

September 15 - 19, 2013

LWR Fuel Performance Meeting

TopFuel 2013



Official Program

Charlotte, NC, USA

Westin Charlotte Hotel



ANS

CONTRIBUTING ORGANIZATIONS

The organizations listed below have made an outstanding contribution to the success of the



LWR Fuel Performance Meeting TopFuel 2013

and to the enjoyment of the attendees and their guests through their generous sponsorship.

Sunday, September 15, 2013

Welcome Reception: **AREVA**

Monday, September 16, 2013

Breakfast/Mid-Morning Coffee Break: **Enusa Industrias Avanzadas**

Lunch: **ANATECH Corp.**

A Structural Integrity Associates, Inc.[®] Company

Afternoon Coffee Break: **Duke Energy**

Poster Reception: **Electric Power Research Institute, Inc.**

Tuesday, September 17, 2013

Breakfast/Mid-Morning Coffee Break: **Babcock & Wilcox mPower**

Lunch: **Studsvik Nuclear and Studsvik Scandpower**

Afternoon Coffee Break: **NETZSCH Instruments North America, LLC
and Nuclear Safety Associates**

NASCAR Banquet: **Westinghouse Electric Co., Toshiba and
Korea Nuclear Fuel Co.**

Wednesday, September 18, 2013

Breakfast/Mid-Morning Coffee Break: **SCANA**

Lunch: **Global Nuclear Fuel**

Thank You!

The Electric Power Research Institute, Inc. (EPRI, www.epri.com) conducts research and development relating to the generation, delivery and use of electricity for the benefit of the public. An independent, nonprofit organization, EPRI brings together its scientists and engineers as well as experts from academia and industry to help address challenges in electricity, including reliability, efficiency, affordability, health, safety and the environment. EPRI's members represent approximately 90 percent of the electricity generated and delivered in the United States, and international participation extends to more than 30 countries.

Meeting Officials	4
Technical Program Members	5
Meeting Schedule	6-7
Meeting Information and Special Events	8-9
Welcome Message	10
Monday Technical Sessions	11-14
Tuesday Technical Sessions	14-18
Wednesday Technical Sessions	19-21
2013 LWR Fuel Handling Events Workshop	22
2013 LWR TopFuel Exhibits	23





LWR Fuel Performance Meeting TopFuel 2013

Achieving Excellence Beyond 0 by 2010

Charlotte, NC • Westin Charlotte Hotel

September 15 - 19, 2013

EXECUTIVE COMMITTEE



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Duke Energy



GENERAL CO-CHAIR:
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Westinghouse Electric Company



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TopFuel 2013 Conference

*Achieving Excellence
Beyond 0 by 2010*

Purpose: TopFuel's primary objective is to bring together leading specialists in the field from around the world to analyze advances in nuclear fuel management technology and to use the findings of the latest cutting-edge research to help manufacture the high-performance nuclear fuels of today and tomorrow.



TECHNICAL PROGRAM MEMBERS



TECHNICAL PROGRAM CHAIR:
Mr. Zeses E. Karoutas
Westinghouse Electric Company



ASSISTANT TECHNICAL PROGRAM CHAIR:
Dr. Peng Xu
Westinghouse Electric Company

- | | |
|---|---|
| Ms. Clara Anghel (<i>GE-Hitachi</i>) | Mr. Pierre Mollard (<i>AREVA</i>) |
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| Mr. Bob Einziger (<i>NRC/US</i>) | Mr. Sumit Ray (<i>Westinghouse</i>) |
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| Mr. Kenneth Geelhood (<i>PNNL</i>) | Mr. Michael Reitmeyer (<i>Exelon</i>) |
| Dr. Jess Gehin (<i>DOE</i>) | Mr. Javier Riverola (<i>ENUSA</i>) |
| Dr. Lars Hallstadius (<i>Westinghouse</i>) | Dr. Kan Sakamoto (<i>NFD</i>) |
| Mr. Charles Heck (<i>GNF</i>) | Dr. David Schrire (<i>Vattenfall</i>) |
| Mr. William Herwig (<i>SCANA</i>) | Dr. Koroush Shirvan (<i>MIT</i>) |
| Ms. Nadine Hollasky (<i>Bel V</i>) | Dr. Russell Stachowski (<i>GNF</i>) |
| Mr. Jim Hoerner (<i>B&W</i>) | Mr. Marco Streit (<i>Paul Scherrer Institut</i>) |
| Mr. Clive Ingram (<i>Office for Nuclear Regulation</i>) | Mr. John Strumpell (<i>AREVA</i>) |
| Mr. Victor Inozemtsev (<i>IAEA</i>) | Mr. Jim Tulenko (<i>UFL/US</i>) |
| Dr. John Jones (<i>Office for Nuclear Regulation</i>) | Dr. Paul Turinsky (<i>NCSU</i>) |
| Dr. Atul Karve (<i>GNF</i>) | Dr. Nicolas Waeckel (<i>EDF</i>) |
| Mr. Koji Kitano (<i>Toshiba</i>) | Mr. Fu Xiangang (<i>CGNPC</i>) |
| Dr. Travis Knight (<i>USC</i>) | Dr. Suresh Yagnik (<i>EPRI</i>) |
| Mr. Keizo Matsuura (<i>NFI</i>) | Dr. Yang-Hyun Koo (<i>KAERI</i>) |
| Mr. Vaclav Mecir (<i>CEZ</i>) | Mr. Ying Yi (<i>SNERDI</i>) |
| Dr. Mitch Meyer (<i>INL</i>) | Dr. Jinzhao Zhang (<i>Tractebel Engineering/GDF SUEZ</i>) |

Meeting Schedule



SUNDAY, SEPTEMBER 15, 2013

3:00 p.m.–5:00 p.m.	Registration	Grand Promenade A
3:00 p.m.–5:00 p.m.	Exhibit Table Setup	Grand Promenade AB
6:00 p.m.–8:30 p.m.	Opening Reception (<i>Sponsored by AREVA</i>)	Grand Promenade AB

MONDAY, SEPTEMBER 16, 2013

7:00 a.m.–5:00 p.m.	Registration	Grand Promenade A
7:00 a.m.–8:30 a.m.	Speaker's Breakfast (Continental)	Sharon
7:00 a.m.–8:30 a.m.	Attendee Continental Breakfast (<i>Sponsored by Enusa Industrias Avanzadas</i>)	Grand Ballroom D
8:30 a.m.–5:30 p.m.	Display Booths	Grand Promenade AB
8:30 a.m.–10:00 a.m.	Opening Plenary Session—Part I	Grand Ballroom C
10:00 a.m.–10:30 a.m.	AM Coffee Break (<i>Sponsored by Enusa Industrias Avanzadas</i>)	Grand Promenade AB
10:30 a.m.–12:00 p.m.	Opening Plenary Session—Part II	Grand Ballroom C
12:00 p.m.–1:00 p.m.	Lunch (<i>Sponsored by ANATECH Corp. A Structural Integrity Associates, Inc.® Company</i>)	Grand Ballroom D
1:00 p.m.–3:00 p.m.	Track 4: Modeling <i>Fuel Modeling</i>	Grand Ballroom A
	Track 1: Operation and Experience <i>Fuel Operating Experience and Performance</i>	Grand Ballroom B
	Track 2: Transient Fuel Behavior <i>Severe Accidents and Transients</i>	Grand Ballroom C
3:00 p.m.–3:30 p.m.	PM Coffee Break (<i>Sponsored by Duke Energy</i>)	Grand Promenade AB
3:30 p.m.–5:30 p.m.	Track 4: Modeling <i>Fuel Modeling and Codes—I</i>	Grand Ballroom A
	Track 1: Operation and Experience <i>Materials</i>	Grand Ballroom B
	Track 2: Transient Fuel Behavior <i>Reactivity Initiated Accident (RIA)</i>	Grand Ballroom C
5:30 p.m.–8:00 p.m.	Evening Poster Reception (<i>Sponsored by Electric Power Research Institute, Inc.</i>)	Grand Ballroom D

TUESDAY, SEPTEMBER 17, 2013

7:00 a.m.–3:00 p.m.	Registration	Grand Promenade A
7:00 a.m.–8:30 a.m.	Speaker's Breakfast (Continental)	Sharon
7:00 a.m.–8:30 a.m.	Attendee Continental Breakfast (<i>Sponsored by Babcock & Wilcox mPower</i>)	Grand Ballroom D
8:30 a.m.–6:00 p.m.	Display Booths	Grand Promenade AB
8:30 a.m.–10:10 a.m.	Track 4: Modeling <i>Modeling and Coupling—I</i>	Grand Ballroom A
	Track 1: Operation and Experience <i>Pool-Side and Hot Cell Examinations</i>	Grand Ballroom B
	Track 2: Transient Fuel Behavior <i>Pellet Cladding Interaction (PCMI/PCI)</i>	Grand Ballroom C
10:10 a.m.–10:30 a.m.	AM Coffee Break (<i>Sponsored by Babcock & Wilcox mPower</i>)	Grand Promenade AB
10:30 a.m.–12:30 p.m.	Track 5: Spent Fuel Storage and Transportation <i>Materials Issues in Spent Fuel Storage and Transportation</i>	Grand Ballroom A
	Track 6: New Fuel Concepts <i>New Fuel Concepts and Designs</i>	Grand Ballroom B
	Track 2: Transient Fuel Behavior <i>Loss of Coolant Accident (LOCA)—I</i>	Grand Ballroom C
12:30 p.m.–1:30 p.m.	Lunch (<i>Sponsored by Studsvik Nuclear and Studsvik Scandpower</i>)	Grand Ballroom D

1:30 p.m.–3:50 p.m.	Track 4: Modeling <i>Fuel Modeling and Codes—II</i>	Grand Ballroom A
	Track 6: New Fuel Concepts <i>Accident Tolerant Fuel</i>	Grand Ballroom B
	Track 2: Transient Fuel Behavior <i>Loss of Coolant Accident (LOCA)—II</i>	Grand Ballroom C
3:50 p.m.–4:20 p.m.	PM Coffee Break (<i>Sponsored by Nuclear Safety Associates and NETZSCH Instruments North America, LLC</i>)	Grand Promenade AB
4:20 p.m.–6:00 p.m.	Track 4: Modeling <i>Modeling and Coupling—I</i>	Grand Ballroom A
	Track 6: New Fuel Concepts <i>Accident Tolerant Cladding: Non-SiC</i>	Grand Ballroom B
	Track 3: Design and Materials <i>Advanced Fuel Design and Processing</i>	Grand Ballroom C
6:30 p.m.–10:00 p.m.	NASCAR Hall of Fame Banquet (<i>Sponsored by Westinghouse Electric Company, Toshiba and Korea Nuclear Fuel Company</i>)	NASCAR Museum

