

# 2012 ANS WINTER MEETING & NUCLEAR TECHNOLOGY EXPO

*"FUTURE NUCLEAR TECHNOLOGIES: RESILIENCE AND FLEXIBILITY"*

November 11-15, 2012 • Town & Country Resort • San Diego, CA



## **EMBEDDED TOPICAL MEETINGS:**

- INTERNATIONAL MEETING ON SEVERE ACCIDENT ASSESSMENT AND MANAGEMENT: LESSONS LEARNED FROM FUKUSHIMA DAIICHI
- ADVANCES IN THERMAL HYDRAULICS (ATH '12)

## **PROFESSIONAL DEVELOPMENT WORKSHOP:**

*"FACILITATING SUCCESS"*

Preliminary Program & Registration Materials

**REGISTER NOW!**

*our most sincere thanks  
to the following contributors  
for their support of the*

## **2012 ANS WINTER MEETING & NUCLEAR TECHNOLOGY EXPO**

---

***"FUTURE NUCLEAR TECHNOLOGIES: RESILIENCE AND FLEXIBILITY"  
& EMBEDDED TOPICAL MEETINGS:***

---

International Meeting on Severe Accident Assessment & Management:  
Lessons Learned from Fukushima Dai-ichi  
Advances in Thermal Hydraulics (ATH '12)

PLATINUM

**DUKE ENERGY  
SCE**

GOLD

**EXCEL SERVICES CORPORATION**

SILVER

**ENERGY OPERATIONS INC.  
PG&E**

BRONZE

**NEXTERA ENERGY  
PPL SUSQUEHANNA, LLC  
AREVA**

***Thank You!***

UPDATED: 10/04/12

## GENERAL MEETING INFORMATION

MEETING HIGHLIGHTS	4
MEETING OFFICIALS	5
MEETING INFORMATION	6-7
SPECIAL EVENTS	8-10

## 2012 ANS WINTER MEETING: TECHNICAL SESSIONS

TECHNICAL SESSIONS BY DIVISION	11-12
OPENING PLENARY: MONDAY	13
TECHNICAL SESSIONS BY DAY: MONDAY	13-16
TECHNICAL SESSIONS BY DAY: TUESDAY	16-22
TECHNICAL SESSIONS BY DAY: WEDNESDAY	23-28
TECHNICAL SESSIONS BY DAY: THURSDAY	29-33

## INTERNATIONAL MEETING ON SEVERE ACCIDENT ASSESSMENT AND MANAGEMENT: LESSONS LEARNED FROM FUKUSHIMA DAIICHI: TECHNICAL SESSIONS

FUKUSHIMA MEETING OFFICIALS	34
TECHNICAL SESSIONS BY DAY: MONDAY	34
TECHNICAL SESSIONS BY DAY: TUESDAY	35-36
TECHNICAL SESSIONS BY DAY: WEDNESDAY	36-37
TECHNICAL SESSIONS BY DAY: THURSDAY	37

## ADVANCES IN THERMAL HYDRAULICS (ATH '12): TECHNICAL SESSIONS

ATH '12 MEETING OFFICIALS	38
OPENING PLENARY: TUESDAY	38
TECHNICAL SESSIONS BY DAY: WEDNESDAY	39
TECHNICAL SESSIONS BY DAY: THURSDAY	40

## ADDITIONAL

PROFESSIONAL DEVELOPMENT WORKSHOP	41
COMMITTEE MEETINGS	42-44
TECHNOLOGY EXHIBIT	45-46
REGISTRATION FORM	47-48
TECH TOUR FORMS	49-50
MENTORING PROGRAM	51
ANS ORGANIZATION MEMBERS	52

**PLEASE NOTE:** This is a preliminary listing. Times and locations are subject to change. The Official Program, distributed at the meeting, will contain the final meeting schedule.

