



2013

International High-Level Radioactive Waste Management Conference



*“Integrating Storage,
Transportation and Disposal”*



Official Program

Albuquerque
New Mexico
April 28-May 2, 2013

Albuquerque
Marriott





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2013 International High-Level Radioactive Waste Management Conference

“Integrating Storage, Transportation, and Disposal”

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*Vice President, Beijing Research Institute of
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HLW Disposal Program, China*



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(Sandia National Laboratories)



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John Walton (*University of Texas at El Paso*)
Ruth Weiner (*Sandia National Laboratories (SNL), USA*)

Track Chairs

Ahn, Joonhong (*University of California at Berkeley (UCB), USA*)
Apted, Mick (*INTERA, Inc., USA*)
Bullen, Daniel (*Exponent Failure Analysis Associates (EFAA), USA*)
Butterfield, Barry (*HDR, USA*)
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Chowdhury, Asadul (*CNWRA*)
Danko, George (*CNWRA*)
Eddebarh, Alaziz (*Emirates Nuclear Energy Corporation (ENEC), USA*)
Garisto, Frank (*Nuclear Waste Management Organization (NWMO), Canada*)
Hanson, Brady (*Pacific Northwest National Laboratory (PNL), USA*)
Kozak, Matt (*INTERA Inc., USA*)

Kremer, Erik (*Nuclear Waste Management Organization (NWMO), Canada*)
McCombie, Charles (*Arius Association, Switzerland*)
McMurry, Jude (*Center for Nuclear Waste Regulatory Analyses (CNWRA), USA*)
Pickett, David (*Center for Nuclear Waste Regulatory Analyses (CNWRA), USA*)
Rechar, Rob (*Sandia National Laboratories (SNL), USA*)
Rondinella, Vincenzo (*Institute for Transuranium Elements (ITE), Germany*)
Sowder, Andrew (*Electric Power Research Institute (EPRI), USA*)
Swift, Peter (*Sandia National Laboratories (SNL), USA*)
Vomvoris, Stratis (*NAGRA*)
Weiner, Ruth (*Sandia National Laboratories (SNL), USA*)



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ACCOMMODATIONS/HOTEL INFORMATION

The Albuquerque Marriott, located at 2101 Louisiana Blvd., NE, Albuquerque, New Mexico, 87110, will be the location for the 2013 International High-Level Radioactive Waste Management Conference Topical Meeting, where all meeting activities and technical sessions will take place.

CONFERENCE PROCEEDINGS

This year's conference proceedings is available on CD-ROM. Copies of the conference proceedings will be available on-site. Each registrant will receive a copy of the proceedings as part of the registration fees. Additional copies may be purchased at the conference registration desk for \$195.00.

To purchase copies following the conference, you may contact the ANS Accounting Department at 708-579-8210 (phone); 708-579-8314 (fax); accounting@ans.org (email); or submit your request in writing to: American Nuclear Society, 97781 Eagle Way, Chicago, IL 60678-9770. Payment information must accompany all orders.

SPEAKER REGISTRATION

All speakers are required to register for the conference in advance and to submit a registration fee. Speakers and session chairs are requested to check-in at the speakers' desk located at the Grand Ballroom Foyer of the Albuquerque Marriott Hotel at least one day prior to their presentation.

CONFERENCE REGISTRATION

Registration is required for all attendees and presenters. Badges are required for admission to all events.

- The **Full Conference Registration Fee** includes admission to all technical sessions, the opening reception, the conference luncheon and the conference proceedings (CD-Rom)
- The **Daily Conference Registration Fee** includes admission to technical sessions on the day registered and the conference proceedings (CD-Rom)
- The **Student Registration Fee** includes admission to all technical sessions and the conference proceedings (CD-Rom).

A full-time student i.d. is required.

Note: Additional tickets can be purchased at the ANS registration desk for the Opening Reception and the Conference Luncheon.

CONFERENCE REGISTRATION HOURS

The ANS registration and message desks will be located in the Grand Ballroom Foyer of the Albuquerque Marriott Hotel. You may register, purchase tickets for events, or pick up your registration packet during the following hours:

SUNDAY, APRIL 28, 2013
12:00 PM - 5:00 PM

MONDAY, APRIL 29, 2013
7:00 AM - 7:00 PM

TUESDAY, APRIL 30, 2013
7:00 AM - 5:00 PM

WEDNESDAY, MAY 1, 2013
7:00 AM - 5:00 PM

THURSDAY, MAY 2, 2013
7:00 AM - 1:00 PM

SOCIAL FUNCTIONS

OPENING RECEPTION

MONDAY, APRIL 29, 2013

7:00 PM – 9:00 PM

Location: Grand Salon E

Each full conference registrant will receive a ticket for the reception. Additional tickets may be purchased at the ANS registration desk for \$95.00.

CONFERENCE LUNCHEON

TUESDAY, APRIL 30, 2013

12:00 PM – 1:00 PM

Location: Grand Salon E

Each full conference registrant will receive a ticket for the luncheon. Additional tickets may be purchased at the ANS registration desk for \$50.00.



Conference Schedule



Monday, April 29, 2013

7:00 AM–7:00 PM	Conference Registration
7:30 AM–9:00 AM	Continental Breakfast
8:00 AM–8:25 AM	Welcome and Opening Remarks
8:25 AM–10:00 AM	Plenary—I: Perspectives on the Backend of the Fuel Cycle, Dr. Allison Macfarlane (<i>NRC</i>) Blue Ribbon Commission, Dr. Per Peterson (<i>Univ of California</i>)
10:00 AM–10:15 AM	Break
10:15 AM–11:15 AM	Plenary—II: How Did We Actually Get Into This Mess?, A. David Rossin (<i>Rossin & Assoc</i>)
11:20 AM–1:00 PM	Panel Discussion—I: Waste from Recycling
1:00 PM–2:00 PM	Lunch Break
2:00 PM–3:40 PM	Technical Sessions <ul style="list-style-type: none">• <i>Biosphere</i>• <i>Natural Systems for Disposal (Generic and Site-Specific)</i>• <i>Storage of Used Nuclear Fuel and High Level Waste</i>• <i>Engineered Systems for Disposal</i>• <i>Regulatory Topics</i>
3:40 PM–3:50 PM	Break
3:50 PM–5:30 PM	Technical Sessions <ul style="list-style-type: none">• <i>Regulatory Topics</i>• <i>Natural Systems for Disposal (Generic and Site-Specific)</i>• <i>Storage of Used Nuclear Fuel and High Level Waste</i>• <i>Engineered Systems for Disposal</i>• <i>Advanced Fuel Cycles: Impacts on Waste Management</i>
7:00 PM–9:00 PM	Opening Reception

Tuesday, April 30, 2013

7:00 AM–5:00 PM	Conference Registration
7:00 AM–8:00 AM	Continental Breakfast
8:00 AM–9:00 AM	Plenary—III: China's Nuclear Energy Program, Dr. Ju Wang
9:00 AM–10:15 AM	Panel Discussion—II: Discussion of activities in China
10:15 AM–10:30 AM	Break
10:30 AM–12:10 PM	Technical Sessions <ul style="list-style-type: none">• <i>Total Repository System (Generic and Site-Specific)</i>• <i>Natural Systems for Disposal (Generic and Site-Specific)</i>• <i>Storage of Used Nuclear Fuel and High Level Waste (2 concurrent sessions)</i>• <i>Engineered Systems for Disposal</i>
12:10 AM–1:30 PM	Conference Luncheon, Southeast New Mexico Nuclear Corridor, Speaker: John Heaton
1:30 PM–3:10 PM	Technical Sessions <ul style="list-style-type: none">• <i>Total Repository System (Generic and Site-Specific)</i>• <i>Natural Systems for Disposal (Generic and Site-Specific)</i>• <i>Storage of Used Nuclear Fuel and High Level Waste</i>• <i>Engineered Systems for Disposal</i>• <i>Institutional Topics (With Emphasis on Lessons Learned)</i>• <i>Advanced Fuel Cycles: Impacts on Waste Management</i>
3:10 PM–3:30 PM	Break
3:30 PM–5:10 PM	Technical Sessions <ul style="list-style-type: none">• <i>Total Repository System (Generic and Site-Specific)</i>

- *Natural Systems for Disposal (Generic and Site-Specific)*
- *Storage of Used Nuclear Fuel and High Level Waste*
- *Engineered Systems for Disposal*
- *Advanced Fuel Cycles: Impacts on Waste Management*

Wednesday, May 1, 2013

7:00 AM–5:00 PM	Conference Registration
7:00 AM–8:00 AM	Continental Breakfast
8:00 AM–10:15 AM	Plenary—IV & Panel—III: Fast Reactors as a Means of Closing the Fuel Cycle, Paul Dickman (<i>ANL</i>)
10:15 AM–10:30 AM	Break
10:30 AM–12:10 PM	Technical Sessions <ul style="list-style-type: none">• <i>Total Repository System (Generic and Site-Specific)</i>• <i>Natural Systems for Disposal (Generic and Site-Specific)</i>• <i>Storage of Used Nuclear Fuel and High Level Waste</i>• <i>Engineered Systems for Disposal</i>• <i>Advanced Fuel Cycles: Impacts on Waste Management</i>
12:10 PM–1:30 PM	Lunch Break
1:30 PM–3:10 PM	Technical Sessions <ul style="list-style-type: none">• <i>Total Repository System (Generic and Site-Specific)</i>• <i>Natural Systems for Disposal (Generic and Site-Specific)</i>• <i>Storage of Used Nuclear Fuel and High Level Waste</i>• <i>Engineered Systems for Disposal</i>• <i>Institutional Topics (With Emphasis on Lessons Learned)</i>• <i>Advanced Fuel Cycles: Impacts on Waste Management</i>
3:10 PM–3:30 PM	Break
3:30 PM–5:10 PM	Technical Sessions <ul style="list-style-type: none">• <i>Total Repository System (Generic and Site-Specific)</i>• <i>Engineered Systems for Disposal</i>• <i>Institutional Topics (With Emphasis on Lessons Learned)</i>• <i>Storage of Used Nuclear Fuel and High Level Waste</i>

