gave the Board and staff feedback on her internship experience and offered suggestions that should be considered when the Board offers future internship opportunities.

**4. Closing Comments and Adjournment** – The Chairman adjourned the meeting at 8:20 p.m.

**Continuation of Minutes of Board Business Meeting  
October 19 and 22, 2015**

*Board members attending on October 22, 2015*

Rodney Ewing, Chairman	Jean Bahr
Steven Becker	Susan Brantley
Allen Croff	Efi Foufoula-Georgiou
Gerald Frankel	Linda Nozick
Kenneth Peddicord	Paul Turinsky

Mary Lou Zoback

*Staff members attending on October 22, 2015*

Nigel Mote, Executive Director	Jayson Bright, IT Systems Administrator
Daniel Campbell, Technical Editor	Linda Soultrey, Meeting Planner
Debra Dickson, Director of Administration	Bret Leslie, Senior Professional
Daniel Metlay, Senior Professional Staff	Eva Moore, Meeting Planner
Daniel Ogg, Senior Professional Staff	Roberto Pabalan, Senior Professional Staff
Karyn Severson, Senior Professional Staff	

*Robert Einziger, Senior Professional Staff, was on official travel and did not attend the meeting.*

- 5. Call to Order** – Chairman of the Board, Dr. Rodney Ewing, opened the meeting at 8:15 a.m. by welcoming the Board and staff. The Chairman welcomed the Board's new technical editor Daniel Campbell to the group and he gave Mr. Campbell an opportunity to tell the group about himself. Following Mr. Campbell's brief comments, the Chairman gave an overview of the day's agenda. He then reported on a meeting held with Department of Energy (DOE) representatives on September 6, 2015 to discuss the Board's letter following the June 2015 Public Meeting. The September 6, 2015, meeting was attended by the Chairman, Board member Dr. Gerald Frankel, and Mr. Daniel Ogg of the Board's senior professional staff. The DOE staff in attendance included Mr. John Kotek, the Assistant Secretary for Nuclear Energy, Ms. Melissa Bates, and Mr. Andy Griffith via telephone. The Chairman noted that during the meeting, the major points of the Board's follow-up letter were discussed. He said generally, the tone of the meeting was polite, straightforward, and constructive. Mr. Daniel Ogg noted that DOE would prepare a response to the Board's letter and Mr. Nigel Mote followed up by pointing out that Mr. John Kotek had indicated that DOE will resurrect the practice of responding to Board letters as a standard practice. Several Board members and staff expressed that they looked forward to reviewing the DOE response letters.

6. **Adoption of Previous Minutes** – The Chairman inquired whether everyone in attendance had reviewed the minutes from the June 2015 business meeting and whether any changes were required. No changes were suggested by the Board or staff. The minutes were accepted.
7. **Discussion of Workshop Points to be Included in Letter to DOE** – The Chairman invited the Board and staff to comment on the Board's two-day workshop held on October 20 and 21, 2015. However, prior to the Board and Staff members' comments, the Chairman stressed that it was critical that the customary follow-up letter to DOE be finalized and forwarded no later than January 2016. He indicated that the letter should include two parts—a main part or beginning section that is comprised of three to five major points, followed by a second section with a discussion about each of the seven panels from the workshop. Dr. Mary Lou Zoback echoed the Chairman's statement about the importance of the letter being transmitted to DOE by early January. She noted that DOE was scheduled to meet with potential drilling contractors in February 2016 and the Board letter could be valuable in DOE's decision-making process. Following that, the Board and staff members shared their personal observations of the workshop. At the conclusion of the comment period, the group took a short break.
8. **Continuation of Discussion of Workshop Points to be Included in Letter to DOE** – Following the break, the discussion continued about the follow-up letter to DOE. The Chairman allowed Board members and staff to make additional general comments following what had been discussed in the previous session. Dr. Efi Foufoula-Georgiou discussed a graphic she developed to capture and convey the Board's collective and key concerns regarding DOE's conceptual plans for deep borehole disposal. The group discussed the graphic and made suggestions for additional information that could be included in the graphic. Dr. Mary Lou Zoback noted that the graphic would be good to include in the Board's letter to DOE. The Chairman indicated that he and Dr. Mary Lou Zoback would draft the first section of the follow-up letter and each of the workshop panel members should draft a summary of the respective panel sessions. The Chairman asked Dr. Foufoula-Georgiou to further develop the diagram and forward the graphic to him and Dr. Mary Lou Zoback.
9. **Board Executive Lunch and Staff Working Lunch** – The Board and staff participated in working lunches. The Executive Director and Director of Administration briefly attended the executive lunch with the Chairman and Board members to discuss the Board's status of funds as well as the Board's recruitment of an additional Senior Professional Staff member. The staff participated in a working lunch to collectively develop a list of key points to be included in the follow-up letter to DOE's Office of Nuclear Energy recording the Board's findings and recommendations from the workshop held on October 20 and 21, 2015.
10. **Board Discussion of Points for Follow-up Letter to DOE** – Dr. Bret Leslie presented the senior professional staff's compiled version of the comments and observations shared during the morning sessions. Subsequent to Dr. Leslie discussing the main points for the letter, the Board members provided suggestions on how to arrange and include the summarized comments in the follow-up Technical Memorandum. In an attempt to determine the best format to convey the Board's observations and comments about the Deep Borehole Workshop it was suggested that the Board publish a *proceedings* document that would include direct quotes from the workshop