# MEETING HIGHLIGHTS

## SUNDAY, NOVEMBER 11, 2012

11:00 A.M. – 7:00 P.M.	Meeting Registration
8:00 A.M. – 5:00 P.M.	Professional Development Workshop: “Facilitating Success”
1:00 P.M. – 1:30 P.M.	First-Time Attendees Orientation
4:00 P.M. – 5:00 P.M.	Student Assistant Training Session
5:00 P.M. – 6:00 P.M.	Mentoring Program
6:00 P.M. – 7:30 P.M.	ANS President’s Reception
6:00 P.M. – 7:30 P.M.	ANS Nuclear Technology Expo

## MONDAY, NOVEMBER 12, 2012

7:30 A.M. – 5:00 P.M.	Meeting Registration
8:00 A.M. – 10:00 A.M.	Spouse/Guest Hospitality
8:00 A.M. – 11:30 A.M.	2012 ANS Winter Meeting: Opening Plenary Session: “Future Nuclear Technologies: Resilience and Flexibility”
11:30 A.M. – 1:00 P.M.	Attendee Luncheon in the Nuclear Technology Expo
11:30 A.M. – 6:00 P.M.	ANS Nuclear Technology Expo
1:00 P.M. – 4:00 P.M.	2012 ANS Winter Meeting: Technical Sessions
1:00 P.M. – 5:00 P.M.	Spouse/Guest Tour: Whistle While You Walk: A Walking Tour of Beautiful Coronado Island
1:30 P.M. – 5:30 P.M.	Fukushima 2012 Meeting: Technical Sessions
6:00 P.M. – 11:00 P.M.	Evening Event: Dinner at the San Diego Zoo

## TUESDAY, NOVEMBER 13, 2012

7:30 A.M. – 5:00 P.M.	Meeting Registration
8:00 A.M. – 10:00 A.M.	Spouse/Guest Hospitality
8:30 A.M. – 12:00 P.M.	2012 ANS Winter Meeting: Technical Sessions
8:30 A.M. – 12:30 P.M.	Fukushima 2012 Meeting: Technical Sessions
10:00 A.M. – 2:00 P.M.	ANS Nuclear Technology Expo
1:00 P.M. – 2:00 P.M.	Advances in Thermal Hydraulics: Opening Plenary: SMR Programs
1:00 P.M. – 5:00 P.M.	Spouse/Guest Tour: Capturing the Culture: Balboa Park Museum Passport
1:30 P.M. – 4:00 P.M.	2012 ANS Winter Meeting: Technical Sessions

1:30 P.M. – 5:30 P.M.

Fukushima 2012 Meeting:  
Technical Sessions

4:00 P.M. – 6:00 P.M.

ANS President’s Special Session:  
“Ten Years Since the Generation IV  
Roadmap: Progress and Future Directions  
for New Reactor Technologies”

## WEDNESDAY, NOVEMBER 14, 2012

7:30 A.M. – 5:00 P.M.	Meeting Registration
8:00 A.M. – 10:00 A.M.	Spouse/Guest Hospitality
8:30 A.M. – 4:30 P.M.	GIF Symposium
8:30 A.M. – 12:00 P.M.	2012 ANS Winter Meeting: Technical Sessions
8:30 A.M. – 12:30 P.M.	Fukushima 2012 Meeting: Technical Sessions
8:30 P.M. – 12:35 P.M.	Advances in Thermal Hydraulics: Technical Sessions
12:30 P.M. – 5:00 P.M.	Technical Tour: Scripps Institute of Oceanography / General Atomics DIII-D Fusion Experiment
1:30 P.M. – 4:00 P.M.	2012 ANS Winter Meeting: Technical Sessions
1:30 P.M. – 5:30 P.M.	Fukushima 2012 Meeting: Technical Sessions
1:30 P.M. – 6:30 P.M.	Advances in Thermal Hydraulics: Technical Sessions
2:15 P.M. – 5:30 P.M.	Technical Tour: Navy Base Point Loma
6:00 P.M. – 10:30 P.M.	Evening Event: “Dinner at the Birch Aquarium”