Thursday, May 2, 2013

7:00 AM–1:00 PM	Conference Registration
7:30 AM–8:30 AM	Continental Breakfast
8:00 AM–9:15 AM	Panel Discussion—V: Large-Volume Wastes from Accident Clean Ups, Charles Forsberg (<i>ORNL</i>)
9:15 AM–11:00 AM	Plenary—V: Consent-Based Nuclear Facility Siting, Hank Jenkins-Smith (<i>Univ of Oklahoma</i>)
11:00 AM–11:10 AM	Break
11:10 AM–12:50 PM	Technical Sessions <ul style="list-style-type: none">• <i>Biosphere</i>• <i>Natural Systems for Disposal (Generic and Site-Specific)</i>• <i>Storage of Used Nuclear Fuel and High Level Waste</i>• <i>Advanced Fuel Cycles: Impacts on Waste Management</i>• <i>High-level Radioactive Waste Transportation</i>
12:50 PM–1:50 PM	Box Lunch Social
1:50 PM	Conference Adjourns



MONDAY, APRIL 29, 2013, 8:00 AM–8:25 AM

Welcome and Opening Remarks

Grand Salon F

Kevin McMahon (*SNL*)

Barry Butterfield (*HDR Engineering*)

MONDAY, APRIL 29, 2013, 8:25 AM–10:00 AM

Plenary—I: Perspectives on the Backend of the Fuel Cycle

Grand Salon F

SPEAKERS:



Nuclear Waste Policy

Dr. Allison Macfarlane (*NRC*)



Blue Ribbon Commission

Dr. Per Peterson (*Univ of California*)

MONDAY, APRIL 29, 2013, 10:00 AM–10:15 AM

Break

MONDAY, APRIL 29, 2013, 11:20 AM–12:30 AM

Plenary II, How Did We Actually Get Into This Mess?

Grand Salon F

Moderator: Kevin A. McMahon (*SNL*)

Nuclear power hit its “cliff” on April 7, 1977. President Jimmy Carter in office less than 100 days, announced an Executive Order to “indefinitely defer reprocessing of spent nuclear fuel.” He said that his policy was designed to protect the world from nuclear weapons proliferation. He also said that the U.S. would lead by example and that nuclear power could go ahead just fine. President Carter was dead wrong on all counts. The U.S. lost its leadership and it derailed our program on nuclear waste disposal.

He had asked no leaders in weapons or energy programs for input. He listened to academics and activists. The nuclear industry was caught totally by surprise. This was nuclear technology: the poster child for Environmental Impact Statements and public participation in decision-making! And how does it still impact us all?

SPEAKERS:



A. David Rossin (*Rossin & Assoc*)

Michael Voegle (*Consultant*)

Paul Dickman (*ANL*)

MONDAY, APRIL 29, 2013, 11:20 AM–1:00 PM

Panel Discussion—I: Waste From Recycling

Moderator: Paul Murray (*AREVA*)

Grand Salon F

11:20 a.m.

(6907) Utilization of Used Nuclear Fuel in a Potential Future U.S. Fuel Cycle Scenario

Andrew Worrall (*ORNL*)

11:45 a.m.

(6927) Evaluating Feasibility of Reactor Grade Mixed Oxide Fuel Use in U.S. Reactors: Application of EPRI’s Decision Analysis Framework

Andrew A. Dykes, David H. Johnson (*ABSG Consulting, Inc.*), Andrew G. Sowder, Albert J. Machiels (*EPRI*)

12:10 p.m.

(6989) An Expert, Top-Level Risk Assessment for Deployment of Future Fuel Cycles

Steven Krahn (*Vanderbilt Univ*), John Vienna (*PNNL*), Allen Croff (*Vanderbilt Univ*), Albert Machiels, Andrew Sowder (*EPRI*)

12:35 p.m.

(7012) Assessment of Used Nuclear Fuel Inventory Relative to Disposition Options

John C. Wagner, Joshua L. Peterson, Donald E. Mueller, Jess C. Gehin, Andrew Worrall (*ORNL*), Temitope Taiwo, Mark Nutt, Mark A. Williamson, (*ANL*), Michael Todosow (*BNL*), Roald Wigeland (*INL*), William G. Halsey (*LLNL*), Ronald P. Omberg (*PNNL*), Peter N. Swift (*SNL*), Joe Carter (*SRNL*)

MONDAY, APRIL 29, 2013, 1:00 PM–2:00 PM

Lunch Break

MONDAY, APRIL 29, 2013, 2:00 PM–3:40 PM

Track 4, Session 1: Biosphere

Organizer: Andrew Sowder

Chair: Nava Garisto (*SENES Consultants*)

Grand Salon G/H

2:00 p.m.

(6990) Model Development for Transport of Radionuclides via Heterogeneous Geological Media

Bret Patrick Van den Akker, Joonhong Ahn (*Univ of California, Berkeley*)

2:25 p.m.

(6707) Algebraic Calculation of ERB Dilution, Capture, Retardation, Decay, and Dose

Paul E. Mariner (*SNL*)

2:50 p.m.

(6867) Potential Impacts of Irrigation Recycling on the Repository Performance

E. A. Kalinina, B. W. Arnold (*SNL*)

3:15 p.m.

(6873) Short-Term Period Simulation of Atmospheric Dispersion on Braka NPP Site Area

Jong Kuk Lee (*KAIST*), Jae Chul Kim (*Kangwon National Univ*), Kun Jae Lee (*KAIST*)



Track 2, Session 1: Natural Systems for Disposal (Generic and Site-Specific)

Organizers: Jude McMurry (CNWRA), Stratis Vomvoris (NAGRA)
Chair: Erik Kremer (NWMO)

Grand Salon A/B

2:00 p.m.

(6835) A Characterization Study of Fault Zone Hydrology

Kenzi Karasaki (LBNL), Celia T. Onisha (USGS), Kenzo Kiho (CRIEPI), Junichi Goto (NWMO)

2:25 p.m.

(6915) Historic Testing Relevant to Disposal of Heat-Generating Waste in Salt

Kristopher Kuhlman (SNL)

2:50 p.m.

(6839) Sensitivity Analysis on Impact of Continental Glaciation on Radionuclide Transport

Shaoping Chu, Scott L. Painter (LANL)

3:15 p.m.

(6931) Assessment of Alternative Host-Rock Distribution in the U.S. Using GIS

Frank V. Perry, Patrick F. Dobson (LBNL), Richard E. Kelley (LANL)

Track 7, Session 1: Storage of Used Nuclear Fuel and High Level Waste

Organizers: Brady Hanson (PNNL), Vincenzo Rondinella (EC-JRC-ITU)
Chair: Ken Sorenson (SNL)

Carlsbad

2:00 p.m.

(6713) Concept Plan for a High Burn-Up Fuel Storage and Transportation Confirmatory Data Project

Marcus Nichol, Rodney McCullum (NEI), John Kessler, Keith Waldrop (EPRI), Tom Brookmire (Dominion), Paul Murray (AREVA Federal Services), Steve Nesbit (Duke Energy)

2:25 p.m.

(6827) Spent Fuel Storage in Dual Purpose Casks Beyond the Original Design Basis

Holger Volzke, Dietmar Wolff (BAM Federal Inst for Materials Research and Testing)

2:50 p.m.

(6830) Potential Stress on Cladding Imposed by the Matrix Swelling from Alpha Decay in High Burnup Spent Nuclear Fuel

Tae Ahn (NRC), V. Rondinella, T. Wiss (European Commission, Institute for Transuranium Elements)

3:15 p.m.

(6832) Extended Dry Storage and Transportation: Model for Evaluating of Vacuum Drying Adequacy

T. Ahn (NRC), Jung, P. K. Shukla, E. L. Tipton, (CNWRA)

Track 7, Session 2: Storage of Used Nuclear Fuel and High Level Waste

Organizers: Brady Hanson (PNNL), Vincenzo Rondinella (EC-JRC-ITU)
Chair: Keith Waldrop (EPRI)

Cimarron

2:00 p.m.

(6868) Logistics Case Study for Shipping Used Nuclear Fuel from Shutdown Reactor Sites

E. A. Kalinina (SNL), I. K. Busch (ORNL), P. E. McConnell (SNL), S. J. Maheras (PNNL)

2:25 p.m.

(6981) Used Fuel Management System Architecture and Interface Analyses

W. Mark Nutt (ANL), Robert Howard, Ingrid Busch (ORNL), Joe Carter, Phillip Rodwell, Alexcia Delley (SRNL), Elena Kalinina, Ernest Hardin (SNL), Thomas Cotton (Complex Systems)

2:50 p.m.