presenters and panel members, as well as Board members' comments. After an extensive discussion about various potential formats that would best capture the Board's comments and review of the workshop presentations, panels, and discussions, it was agreed that a letter would be the most appropriate option given that a proceedings document would have required advanced actions and planning. Following the discussion, it was agreed that Dr. Leslie would forward the senior professional staff's draft outline of the comments shared during the morning session to Dr. Mary Lou Zoback. The Chairman also asked that Dr. Leslie prepare a pie-chart to demonstrate the activity represented by cesium and strontium capsules in 2048 as a percentage of the total activity in DOE-managed spent nuclear fuel and high level waste to include in the letter. The Chairman noted that he and Dr. Zoback would forward the draft letter to the Board members and senior professional staff for comment and review by Friday, October 30, 2015. The Chairman asked that Mr. Daniel Campbell edit the draft as it is being developed by the group. In addition, Mr. Campbell noted that he would review the archived webcast of the workshop and produce a draft proceedings-type document for the session in which Dr. Jean Bahr acted as moderator. Dr. Bahr was asked to forward her written review of the panel session to Mr. Campbell.

#### **11. Discussion of Reports and other related matters:**

- a. **Report on Implications of Canister Size** – Mr. Nigel Mote gave an update on the status of the draft *Report on Implications of Canister Size*. The draft report will be submitted to the review team by November 30, 2015. The report reviewers are Board members Drs. Lee Peddicord, Jean Bahr, and senior professional staff members Dr. Roberto Pabalan and Mr. Daniel Ogg.
- b. **Report on Management and Disposal of DOE Spent Nuclear Fuel (SNF)** – Dr. Bret Leslie provided an update on the status of the draft *Report on Management and Disposal of DOE SNF*. He noted that he is completing the findings and recommendations sections of the report and will forward the revised findings and recommendations to the review team by mid-November. The report reviewers are Drs. Paul Turinsky, Rod Ewing, Gerald Frankel and Allen Croff.
- c. **Siting Report** – Dr. Daniel Metlay indicated that the Siting report was in the final editing and layout phase. Dr. Metlay explained the final draft was not able to address all the comments provided by Mr. Allen Croff, who joined the Board well after the report had been written and reviewed by the Board and staff. After some discussion, it was agreed that a footnote would be included on the Board member page of the report to indicate that Mr. Croff joined the Board after the report was near completion.
- d. **Board Member Concurrence on Reports** - The Chairman suggested that the Board adopt a new administrative procedure for future reports and other formal Board documents, for the Board members to record that they have: (1) reviewed the report, and/or (2) consent to the release of the report. The Board members agreed to adopt the new procedure. The new procedure will be followed for all future reports including those that are currently in the beginning draft stages.
- e. **Proposed Report on Chloride Induced Stress Corrosion Cracking (CISCC)** – Mr. Daniel Ogg gave an overview of a proposed report on CISCC in dry storage canisters containing spent nuclear fuel. During the discussion, Mr. Ogg provided an overview of