WEDNESDAY, SEPTEMBER 18, 2013

7:00 a.m.–3:00 p.m.	Registration	Grand Promenade A
7:00 a.m.–8:30 a.m.	Speaker's Breakfast (Continental)	Sharon
7:00 a.m.–8:30 a.m.	Attendee Continental Breakfast (<i>Sponsored by SCANA</i>)	Grand Ballroom D
8:30 a.m.–12:00 p.m.	Display Booths	Grand Promenade AB
8:30 a.m.–10:10 a.m.	Track 4: Modeling <i>Fuel Mechanical Modeling</i>	Grand Ballroom A
	Track 6: New Fuel Concepts II <i>Accident Tolerant Cladding: SiC—I</i>	Grand Ballroom B
	Track 3: Design and Materials <i>Cladding and Structural Alloy Development—I</i>	Grand Ballroom C
10:10 a.m.–10:30 a.m.	AM Coffee Break (<i>Sponsored by SCANA</i>)	Grand Promenade AB
10:30 a.m.–12:30 p.m.	Track 4: Modeling <i>Thermal Hydraulic Modeling—I</i>	Grand Ballroom A
	Track 6: New Fuel Concepts <i>Accident Tolerant Cladding: SiC—II</i>	Grand Ballroom B
	Track 3: Design and Materials <i>Cladding and Structural Alloy Development—II</i>	Grand Ballroom C
12:30 p.m.–1:20 p.m.	Lunch (<i>Sponsored by Global Nuclear Fuel</i>)	Grand Ballroom D
1:20 p.m.–3:30 p.m.	Track 4: Modeling <i>Thermal Hydraulic Modeling—II</i>	Grand Ballroom A
	Track 6: New Fuel Concepts <i>Advanced LWR Fuel and Processing</i>	Grand Ballroom B
	Track 3: Design and Materials <i>Fuel Testing and Improvement</i>	Grand Ballroom C

THURSDAY, SEPTEMBER 19, 2013

7:00 a.m.–1:00 p.m.	Registration	Grand Promenade A
7:00 a.m.–8:30 a.m.	Workshop Breakfast	College
8:00 a.m.–3:00 p.m.	VC Summer Site/AP1000 Plant Tour	VC Summer Site/ AP1000 Plant
8:30 a.m.–10:10 a.m.	Fuel Handling Events Workshop	Independence
10:10 a.m.–10:30 a.m.	Workshop a.m. Coffee Break	College
10:30 a.m.–12:00 p.m.	Fuel Handling Events Workshop	Independence



MEETING INFORMATION

The LWR Fuel Performance Meeting TopFuel 2013 will be held September 15-19, 2013, in Charlotte, NC. There will be a Fuel Handling Events Workshop (coordinated by EPRI) held on the final day.



ACCOMMODATIONS/HOTEL INFORMATION

The Westin Charlotte Hotel will be the location for the LWR Fuel Performance Meeting, where all activities and technical sessions will take place.

The Westin Charlotte Hotel is located at 601 S. College Street, Charlotte, NC 28202.



MEETING REGISTRATION

Registration is required for all attendees and presenters. Badges are required for admission to all events. The Full Meeting Registration fee includes one (1) ticket to the Opening Reception, Evening Poster Reception, Tuesday NASCAR Banquet, Monday, Tuesday, Wednesday Luncheons, and a copy of the Meeting Proceedings on CD-Rom.

REGISTRATION HOURS

The Meeting Registration Desk and Message Center will be located in Grand Promenade A of the Westin Charlotte Hotel. You may register, purchase tickets for events, or pick up your registration packet during the following hours:

SUNDAY, SEPTEMBER 15, 2013
3:00 p.m. – 5:00 p.m.

MONDAY, SEPTEMBER 16, 2013
7:00 a.m. – 5:00 p.m.

TUESDAY, SEPTEMBER 17, 2013
7:00 a.m. – 3:00 p.m.

WEDNESDAY, SEPTEMBER 18, 2013
7:00 a.m. – 3:00 p.m.

THURSDAY, SEPTEMBER 19, 2013
7:00 a.m. – 1:00 p.m.

NOTE:

Additional tickets can be purchased at the ANS Registration Desk for the Sunday Opening Reception, Monday, Tuesday, Wednesday Luncheons, Evening Poster Event and NASCAR Banquet.

MEETINGS PROCEEDINGS

The meeting proceedings is available on CD-ROM. Copies of the Meeting Proceedings will be available on-site. Each full meeting registrant will receive a copy of the proceedings as part of the full meeting registration fee. Additional copies may be purchased at the meeting registration desk for \$195.00.

This special rate is available at the meeting only. To purchase copies following the meeting, you may contact the ANS Accounting Department at 708-579-8210 (telephone); 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. Copies of the proceedings are available for \$220.00 after the meeting. Payment information must accompany all orders.

SPECIAL EVENTS

Opening Reception

SUNDAY, SEPTEMBER 15, 2013

6:00 p.m. – 8:30 p.m.

Location: Grand Promenade AB

The meeting will start with a welcome reception. One ticket to the Opening Reception is included with the full meeting registration.

Additional tickets can be purchased at the ANS Registration Desk for \$75.00 each.

Monday Luncheon

MONDAY, SEPTEMBER 16, 2013

12:00 p.m. – 1:00 p.m.

Location: Grand Ballroom D

One ticket to the Monday Luncheon is included with the full meeting registration.

Additional tickets can be purchased at the ANS Registration Desk for \$50.00 each.

Evening Poster Reception

MONDAY, SEPTEMBER 16, 2013

5:30 p.m.–8:00 p.m.

Location: Grand Ballroom D

One ticket to the Monday Evening Poster Reception is included with the full meeting registration.

Additional tickets can be purchased at the ANS Registration Desk for \$75.00 each.

Tuesday Luncheon

TUESDAY, SEPTEMBER 17, 2013

12:30 p.m.–1:30 p.m.

Location: Grand Ballroom D

One ticket to the Tuesday Luncheon is included with the full meeting registration.

Additional tickets can be purchased at the ANS Registration Desk for \$50.00 each.

Wednesday Luncheon

WEDNESDAY, SEPTEMBER 18, 2013

12:30 p.m.–1:20 p.m.

Location: Grand Ballroom D

One ticket to the Wednesday Luncheon is included with the full meeting registration.

Additional tickets can be purchased at the ANS Registration Desk for \$50.00 each.

NASCAR Hall of Fame Banquet
TUESDAY, SEPTEMBER 17, 2013
 6:30 p.m.–10:00 p.m.



Located in Uptown Charlotte, NC, the 150,000-square-foot NASCAR Hall of Fame is an interactive, entertainment attraction honoring the history and heritage of NASCAR. The high-tech venue, designed to educate and entertain race fans and non-fans alike, opened May 11, 2010 and includes artifacts, interactive exhibits, and a 278-person state-of-the-art theater. Also on the property is Buffalo Wild Wings restaurant and the NASCAR Hall of Fame Gear Shop.



The goal of the facility is to honor NASCAR icons and create an enduring tribute to the drivers, crew members, team owners and others that have impacted the sport in the past, present and future.

Enjoy an adventure at the NASCAR Hall of Fame. First test your driving skills at the iRacing simulators with some serious competition. The simulator tracks are laser scanned replicas and the cars have all the setup and feel as their real world counterparts. Then, stroll through the 40,000 square foot exhibit space showcasing the history and heritage of the sport.

Also here is the link to the website:
<http://www.nascarhall.com/>

The evening includes cocktails, appetizers and dinner.

One ticket to the NASCAR Hall of Fame is included with the full meeting registration.

Additional tickets can be purchased at the ANS Registration Desk for \$100.00 each.

Technical Tour: AP1000 Plant Construction Site Tour (SCE&G)
THURSDAY, SEPTEMBER 19, 2013
 8:00 a.m.-3:00 p.m.



For the first time in nearly 30 years, new nuclear plants are being constructed in the United States. Construction of the Westinghouse-designed AP1000® nuclear plants is taking place at SCE&G's V.C. Summer Nuclear Station in Jenkinsville, South Carolina and at Southern Company's Plant Vogtle in Waynesboro, Georgia.



The AP1000 plant, based on the proven performance of Westinghouse-designed PWRs, is an advanced 1154 MWe nuclear power plant that uses the forces of nature and simplicity of design to enhance plant safety and operations. In addition, the simpler design and smaller physical footprint of the AP1000 plant reduces construction costs. The AP1000 plant is the only Generation III+ reactor to receive Design Certification from the U.S. Nuclear Regulatory Commission (NRC).

We're excited to offer Top Fuel participants the opportunity to see history in the making during a visit to the V.C. Summer station on Thursday, Sept. 19.

As part of this unique opportunity, participants will receive an overview of the SCE&G V.C. Summer station, including a discussion on regulatory challenges. Following an introduction to V.C. Summer, participants will

learn about the construction of the AP1000 plants in China before experiencing firsthand the construction taking place at V.C. Summer. The visit will conclude with a tour of the AP1000 plant simulator.

A box lunch will be served. Register early as seating is limited. To learn more about the AP1000 plant prior to the site visit, go to: [http:// ap1000.westinghousenuclear.com](http://ap1000.westinghousenuclear.com)

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Fuel Handling Events Workshop
THURSDAY, SEPTEMBER 19, 2013
 8:30 a.m.-12:00 p.m.
 Location: Independence

Over the past decade, nuclear plants have experienced a higher number of adverse fuel handling events. These events can range from mispositioning a fuel assembly during in-core refueling to damaging an assembly component in the spent fuel pool during inspection.

The events have a global reach and their frequency has risen - particularly in the spent fuel pool area. This increase has been linked to several factors, including an increase in off-normal fuel handling activities such as dry cask loading, fuel cleaning, healthy fuel inspections that require disassembly of fuel bundles, as well as assembly reconstitution. Additionally, with a growing population of fuel handling workers reaching retirement, "tribal knowledge" may not be getting communicated to replacement personnel or captured in procedures.

This workshop is designed to communicate this growing problem to a broader audience. Speakers will describe the types of events encountered, their causal factors and actions being taken to address the events. A Q&A panel session will follow and participants will solicit assistance from the technical community to help address gaps in knowledge and solutions.





Welcome from your Conference General Co-Chairs

Welcome to *TopFuel 2013* in the energy hub city of Charlotte, North Carolina (USA)!

The meeting promises to be a “high-octane” event as we focus on *Achieving Excellence Beyond Zero by 2010*. What better place to talk about fuel excellence than an area rich in the application of nuclear technology, and in auto racing heritage and excellence—home of the NASCAR Hall of Fame.