(6985) A Modular Design Concept for a Used Nuclear Fuel Repackaging Facility

R. L. Howard, D. R. Giuliano, T. L. Lessard (ORNL), J. T. Carter, P. O. Rodwell (SRNL)

Track 3, Session 1: Engineered Systems for Disposal

Organizers: Frank Garisto (NWMO), Asdul Chowdhury (CNWRA), David Pickett (CNWRA)

Chair: Frank Garisto (NWMO)

Grand Salon C/D

2:00 p.m.

(6934) The Grimsel Test Site—Going into the Fourth Decade of Applied RD&D

S. Vomvoris, I. Blechschmidt, I. Gaus, J. Rueedi, A. Martin, T. Spillmann (NAGRA)

2:25 p.m.

(6878) Used Fuel Container Retrieval from a Deep Geological Repository in Sedimentary Rock

J. E. Villagran, D. Marinceu (NWMO)

2:50 p.m.

(6923) Operational Efficiency Through Regulatory Change at WIPP

Russ Patterson (DOE), Thomas Klein (URS-Professional Solutions)

Track 5, Session 1: Regulatory Topics

Organizers: Daniel Bullen (DNFSB), Barry Butterfield (HDR Eng)

Chair: Daniel Bullen (DNFSB)

Grand Salon I/J

2:00 p.m.

(7020) The Logic and Benefits of a Regional Approach to HLW, SNE, and TRU Waste Disposal in New Mexico

Christopher M. Timm (PECOS Management Services, Inc.)

2:25 p.m.

(6872) Recent Technical Issues Raised by the State of Nevada to be Addressed Should the Yucca Mountain License Application Process be Restarted

Michael Voegele, Darrell Lacy (NWRPO)



MONDAY, APRIL 29, 2013, 3:40 PM–3:50 PM

Break

MONDAY, APRIL 29, 2013, 3:50 PM–5:30 PM

Track 5, Session 2: Regulatory Topics

Organizers: Daniel Bullen (*DNFSB*), Barry Butterfield (*HDR Eng*)

Chair: Barry Butterfield (*HDR Eng*)

Pecos

3:50 p.m.

(7246) The IAEA World Advisory Safety Standard for Radioactive Waste Disposal: A Critique of a “Generic Standard”

Abraham Van Luik (*DOE*)

4:15 p.m.

(6901) Initial Review of a License Application for a Spent Nuclear Fuel Repository in Sweden

Björn Dverstorp, Bo Strömberg (*Swedish Radiation Safety Authority (SSM)*)

4:40 p.m.

(6890) The Finnish Regulatory Experience in the Construction of ONKALO

Jussi Heinonen, Kai Hämäläinen, Risto Paltemaa (*STUK*)

Track 2, Session 2: Natural Systems for Disposal (Generic and Site-Specific)

Organizers: Jude McMurry (*CNWRA*), Stratis Vomvoris (*NAGRA*)

Chair: Irina Gaus (*NAGRA*)

Las Cruces

3:50 p.m.

(6836) Iodide Uptake onto Clay Minerals and the Relationship to Fixed Charge

Andrew Miller, Jessica Kruichak, Melissa Mills, Hernesto Tellez, Yifeng Wang (*SNL*)

4:15 p.m.

(6837) Relationship Between Water Flux and Hydraulic Gradient for Clay Formations

Hui-Hai Liu, Jens Birkholzer (*LBNL*)

4:40 p.m.

(6850) Modeling Swelling and Swelling Pressure in Expansive Clays

G. Ofoegbu, B. Dasgupta, C. Manepally, H. Basağaoğlu (*CNWRA*), R. Fedors (*NRC*)

5:05 p.m.

(6974) Pore Characteristics and Their Evolution in Clays Using Small Angle Neutron Scattering

M. Ding, M. Hartl, H. Xu, R. P. Hjelm (*LANL*), A. Miller, Y. Wang (*SNL*)

Track 7, Session 3: Storage of Used Nuclear Fuel and High Level Waste

Organizers: Brady Hanson (*PNNL*), Vincenzo Rondinella (*EC-JRC-ITU*)

Chair: Vincenzo Rondinella (*EU-JRC-ITU*)

Acoma

3:50 p.m.

(6871) Assessing Material Degradation Effects on Long Term Storage Structural Analyses

Nicholas A. Klymyshyn, Harold E. Adkins, Jr., Brady D. Hanson (*PNNL*)

4:15 p.m.

(6908) Consequences of Used Nuclear Fuel Failure on Criticality Safety

William J. Marshall, J. C. Wagner (*ORNL*)

4:40 p.m.

(6913) Optimizing Back-End Flexibility with the CARE Concept CARE

M. J. Apted (*Intera, Inc.*), I. G. McKinley (*McKinley Consulting*)

5:05 p.m.

(6920) Corrosion of Canister Materials for Extended Storage of Used Fuel

Benjamin Hauch, Brandon Semerau, Soham Banerjee, Kumar Sridharan (*Univ of Wisconsin, Madison*)

Track 3, Session 2: Engineered Systems for Disposal

Organizers: Frank Garisto (*NWMO*), Asdul Chowdhury (*CNWRA*), David Pickett (*CNWRA*)

Chair: George Danko (*Univ of Nevada-Reno*)

Carlsbad

3:50 p.m.

(6976) A Demonstration of the Disposal Systems Evaluation Framework (DSEF)

Harris R. Greenberg, James A. Blink, Mark Sutton, Montu Sharma (*LLNL*)

4:15 p.m.

(6806) FIRST-Nuclides: European Project on Radionuclide Release from Spent Fuel

Bernhard Kienzler, Ernesto González-Robles, Volker Metz (*KIT*), Alba Valls, Lara Duro (*Amphos 21*)

4:40 p.m.

(6859) The Manufacturing of a Disposal Canister Using a Cold Spray Coating of Copper

Minsoo Lee, Heui Joo Choi, Jong Youl Lee, Jong Won Choi (*KAERI*)

5:05 p.m.

(6863) Design Code Application and Preliminary Structural Evaluation of a Used Fuel Containe

Chris Boyle (*NWMO*)

Track 9, Session 1: High-Level Radioactive Waste Transportation

Organizer: Ruth Weiner (*SNL*)

Grand Salon C/D

3:50 p.m.

Spent Fuel Transportation on Risk Assessment–Panel

The U. S. Nuclear Regulatory Commission (NRC) is responsible for promulgating regulations for the packaging of spent fuel (and other large quantities of radioactive material) for transport that provide for public health and safety during transport). In 1977 the NRC published NUREG-0170, an assessment of the adequacy of those regulations to provide



the assurance of safety. In that assessment, the measure of safety was risk of radiation doses to the public under routine and accident transport conditions, and the risk was found to be acceptable. The panel will present the results of the most recent investigation into the safety of spent nuclear fuel transportation. This investigation shows the risk from the radiation emitted from the casks to be a small fraction of that from naturally occurring background radiation and the risk from accidental release of radioactive material to be several orders of magnitude less. The calculated dose due to the external radiation from the cask under routine transport conditions is similar to that found in earlier studies. The improved analysis tools and techniques, improved data availability, and reduction in the number of conservative assumptions has made the estimate of accident risk from the release of radioactive material in this study approximately five orders of magnitude less than was estimated in NUREG-0170. The results demonstrate that the regulations of the NRC continue to provide adequate protection of public health and safety during the transportation of spent nuclear fuel.

PANELISTS:

- John Cook (*NRC*)
- Douglas Ammerman (*SNL*)
- Ruth Weiner (*SNL*)
- Carlos Lopez (*SNL*)
- Victor Figueroa (*SNL*)

Track 8, Session 1: Advanced Fuel Cycles: Impacts on Waste Management

Organizers: Joonhong Ahn (*Univ of California, Berkeley*), Jongwon Choi (*KAERI*)

Chair: Joonhong Ahn (*Univ of California, Berkeley*)

Grand Salon A/B

3:50 p.m.

(6858) Modeling the Environmental Health and Safety Risks of the Present U.S. Nuclear Fuel Cycle

Bethany Smith, Kevin Brown, Steven Krahn, James H. Clarke (*Vanderbilt Univ*), Albert Machiels, Andrew Sowder (*EPRI*)

4:15 p.m.

(6892) Developing Operational Safety Performance Measures for Nuclear Chemical Facilities

Lyndsey Fyffe (*Vanderbilt Univ*), James A. Hutton (*DOE*), James H. Clarke, Steven Krahn (*Vanderbilt Univ*)

4:40 p.m.

(6964) Transient Analysis of Nuclear Technologies—Input for Decision Making

J. Hart, A. I. van Heek, F. Roelofs, A. Wakker (*NRG*)

5:05 p.m.

(7005) Energy Return on Energy Investment for an LWR Fuel Cycle

Harris R. Greenberg, Clara Smith, James A. Blink (*LLNL*), Massimiliano Fratoni (*Penn State*), William G. Halsey, A. J. Simon, Mark Sutton (*LLNL*)

MONDAY, APRIL 29, 2013, 7:00 PM–9:00 PM

Opening Reception

Grand Salon E

TUESDAY, APRIL 30, 2013, 8:00 AM–9:00 AM

Plenary—III: China's Nuclear Energy Program

Organizer: Mick Apted (*Intera, Inc*)

Chair: Kevin A. McMahon (*SNL*)

Grand Salon F

SPEAKER:



Dr. Ju Wang (*BRIUG*)

TUESDAY, APRIL 30, 2013, 9:00 AM–10:15 AM

Panel Discussion—II: Discussion of Activities in China

Organizer: Mick Apted (*Intera, Inc.*)

Chair: Mick Apted (*Intera, Inc*)

Grand Salon F

9:00 a.m.