how chloride-induced stress corrosion cracking can occur; he also addressed some of the on-going research on the topic. However, he recommended that the Board not develop a report on CISCC at this time, but proposed other potential Board actions based upon published research and other work that is available on the topic of CISCC. Subsequent to the discussion, Dr. Gerald Frankel noted that the topic is very important and suggested that the Board consider hosting a public meeting to learn more about DOE activities related to CISCC. The Board and staff members agreed that preparation of a report or letter be reconsidered after DOE has conducted further research on the topic.

- f. **Factsheets on SNF and High-level Radioactive Waste (HLW)** – Dr. Roberto Pabalan discussed six fact sheets that were drafted and/or updated, by Nicolette Brannon, the Stanford in Government Intern that worked with the Board during the 2015 summer months. Dr. Pabalan indicated that fact sheets had been reviewed and edited by the senior professional staff members. He noted that, with the Board members' approval, the fact sheets were ready for public release. The Chairman commended the staff for completing the factsheets and encouraged the senior professional staff to consider additional factsheets that could be prepared on relevant topics, including from issues addressed in the Board's past reports, as well as Board reports currently in preparation. Dr. Steven Becker suggested that it would be beneficial to add a closing paragraph to each factsheet to indicate that the factsheet was a Board-produced document accompanied by a brief summary of the Board's mission. The Board and Staff members agreed that Dr. Becker's suggestion was a good one. The Chairman asked Mr. Daniel Campbell to standardize the format of the Board's factsheets to include the suggested closing paragraph. The Chairman petitioned the Board members for volunteers to review the fact sheets prior to final release. Drs. Jean Bahr and Paul Turinsky volunteered to review the documents. Dr. Pabalan was asked to forward the final draft factsheets to Drs. Bahr and Turinsky for review and comment by November 27, 2015.
- g. **NUWASTE System Description Report** – Mr. Daniel Ogg announced that the editing and layout of the *NUWASTE Systems Description Report* has been completed and the report will be ready to forward to the printer after the report's transmittal letter has been completed. Mr. Ogg noted that a transmittal letter has not been drafted yet because it will reference the report on *Implications of SNF Dry-Storage Canister Designs* (canister report), which is still under development. It was agreed that the *NUWASTE Systems Description Report* will not be published until the canister report has been completed. It is anticipated that the two reports will be jointly released early in 2016.
- h. **Proposed Format and Outline for Board Reports** – Mr. Nigel Mote discussed the standard format for proposing future Board reports that had been used to update the outlines of two Board reports initially proposed at the June 2015 business meeting. He indicated that the staff would use the standard format for proposing future Board reports but said any additional Board comments on how to make the format more useful would be welcome. The Chairman and Board members agreed that the proposed report outline would be beneficial to the lead author, as well as the Board and staff as they considered whether to develop a full report on the topic being proposed. The Chairman suggested that a one-page summary outline would also be helpful in giving a brief outline of proposed report topics and it was agreed that this should be added to future report proposals.

**12. Monthly Board and Staff Conference Phone Calls** – The Chairman and the Executive Director, Mr. Nigel Mote, inquired about the Board members' opinions regarding the value of the conference call held on September 24, 2015. The general consensus of the group was that the call was an effective means to enable the Board members and staff to communicate and get updates on the status of reports and other pertinent Board matters. It was agreed that the Board would adopt the practice of hosting a 30-minute conference call each month. The next call is scheduled for Thursday, December 10, 2015 at noon Eastern Time. The Executive Director will prepare the list of points to be covered in the call; however, Board and staff were encouraged to forward their proposed points to the Executive Director for consideration.