Charlotte, the largest city in North Carolina, also is the second largest financial center in the U.S. and has more than 850 non-U.S.-owned companies representing 42 countries, as well as a metro population of more than 2.6 million people.

In this beautiful city, *TopFuel 2013* showcases the latest in technology and future industry trends for world-class LWR fuel performance. It also provides you an opportunity to exchange best practices with your peers representing more than 20 countries, 150 technical papers and 32 poster papers.

The plenary session features U.S. Nuclear Regulatory Commissioner Kristine Svinicki, Duke Energy Nuclear Senior Vice President Garry Miller, and Westinghouse President and Chief Executive Officer Danny Roderick. A panel discussion including key industry leaders also will be an important focus in the plenary.

In addition to the many excellent technical presentations, this week you will have an opportunity to network during social events, visit display booths in the exhibit area and take a tour of the V.C. Summer nuclear plant construction site—one of only two sites in the U.S. constructing new plants featuring Westinghouse **AP1000**[®] power plant technology.

We look forward to meeting you at this important event for our industry and extend a special thanks to our many corporate financial sponsors for making this conference possible.

Enjoy!

David C. Culp
General Co-Chair
Duke Energy

José Emeterio Gutiérrez
General Co-Chair
Westinghouse Electric Company

MONDAY, SEPTEMBER 16, 2013 • 8:30 AM–10:00 AM

OPENING PLENARY SESSION—PART I

Grand Ballroom C

OPENING REMARKS BY CONFERENCE GENERAL CHAIRS:

- David C. Culp (*Duke Energy*)
- José Emeterio Gutiérrez (*Westinghouse Electric Company*)

PLENARY SPEAKER:

- Kazuo Minato (*Deputy Director General, Nuclear Science Research Institute, Japan Atomic Energy Agency, JAEA*)

KEYNOTE SPEAKERS:

- Commissioner Kristine Svinicki (*Nuclear Regulatory Commission*)
- Garry Miller (*Senior Vice President, Duke Energy Nuclear*)
- Danny Roderick (*CEO, Westinghouse*)

MONDAY, SEPTEMBER 16, 2013 • 10:30 AM–12:00 PM

OPENING PLENARY SESSION—PART II

Grand Ballroom C

Moderator: Vinny Esposito (*2013 ANS Congressional Fellow*)

PLENARY PANEL SPEAKERS:

- Dave Garchow (*VP Plant Technical Support, INPO*)
- John Herczeg (*Associate Deputy Assistant Secretary, Office of Fuel Cycle Technologies, Department of Energy*)
- Dr. Jeon Kyeong Lak (*Head of R&D Center, KEPCO NF*)
- Marie Moatti (*EDF Nuclear Fuel Division*)
- Kemal Pasamehmetoglu (*Associate Laboratory Director for Nuclear Science and Technology at Idaho National Laboratory*)

MONDAY, SEPTEMBER 16, 2013 • 1:00 PM

TRACK 1: OPERATION AND EXPERIENCE

Fuel Operating Experience and Performance

Co-Chairs: David Schrire (*Vattenfall*), Jinzhao Zhang (*Tractabel*)

Grand Ballroom B

1:00 p.m.

8427 High Burnup Optimized ZIRLO Cladding Performance
G. Pan, A. M. Garde, A. R. Atwood (*Westinghouse*), Rikard Källström, Daniel Jädernäs (*Studsвик Nuclear*)

1:20 p.m.

8362 MSHIM Strategy Finalization for AP1000 PWRs and Fuel Performance Assessment
Michael J. Hone, Robert E. Sears, Stephen P. Schnellker (*Westinghouse*)

1:40 p.m.

8426 AREVA's Integrated Solution to Fuel Channel Performance
Ali A. Zbib (*AREVA NP*), Dirk Blavius (*AREVA GmbH*), William Kahler (*PPL Susquehanna*), Jeff Morris (*AREVA NP*), Markus Singer, Andreas Moeckel (*AREVA GmbH*), Kevin Mon, Norman Garner (*AREVA NP*), Hans-Joachim Lippert (*AREVA GmbH*), Steven Cole (*AREVA NP*)

2:00 p.m.

8492 Design and Operation of EFG Fuel in Ringhals PWRs
David L. Chapin, Raymond W. Brashier, Dustin E. Staub, Max B. O'Cain (*Westinghouse*), Jan S. Höglund (*Westinghouse Electric Sweden*), Audrius Jasiulevicius, Bertil Josefsson (*Vattenfall Nuclear Fuel AB*), Tell Andersson, Ann-Louise Öhman (*Ringhals AB*), Miguel Aulló (*ENUSA*)

2:20 p.m.

8532 Fuel Assembly Surveillance from a TSO Point of View
Gerold Spykman (*TÜV NORD Nuclear*)

2:40 p.m.

8535 Elevated Lithium Operation with Westinghouse Fuel
Jayashri N. Iyer, A. Petrarca, E. F. Pulver, D. Mitchell, H. Schutte, J. P. Foster (*Westinghouse*)

TRACK 2: TRANSIENT FUEL BEHAVIOR

Severe Accidents and Transients

Co-Chairs: Edward J. Lahoda (*Westinghouse*), Rob Montgomery (*PNNL*)

Grand Ballroom C

1:00 p.m.

7916 Metallurgical Examination of Simulated-Debris of Severe Accident BWR
Shohei Kawano, Jun Suzuki (*Toshiba Corp.*), Tadahiko Torimaru, Hiroshi Ohara (*Nippon Nuclear Fuel Development Co. Ltd.*)

1:20 p.m.

8414 Time Constants in the Transient
Márcio S. Dias, João Roberto L. de Mattos, Vanderley de Vasconcelos, Fernando S. Lameiras (*CDTN/CNEN*)

1:40 p.m.

8442 Severe Accident Test Station at ORNL
K. A. Terrani, B. A. Pint, Y. Yan, J. R. Keiser, L. L. Snead (*ORNL*)

2:00 p.m.

8506 Engineered Zircaloy Cladding Modifications for Improved Accident Tolerance of LWR Fuel: A Summary
Brent J. Heuser, Tomasz Kozłowski, Wu Xu (*Univ of Illinois*)

2:20 p.m.

8546 SiC Modifications to MELCOR for Severe Accident Analysis Applications
Brad J. Merrill, Shannon M. Bragg-Sitton (*INL*)



TRACK 4: MODELING

Fuel Modeling

Co-Chairs: Rich Williamson (*INL*), Koroush Shirvan (*MIT*)

Grand Ballroom A

1:00 p.m.

8379 Crack Initiation and Growth in Fuel Pellets Modeling Using ANSYS Software

V. I. Kuznetsov, A. V. Krupkin, V. V. Novikov (*JSC "VNIINM"*)

1:20 p.m.

7458 Microstructural Characterization and Modeling of High Burn-Up Mixed Oxide Fuel

Melissa Teague, Michael Tonks, Stephen Novascone (*INL*)

1:40 p.m.

8029 Modeling of MOX Fuel Pellet Heterogeneous Behavior by Micro-Mechanical Approach

R. Largenton, G. Thouvenin (*EDF R&D MMC*), J.-C. Michel, P. Suquet (*CNRS LMA*)

2:00 p.m.

7438 Evaluation of Nuclear Fuel Centreline Temperature Using New UO_2 Thermal Conductivity Models

Daniel Artur Pinheiro Palma (*CNEN*), Amir Zacarias Mesquita (*CDTN*), Aquilino Senra Martinez (*PEN – COPPE/UF RJ*)

2:20 p.m.

8531 Influence of Boron Addition on Fuel Rod Internal Pressure

Gwan Yoon Jeong, Byung-Jin Cho (*UNIST*), Yong Sik Yang, Je Keun Bang (*KAERI*), Dong-Seong Sohn (*UNIST*)

2:40 p.m.

8510 Thermo-Mechanical Analysis of Cladding Behaviour Under Cask Blockage Conditions

F. Fera, J. Penalva, L. E. Herranz (*CIEMAT*)

MONDAY, SEPTEMBER 16, 2013 • 3:30 PM

TRACK 1: OPERATION AND EXPERIENCE

Materials

Co-Chairs: Nadine Hollasky (*BelV*), John Strumpell (*AREVA*)

Grand Ballroom B

3:30 p.m.

8538 Recrystallized Zircaloy-2 Mechanical Properties After Irradiation and Associated H Pickup

I. Arimescu (*AREVA NP*), W. Goll, P. B. Hoffmann (*AREVA GmbH*)

3:50 p.m.

8323 Behavior of Disseminated Actinides in PWR Primary Coolant

M. Benfarah (*EDF-SEPTEN*), C. Dinse, M.-O. Sornein (*EDF-CEIDRE*), J.-B. Genin, H. Marteau (*CEA-Cardache*)

4:10 p.m.

8530 Study of Mechanism for Corrosion and Hydrogen Absorption of High Burnup Fuel Cladding

Y. Saiki, K. Kakiuchi, H. Kishita (*NFI*), H. Muta (*Osaka Univ*), S. Yamanaka (*Osaka Univ/Fukui Univ*), M. Hatakeyama, K. Konashi, T. Shikama (*Toboku Univ*), M. Uno (*Fukui Univ*), T. Terai (*Univ of Tokyo*), K. Oyama (*TEPCO*)

4:30 p.m.

8421 Mechanical Properties of Zirconium Hydrides by Nanoindentation

J. Ruiz-Hervias (*UPM, E.T.S.I.*), A. Rico (*URJC*), M. A. Martin-Rengel (*UPM, E.T.S.I.*), J. Rodriguez (*URJC*), F. J. Gomez Sanchez (*Advanced Material Simulation*)

4:50 p.m.

8412 Analysis and Examination of MOX Fuel from Nonproliferation Programs

Kevin McCoy, McLean Machut (*AREVA NP*), James G. Hemrick, Robert Morris (*ORNL*), Patrick Blanpain, Nicolas Vioujard (*AREVA NP*)

5:10 p.m.

8455 MOX Challenges from Fuel Design to Reactor Operation

S. Thareau (*AREVA NP*), G. Chaigne, P. Paulin (*EDF UNIE GECC*), I. Segui, N. Vioujard, B. Winterholer (*AREVA NP*)

TRACK 2: TRANSIENT FUEL BEHAVIOR

Reactivity Initiated Accident (RIA)

Co-Chairs: John Jones (*Office for Nuclear Regulation UK*), Dave Mitchell (*Westinghouse*)

Grand Ballroom C

3:30 p.m.