(6882) Site-Specific FEP Analysis for the Beishan Area, China

W. Zhou, M. Stenhouse, M. J. Apted (*Intera, Inc.*), W. M. Chen, J. Wang (*BRIUG*)

9:25 a.m.

(6883) Performance Assessment of the Candidate Site for HLW Repository in Beishan, China

W. Zhou, M. J. Apted (*Intera, Inc.*), W. M. Chen, J. Wang (*BRIUG*)

9:50 a.m.

(6980) Geological Disposal Program for High Level Radioactive Waste in China: Update 2012

Ju Wang, Zihua Zong, Rui Su, Weimin Chen (*BRIUG*)

TUESDAY, APRIL 30, 2013, 10:15 AM–10:30 AM

Break

TUESDAY, APRIL 30, 2013, 10:30 AM–12:10 PM

Track 1, Session 1: Total Repository System (Generic and Site-Specific)

Organizers: Peter Swift (*SNL*), Matt Kozak (*Intera, Inc.*), George Danko (*Univ. of Nevada, Reno*)

Cochairs: Peter Swift (*SNL*), O. Pensado (*CNWRA*)

Grand Salon A/B

10:30 a.m.

(6852) Building Confidence for the Korean Repository Performance Assessment Model

Olufemi Osidele, Osvaldo Pensado (*CNWRA*), Youn-Myoung Lee, Jongtae Jeong (*KAERI*)

10:55 a.m.

(6875) Verification of Calculational Cases in Performance Assessment for KBS-3 Repository



Osvaldo Pensado, Sitakanta Mohanty, Patrick LaPlante (*CNWRA*)

11:20 a.m.

(6876) Fourth Case Study: Analysis of Disruptive Scenarios

F. Garisto (*NWMO*), J. Avis (*Geofirma Engineering Ltd*), M. Gobien, C. Medri, E. Kremer (*NWMO*)

Track 2, Session 3: Natural Systems for Disposal (Generic and Site-Specific)

Organizers: Jude McMurry (*CNWRA*), Stratis Vomvoris (*NAGRA*)

Chair: John Walton (*UTEP*)

Grand Salon C/D

10:30 a.m.

(6864) Modeling of Induced Damage and Plastic Deformation in Granite

Liang Chen, Chunping Wang (*BRIUG*), Jianfeng Liu (*Sichuan Univ*), Xiyong Wang, Ju Wang (*BRIUG*), Jianfu Shao (*Univ of Lille*)

10:55 a.m.

(6877) Integrated-Tool Development for Evaluation of Radionuclide Transport in the Far-Field of High-Level Radioactive Waste Repositories

Teklu Hadgu, Yifeng Wang (*SNL*)

Track 7, Session 4: Storage of Used Nuclear Fuel and High Level Waste

Organizers: Brady Hanson (*PNNL*), Vincenzo Rondinella (*EC-JRC-ITU*)

Chair: Robert Einziger (*NRC*)

Grand Salon I/J

10:30 a.m.

(6925) Criticality Safety for Plutonium-Filled Canister in a Repository

Elsa Lemaitre-Xavier, Joonhong Ahn (*Univ of California, Berkeley*)

10:55 a.m.

(6962) Observation and Mechanism of Hydride in Zircaloy-4 Re-Orientation Induced by High Pressure at High Temperatures

Y. Yan, A. Blackwell, L. Plummer, B. Radhakrishnan, S. Gorti, K. Clarno (*ORNL*)

Track 3, Session 3: Engineered Systems for Disposal

Organizers: Frank Garisto (*NWMO*), Asdul Chowdhury (*CNWRA*), David Pickett (*CNWRA*)

Chair: Willam Halsey (*LLNL*)

Grand Salon G/H

10:30 a.m.

(6887) Using Copper Coatings for Corrosion Protection of a Used Fuel Container During Geological Storage

Peter G. Keech (*NWMO*)

10:55 a.m.

(6893) Alteration of Clinoptilolite into High-Silica Analcime Within a Bentonite Barrier System Under Used Nuclear Fuel Repository Conditions

M. C. Cheshire, F. A. Caporuscio (*LANL*), C. Jové-Colon (*SNL*), M. K. McCarney (*Univ of Wyoming*)

11:20 a.m.

(6894) Metallic Alloy Waste Forms—A First Principles Approach to Corrosion

C. D. Taylor, X-Y. Liu (*LANL*), O. Olatunji-Ojo, D. P. Moore, D. G. Kolman (*LANL*), E. Kim, K. R. Czerwinski (*UNLV*)

11:45 a.m.

(6994) Thermodynamic Model Development of Engineered Barrier System Materials: Cement Leaching and Clay Hydration

Carlos F. Jové Colón, Harry K. Moffat (*SNL*)

Track 7, Session 5: Storage of Used Nuclear Fuel and High Level Waste

Organizers: Brady Hanson (*PNNL*), Vincenzo Rondinella (*EC-JRC-ITU*)

Chair: Brady Hanson (*PNNL*)

Carlsbad

10:30 a.m.

(6984) Integrating Data and Analysis Capabilities for Cask-Specific Safety Evaluations

J. M. Scaglione, R. A. Lefebvre, G. Radulescu, H. J. Smith, D. Ilas, Koo Robb, J.C. Wagner (*ORNL*), H. E. Adkins, T. E. Michener (*PNNL*), D. Vinson (*SRNL*)

10:55 a.m.

(6881) Effect of Ground Materials on Dose Rates at Dry Storage for Spent Fuel

Gilyong Cha, Kyoungyong Noh, Yisoo Kim (*Radiation Core Technologies*), Taeman Kim, Chang Yeal Baeg (*Korea Radioactive Waste Management Corporation*), Soonyoung Kim (*Radiation Core Technologies*)

11:20 a.m.

(6986) Considerations for an Integrated Storage, Transportation, and Disposal Canister

J. M. Scaglione, A.G. Caswell, J. B. Clarity, G. Radulescu (*ORNL*)

TUESDAY, APRIL 30, 2013, 12:10 AM–1:30 PM

Conference Luncheon

The Fuel Cycle Solution—Southeast New Mexico Nuclear Corridor Grand Salon E

SPEAKER



John Heaton (*presently serving the mayor of Carlsbad, New Mexico as the volunteer energy coordinator*)

TUESDAY, APRIL 30, 2013, 1:30 PM–3:10 PM

Track 1, Session 2: Total Repository System (Generic and Site-Specific)

Organizers: Peter Swift (*SNL*), Matt Kozak (*Intera, Inc.*), George Danko (*Univ. of Nevada, Reno*)



Cochairs: Matt Kozak (*Intera, Inc.*), E. Kremer (*NWMO*)

Cimarron

1:30 p.m.

(6880) Reference Case for Generic Disposal of HLW and SNF in Salt

Palmer Vaughn, S. David Sevougian, Ernest L. Hardin, Paul Mariner, Michael B. Gross (*SNL*)

1:55 p.m.

(6905) New Transport Modeling Approach for the Groundwater Pathway in PA Models

Bruce A. Robinson, Shaoping Chu (*LANL*)

2:20 p.m.

(6935) Development of Complex Scenarios for a Safety Case Development

Jongtae Jeong, Jung-Woo Kim, Youn-Myoung Lee, Dong-Keun Cho, Chul-Hyung Kang (*KAERI*)

2:45 p.m.

(6954) Performance Assessment Model Development Methodology for a Bedded Salt Repository

S. David Sevougian, Geoff A. Freeze, Michael B. Gross, Ernest L. Hardin, Joon Lee, Christi D. Leigh, Robert J. MacKinnon, Paul Mariner, Palmer Vaughn (*SNL*)

Track 2, Session 4: Natural Systems for Disposal (Generic and Site-Specific)

Organizers: Jude McMurry (*CNWRA*), Stratis Vomvoris (*NAGRA*)

Chair: Scott Painter (*LANL*)

Las Cruces

1:30 p.m.

(6906) Experimental Evaluation of Actinide Transport in a Fractured Granodiorite

Timothy M. Dittrich, Paul W. Reimus (*LANL*)

1:55 p.m.

(6928) Thermal-Hydrologic Modeling of a Deep Borehole Disposal System

Bill W. Arnold, Teklu Hadgu (*SNL*)

2:20 p.m.

(6941) Mesoscale Modeling of Brine Processes in a Single Salt Crystal

Qinjun Kang, Bruce Robinson (*LANL*), Li Chen (*LANL/Xian Jiaotong Univ*)

2:45 p.m.

(6932) A Thermodynamic Model for Na-Mg-B(OH)₃-HCO₃-CO₃-Cl-SO₄ System to High Ionic Strengths

Yongliang Xiong (*SNL*)

Track 7, Session 6: Storage of Used Nuclear Fuel and High Level Waste

Organizers: Brady Hanson (*PNNL*), Vincenzo Rondinella (*EC-JRC-ITU*)

Chair: Jim Tulenko, (*Univ of Florida*)

Grand Salon A/B

1:30 p.m.