## THURSDAY, NOVEMBER 15, 2012

7:30 A.M. – 2:00 P.M.	Meeting Registration
8:30 A.M. – 12:00 P.M.	2012 ANS Winter Meeting: Technical Sessions
8:30 A.M. – 12:30 P.M.	Fukushima 2012 Meeting: Technical Sessions
8:30 A.M. – 12:30 P.M.	Advances in Thermal Hydraulics: Technical Sessions
1:30 P.M. – 4:00 P.M.	2012 ANS Winter Meeting: Technical Sessions
1:30 P.M. – 6:05 P.M.	Advances in Thermal Hydraulics: Technical Sessions

## 2012 ANS Winter Meeting: Meeting Officials



HONORARY CHAIR:  
**DR. SALOMON LEVY**  
*Levy & Associates*



GENERAL CHAIR:  
**PROF. PER F. PETERSON**  
*University of California*



ASSISTANT GENERAL CHAIR:  
**MR. LOYD A. WRIGHT**  
*Southern California Edison*



TECHNICAL PROGRAM CHAIR (TPC):  
**DR. XIAODONG SUN**  
*The Ohio State University*



ASSISTANT PROGRAM CHAIR:  
**DR. SACIT M. CETINER**  
*Oak Ridge National Laboratory*



ASSISTANT PROGRAM CHAIR:  
**DR. SEDAT GOLUOGLU**  
*University of Florida*



FINANCE CHAIR:  
**MR. TED QUINN**  
*Technology Resources*



STUDENT CHAIR:  
**MR. CHRISTOPHER ROBINSON**  
*Southern California Edison*



SPOUSE/GUEST CHAIR  
**KAREN SEELAND**



TECHNICAL TOURS CHAIR:  
**DR. HENRY CHIU**  
*General Atomics*



## MEETING INFORMATION

The 2012 ANS Winter Meeting and two Embedded Topical Meetings: Advances in Thermal Hydraulics (ATH '12), and International Meeting on Severe Accident Assessment and Management: Lessons Learned from Fukushima Daiichi will be held November 11-15, 2012, in San Diego, CA.

There will also be a Professional Development Workshop, "Facilitating Success" on Sunday from 8:00 a.m. – 10:00 a.m.

## ACCOMMODATIONS/HOTEL INFORMATION

The Town and Country Resort and Convention Center, located at **500 HOTEL CIRCLE NORTH, SAN DIEGO, CALIFORNIA, 92108**, will be the location for the 2012 Winter Meeting and Nuclear Technology Expo, where all meeting activities and technical sessions will take place.

The special room rate for the meeting is: \$149.00/night (single rate); and \$169.00/night (double rate). [\$20.00 for each additional guest in the room.]

The government rate is: \$133.00/night (single rate); and \$153.00/night (double rate).

The parking fees are \$10.00 per day for hotel guests and prevailing fees for non guests.

Reservations can be made on their website at:

<https://resweb.passkey.com/go/72b3dd07>

To register by phone for a guest room: 800-772-8527.

Attendees must identify themselves as part of the American Nuclear Society to receive the group rate.

### *Message to Attendees:*

ANS has made every effort to secure the best possible nightly room rate for you at the Town and Country Resort and Convention Center. That rate results from a negotiated overall package of event needs such as sleeping rooms, meeting room space and other requirements. Event costs will increase if ANS falls short of its minimum room block guarantee.

Please help ANS keep the costs of this event as low as possible by booking your housing needs at the designated host hotel and through the reservation process created by ANS. Reserving your rooms elsewhere means you are booking outside the contracted room block, jeopardizing ANS' ability to meet its contracted obligations and to keep



registration fees to a minimum. ANS appreciates your support and understanding of this important issue. **Thank you!**

## ANS NUCLEAR TECHNOLOGY EXPO

The ANS Nuclear Technology Expo will be held in conjunction with the 2012 ANS Winter Meeting in the Grand Exhibit Hall of the hotel. Please turn to page 46 for additional information.

## FIRST-TIME ATTENDEE ORIENTATION

The ANS Membership Committee will offer an orientation session for first-time ANS meeting attendees. Learn what goes on at national meetings, how the national organization works, and how to get involved at the national and local levels.