7850 Hydride Blisters Formation, Characterization and Effect on the Fracture of Zircaloy-4 Cladding Tubes Under Reactivity Initiated Accident Conditions

Arthur Hellouin de Menibus, Quentin Auzoux, Ousmane Dieye (*CEA Saclay*), Vincent Macdonald (*CEA Saclay/MinesParistech*), Pascal Berge (*CEA Saclay/CNRS UMR*), Sebastien Carassou (*CEA Saclay*), Jacques Besson, Jérôme Crépin (*MinesParistech*)

3:50 p.m.

8368 The Study on the Mechanical Fuel Failure at PWR RIA

Soichi Doi, Yuma Higashi, Manabu Miyata (*MHI*)

4:10 p.m.

8385 M5 Fulfills the New Requirements by Regulators

V. Garat, J. P. Mardon (*AREVA NP SAS*), K. McCoy, B. Dunn (*AREVA NP*)

4:30 p.m.

8440 Evaluation of PWR Rod Ejection Accident Margins Using PANTHER/COBRA and FRAPTRAN

Jimmy Sudjana, Zeynab Umidova, Jinzhao Zhang, Maxime Haedens, Christophe Schneidesch (*GDF SUEZ*)

4:50 p.m.

8559 AREVA's Advanced BWR Transient and Accident Methodologies
Kevin Quick, Stan Jones, Robert Schnepf, Doug Pruitt (*AREVA NP*),
Franz Wehle (*AREVA GmbH*)

5:10 p.m.

7851 Temperature Increase of Zircaloy-4 Cladding Tubes due to Plastic Heat Dissipation During Tensile Tests at Reactivity Initiated Accident Representative Strain Rates
Arthur Hellouin de Menibus, Quentin Auzoux (*CEA Saclay*), Jacques Besson, Jérôme Crépin (*MinesParistech*)

TRACK 4: MODELING

Fuel Modeling and Codes—I

Co-Chairs: Hidekazu Ide (*NFI*), Kenneth Geelhood (*PNNL*)

Grand Ballroom A

3:30 p.m.

8445 Verification and Benchmarking of Peregrine Against Halden Fuel Rod Data and Falcon
Nathan Capps (*Univ of Tennessee*), Dion Sunderland, Wenfeng Liu (*ANATECH*), Robert Montgomery (*PNNL*), Jason Hales (*INL*), Chris Stanek (*LANL*), Brian Wirth (*Univ of Tennessee*)

3:50 p.m.

8010 Implementing Primary Creep Calculation During Stress Changes and Reversals in the Fuel Performance Code FRAPCON-3
Kenneth Geelhood (*PNNL*)

4:10 p.m.

8386 The Universal Fuel Performance Code Interface in Serpent 2
V. Valtavirta, V. Tulkki, J. Leppänen, T. Viitanen (*VTT Technical Research Centre of Finland*)

4:30 p.m.

8370 Codes and Software in Support of Fuel Operation in LWRs
V. V. Likhanskii, I. A. Evdokimov, A. A. Sorokin, V. G. Zborovskii, K. E. Ulybyshev, A. Y. Burtsev, I. O. Goryushin, A. P. Ponomarev (*SRC RF "TRINITI"*), A. V. Ugrumov, A. A. Shishkin (*JSC "TVEL"*)

4:50 p.m.

8395 FGR Modeling of Large Grained Fuel During Transients by START-3A
D. A. Chulkin, V. I. Kuznetsov, A. V. Krupkin, V. V. Novikov (*JSC VNIINM*)

5:10 p.m.

8305 Development and Demonstration of the TRIUNE TRISO Fuel Performance Model
J. J. Powers (*ORNL*), B. D. Wirth (*ORNL/Univ of Tennessee*)

MONDAY, SEPTEMBER 16, 2013, 5:30 PM

POSTER RECEPTION

Grand Ballroom D

Operation and Experience

8269 Distribution of Hydrides as a Function of the Stress-Strain State
G. V. Kulakov, A. V. Vatulin, Y. V. Konovalov, A. A. Kosaurov, M. M. Peregud (*JSC "VNIINM"*)

8294 Foreign Material Exclusion in Westinghouse Nuclear Fuel Fabrication Facilities
J. R. Halligan (*Westinghouse*)

8309 Results of the IAEA Study of Fuel Failures in Water Cooled Reactors in 2006-2010
V. Inozemtsev, V. Onufriev (*IAEA*)

8366 Zinc Injection Program Assessment at a Korean PWR Reactor
Jin-Won Son, Ki-Young Kim, Yong-Bae Kim, Tae-Hyung Lee, Shin-Seop Kang (*KHNP*)

8425 Laboratory Reproduction of Different Hydride Morphologies in Nuclear Fuel Cladding
M. A. Martín-Rengel (*UPM, E.T.S.I.*), F. J. Gómez Sánchez (*Advanced Material Simulation*), J. Ruiz-Hervías, P. Muñoz (*UPM, E.T.S.I.*)

8369 Retention Characteristics of Fission Gas in an Irradiated Oxide Fuel
S. D. Park, Y. K. Ha, K. Song (*KAERI*)

Transient Fuel Behavior

7904 PCI Analysis on a Vendor-Recommended Fuel Preconditioning Guideline for PWR Fuel Rods in Korea
Yongdeog Kim, Kiyoun Kim, Jongsun Lee, Shinseob Kang, Yongbae Kim (*KHNP Central Research Inst*)

8409 Analytical Solutions of the Heat Conduction Equation in Steady State and Transient Conditions
Márcio S. Dias, João Roberto L. de Mattos, Vanderley de Vasconcelos (*CDTN/CNEN*), Elizabete Jordão (*UNICAMP*)

8423 Rewetting Characteristics in 6 x 6 Rod Bundle During the Reflood Phase
Jongrok Kim, Sang-Ki Moon, Seok Cho, Jong-Kuk Park (*KAERI*)

Design, Materials and Testing

7864 Bottom Nozzle Flow Holes Design in SMR Fuel Assembly
Euijae Kim, KangHoon Kim, JinSun Kim, KeeYil Nahm (*KEPCO*)

8320 Formation of Structural-Phase State and Properties of HANA Alloy in Tube Shells Manufacturing
Yong-Kyoon Mok, Min-Young Choi, Yoon-Ho Kim (*KEPCO*), Elena Aktuganova, Vladimir Kotrekhov, Sergey Zavodchikov (*Chepetsky Mechanical Plant, JSC*)

8337 Asymmetric Clearance Effects in Grid-to-Rod Fretting
Young-Ho Lee, Kyung-Ho Yoon, Hyung-Kyu Kim, Heung-Seok Kang



(KAERI)

8374 Development of Sealing Techniques for Instrumentation Cables of IPS

Jintae Hong, Sung-Ho Ahn, Chang-Young Joung, Ka-Hye Kim (KAERI)

8377 Recycling Process of Large Grain UO₂ Pellet Scrap

Jang Soo Oh, Jae Ho Yang, Dong-Joo Kim, Jong Hun Kim, Young Woo Rhee, Keon Sik Kim, Yang-Hyun Koo (KAERI)

8413 Influence of the Hydriding Cycles on U10Mo Alloy Comminution Process

Kelly Cristina Martins Faêda, Ana Maria Matildes dos Santos, Tércio Assunção Pedrosa, Natália Mattar Cantagalli, Fernando Soares Lameiras, Wilmar Barbosa Ferraz (CDTN/CNEN)

8451 Impact of Applied Stress on c-Component Loops: Toward an Advanced Understanding of Radiation Induced Growth of Recrystallized Zirconium Alloys

N. Gharbi, F. Onimus, T. Jourdan, D. Gilbon (CEA, DEN), J.-P. Mardon (AREVA NP), X. Feaugas (LaSIE, FRE, CNRS)

8529 RepU Recycling in PHWRs

Cécile Evans, Mustapha Chiguer, Philippe Lacombe, Gérald Senentz (AREVA)

8345 Revisiting Stainless Steel as PWR Fuel Rod Cladding After Fukushima Daiichi Accident

Alfredo Abe (IPEN/CNEN-SP), Claudia Giovedi (CTMSP), Daniel Souza Gomes, Antonio Teixeira e Silva (IPEN/CNEN-SP)

8573 “Clever” Nuclear Fuel Technology

I. I. Loktev, Y. V. Goncharov, A. O. Basihin, M. G. Zarubin, A. V. Strukov (NCCP)

8536 Methods to Increase Corrosion Stability and Wear Resistance of LWR Active Core Zirconium Components During Operation and in Conditions of Loss-of-Coolant Accident

S. V. Ivanova, E. M. Glagovsky, K. Y. Nikonorov, I. I. Belugin (“MEPhi”), I. A. Khazov (FSUE)

8326 LWR Fuel Irradiation Hosting Systems in the Jules Horowitz Reactor

Ch. Blandin, P. Roux, T. Dousson, L. Ferry (CEA DEN DER), D. Parrat (CEA DEN DEC), Ch. Gonnier (CEA DEN DER)

8353 Hydrides in Zirconium Alloys—A Characterization Methods Comparison

S. Valance, J. Bertsch, R. Bruetsch, M. Martin, H. Namburi, S. Portier, C. Proff, N. Mine, S. Abolhassani (Paul Scherrer Inst)

Modeling

8270 Development of the Database by Results of Post-Irradiation Investigations and Properties of Dispersion Type Fuel Elements

Y. V. Konovalov, G. V. Kulakov, A. V. Vatulin (JSC “VNIINM”), A. E. Novoselov, I. A. Minduksheva (JSC RIAR)

8516 Numerical Study on Hydraulic Characteristics of Spacer Grids with Flow Openings on Outer Straps

Zhiwei Lu, Weicai Li, Yuemin Zhou, Yuxiang Zhang, Wenchi, Yu, Jingwen Yan (China Nuclear Power Technology Research Inst)

9593 Applications of BISON to Multiphysics Multiscale Nuclear Fuel Analysis

Jason Hales, S. R. Novascone, B. S. Spencer, G. Pastore, D. M. Perez, D. R. Gaston, R. C. Martineau, F. N. Gleicher, P. G. Medvedev (INL)

Spent Fuel Storage and Transportation

8486 Effect of Cooling Rates on Hydride Reorientation and Mechanical Properties

Kyu-Tae Kim (Dongguk Univ)

New Fuel Concepts

8291 The Main Principles of Irradiated Dispersion Type Fuel “UO₂ + Aluminum Alloy” Behavior

G. V. Kulakov, A. V. Vatulin, S. A. Ershov, Y. V. Konovalov, A. V. Morozov, A. M. Savchenko, V. I. Sorokin, V. V. Fedotov (JSC “VNIINM”), A. E. Novoselov, V. A. Ovchinnikov, V. Y. Shishin (JSC RIAR)

8381 Nitride Powder Preparation from Nitridation of Uranium Based Alloy

Dong-Joo Kim, Jae Ho Yang, Jong Hun Kim, Jang Soo Oh, Young Woo Rhee, Keon Sik Kim, Yang Hyun Koo (KAERI)

New Topics

8405 BWR Fuel Storage Criticality Safety Analysis Automation and Sensitivity Studies

John Hannah, Kristin Bennett, Christopher Kmiec (GNF)

8522 Development of a Fuel Rod Transportation System

H. Ide, S. Uchikawa, T. Kawano, K. Mori, T. Ito (NFI)

TUESDAY, SEPTEMBER 17, 2013, 8:30 AM

TRACK 1: OPERATION AND EXPERIENCE

Pool-Side and Hot Cell Examinations

Co-Chairs: William Herwig (SCANA), Lars Hallstadius (Westinghouse)

Grand Ballroom B

8:30 a.m.