**13. Technical Information Needs Related to SNF and Storage System Degradation** – Mr. Allen Croff gave a presentation on the technical information needs related to spent nuclear fuel and storage system degradation. He first provided an overview of the transportation paths of spent nuclear fuel from the reactor to a repository; after which, he discussed recommendations for conducting technical information needs analyses and offered proposed actions on how the analyses could be conducted. After discussion of the actions proposed in Mr. Croff's presentation, it was agreed that he and Dr. Einziger should proceed to recommend completion of technical information needs analysis with DOE and at the meeting of the Electric Power Research Institute Extended Storage Collaborative Program Steering Committee meeting in December 2015. At the conclusion, the Chairman and group agreed that, while the issue of disposal of spent nuclear fuel is important, the Board's focus for technical information needs should initially remain on transportation and interim storage.

#### **14. Future Meetings -**

- i. **February 16 – 18, 2016:** Dr. Gerald Frankel gave an overview of the draft agenda for the Board's 2016 winter meeting in Knoxville for which he and Dr. Robert Einziger are the lead planners. The topic of the upcoming meeting is *Research and Development on the Performance of High Burnup Spent Nuclear Fuel during Storage and Transportation*. Dr. Frankel noted that a tour of the Oak Ridge National Laboratory is scheduled for Tuesday, February 16, 2016. The public meeting will be held on Wednesday, February 17, 2016. Dr. Frankel indicated that given the depth of information to be covered on the topic, the public meeting will be followed by more detailed fact finding meeting a month or two after the February public meeting. The location and format of the follow-up meeting will be determined after the February public meeting. Dr. Frankel concluded the presentation by indicating that Dr. Einziger is preparing a Board report on the implications of increased burnup for the management and disposal of SNF and the two meetings will provide useful input to the report.
- j. **June 13 – 17, 2016:** Dr. Kenneth Peddicord gave an overview of the agenda of the international exchange and site tours to be held in Zurich, Switzerland.
- k. **October 23, 2015 and June 19 – 22, 2016:** Dr. Daniel Metlay gave an overview of an upcoming international exchange meeting with the Swiss Federal Nuclear Safety Inspectorate (ENSI) scheduled for Friday, October 23, 2015 in Washington, DC. Dr. Metlay also discussed the June 19 through June 22, 2016, Board trip to Belgium to visit the Belgian repositories and test sites and to meet with the site's representatives. Dr. Metlay indicated that the purpose of the October 23rd meeting was to give the Board and ENSI

delegation an opportunity to discuss the Board's activities, as well as to discuss some of the details pertaining to the repository tours and meetings that will occur in June 2016.

- I. **Summer 2016 Meeting:** The Chairman indicated that there was no week during the summer of 2016 when all of the Board members were available to attend a Board meeting. The best availability of Board members was during the week of August 22, 2016, although four members had indicated that they would not be available that week. The Chairman asked the four Board members who had indicated they would not be available to let Mr. Mote know if there were any days in the week they could be available. Based on their replies, Mr. Mote would determine the best dates to schedule the public and business meetings and inform the Board and staff of the outcome. It was agreed that the summer meeting will be held in Washington, DC. The Chairman noted that the topic and lead planners for the meeting will be determined in the next few weeks and the plans for the meeting would be discussed during the Board business meeting on Thursday, February 18, 2016.
- 15. Comments on Trip and Meeting Reports** – The Chairman reminded the Board and staff members to read the trip reports that were included in the briefing books. Dr. Mary Lou Zoback noted that she had reviewed the trip reports but found it difficult, in some instances, to glean the most important points included in the reports. Dr. Zoback asked if a standard format could be developed for the trip reports, specifically a format where an abstract of the report was placed at the front of the report. Mr. Daniel Campbell was tasked with reviewing the reports and developing a standard format for future trip reports.
- 16. Wrap up and Adjournment** – The Chairman thanked everyone for their contributions to planning and hosting the workshop and public meeting. He especially thanked Ms. Linda Coultry for her help and contributions to the Board over the years and wished her well in her retirement. The Board and staff members joined the Chairman in thanking Ms. Coultry. The Chairman adjourned the meeting at 5:45p.m.