Whether you are a member or not, student or professional, if this is your first ANS national meeting, the Membership Committee invites you to attend this session, which will be held 1:00 - 1:30 p.m. on Sunday, November 11, 2012, in the **Royal Palm Salon 1**.

## STUDENT ASSISTANT PROGRAM

Attendance at the 2012 ANS Winter Meeting is an exciting professional opportunity for college and graduate students.

To help defray travel and living expenses, students can sign up to work as session chairs' assistants. Student assistants must attend the student training session on Sunday, November 11, 2012, 4:00 - 5:00 p.m. in the **Royal Palm Salon 1**.

Student assistants receive free meeting registration and a copy of the meeting **TRANSACTIONS**.

All students are responsible for paying their own room, tax, and incidentals. If you are in need of a roommate, you can contact the Student Program Chair for other students who may need a roommate. It will be your responsibility to contact them to make room arrangements

ANS student members who register for the meeting and/or work as session chairs' assistants should pick up a travel assistance form which can be found in the student headquarters room. Student travel assistance is provided through contributions from the ANS professional divisions.

The student headquarters room will be located in the **Esquire** room.

For more information regarding the meeting, please contact the Student Program Chair,

Christopher Robinson:  
(949) 368-757

e-mail: [christopher.robinson@sce.com](mailto:christopher.robinson@sce.com)

or

ANS Meetings Department:  
(708) 579-8287  
[www.ans.org](http://www.ans.org)

## NOTICE FOR SPEAKERS

All speakers and session chairs must sign in at the "Speakers' Desk," located in the ANS Registration Area of the hotel during registration hours.

**ANS REGISTRATION**

Meeting registration, speakers' & sessions chairs' desk and the message desk will be located in the **Atlas Foyer** of the Town & Country Resort, Sunday, November 11, 2012 - Thursday, November 15, 2012. Meeting registration is required for all attendees and presenters. Name badges are required for admission to all technical sessions and events.x

**REGISTRATION HOURS:**

\*Sunday, November 11, 2012  
11:00 a.m. - 7:00 p.m.  
Monday, November 12, 2012  
7:30 a.m. - 5:00 p.m.  
Tuesday, November 13, 2012  
7:30 a.m. - 5:00 p.m.  
Wednesday, November 14, 2012  
7:30 a.m. - 5:00 p.m.  
Thursday, November 15, 2012  
7:30 a.m. - 2:00 p.m.

**\* Sunday workshop attendees only**

*Registration for the ANS Professional Development Workshops will take place at the Atlas Foyer Registration Desk of the hotel on Sunday, November 11, 2012, 7:00 A.M. - 8:00 A.M. Please note: only workshop information will be available; all other registrants see times and location above.*

**ANS CONFERENCE OFFICE**

Location: **Terrace Salon 1**

**ANS SECRETARIAT**

Location: **Terrace Salon 2**

**ANS MEDIA CENTER**

Monday, November 12, 2012  
7:45 A.M. - 4:00 P.M.  
Tuesday, November 13, 2012  
8:00 A.M. - 4:00 P.M.  
Wednesday, November 14, 2012  
8:00 A.M. - 4:00 P.M.

Location: **Terrace Salon 3**

**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 President's Reception 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.

**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 at least one day prior to their presentation.

Location: **Atlas Foyer**

**SPOUSE/GUEST HOSPITALITY**

Spouse/guest hospitality breakfast will be served from 8:00 a.m. - 10:00 a.m., Monday, November 12, 2012, through Wednesday, November 14, 2012, in **Tiki Pavilion**. Continental breakfast will be served each morning.

Spouse/guest registration is required for admittance to the spouse/guest hospitality breakfast.

Spouse/guest registration includes one ticket to the President's Reception and admittance to the spouse/guest breakfast only - it does not include technical sessions or other events. Spouse/guest tours are scheduled.

Registration for the tours is separate from the spouse/guest meeting registration.

**ATTENTION RUNNERS: ANS FUN RUN**

On Tuesday, November 13, 2012, there will be a noncompetitive run starting at 6:00 a.m. from the **Lobby Entrance** of the hotel.

We are looking forward to seeing you at the fun run in San Diego, CA. Bring shoes and a big smile.