(6993) Development of Closure Bolt Analysis Rules for Division 3 Containments

Z. H. Han, V. N. Shah, Y. Y. Liu (*ANL*)

1:55 p.m.

(6995) Used Nuclear Fuel Storage and Transportation Data Gap Prioritization

Christine T. Stockman (*SNL*), Brady D. Hanson (*PNNL*), Abdelhalim A. Alsaed (*Enviro Nuclear Services*)

2:20 p.m.

(6996) Aging Management for Extended Storage and Transportation of Used Fuel

Y. Y. Liu, O. K. Chopra, D. Ma, D. Diercks (*ANL*)

2:45 p.m.

(7006) Radiological Implications of Extended Storage of Spent Nuclear Fuel

Ethan Bates, Charles Forsberg (*MIT*)

Track 3, Session 4: Engineered Systems for Disposal

Organizers: Frank Garisto (*NWMO*), Asdul Chowdhury (*CNWRA*), David Pickett (*CNWRA*)

Chair: Emory Collins (*ORNL*)

Santa Fe

1:30 p.m.

(6947) Repository Criticality Analysis for Damaged Fuels: Geometry Effect in the Modeling of Uranium and Plutonium Deposition in Geological Formations

Xudong Liu, Joonhong Ahn (*Univ of California, Berkeley*), Fumio Hirano (*JAEA*)

1:55 p.m.

(6936) Anoxic Corrosion of Steel and Lead in Na-Cl±Mg Dominated Brines

Gregory T. Roselle (*SNL*)

2:20 p.m.

(6987) Integrating Used Fuel Degradation Models into Generic Performance Assessment

David C. Sassani, Carlos F. Jové Colón, Philippe F. Weck (*SNL*)

Track 6, Session 1: Institutional Topics (With Emphasis on Lessons Learned)

Organizers: Charles McCombie (*MCM Consulting*)

Cochairs: Dan Bullen (*DNFSB*), Charles McCombie (*MCM Consulting*)

Pecos

1:30 p.m.

(6936) National Programmes and Implementation of EU Nuclear Waste Directive

Gunnar Buckau [*European Commission (JRC-ITU)*]

1:55 p.m.

(7000) Overview of the United States Department of Energy's Used Fuel Disposition Research and Development Campaign

Peter N. Swift (*SNL*), Jens T. Birkholzer (*LBNL*), William J. Boyle, Timothy C. Gunter, Ned B. Larson (*DOE*), Robert J. MacKinnon, Kevin A. McMahon (*SNL*), W. Mark Nutt (*ANL*), Ken B. Sorenson (*SNL*)

2:20 p.m.

(6703) Integrating Fuel Cycles with the Repository: What Fuel Cycle Facilities and What Institutional Structures?

Charles Forsberg (*MIT*)

2:45 p.m.



(6869) A Blueprint for the New Used Fuel Management Organization

Steve Nesbit (*Duke Energy*), Lake Barrett (*L. Barrett Consulting*), Rod McCullum (*NEI*), Dan Stout (*TVA*)

Track 8, Session 2: Advanced Fuel Cycles: Impacts on Waste Management

Organizers: Joonhong Ahn (*Univ of California, Berkeley*), Jongwon Choi (*KAERI*)

Chair: Max Fratoni (*Penn State Univ*)

Acoma

1:30 p.m.

(6843) The Concentration and Distribution of Beryllium in Hanford High-Level Waste

Jacob G. Reynolds (*Washington River Protection Solutions, LLC*)

1:55 p.m.

(6856) Partitioning and Durable Waste Forms for Highly Radiotoxic Isotopes

Bruce E. Kirstein, Sue B. Clark (*NWTRB*)

2:20 p.m.

(6870) Evaluation of High-Level Melter Feed at Hanford

Jeremy Belsher, Amy Ramsey, William Ramsey (*Washington River Protection Solutions, LLC*)

2:45 p.m.

(6924) Inorganic Metal Fluorite Materials as Novel Adsorbents for Gaseous Radioiodine Capture

Yifeng Wang, Andy Miller (*SNL*)

TUESDAY, APRIL 30, 2013, 3:10 PM–3:30 PM

Break

TUESDAY, APRIL 30, 2013, 3:30 PM–5:10 PM

Track 1, Session 3: Total Repository System (Generic and Site-Specific)

Organizers: Peter Swift (*SNL*), Matt Kozak (*Intera, Inc.*), George Danko (*Univ. of Nevada, Reno*)

Cochairs: D. Sevougian (*SNL*), G. Freeze (*SNL*)

Grand Salon C/D

3:30 p.m.

(6977) Leveraging Existing Process Modeling Capability in Geosphere Performance Assessments

Dylan R. Harp, Scott L. Painter (*LANL*)

3:55 p.m.

(7004) Repository Performance Insights from Simplified Generic Safety Assessment Models

Geoff Freeze, Peter Swift, Palmer Vaughn (*SNL*)

4:20 p.m.

(7040) Fourth Case Study: Postclosure Safety Assessment of a Used Fuel Repository in Crystalline Rock

E. P. Kremer, N. G. Hunt (*NWMO*), J. D. Avis (*Geofirma Engineering ILtd*), T. Chshyolkova (*AECL*), F. Garisto, P. Gierszewski, M. Gobien (*NWMO*), C. I. Kitson (*AECL*), C. L. D. Medri (*NWMO*), T. W. Melnyk, L. C. Wojciechowski (*AECL*)

Track 2, Session 5: Natural Systems for Disposal (Generic and Site-Specific)

Organizers: Jude McMurry (*CNWRA*), Stratis Vomvoris (*NAGRA*)

Chair: Budhi Sagar (*Consultant*)

Carlsbad

3:30 p.m.

(6943) Modeling of Fate and Transport of Water in a Salt-Based Repository

Philip Stauffer, Dylan Harp, Bruce Robinson (*LANL*)

3:55 p.m.

(6948) Modeling of Coupled Thermo-Hydro-Mechanical Processes at Mont Terri Heater Experiments in Opalinus Clay Using TOUGH-FLAC

Jonny Rutqvist, Fei Chen, Jens Birkholzer, Hui-Hai Liu (*LBNL*), Benoit Garitte, Tim Victor (*NAGRA*)

4:20 p.m.

(6949) Hydrological and Hydrochemical Studies in KAERI Underground Research Tunnel, Korea

Yong-Kwon Koh, Jang-Soon Kwon, Geon-Young Kim, Jong-Won Choi (*KAERI*)

Track 7, Session 7: Storage of Used Nuclear Fuel and High Level Waste

Organizers: Brady Hanson (*PNNL*), Vincenzo Rondinella (*EC-JRC-ITU*)

Chair: John Scaglione (*ORNL*)

Grand Salon I/J

3:30 p.m.

(7013) Phase Field Simulations of Hydride Reorientation in Zircaloy B. Radhakrishnan, S. B. Gorti, K. Clarno, Y. Yan (ORNL)

3:55 p.m.

(7016) Impact of Atmospherically Deposited Salts on the Localized Corrosion Performance of Materials Used for the Interim Storage of Used Nuclear Fuel

David G. Enos, Charles R. Bryan (*SNL*)

4:20 p.m.

(7032) Low Temperature Creep of Used Nuclear Fuel During Long Term Dry Storage

Carl E. Beyer (*PNNL*), James S. Tulenko, Yong Yang, Gerhard E. Fuchs (*Univ of Florida*), James Stubbin (*Univ of Illinois*), Jacob Eapen, Korukonda Murty (*NCSU*)

4:45 p.m.

(7037) Simulation of Hydride Reorientation in Zr-Based Claddings During Dry Storage

Veena Tikare (*SNL*)

Track 3, Session 5: Engineered Systems for Disposal

Organizers: Frank Garisto (*NWMO*), Asdul Chowdhury (*CNWRA*), David Pickett (*CNWRA*)

Chair: Charles Forberg (*MIT*)

Cimarron

3:30 p.m.



(6955) Electrochemical Modeling and Experimental Study of Used Fuel Matrix Degradation

James L. Jerden, Jr., Kurt E. Frey, Terry A. Cruse, William L. Ebert (*ANL*)

3:55 p.m.

(6991) Spectroscopic Detection of Hydrogen Peroxide Generated by Alpha Radiolysis in Solution

Frances N. Smith, Sergey I. Sinkov, Chuck Z. Soderquist, Richard S. Wittman, Alexander R. Geanes, Bruce K. McNamara, Edgar C. Buck (*PNNL*)

4:20 p.m.

(6926) Spent Nuclear Fuel and its Corrosion Products: A Quantum-Mechanical Modeling Investigation

Philippe F. Weck (*SNL*), Eunja Kim (*UNLV*), Carlos Jové-Colón, David C. Sassani (*SNL*)

4:45 p.m.

(6997) Formation of Studite during the Oxidative Dissolution of Doped UO₂ by Hydrogen Peroxide: Effect of Dopant Chemistry

Edgar Buck, Andrew Casella, Rick Wittman, Lanee Snow, Bruce McNamara, Frannie Smith (*PNNL*)

Track 8, Session 3: Advanced Fuel Cycles: Impacts on Waste Management

Organizers: Joonhong Ahn (*Univ of California, Berkeley*), Jongwon Choi (*KAERI*)

Chair: Jim Blink (*LLNL*)

Grand Salon G/H

3:30 p.m.