7906 Channel Measurement Campaign at EOC18 in Cofrentes NPP
Pablo J. Garcia Sedano, Javier Iglesias Ayuela (Iberdrola Ingenieria y Construccion SAU), Manuel Albendea (Iberdrola Generacion), Erik Mader (EPRI)

8:50 a.m.

8280 The Hydrogen Water Chemistry Fuel Surveillance Program in

Taiwan
Wan-June Chiu, Shih-Chung Cheng, Yaw-Hwa Shiu (*INER*)

9:10 a.m.

8380 A Nondestructive Method for Investigating the Origin of Released Fission Gasses in Nuclear Fuel Rods
Scott Holcombe (*OECD*), Staffan Jacobsson Svärd (*Uppsala Univ*), Knut Eitrheim (*OECD*), Lars Hallstadius (*Westinghouse Electric Sweden*)

9:30 a.m.

8418 Plant Statistics with Updated CFM and NSF Channels in Reload Cores
Atul A. Karve, Gregory J. Pearson, Paul E. Cantonwine, Michael W. Thomas (*GNF*)

9:50 a.m.

8487 Post Irradiation Examination of a Failed BWR Fuel Rod from Forsmark 1
Göran Blomberg, Gunnar Lysell (*Studsвик Nuclear*), David Schrire (Vattenfall Nuclear Fuel), Clara Anghel (*GE Hitachi Nuclear International*), Rob Schneider (*GNF*)

TRACK 2: TRANSIENT FUEL BEHAVIOR

Pellet Cladding Interaction (PCMI/PCI)

Co-Chairs: Jinzhao Zhang (*Tractabel*), Koji Kitano (*Toshiba*)

Grand Ballroom C

8:30 a.m.

8387 Fuel Rod Performance and Failure Prediction During Power Ramp
N. Doncel, C. Muñoz-Reja (*ENUSA Industrias*), R. Dunavant, M. Jahingir (*GNF*)

8:50 a.m.

8431 Microstructural and Chemical Characterization of Ramp Tested Additive Fuel
Daniel Jädernäs, Fransesco Corleoni, Anders Puranen, Michael Granfors, Gunnar Lysell, Pia Tejlund (*Studsвик Nuclear*), Dan Lutz (*GNF*), Lars Hallstadius (*Westinghouse Electric Sweden*)

9:10 a.m.

8453 Conditions to Cause Cladding Failure by Hydrogen-Induced Cracking
Keizo Ogata, Toshikazu Baba, Katsuihiro Kamimura (*JNES*), Toru Higuchi, Kan Sakamoto, Yoshinori Etoh (*Nippon Nuclear Fuel Development*), Akihiko Sawada (*GNF*)

9:30 a.m.

8392 Ramp Test Facilities at NRG Petten
Ralph Hania, Klaas Bakker (*NRG*)

9:50 a.m.

7924 Tests of VVER Fuel Rods Under Transient Conditions in Research Reactor MIR
A. V. Burukin, A. L. Izhutov, G. P. Kobylansky (*JSC "SSC RIAR"*), V. I. Kuznetsov (*JSC "VNIINM"*), V. L. Molchanov (*JSC "TVEL"*), V. V. Novikov

(*JSC "VNIINM"*), V. A. Ovchinnikov (*JSC "SSC RIAR"*), Yu. V. Pimenov (*JSC "TVEL"*), V. A. Zhitelev (*JSC "SSC RIAR"*)

TRACK 4: MODELING

Modeling and Coupling—I

Co-Chairs: Atul Karve (*GNF*), Pierre Mollard (*AREVA*)

Grand Ballroom A

8:30 a.m.

8434 Modeling of Gd Cores with NEXUS/ANC9/BEACON
B. Zhang (*Westinghouse*), M. Lucia Diaz Redondo (*ENUSA Industrias*), Karolina Brynjell Rahkola (*Westinghouse Electric Sweden*), Larry Mayhue (*Westinghouse*)

8:50 a.m.

8407 BWR TIP Detector Operational Impacts for Thermal vs. Gamma TIP Detectors
John P. Rea, John C. Hannah (*GNF*)

9:10 a.m.

8300 Studsvik CMS Capability for Reactivity Initiated Accidents
Gerardo Grandi, Lotfi Belblidia (*Studsвик Scandpower*)

9:30 a.m.

8341 Impact of Steady State Uncertainties on RIA Modeling Calculations
Inmaculada C. Sagrado, Luis E. Herranz (*CIEMAT*)

9:50 a.m.

8361 Evaluation of PWR ATWS Events Using Westinghouse RAVE Methodology
Peter A. Hilton, Edward Monahan, Jorge Fontes (*Westinghouse*)

TUESDAY, SEPTEMBER 17, 2013, 10:30 AM

TRACK 2: TRANSIENT FUEL BEHAVIOR

Loss of Coolant Accident (LOCA)—I

Co-Chairs: Nicolas Waeckel (*EDF*), Peng Xu (*Westinghouse*)

Grand Ballroom C

10:30 a.m.

8307 Coolability of the Ballooned Region in a 2x2 Rod Bundle
Kihwan Kim, Byung-Jae Kim, Young-Jung Youn, Hae Seob Choi, Jongrok Kim, Sang-Ki Moon (*KAERI*)

11:50 a.m.

8331 Creep Behavior at High Temperature of the Oxygen Stabilized Zirconium Alpha Phase of Fuel Cladding Tubes Oxidized in LOCA Conditions
R. Chosson (*MINES ParisTech/CEA Saclay*), V. Vandenberghe (*CEA Saclay*), A.-F. Gourgues-Lorenzon, J. Crépin (*MINES ParisTech*), J.-C. Brachet (*CEA Saclay*), A. Cabrera (*EDF SEPTEN*), V. Garat (*AREVA NP*)



11:10 a.m.

8332 Factors Affecting Breakaway Oxidation of Zr-Alloys
Y. P. Lin, D. R. Lutz (*GNF*), K. Yueh (*EPRI*)

11:30 a.m.

8375 Oxygen Diffusion and Partially Blocked Bundle Reflooding Simulation Using DRACCAR
S. Bascou, S. Guilbert, G. Guillard (*IRSN*)

11:50 a.m.

8342 TRACE/FRAPTRAN Code Simulation for Fuel Rods Under LBLOCA
Wei Chen, Shao-Wen Chen, Chunkuan Shih, Jung-Hua Yang (*National Tsing Hua Univ*), Hao-Tzu Lin, Jong-Rong Wang (*INER*)

12:10 p.m.

8495 Loss of Coolant Accident Testing Round Robin
H. K. Yueh (*EPRI*), R. J. Comstock (*Westinghouse*), B. Dunn (*AREVA NP*), M. Le Saux (*CEA*), Y. P. Lin, D. Lutz (*GNF*), D. J. Park (*KAERI*), E. Perez-Fero (*Hungarian Academy of Sciences*), Y. Yan (*ORNL*)

TRACK 5: SPENT FUEL STORAGE AND TRANSPORTATION

Materials Issues in Spent Fuel Storage and Transportation

Co-Chairs: Robert Einziger (*NRC*), Christopher Brown (*NRC*)

Grand Ballroom A

10:30 a.m.

8575 Fuel Behaviour in Transport After Dry Storage, a Key Issue for the Management of Used Nuclear Fuel: An Industry View
Maurice Dallongeville, Hervé Issard, Elisa Leoni, Aravinda Zeachandirin (*AREVA*)

10:50 a.m.

8393 Characterization of Radial Hydride Precipitation in Zy-4 Using “C”-Shaped Samples
J. Desquines, D. Drouan, P. March, S. Fourgeaud, C. Getrey, V. Elbaz, M. Philippe (*IRSN*)

11:10 a.m.

8411 Preparation of Prototypic Irradiated Hydrided-Zircaloy Cladding
L. J. Ott, R. H. Howard, R. L. Howard, Y. Yan (*ORNL*)

11:30 a.m.

8488 Performance Considerations for Used BWR Fuel in Dry Storage and Transportation
R. Dunavant, D. Lutz, P. Cantonwine (*GNF*)

11:50 a.m.

8520 Effect of Hydrogen on Creep Behavior of Zirconium Alloys
A. Sarkar, K. Boopathy, J. Eapen, K. L. Murty (*NCSU*)

12:10 p.m.

8539 Nuclear Fuel Safety After Discharge: Property Evolution and Testing

Vincenzo V. Rondinella, Thierry A. G. Wiss, Dimitrios Papaioannou, Ramil Nasyrow, Stefaan van Winckel, Daniel Serrano-Purroy, Detlef H. Wegen (*EC JRC*)

TRACK 6: NEW FUEL CONCEPTS

New Fuel Concepts and Designs

Co-Chairs: Norman Garner (*AREVA*), Travis Knight (*USC*)

Grand Ballroom B

10:30 a.m.

8359 Fuel Cycle Cost Trade-Off Studies for I2S-LWR (Integral Inherently Safe LWR) Fuel Design Selection
Bojan Petrovic (*Georgia Tech*), Fausto Franceschini, Paolo Ferroni (*Westinghouse*)

10:50 a.m.

8542 Fuel Development for Westinghouse Small Modular Reactor
M. E. Conner, J. H. Choi, R. J. Fetterman (*Westinghouse*)

11:10 a.m.

8500 Supercritical Water-Cooled Reactor CSR1000 Core Thermal-Hydraulics Characteristics Analysis
Shumao Bi, Chuan Lu, Jianchao Lu, Xiang Li, Xiaokang Zeng (*NPIC*)

11:30 a.m.

8433 Industry-Valued Design Objectives for Advanced LWR Fuels and Concept Screening Results
Rose Montgomery (*TVA*), Erik Mader (*EPRI*), Nick Domenico (*Constellation Energy Nuclear Group*), Russ Fawcett (*GE-Hitachi*), John Guerci (*Dominion*), Ed Lahoda (*Westinghouse*), Butch Minnick (*B&W*), Paul Murray (*AREVA Federal Services*), Steve Nesbit (*Duke Energy*), Mitch Meyer, Shannon Bragg-Sitton (*INL*)

11:50 a.m.