**GIF SYMPOSIUM**

Wednesday, November 14, 2012  
8:30 AM - 4:30 PM

The Generation IV International Forum, an international collective of nations working cooperatively on development of 6 next generation reactor concepts, will hold its 2nd Symposium at the 2012 ANS Winter Meeting, Nov. 13-16, 2012. The opening day meetings will be split session in the morning consisting of an opening plenary hosted by the GIF Chairman, a panel discussion on development of Safety Design Criteria for Sodium Fast Reactors, and a panel discussion of the next ten years of GIF cooperation. The remainder of the meeting will focus on development of fast reactor systems, including research on other reactor concepts and areas where the countries can work together to advance nuclear energy.

Location: **Royal Palm Salon 4-6**

**MENTORING PROGRAM**

A special mentoring program will be held from 5:00 p.m. - 6:00 p.m. on Sunday, November 11, 2012, in the **Royal Palm Salon 1**.

ANS Members who will serve as mentors hold a variety of positions within the Society, serving on governance committees and working within the divisions. The mentors encompass a wide range of careers and technical specialties, all of which they hope to share with first-time attendees, student members, new members and those seeking career advancement and networking opportunities.

**WORKSHOP FOR SCIENCE EDUCATORS**

A workshop for science educators will be held on Saturday, November 10, 2012, 7:30 a.m. - 4:30 p.m. You must contact Chuck Vincent, ANS Outreach Department, at (708) 579-8311 for further details. Advance registration is required for all who wish to attend.

This Workshop is supported by individual and organizational contributions to the American Nuclear Society's Outreach Program and by gifts from several professional divisions of ANS.

**STANDARDS WORKSHOP:**

**EXPORT CONTROLS IN A GLOBAL NUCLEAR ECONOMY: A WORKSHOP ON THE 810 PROCESS**  
Tuesday, November 13, 2012

4:00 PM - 5:30 PM

Location: **Garden 1**

**FOCUS ON COMMUNICATIONS WORKSHOP**

Wednesday, November 14, 2012  
4:30 PM - 6:30 PM

Location: **Sunrise**

**PROFESSIONAL DEVELOPMENT WORKSHOP: FACILITATING SUCCESS**

Sunday November 11, 2012  
8:00 A.M. - 10:00 A.M.

Location: **Pacific Salon 6**

*PDW Organizer:* Gale Hauck

*Instructor:* Dr. Audeen Fentiman

Facilitation Skills are extremely useful for any thought Leader in NS&T. This Workshop will overview facilitation skills for future leaders and will help current leaders to hone their skills.

Attendee registration fees: \$25 (ANS member) and \$30 (non-members)

Please see page 41 for additional info.



## SPECIAL EVENTS & TOURS

### PLEASE NOTE:

- You must be registered for the meeting to attend evening events.
- Times listed are departure times and return times to/from the hotel.
- Busses will leave promptly from the Atlas Foyer Entrance (West) of the Town & Country Resort.

## CONFERENCE LUNCHEONS

### ATTENDEE LUNCHEON IN THE NUCLEAR TECHNOLOGY EXPO

MONDAY, NOVEMBER 12, 2012

11:30 A.M. – 1:00 P.M.

Location: Exhibit Hall (Grand Hall)

One ticket to the Attendee Luncheon in the Nuclear Technology Expo is included in the full meeting registration fee.

Additional tickets can be purchased in advance or on-site at the ANS Registration Desk for \$65.00.

### ANS PRESIDENT'S RECEPTION

SUNDAY, NOVEMBER 11, 2012

6:00 P.M. – 7:30 P.M.

Location: Exhibit Hall (Grand Hall)

One ticket to the ANS President's Reception is included in the full meeting registration fee.

Additional tickets can be purchased in advance or on-site at the ANS Registration Desk for \$85.00 per person.

## DINNER AT THE SAN DIEGO ZOO

MONDAY, NOVEMBER 12, 2012

6:00 P.M. – 11:00 P.M.