(6942) Influence of Advanced Fuel Cycles on Uncertainty in the Performance of Geologic Disposal Systems

Rob P. Rechard (*SNL*), Mark Sutton, James A. Blink, Harris R. Greenberg, M. Sharma (*LLNL*), Bruce A. Robinson (*LANL*), Mark Nutt (*ANL*)

3:55 p.m.

(7010) Secondary Waste Estimate for Recycling Based on AREVA Operating Experience

Genevieve Foare, Florian Meze (*AREVA*), Don McGee, Paul Murray, Sven Bader (*AREVA Federal Services*)

WEDNESDAY, MAY 1, 2013, 8:00 AM–10:15 AM

Plenary—IV and Panel—III: Fast Reactors as a Means of Closing the Fuel Cycle

Organizer: Paul Dickman (*ANL*)

Cochairs: Kevin A. McMahon (*SNL*), Paul Dickman (*ANL*)

Grand Salon F

SPEAKERS:

- John Kelly (*US Dept of Energy*)
- Dr. Mark Peters (*ANL*)
- Neile Miller (*NNSA*)—invited
- Won-Seok Park (*KAERI*)
- Others speakers to be determined.

WEDNESDAY, MAY 1, 2013, 10:15 AM–10:30 AM

Break

WEDNESDAY, MAY 1, 2013, 10:30 AM–12:10 PM

Track 1, Session 4: Total Repository System (Generic and Site-Specific)

Organizers: Peter Swift (*SNL*), Matt Kozak (*Intera, Inc.*), George Danko (*Univ. of Nevada, Reno*)

Cochairs: Erik Kremer (*NWMO*), Peter Swift (*SNL*)

Grand Salon A/B

10:30 a.m.

(6805) Preliminary Safety Analysis Gorleben: Source Terms for Heat-Producing Wastes

Bernhard Kienzler, Marcus Altmaier, Christiane Bube, Volker Metz (*KIT*)

10:55 a.m.

(6821) Sensitivity Analysis of Probabilistic Dose Results in SKB's License Application

Allan Hedin (*SKB*)

Track 2, Session 6: Natural Systems for Disposal (Generic and Site-Specific)

Organizers: Jude McMurry (*CNWRA*), Stratis Vomvoris (*NAGRA*)

Cochairs: Björn Dverstorp (*SSM*), John Walton (*UTEP*)

Cimarron

10:30 a.m.

(6956) THM Processes Modeling to Evaluate Salt-Based Repositories in the Long-Term

Laura Blanco Martin, Jonny Rutqvist, James Houseworth, Jens Birkholzer (*LBNL*)

10:55 a.m.

(6944) Development and Verification of a New Particle Tracking Capability for Modeling Radionuclide Transport in Discrete Fracture Networks

Nataliia Makedonska, Scott Painter, Tsung-Lin Hsieh, Quan Bui, Carl Cable (*LANL*)

11:20 a.m.

(6982) Chemical-Mechanical Coupling Related to THMC Modelling of Clay Formations

Liange Zheng, Jonny Rutqvist, Hui-Hai Liu, Jens Birkholzer, Eric Sonnenthal (*LBNL*)

11:45 a.m.

(6988) Thermal-Hydro-Mechanical Modeling of Clay Rock Including Fracture Damage

Daisuke Asahina, Jim Houseworth, Jens Birkholzer (*LBNL*)

Chair: Dietmar Wolff (*BAM*)

Track 7, Session 8: Storage of Used Nuclear Fuel and High Level Waste

Organizers: Brady Hanson (*PNNL*), Vincenzo Rondinella (*EC-JRC-ITU*)

Chair: Dietmar Wolff (*BAM*)

Grand Salon G/H

10:30 a.m.

(7034) Study on the Delayed Hydride Cracking for Used Nuclear Fuel Cladding in Dry Storage

Dallas Burton, Yong Yang (*Univ of Florida*)



10:55 a.m.

(7038) Interim Storage Environment: Considerations for Corrosion Testing of SNF Dry Storage Containers

Charles R. Bryan, David Enos (SNL)

11:20 a.m.

(7024) Development of a Comprehensive Health Monitoring System for Dry Storage of Spent Nuclear Fuel

Michael Hurley, Brian Jaques, Vikram Patel (Boise State Univ), Jack Ma, Jake Blanchard, Hongyi Mi, Kumar Sridharan (Univ of Wisconsin), Sean McDeavitt (Texas A&M), Sin Loo, Darryl Butt (Boise State Univ)

Track 3, Session 6: Engineered Systems for Disposal

Organizers: Frank Garisto (NWMO), Asdul Chowdhury (CNWRA), David Pickett (CNWRA)

Chair: Matt Kozak (Interra, Inc.)

Grand Salon I/J

10:30 a.m.

(6998) Modelling the Interactions of Radiolytic Species with Noble Metal Particles

Alexander Geanes, Frances Smith, Donghai Mei, Edgar Buck (PNNL)

10:55 a.m.

(7003) Onset and Stability of Natural Convection in Deep Boreholes

E. A. Bates, E. Baglietto, M. J. Driscoll, J. Buongiorno (MIT)

11:20 a.m.

(6909) ADVANTG Shielding Analysis for Closure Operations in an Open-Mode Repository

Aaron M. Bevill, Georgeta Radulescu, John M. Scaglione, Rob L. Howard (ORNL)

Track 8, Session 4: Advanced Fuel Cycles: Impacts on Waste Management

Organizers: Joonhong Ahn (Univ of California, Berkeley), Jongwon Choi (KAERI)

Chair: Jongwon Choi (KAERI)

Grand Salon C/D

10:30 a.m.

(6702) Why We Can't Predict Future Fuel Cycles: Implications for Waste Management and Repository Design

Charles Forsberg (MIT)

10:55 a.m.

(6847) Are Fast Reactors Necessary for Full Actinide Recycle?

E. D. Collins, C. W. Alexander, G.D. Del Cul (ORNL), J. P. Renier (ORNL (Ret.))

11:20 a.m.

(6922) A Practical Path Forward for U.S. Used Nuclear Fuel

Guillermo D Del Cul, Emory D. Collins, Barry B. Spencer, R. T. Jubin (ORNL)

WEDNESDAY, MAY 1, 2013, 12:10 AM–1:30 PM

Lunch Break

WEDNESDAY, MAY 1, 2013, 1:30 PM–3:10 PM

Track 1, Session 5: Total Repository System (Generic and Site-Specific)

Organizers: Peter Swift (SNL), Matt Kozak (Interra, Inc.), George Danko (Univ. of Nevada, Reno)

Cochairs: G. Freeze (SNL), D. Sevougian (SNL)

Cimarron

1:30 p.m.

(6945) Disposal of Heat-Generating Nuclear Waste in Salt—Recent Activities and Future Plans

Bruce A. Robinson (LANL), Roger A. Nelson (DOE), Douglas J. Weaver (LANL)

1:55 p.m.

(6992) Used Fuel Security—Prioritized Issues, R&D Needs, Best Practices, and Security Risk Analysis for Extended Storage

Felicia A Durán, Gregory D. Wyss (SNL), Scott DeMuth (LANL), James A. Blink (LLNL)

Track 2, Session 7: Natural Systems for Disposal (Generic and Site-Specific)

Organizers: Jude McMurry (CNWRA), Stratis Vomvoris (NAGRA)

Chair: Stratis Vomvoris (NAGRA)

Grand Salon I/J

1:30 p.m.

(7001) Thermal-Hydrologic-Mechanical Modeling of a Generic Salt High-Level Radioactive Waste Repository

Teklu Hadgu, Mario Martinez, James Bean, Jose G. Arguello, Carlos F. Jové-Colón, Francis Hansen (SNL)

1:55 p.m.

(7021) Morphology of Plutonium Precipitates in the Presence of Goethite at 25 and 80°C

M. Zavarin, P. Zhao, Z. R. Dai, S. A. Carroll, A. B. Kersting (LLNL)

Track 7, Session 9: Storage of Used Nuclear Fuel and High Level Waste

Organizers: Brady Hanson (PNNL), Vincenzo Rondinella (EC-JRC-ITU)

Chair: Holger Voelzke (BAM)

Grand Salon G/H

1:30 p.m.

(6845) Impacts Associated with Early Transfer of Spent Fuel to Dry Storage

Eileen Supko (Energy Resources International, Inc.), Keith Waldrop (EPRI)

1:55 p.m.

(6857) Two-Dimensional CFD Simulations of a Square 8x8 Heater Rod Array in an Isothermal Enclosure Filled with Rarefied Air

Miles Greiner, Pablo Araya, N. R. Chalasani (Univ of Nevada, Reno), Jie Li, Yung Liu (ANL)

2:20 p.m.

(6895) The Effect of Weld Residual Stress on Life Prediction of Used Fuel Storage Canister Material

B. P. Black, R. G. Ballinger, S. E. Ferry (MIT), S. Teyseyre (INL)

2:45 p.m.



(6912) Assessment of Available Techniques for the Interim Storage of AGR Fuel

Laura McManniman (*Sellafield Limited*)

Track 3, Session 7: Engineered Systems for Disposal

Organizers: Frank Garisto (*NWMO*), Asdul Chowdhury (*CNWRA*), David Pickett (*CNWRA*)

Chair: Dan Bullen (*DNFSB*)

Carlsbad

1:30 p.m.

(6846) Modelling Container Failure in a Canadian Deep Geologic Repository

Mark Gobien, Frank Garisto (*NWMO*)

1:55 p.m.