8446 Changing the Severe Accident Story Through the Transformation of Light Water Reactor Fuel: A Call for International Collaboration
Andrew G. Sowder (*EPRI*)

12:10 p.m.

8277 Thermal Hydraulic Design of Dual-Cooled Annular Fuel Array for a Power-Uprate of OPR1000
Chang-Hwan Shin, Tae-Hyun Chun, Chi Young Lee, Dong-Seok Oh, Wang-Kee In (*KAERI*)

TUESDAY, SEPTEMBER 17, 2013, 1:30 PM

TRACK 2: TRANSIENT FUEL BEHAVIOR

Loss of Coolant Accident (LOCA)—II

Co-Chairs: Nicolas Waeckel (*EDF*), Manuel Quecedo (*ENUSA*)

Grand Ballroom C

1:30 p.m.

7927 Core-Wide Estimates of Fuel Dispersal During a LOCA
Patrick A. C. Raynaud (*NRC*)

2:00 p.m.

8297 Analysis of a Halden LOCA Test with the BWR High Burnup Fuel
G. Khvostov (*Paul Scherrer Inst*), A. Pautz (*Paul Scherrer Inst/EPFL*), E. Kolstad (*OECD*), G. Ledergerber (*Kernkraftwerk Leibstadt*)

2:20 p.m.

8318 Validation of Gap Conductance Uncertainty for Realistic
Evaluation Methodology on LOCA Analysis
Joosuk Lee, Swengwoong Woo (*KINS*)

2:40 p.m.

8334 Fuel Fragmentation, Relocation and Dispersal Under LOCA
Conditions: Experimental Observations
M. Flanagan (*NRC*), B. C. Oberländer (*Halden Reactor Project*), A. Puranen (*Studsвик Nuclear AB*)

3:10 p.m.

8415 Burnup Effects on Fine Fuel Fragmentation in Simulated LOCA
Testing
A. Puranen, M. Granfors, P. Askeljung, D. Jädernäs (*Studsвик Nuclear AB*),
M. Flanagan (*NRC*)

3:30 p.m.

8447 Changes in Cladding Properties Under LOCA Conditions
H. K. Yueh (*EPRI*), R. J. Comstock (*Westinghouse*), B. Dunn (*AREVA*), Y. P. Lin (*GNF*), D. Lutz, E. Perez-Fero (*Hungarian Academy of Sciences*)

TRACK 4: MODELING

Fuel Modeling and Codes—II

Co-Chairs: Rob Montgomery (*PNNL*), John Jones (*Office for Nuclear Regulation UK*)

Grand Ballroom A

1:30 p.m.

8365 Analysis of Fission Gas Release in LWR Fuel Using the BISON
Code
G. Pastore, J. D. Hales, S. R. Novascone, D. M. Perez, B. W. Spencer, R. L. Williamson (*INL*)

1:50 p.m.

8432 PAD5: Westinghouse High Burnup Fuel Performance Models
Y. Long, P. J. Kersting, O. Linsuain, H. C. Schutte, D. T. Rumschlag, K. B. Keiser, D. Mitchell, R. L. Oelrich (*Westinghouse*)

2:10 p.m.

8552 Redesign and Applications of Fuel Performance Codes: A Case
Study of FALCON
Suresh Yagnik, Martin Pytel (*EPRI*), Bill Lyon (*ANATECH Corp*), Stuart Mentzer (*Objexx Eng*)

2:30 p.m.

8553 Numerical Method of Modeling Creep of Zirconium-Alloy

Cladding in a Multi-Physics Fuel Performance Code
Wenfeng Liu, Joe Rashid, Dion Sunderland (*ANATECH Corp*), Robert Montgomery (*PNNL*), Chris Stanek (*LANL*), Brian Wirth (*Univ of Tennessee*), Jason Hales, Richard Williamson (*INL*)

2:50 p.m.

8572 3D Modelling of Strain Concentration due to PCI Within the Fuel
Code ALCYONE
J. Sercombe, J. Julien, F. Michel, B. Michel, E. Fédérici (*CEA*)

3:10 p.m.

8515 Application of Galileo: AREVA's Advanced Fuel Performance Code
and Methodology
J. H. Strumpell, P. Bellanger, V. I. Arimescu, M. Smith, C. Garnier, V. Georget, P. Mailhe, B. Barbier (*AREVA NP*), D. Deuble, H. Landskron (*AREVA GmbH*)

3:30 p.m.

8273 FINIX—Fuel Behavior Model and Interface for Multiphysics
Applications
Timo Ikonen, Ville Tulkki, Elina Syrjälähti, Ville Valtavirta, Jaakko Leppänen (*VTT*)

TRACK 6: NEW FUEL CONCEPTS

Accident Tolerant Fuel

Co-Chairs: Jim Tulenko (*Univ of Florida*), Rose Montgomery (*TVA*)

Grand Ballroom B

1:30 p.m.

8547 Overview of the U.S. DOE Accident Tolerant Fuel Development
Program
Jon Carmack (*INL*), Frank Goldner (*DOE*), Shannon M. Bragg-Sitton (*INL*), Lance L. Snead (*ORNL*)

1:50 p.m.

8419 Enhanced Accident Tolerant LWR Fuels: Metrics Development
Shannon M. Bragg-Sitton, Lori Braase (*INL*), Rose Montgomery (*TVA*),
Chris R. Stanek (*LANL*), Robert H. Montgomery (*PNNL*), Larry J. Ott,
Lance L. Snead (*ORNL*), Michael C. Billone (*ANL*)

2:10 p.m.

8429 Use of Gate Reviews to Select Approaches for Enhancing Accident
Tolerance
Rich Kochendarfer (*AREVA Federal Services*), Kevin McCoy, Patrick Blainpain (*AREVA NP*)

2:30 p.m.

8378 Micro-Cell UO₂ Pellets for Enhanced Accident Tolerant Fuel
Jae Ho Yang, Keon Sik Kim, Dong-Joo Kim, Jong Hun Kim, Jang Soo Oh, Young Woo Rhee, Yang-Hyun Koo (*KAERI*)

2:50 p.m.

8306 Preliminary Investigation of Candidate Materials for Use in
Accident Resistant Fuel
Jason M. Harp, Paul A. Lessing, Blair H. Park, Jakeob Maupin (*INL*)

3:10 p.m.

8268 Novel Accident-Tolerant Fuel Meat and Cladding
Robert D. Mariani, Pavel Medvedev, Douglas L. Porter, Steven L. Hayes,
James I. Cole, Xian-Ming Bai (*INL*)

3:30 p.m.

8364 Comparison of Spark Plasma Sintering Versus Conventional
Sintering UO₂ and UO₂-Composite Fuel Pellets
G. Subhash, L. Ge, S. Yeo, J. Tulenko, R. Baney (*Univ of Florida*)

TUESDAY, SEPTEMBER 17, 2013, 4:20 PM

TRACK 3: DESIGN AND MATERIALS

Advanced Fuel Design and Processing

Co-Chairs: Kevin Ledford (*GNF*), Kurt Terrani (*ORNL*)

Grand Ballroom C

4:20 p.m.

8428 ATRIUM 11—The Utilization of Reduced LHGR for Optimized
BWR Operations
Norman Garner, Steven Cole (*AREVA NP*), Rüdiger-Frank Graebert,
Hans-Joachim Lippert, Dieter Bender (*AREVA GmbH*), Nathalie Teboul,
Pierre Mollard (*AREVA NP*)

4:40 p.m.

8327 HIPER16 Fuel Assembly Development for 16x16 CE-NSSS Type
Nuclear Power Plants
Sang-Youn Jeon, Jung-Min Suh, Kyeong-Lak Jeon (*KEPCO*), Jin-Su Baik,
Tae-Hyoung Lee, Shin-Seob Kang (*Korea Hydro & Nuclear Power Co.*)

5:00 p.m.

8333 AXPo's Quality Assurance System for Fuel Assembly Fabrication
Monitoring
Dan Slabu, Martin Zemek, Christian Hellwig (*Axpo Power AG*)

5:20 p.m.

8496 Projected Relative Worker Radiation Doses from Fresh Recycled
Fuel Using Different Fuel Matrices
Alejandra Jolodosky, Andrew Cartas, James S. Tulenko (*Univ of Florida*)

5:40 p.m.

8396 A PWR Mixed Oxide Fuel Strategy Using Surplus Plutonium
Kenneth Naugle (*AREVA NP*), P. Mick Mastilovic (*TVA*)

TRACK 4: MODELING

Modeling and Coupling—II

Co-Chairs: Paul Turinsky (*NCSU*), Florin Curca-Tivig (*AREVA*)

Grand Ballroom A

4:20 p.m.

8408 ARTEMIS Transient Capabilities and Recent Validation
Experience
G. Hobson, K. Rooks (*AREVA NP*), S. Kuch, F. Reiterer, M. Riedmann,
H.-W. Bolloni (*AREVA GmbH*), B. Pothet (*AREVA NP*)

4:40 p.m.

8454 AREVA's New Generation of Advanced Codes and Methods—The
Key to Successful Licensing of High-Performance Fuel Products and Core
Designs in a Moving Regulatory Environment
Florin Curca-Tivig (*AREVA GmbH*)

5:00 p.m.

8541 CASL Multiphysics Modeling of Crud Deposition in PWRs
Brian K. Kendrick (*LANL*), Victor Petrov, Daniel Walter, Annalisa
Manera, Ben Collins, Thomas Downar (*Univ of Michigan*), Jeffrey Secker
(*Westinghouse*), Kenneth Belcourt (*SNL*)

5:20 p.m.

8400 AREVA's Four Levels of Crud Risk Assessment
J. H. Jones, M. G. Pop, C. M. Hove, R. L. Harne, M. S. Anghelescu, A.
Y. Galimov, S. M. Palzewicz, S. R. Lydzinski, L. Monti (*AREVA NP*), F.
Reiterer (*AREVA GmbH*)

5:40 p.m.

8394 Impact on Reactor Physics Parameters of 3D CFD VS. 1D T-H
Feedback for a 4x4 Sub-Assembly During Depletion
D. Walter, V. Petrov, A. Manera, T. Downar (*Univ of Michigan*), F.
Franceschini (*Westinghouse*)

TRACK 6: NEW FUEL CONCEPTS

Accident Tolerant Cladding: Non-SiC

Co-Chairs: Koroush Shirvan (*MIT*), John Strumpell (*AREVA*)

Grand Ballroom B

4:20 p.m.