(6896) Sorption of Neptunium on Graphite under Potential Repository Conditions

C. Keith, M. Kalagorgevich, R. Springs, G. C. S. Cerefice (*UNLV*)

2:20 p.m.

(6921) Effects of Chemical Solution Conditions on Uranium(VI) Diffusion in Clays

Ruth M. Tinnacher, James A. Davis (*LBNL*)

2:45 p.m.

(7029) Coupled THMC Ventilation Model Tasks for Integrated, High-Capacity SNF Management

George Danko, Davood Bahrami (*Univ of Nevada, Reno*)

Track 6, Session 2: Institutional Topics (With Emphasis on Lessons Learned)

Organizer: Charles McCombie (*MCM Consulting*)

Cochairs: Mick Apted (*Intera, Inc.*), Ray Clark (*EPA*)

Grand Salon D

1:30 p.m.

(6842) The Technical Stability of the Swedish Nuclear Fuel Safety Program

Thomas Kaiserfeld (*Lund Univ*)

1:55 p.m.

(6897) Planning an Integrated Waste Management Strategy for New Nuclear Nations

Charles McCombie, Neil Chapman, Wolfgang Kickmaier, Ellie Scourse (*MCM Consulting*)

2:20 p.m.

(6898) Progress with Multinational Disposal Initiatives

Charles McCombie, Neil Chapman (*Arius Association*), Ewoud Verhoef (*COVRA*)

2:45 p.m.

(6874) Technology Transfer—Identification and Quantification of Potential Benefits

Kjell Westerberg (*SKB International AB*)

Track 8, Session 5: Advanced Fuel Cycles: Impacts on Waste Management

Organizers: Joonhong Ahn (*Univ of California, Berkeley*), Jongwon Choi

(*KAERI*)

Chair: Charles Forsberg (*MIT*)

Las Cruces

1:30 p.m.

(6952) Feasibility Analyses for Electrorefining Waste Disposal in Salt

Joon Lee, Yifeng Wang (*SNL*), Michael Simpson (*INL*), Andy Miller (*SNL*)

1:55 p.m.

(6958) THM Coupling Analysis of Korea Research Teams for Task B of the International Cooperation Project, DECOVALEX

Changsoo Lee (*KAERI*), Sangki Kwon (*Inha Univ*), Won-Jin Cho, Heui-Joo Choi, Jong-Won Choi (*KAERI*)

WEDNESDAY, MAY 1, 2013, 3:10 PM–3:30 PM

Break

WEDNESDAY, MAY 1, 2013, 3:30 PM–5:10 PM

Track 1, Session 6: Total Repository System (Generic and Site-Specific)

Organizers: Peter Swift (*SNL*), Matt Kozak (*Intera, Inc.*), George Danko (*Univ. of Nevada, Reno*)

Cochairs: O. Pensado (*CNWRA*), M. Kozak (*Intera, Inc.*)

Grand Salon A/B

3:30 p.m.

(6950) Independent Modelling in SSM's Licensing Review

Shulan Xu, Björn Dverstorp, Maria Norden (*Swedish Radiation Safety Authority*)

3:55 p.m.

(6966) Wireless Data Transmission from Deep Geological Disposal Facilities to the Surface

Thomas J. Schröder, Ecaterina Rosca-Bocancea, Jaap Hart (*NRG*)

Track 3, Session 8: Engineered Systems for Disposal

Organizers: Frank Garisto (*NWMO*), Asdul Chowdhury (*CNWRA*), David Pickett (*CNWRA*)

Chair: Abe van Luik (*DOE*)

Acema

3:30 p.m.

(7007) Using the Disposal Systems Evaluation Framework to Evaluate Design Tradeoffs

Harris R. Greenberg, James A. Blink, Montu Sharma (*LLNL*)

3:55 p.m.

(7022) SNF Disposal Concepts for Small and Large Waste Packages

Ernest Hardin, Teklu Hadgu, Dan Clayton (*SNL*), Rob Howard (*ORNL*), Harris Greenberg, Jim Blink, Montu Sharma, Mark Sutton (*LLNL*), Joe Carter, Mark Dupont, Philip Rodwell (*SRNL*)

4:20 p.m.

(6796) Diffusion of Cesium in Compacted Bentonite with Different Column Lengths

Chuan-Pin Lee, Ming-Chee Wu (*National Cheng Kung Univ*), Ching-Yuan Liu (*National Central Univ*), Chun-Hua Pan (*National Cheng Kung Univ*), Tsuey-Lin Tsai, Hwa-Jou Wei, Lee-Chung Men (*Inst of Nuclear Energy Research*)



4:45 a.m.

(6862) Modeling of Cylindrical Casks under Horizontal Drop Test Conditions

Uwe Zencker, Linan Qiao, Eva-Maria Kasparek, Holger Völzke (*BAM Federal Inst for Materials Research and Testing*)

Track 6, Session 3: Institutional Topics (With Emphasis on Lessons Learned)

Organizer: Charles McCombie (*MCM Consulting*)

Cochairs: Ray Clark (*EPA*), Charles McCombie (*MCM Consulting*)

Cimarron

3:30 p.m.

(6841) Cigéo, the French Geological Repository Project

T. Labalette, A. Harman, M. C. Dupuis, G. Ouzounian (*ANDRA*)

3:55 p.m.

(6844) URLs in European Programs for High Level Waste Disposal—How Used?

Kimitaka Yoshimura (*NUMO*), Irina Gaus (*NAGRA*), Kenichi Kaku (*NUMO*), Stratis Vomvoris (*NAGRA*)

4:20 p.m.

(6933) Geological Disposal and Site Selection in Switzerland—Accomplishments and Outlook

Thomas Ernst, Efstratios (Stratis) Vomvoris, Anne Claudel (*NAGRA*)

4:45 p.m.

(6938) The Strategic Role of Underground Rock Laboratories in a Geological Disposal Programme

Wolfgang Kickmaier, Charles McCombie, Ian G. McKinley, Ellie M. Scourse (*MCM Consulting*)

Track 7, Session 11: Storage of Used Nuclear Fuel and High Level Waste

Organizers: Brady Hanson (*PNNL*), Vincenzo Rondinella (*EC-JRC-ITU*)

Chair: Ken Sorenson (*SNL*)

Grand Salon C/D

3:30 p.m.

(6838) Logistical Simulation of Spent Nuclear Fuel Disposal in a Salt Repository with Low Temperature Limits

E. A. Kalinina, E. L. Hardin (*SNL*)

3:55 p.m.

(6851) Integrated Modeling of Spent Nuclear Fuel Management Stages

Osvaldo Pensado, Sitakanta Mohanty (*CNWRA*), Keith Compton (*NRC*), E. Lynn Tipton, Razvan Nes, Patrick LaPlante (*CNWRA*)

4:20 p.m.

(6861) An Auxiliary System to Monitor the Key Environmental Variables in Spent Fuel Pool at the Loss of Power Accident

Chan Hee Park, Jung Min Lee, Arim Lee, Joo Hyun Moon (*Dongguk Univ*), Wook Jae Yoo, Bong Soo Lee (*Konkuk Univ*), Sung Kyu Shin (*Korea Radioactive Waste Management Corp*)

4:45 p.m.

(6866) Thermal Modeling Studies for Active Storage Modules in the Calvert Cliffs ISFSI

Harold E. Adkins, Jr., James A. Fort, Sarah R. Suffield, Judith M. Cuta,

Brian A. Collins (*PNNL*)

THURSDAY, MAY 2, 2013, 8:00 AM–9:15 AM

Panel Discussion—IV: Large-Volume Wastes from Accident Cleanups

Organizer: Charles Forsberg (*MIT*)

Chair: Charles Forsberg (*MIT*)

Grand Salon F

Waste management systems are designed for process wastes produced at a relatively uniform rate, not the quantities of wastes generated by a major accident. As a consequence waste disposal limits the rate of cleanup after an accident. The panel will address key post-accident waste disposal issues including: Is there a risk-based strategy that is practical and politically viable? How should one classify wastes in a post-accident environment? Are new disposal technologies (such as seabed disposal) required?

PANELISTS:

- Charles Forsberg (*MIT*)
- Thomas Cotton (*Complex Systems Group, LLC*)
- Kaname Miyahara (*JAEA*)
- John Kessler (*EPRI*)

THURSDAY, MAY 2, 2013, 9:15 AM–11:00 AM

Plenary—V: Consent-Based Nuclear Facility Siting

Organizer: Hank Jenkins-Smith (*Univ of Oklahoma*)

Chair: Barry Butterfield (*HDR Eng*)

Grand Salon F

9:15 a.m.

(7185) Familiarity as Key to Public Acceptance of Used Nuclear Fuel Facilities

Ann Bisconti (*Bisconti Research, Inc.*)

9:40 a.m.

(7186) Consent-Based Siting: What We Have Learned

Daniel Metlay (*U.S. Nuclear Waste Technical Review Board*)

10:05 a.m.

(7229) Department of Energy Consent-Based Siting Approach

Jeff Williams (*DOE*)

10:30 a.m.

(7234) Siting of Radioactive Waste Disposal Facilities—A Synthesis of International Learning

Claudio Pescatore (*OECD/NEA*)

THURSDAY, MAY 2, 2013, 11:00 AM–11:10 AM

Break

THURSDAY, MAY 2, 2013, 11:10 AM–12:50 PM

Track 4, Session 2: Biosphere

Organizers: Andrew Sowder (*EPRI*)

Chair: Nava Garisto (*SENES Consultants*)

Grand Salon A/B

11:10 a.m.



(6959) Uncertainties in Doses from Agricultural Ecosystems Following Conversion from Wetlands

R. A. Klos (*Aleksandria Sciences Ltd*), Anders Wörman (*KTH*)

11:35 a.m.

(6709) Continental-Shelf Seabed Disposal: Disposal of Non-Repository Radioactive Wastes for a World of 10 Billion People

Charles Forsberg (*MIT*)

Track 2, Session 8: Natural Systems for Disposal (Generic and Site-Specific)

Organizers: Jude McMurry (*CNWRA*), Stratis Vomvoris (*NAGRA*)

Chair: Stratis Vomvoris (*NAGRA*)

Grand Salon C/D

11:10 a.m.

(6918) Underground Salt Research Laboratory at the Waste Isolation Pilot Plant

F. D. Hansen (*SNL*)

11:35 a.m.

(6919) An Overview of U.S. Disposal Research Activities Linked to International URLs

Jens Birkholzer, Daisuke Asahina, Fei Chen (*LBNL*), Payton Gardner (*SNL*), James Houseworth (*LBNL*), Carlos Jové-Colón (*SNL*), Annie Kersting (*LLNL*), Prasad Nair (*DOE*), Lianchong Li, Hui-Hai Liu (*LBNL*), Scott Painter, Paul Reimus (*LANL*), Jonny Rutqvist, Carl Steefel (*LBNL*), Mark Tynan (*DOE*), Yifeng Wang (*SNL*), Mavrik Zavarin (*LLNL*)

12:00 p.m.

(6971) KURT (KAERI Underground Research Tunnel) Activities for HLW Disposal Technology Development in Korea

Jongwon Choi, Kyungsu Kim (*KAERI*)

Track 7, Session 12: Storage of Used Nuclear Fuel and High Level Waste

Organizers: Brady Hanson (*PNNL*), Vincenzo Rondinella (*EC-JRC-ITU*)

Chair: Robert Einziger (*NRC*)

Carlsbad

11:10 a.m.

(7081) NUHOWS Storage and Transportation of Irradiated Reactor Components and High Level Waste in Large Packages

Glen A. Rae (*Transnuclear*)

11:35 a.m.

(6979) Production of Simulated High-Burnup Used Fuel Cladding in the HFIR

R. H. Howard, Y. Yan, R. L. Howard, J. L. McDuffee, L. J. Ott (*ORNL*)

12:00 p.m.

(6983) Test System for Evaluating Spent Nuclear Fuel Bending Stiffness and Vibration Integrity

J-A. Wang, H. Wang, B. B. Bevard, R. L. Howard (*ORNL*), M. E. Flanagan (*NRC*)

12:25 p.m.

(7018) Microstructure and Macroscopic Alteration Affecting Nuclear Fuel During Extended Storage

Vincenzo V. Rondinella, Thierry Wiss, Dimitrios Papaioannou, Ramil Nasyrow (*EC-JRC-ITU*)

Track 8, Session 6: Advanced Fuel Cycles: Impacts on Waste Management

Organizers: Joonhong Ahn (*Univ of California, Berkeley*), Jongwon Choi (*KAERI*)

Chair: Don McGee (*AREVA*)

Grand Salon I/J

11:10 a.m.

(6884) Study of Unfolding Method to Determine Pin-Wise Source Strength Distribution

Yos Panagaman Sitompul, Hee-Sung Shin, Se-Hwan Park, Oh Jong Myeong, Seo Hee, Ho-Dong Kim (*KAERI*)

11:35 a.m.

(6885) Development of Axial Burnup Measurement System for PWR Spent Fuel Assembly

Hee-Sung Shin, Yos Panagaman Sitompul, Se-Hwan Park, Oh Jong Myeong, Seo Hee, Ho-Dong Kim (*KAERI*)

12:00 p.m.

(6889) Data Mining to Determine Inventory Characteristics of Used Nuclear Fuel for Potential Future Recycling Campaigns

Josh Peterson (*ORNL*)

Track 9, Session 2: High-Level Radioactive Waste Transportation

Organizer: Ruth Weiner (*SNL*)

Chair: Ruth Weiner (*SNL*)

Grand Salon G/H

11:10 a.m.

(6973) Effects of Drying and Storage on High-Burnup Cladding Ductility

M. C. Billone, T. A. Burtseva, Y. Y. Liu (*ANL*)

12:00 p.m.

(6888) Investigating the Performance of Rubber Seals at Low Temperatures

Dietmar Wolff, Matthias Jaunich, Wolfgang Stark (*BAM Federal Inst for Materials Research and Testing*)

THURSDAY, MAY 2, 2013, 12:50 PM–1:50 PM

Grab & Go Lunch

Grand Salon E



Technical Tour: Waste Isolation Pilot Plant (WIPP), URENCO USA uranium enrichment facilities and Waste Control Specialists radioactive and mixed waste processing and disposal company

Sponsored by Sandia National Laboratories

DATE: Thursday May 2, 2013 – Saturday, May 4, 2013

TRANSPORTATION: Fee includes the trip from ABQ Marriott and back to ABQ Marriott also the trips to WIPP/URENCO/WCS and any incidental transportation while in SE New Mexico. \$220.00

LODGING: Includes two nights at the Stevens Inn in Carlsbad, NM. \$220.00

MEALS: Include group dinner Thursday night. \$35.00 (does not include any alcoholic beverages, but there will be a cash bar available). Lunches on Friday and Saturday (\$17.50 each) \$35.00

TOUR-FEE: Final pricing is \$510 and will include transportation, two nights hotel in Carlsbad, a group dinner, and box lunches on the days of the tours.

PARTICIPATION IS LIMITED – REGISTER EARLY!

Sandia National Laboratories (SNL) is pleased to offer and host these three tours.

1. WIPP is the Department of Energy's facility for the deep geologic disposal of defense related transuranic wastes. The repository has been operational for 13 years and has received in excess of 10,000 shipments. In 2010 WIPP received its third 5-year certification from the US Environmental Protection Agency (EPA) in terms of meeting EPA's long term safety criteria, and it also received its second 10-year certification from the State of New Mexico Environment Department regarding the disposal of Hazardous Waste. The WIPP repository is located in bedded rock salt ~660 m (~2,150 feet) below the surrounding Chihuahuan desert terrain. Tours will be led by project scientists and engineers directly involved with the WIPP repository and its operation. This is a unique opportunity to experience the world's most successful operating deep geologic repository and to have direct access to the scientists and engineers with WIPP expertise. You will witness first-hand the WIPP facility, including the transportation systems, the transuranic waste handling systems, and the underground disposal environment; everything from waste receipt to emplacement underground for final disposal.
2. The URENCO USA facility began operations on June 11, 2010. Construction of the project will continue until the plant reaches the planned 5,700 tSW/a capacity. URENCO USA is the first enrichment facility to be built in the US in 30 years and the first ever using centrifuge enrichment technology. Robust project, operational, and corporate teams have been established to monitor construction activities, and to ensure training and procedural development run to schedule.

Capacity at URENCO USA currently stands at 2,000 tSW/a. It is anticipated that at full capacity the facility can produce sufficient enriched uranium for nuclear fuel to provide approximately 10% of America's electricity needs.

3. Waste Control Specialists LLC (WCS) is a national leader in treatment, storage and disposal of radioactive, hazardous and mixed waste at its 1,338-acre west Texas facility near Andrews. With the opening of the Texas Compact Disposal Facility in April 2012, and approval for operation of its Federal Disposal Facility in September 2012, WCS is now the only facility in the United States licensed in the last 30 years to dispose of Class A, B and C low-level and mixed low-level radioactive waste. These new disposal facilities complement WCS' existing byproduct disposal facility, the hazardous/toxic disposal facility, and the treatment facility. WCS is now a "one-stop shop" for treatment, storage and disposal of hazardous, toxic, mixed and radioactive waste needs. The company was founded in 1989 and is based in Dallas, Texas. Waste Control Specialists LLC operates as a subsidiary of Valhi, Inc

The WIPP facility is located about 40 miles from Carlsbad, New Mexico, URENCO is located near Eunice, New Mexico and WCS is located in Andrews, TX. Therefore hotel reservations will be made in Carlsbad on behalf of registered tour participants for two nights lodging and a group dinner on Thursday evening will be organized. Lodging and the dinner are both included in the participant fee.

HOW TO REGISTER:

At this time, the tour is limited to the first 25 registrants. Please indicate your interest in participating in the tour by emailing Ms. Dina Howell at vdhowel@sandia.gov no later than February 28th, 2013. Ms. Howell will send you further information with a link to the registration website, and inform you of the security requirements that apply for non-US citizens entering a federal government facility. Non-US citizens will need to fill out a form and submit it to the address given on the form, via fax or email, about 60 days prior to the tour. Full non-refundable payment for the tour will be required prior to March 15th, or the tour slot will be offered to a waiting list. Any questions, please contact Ms. Howell at vdhowel@sandia.gov or (505) 284-2780.

Payment can be most easily made through a Web-Pay URL using any major credit card. The Web-Pay application can be found at:

<https://cfwebprod.sandia.gov/cfdocs/ccpwa/index.cfm>

GRAND BALLROOM