8373 High-Temperature Oxidation Behavior of Cr-Coated Zirconium
Alloy
Hyun-Gil Kim, Il-Hyun Kim, Yang-Il Jung, Dong-Jun Park, Jeong-Yong
Park, Yang-Hyun Koo (*KAERI*)

4:40 p.m.

8540 Development and Testing of Nanolaminate Coatings for
Conventional LWR Cladding
Abdellatif M. Yacout, Michael Pellin, Michael C. Billone (*ANL*)

5:00 p.m.

8555 Development of Mo-Alloy for LWR Fuel Cladding to Enhance
Fuel Tolerance to Severe Accidents
Bo Cheng (*EPRI*), Young-Jin Kim (*GE Global Research Center*), Peter Chou,
Jeff Deshon (*EPRI*)

5:20 p.m.

8483 Assessment at CEA of Coated Nuclear Fuel Cladding for LWRs
with Increased Margins in LOCA and Beyond LOCA Conditions
Isabel Idarraga-Trujillo, Marion Le Flem, Jean-Christophe Brachet,

Matthieu Le Saux, Didier Hamon (CEA, DEN), Sébastien Muller (CEA, DEN/CEA, INSTN), Valérie Vandenberghe, Marc Tupin (CEA, DEN), Emilie Papin (Mecachrome), Eric Monsifrot, Alain Billard (LRC CEA), Frédéric Schuster (CEA, DEN)

5:40 p.m.

8441 Development of Oxidation Resistant Iron Alloys for LWR Cladding
L. L. Snead, Y. Yamamoto, K. A. Terrani, B. A. Pint (ORNL)

WEDNESDAY, SEPTEMBER 18, 2013, 8:30 AM

TRACK 3: DESIGN AND MATERIALS

Cladding and Structural Alloy Development—I

Co-Chairs: Norman Garner (AREVA), Manuel Quecedo (ENUSA)

Grand Ballroom C

8:30 a.m.

8527 Property Change of Oxide Layer of Zr-Based Alloys with Oxide Growth
K. Sakamoto, K. Une (Nippon Nuclear Fuel Development Co.), Y. Kashiba, H. Watanabe, I. Takagi (Kyoto Univ), M. Aomi (GNF)

9:00 a.m.

8557 Hydride Reorientation in M5 Cladding and Its Impact on Mechanical Properties
P. Bouffieux, A. Ambard (EDF/R&D), A. Miquet (EDF/SEPTEN), C. Cappelaere, Q. Auzoux, M. Bono, O. Rabouille, S. Allegre (CEA-Saclay), V. Chabretou, C.P. Scott (AREVA NP)

9:30 a.m.

8310 Mitigating BWR Channel Distortion: Westinghouse Low Tin ZIRLO Channel
J. Romero (Westinghouse), M. Dahlbäck, L. Hallstadius (Westinghouse Electric Sweden)

9:50 a.m.

8465 BWR Corrosion Experience of NSF Channels
Paul E. Cantonwine, Yang-Pi Lin, Dan R. Lutz, David W. White, Kevin L. Ledford (GNF)

TRACK 4: MODELING

Fuel Mechanical Modeling

Co-Chairs: Zeses Karoutas (Westinghouse), Ying Yi (SNERDI)

Grand Ballroom A

8:30 a.m.

8100 Nuclear Fuel Assembly Finite Element Model for End-of-Life Condition
Joonhyung Choi, Michael C. Misvel, Zeses E. Karoutas (Westinghouse)

8:50 a.m.

8272 FSI Application to Seismic/LOCA Analysis of PWR Fuel Assemblies
Heng Huang, Tong Liu, Yuemin Zhou, Yebin Han, Yan Guo (China Nuclear Power Technology Research Inst)

9:10 a.m.

8279 Seismic Analysis of the Dual-Cooled Fuel Assembly by Enhanced Seismic Design Criteria
Kyungho Yoon, Min-Kyu Kim, Heung-Seok Kang (KAERI), Chang-Ki Ahn (SHINHWA Technology)

9:30 a.m.

8389 Benchmarking of SAVAN2D and MAC3S2 (Stage 1): Simulation of Fuel Assembly Mechanical Performance
Enrique Gutiérrez, Jorge Muñoz (ENUSA Industrias), Yuriy Aleshin (Westinghouse), Damien Hubert (EDF SEPTEN), Romeo Fernandes (EDF R&D)

9:50 a.m.

8509 Simulating Impact Tests of Fuel Assembly Spacer Grids
W. Zhao, Z. Karoutas, B. Jeffcoat, P. Evans, O. McRae (Westinghouse)

TRACK 6: NEW FUEL CONCEPTS

Accident Tolerant Cladding: SiC—I

Co-Chairs: Peng Xu (Westinghouse), Mitch Meyer (INL)

Grand Ballroom B

8:30 a.m.

8316 Silicon Carbide TRIPLEX Cladding: Recent Advances in Manufacturing and Testing
Herbert Feinroth, Gregory Markham, Matthew Ales (CTP)

8:50 a.m.

8338 Development of Innovative Material for Nuclear Reactor Core with Enhanced Safety
Koji Kitano, Masaru Ukai, Takahiro Kubo (Toshiba Corp)

9:10 a.m.

8490 Preliminary Assessment of the Performance of SiC Based Accident Tolerant Fuel in Commercial LWR Systems
S. Ray, S. C. Johnson, E. J. Lahoda (Westinghouse)

9:30 a.m.

8524 Assessment of SiC/SiC Cladding for LWRs
C. Sauder, A. Michaux, G. Louprias, P. Billaud, J. Braun (CEA)

9:50 a.m.

8544 Sensitivity Study on LWR Fuel SiC Cladding Dimension
Hangbok Choi (General Atomics)



WEDNESDAY, SEPTEMBER 18, 2013, 10:30 AM

TRACK 3: DESIGN AND MATERIALS

Cladding and Structural Alloy Development—II

Co-Chairs: Suresh Yagnik (EPRI), Yang-Hyun Koo (KAERI)

Grand Ballroom C

10:30 a.m.

8584 Structure of Zircaloy-4 Oxides Formed During Autoclave Corrosion
Benoit de Gabory, Arthur T. Motta (Penn State Univ)

10:50 a.m.

8519 Zirconium Alloy Irradiation Hardening: Yield and Ultimate Strength Comparison of Optimized ZIRLO Cladding and ZIRLO Cladding
John Paul Foster (Westinghouse), A. Muñoz (ENUSA Industrias), B. W. Amiri (Westinghouse), C. Muñoz-Reja (ENUSA Industrias), A. Atwood (Westinghouse)

11:10 a.m.

8402 In-Situ Neutron Radiography Determination of Hydrogen Concentration at a Stress Raiser
S. Valance (Paul Scherrer Inst), M. Grosse (KIT), J. Bertsch, A. Kaestner, S. Hartmann (Paul Scherrer Inst), J. Santisteban (CNEA)

11:30 a.m.

8228 A Novel Zr-1Nb Alloy and a New Look at Hydriding
Robert D. Mariani, James I. Cole, Assel Aitkaliyeva (INL)

11:50 a.m.

8420 Process Development of Zircaloy Clad U10Mo Monolithic Fuel Plate Fabrication
Tércio Assunção Pedrosa, Ana Maria Matildes dos Santos, Fernando Soares Lameiras, Wilmar Barbosa Ferraz (CDT/CNEN)

12:10 p.m.

8484 Experimental Studies to Justify the Operational Reliability of VVER Fuel Assemblies
V. V. Makarov, A. V. Afanasiev, I. V. Matvienko, D. N. Puzanov (OKB GIDROPRESS), S. Ye. Volkov, A. B. Dolgov (JSC TVEL)

TRACK 4: MODELING

Thermal Hydraulic Modeling—I

Co-Chairs: Brian Moore (GNF), James Hoerner (B&W)

Grand Ballroom A

10:30 a.m.

8028 Advanced Dryout Prediction Methods at Westinghouse
Jean-Marie Le Corre (Westinghouse Electric Sweden)

10:50 a.m.

8271 WVHI and WVLO Correlations for Predicting Critical Heat Flux of VVER-1000 Fuel Designs

P. F. Joffe, Y. Sung, L. D. Smith, A. Mandour, Z. E. Karoutas (Westinghouse)

11:10 a.m.

8435 Challenges in CHF Correlation Development
Ole Wieckhorst, S. Opel (AREVA GmbH), R. Harne, F. Filhol (AREVA NP)

11:30 a.m.

8450 Advanced CHF Prediction by F-COBRA-TF and CFD Analysis to Support PWR and BWR Fuel Product and Methodology Development
S. Opel, N. Alleborn, P. Pohl (AREVA GmbH), K. Greene, A. Chatelain (AREVA NP)

11:50 a.m.

8422 Impact of Mixing Grid Design on Flow Patterns and CHF Performance
Zeses E. Karoutas, Paul F. Joffe, L. David Smith, Jin Yan, J. Jiang, Y. Xu, P. Yuan (Westinghouse)

12:10 p.m.

8348 Evaluating Spacer Grid CHF Performance by High Fidelity 2-Phase Flow Modeling
J. Yan, Z. E. Karoutas, L. D. Smith, Paul F. Joffe, M. E. Conner (Westinghouse)

TRACK 6: NEW FUEL CONCEPTS

Accident Tolerant Cladding: SiC—II

Co-Chairs: Koji Kitano (Toshiba), Sean McDevitt (TAMU)

Grand Ballroom B

10:30 a.m.

8259 Metal-Ceramic Hybrid Fuel Cladding Tubes for LWR Application
Yang-Il Jung, Sun-Han Kim, Hyun-Gil Kim, Dong-Jun Park, Jeong-Yong Park (KAERI)

10:50 a.m.

8383 Oxidation Resistant Novel Silicon Carbide Composites for Accident Tolerant Fuel
Tatsuya Hinoki, Kazuya Shimoda (Kyoto Univ)

11:10 a.m.

8416 Irradiation of SiC-Clad Fuel Rods in the HFIR
L. J. Ott, G. L. Bell, R. J. Ellis, J. L. McDuffee, R. N. Morris (ORNL)

11:30 a.m.

8360 SiC-CMC-Zircaloy-4 Nuclear Fuel Cladding Performance During 4-Point Tubular Bend Testing
I. J. van Rooyen, W. R. Lloyd, T. L. Trowbridge, S. R. Novascone, K. M. Wendt, S. M. Bragg-Sitton (INL)

11:50 a.m.

8417 FRAPCON-MIT: A Fuel Performance Tool For Innovative Fuel Designs
Alexander Mieloszyk, Yanin Sukjai, Sheng Xu, Mujid S. Kazimi (MIT)

WEDNESDAY, SEPTEMBER 18, 2013, 1:20 PM

TRACK 3: DESIGN AND MATERIALS

Fuel Testing and Improvement

Co-Chairs: Lars Hallstadius (*Westinghouse*), Kan Sakamoto (*NFD*)

Grand Ballroom C

1:20 p.m.

8344 Fission Gas Release Mechanism of MOX and UO₂ Fuels
N. Nakae, H. Akiyama, H. Miura, T. Baba, K. Kamimura (*JNES*)

1:50 p.m.

8384 Nuclear Fuels and Materials Qualification Programs in the European Jules Horowitz Material Testing Reactor
D. Parrat, M. Tourasse (*CEA, DEN, DEC*), J.C. Brachet (*CEA, DEN, DMN*), G. Bignan, J. P. Chauvin, C. Gonnier (*CEA, DEN, DER*)

2:10 p.m.

8534 CEA Activities in Support of the Development and Qualification of Fuel Assemblies
B. Collard, Ph. Clément (*CEA DEN, DTN*), Y. Robert (*CEA, DEN, DMN*)

2:30 p.m.

8579 GAIA: AREVA's Advanced PWR Fuel Design
G. A. Thomas, J. S. D'Orio, G. Gentet, P.-H. Louf (*AREVA NP*), M. Mindt (*AREVA GmbH*)

2:50 p.m.

8585 Effective Improvement Against Bottom Grid to Rod Fretting Issue on Mitsubishi ZDP-1 Fuel Assembly
Norihiro Kitashiba (*Mitsubishi Nuclear Fuel Co.*), Seinosuke Azuma (*Mitsubishi Heavy Industry*)

3:10 p.m.

8545 Fluctuating Pressure Measurements Induced by Flow Through Mixing Grid
Elvis E. Dominguez-Ontiveros, Yassin A. Hassan (*Texas A&M Univ*), M. E. Conner (*Westinghouse*)

TRACK 4: MODELING

Thermal Hydraulic Modeling—II

Co-Chairs: Zeses Karoutas (*Westinghouse*), Ken Yueh (*EPRI*)

Grand Ballroom A

1:20 p.m.

8102 Numerically Simulating Thermal-Hydraulic Characteristics of Fuel Bundle with Conceptual Vane
Wenchi Yu, Yuemin Zhou, Zhengzheng Pang, Weicai Li, Jingwen Yan, Xiaoming Chen (*China Nuclear Power Technology Research Inst*)

1:40 p.m.

7989 Validation of a CFD Methodology to Evaluate Two-Phase Mixing Characteristics on PWR Fuel Rod Bundle with Spacer Grids

Xi Chen, Hong Zhang (*Nuclear Power Inst of China*)

2:00 p.m.

8533 Pressure Drop Measurements and CFD Predictions for PWR Structural Grids
R. Sugrue (*MIT*), M. Conner, J. Yan (*Westinghouse*), E. Baglietto (*MIT*)

2:20 p.m.

8328 Monte-Carlo Simulation and Manufacturing—How to Match?
Dietmar Goeck, Torsten Thumstaedter (*TÜV SÜD*)

2:40 p.m.

8354 Integrated Grid to Rod Fretting Wear Approach—VITRAN Reactor GTRF Simulations
R. Y. Lu, Z. Karoutas, M. Krammen, J. Yan, J. Wang (*Westinghouse*)

3:00 p.m.

8080 Process of Quantifying the GTRF Improvement by Using 5x5 Bundle
Jane Xiaoyan Jiang, Jiwei Wang, Zeses E. Karoutas (*Westinghouse*)

TRACK 6: NEW FUEL CONCEPTS

Advanced LWR Fuel and Processing

Co-Chairs: Sumit Ray (*Westinghouse*), Shannon Bragg-Sitton (*INL*)

Grand Ballroom B

1:20 p.m.

8588 Behavior Assessments for UO₂-BeO Enhanced Conductivity Fuel in a PWR
Sean M. McDevitt, Chad Garcia, Jean C. Ragusa, Joshua Smith (*Texas A&M Univ*), James Malone (*IBC Advanced Alloys*)

1:40 p.m.

8551 Modeling of Thermal Property and Performance for UO₂/BeO Composite Fuel
Wenzhong Zhou (*Univ of Hong Kong*)

2:00 p.m.

8304 Uranium Nitride: Enabling New Applications for TRISO Fuel Particles
J. J. Powers, K. A. Terrani (*ORNL*)

2:20 p.m.

8518 TOP-MOX Fuel Solution: Strategies, Challenges, Opportunities
Peter Breitenstein (*AREVA*)

2:40 p.m.

8543 Status of the Norwegian Thorium Light Water Reactor (LWR) Fuel Development and Irradiation Test Program
Saleem S. Drera, Klara Insulander Bjork, Julian F. Kelly, Oystein Asphjell (*Thor Energy AS*)

3:00 p.m.

8493 Redox Behaviour of Americium in Mixed Oxide Fuels
C. Degueldre, C. Cozzo, M. Martin, D. Grolimund, J. Poonoosamy, D. Kulik (*Paul Scherrer Inst*)



ANS 2013 LWR Fuel Performance Meeting/TopFuel



September 15-19, 2013 • Charlotte, NC • Westin Charlotte Hotel

Fuel Handling Events Workshop September 19, 2013

Over the past decade, nuclear plants have experienced a higher number of adverse fuel handling events. These events can range from mis-positioning a fuel assembly during in-core refueling to damaging an assembly component in the spent fuel pool during inspection.

The events have a global reach and their frequency has risen - particularly in the spent fuel pool area. This increase has been linked to several factors, including an increase in off-normal fuel handling activities such as dry cask loading, fuel cleaning, healthy fuel inspections that require disassembly of fuel bundles, as well as assembly reconstitution. Additionally, with a growing population of fuel handling workers reaching retirement, “tribal knowledge” may not be getting communicated to replacement personnel or captured in procedures.

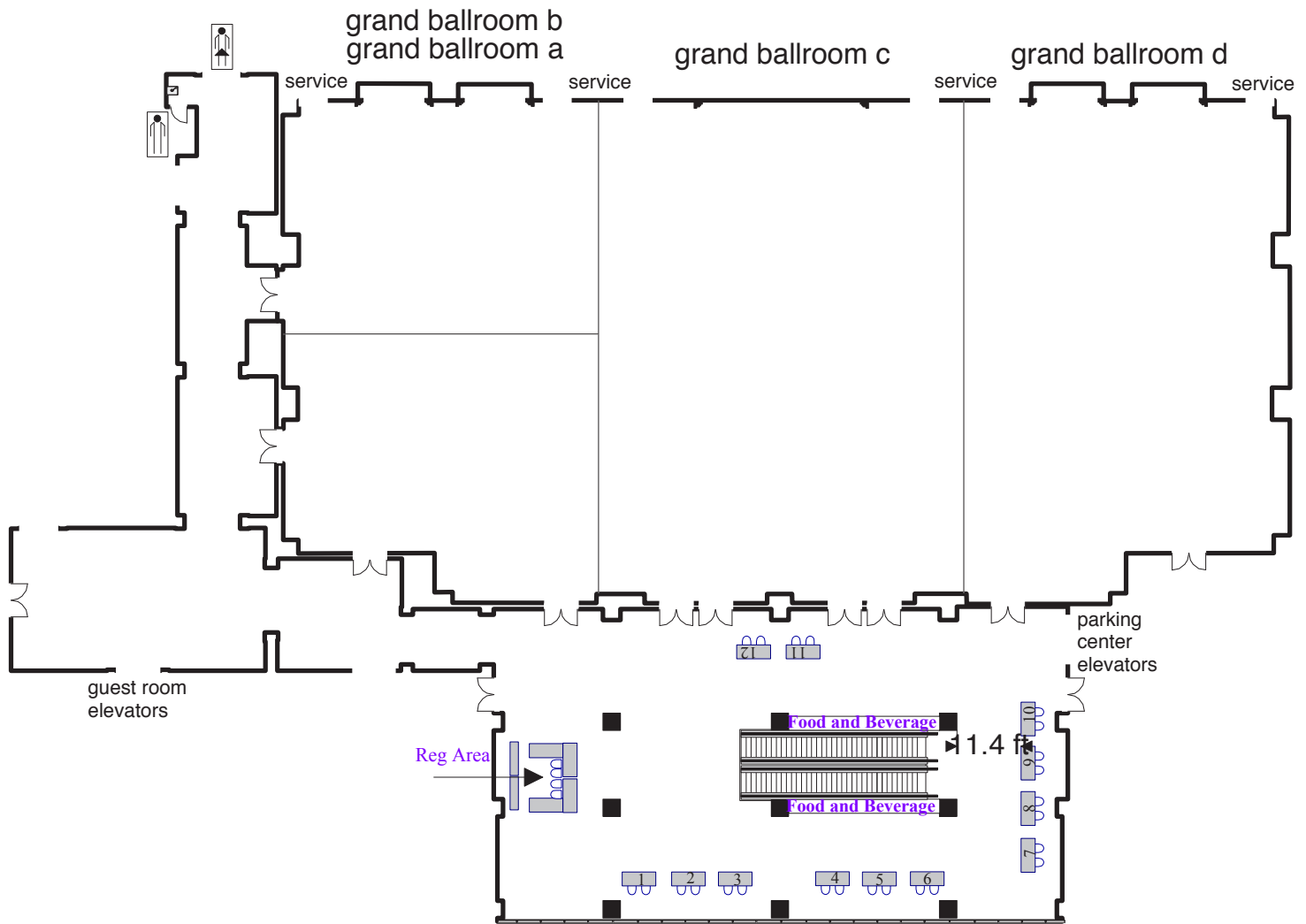
This workshop is designed to communicate this growing problem to a broader audience. Speakers will describe the types of events encountered, their causal factors and actions being taken to address the events. A Q&A panel session will follow and participants will solicit assistance from the technical community to help address gaps in knowledge and solutions.

SCHEDULE FOR THE FUEL HANDLING EVENTS WORKSHOP

- **Workshop Introduction and Objectives (15 min)**
- **Utility Presentations and Case Examples (60 - 90 min)**
- **INPO Presentation: Excellence in Refueling Operations (30 min)**
- **Break (15 min)**
- **Commercial Vendor Presentations (60 min)**
- **Panel Discussion (30 - 45 min)**

2013 LWR TopFuel Exhibits

grand ballroom & promenade



EXHIBITORS AND SPACE NUMBERS



ANATECH Corp.		Korea Nuclear Fuel Co.	7
A Structural Integrity Associates, Inc.® Company	1	NETZSCH Instruments North America, LLC	8
Global Nuclear Fuel	2	AREVA	9
Nuclear Safety Associates	3	Studsvik Nuclear/ Scandpower	10
Westinghouse Electric Co.	5		