[www.elephantodyssey.com](http://www.elephantodyssey.com)

### *A not to be missed event!*

The Elephant Odyssey is the San Diego Zoo's most ambitious project yet combining animal species from all over the world into one shared exhibit. So what makes this Exhibit different from other exhibits at the zoo? Every member of the Elephant Odyssey, whether mammal, bird, reptile or insect, can have its origins traced back to the southern California region!

Learn about the Pleistocene epoch (the time of megafauna; i.e., large animals) and how creatures of a bygone era could become dispersed throughout the world through the use of ancient land bridges.

The large cat habitat will probably be the first location to catch your attention on your way to dinner. Lions and jaguars will be there to greet you.

Visit the jaguars and congratulate them on the new additions to their family. The new jaguar cubs need lots of care and attention so make sure to come by and see what kind of mischief they get into.

The stars of the exhibit, the elephants, are a mixture of Asian and Indian varieties. These park residents get premium service with spa services that they are able to schedule themselves!

At any time, these pampered pachyderms can mosey into the Elephant Care Center for a massive manicure and foot soak courtesy of the San Diego Zoo staff.



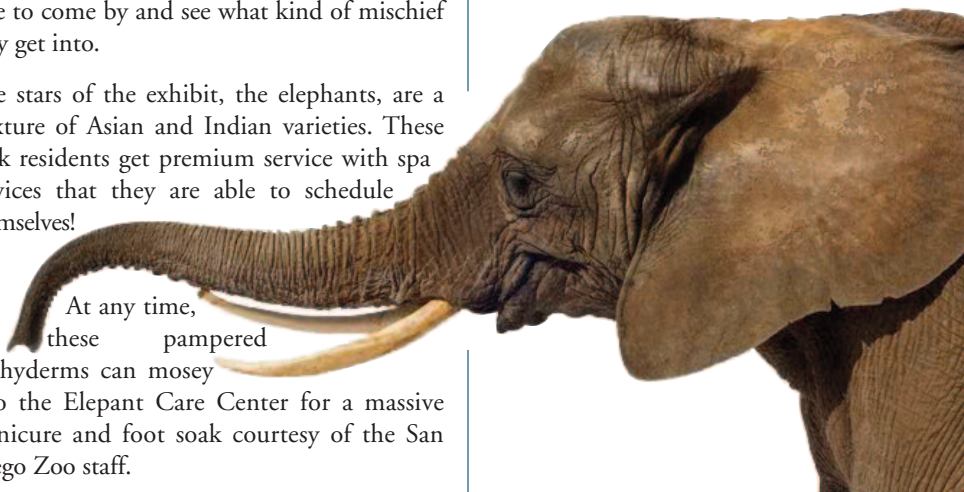
*One of the Residents at the Elephant Odyssey*

Prepare for this fantastic adventure by visiting the San Diego Zoo's website:

[www.elephantodyssey.com](http://www.elephantodyssey.com)

Here, you can learn the elephant's names and what they like to do. Also, try out the "Elephant Odyssey" game and prepare to be taken on a prehistoric adventure. Learn about mammoths from 200,000 years ago as well as the other animals in the exhibit like the world's largest rodent, the capybara and the California condor, a monstrous bird that nearly became extinct!

Tickets can be purchased in advance or on-site at the ANS Registration Desk for \$80.00 per person.





## DINNER AT THE BIRCH AQUARIUM IN SAN DIEGO

WEDNESDAY, NOVEMBER 14, 2012

6:00 P.M. – 10:00 P.M.

Visit the Birch Aquarium and celebrate 20 years of oceanography and education!

During the event, feel free to wander through the Birch's many exhibits including the Hall of Fishes, Shark Reef the Coral Displays.



*Coral Display*

The Hall of Fishes boast more than 60 habitats with fish ranging from the California coast, Mexico and the Caribbean! Among these exhibits is a 70,000 gallon kelp forest tank. Here, you can observe the aquatic life that calls this submerged wilderness home!

Take a peek right now!

[http://aquarium.ucsd.edu/Education/Learning\\_Resources/Kelp\\_Cam/](http://aquarium.ucsd.edu/Education/Learning_Resources/Kelp_Cam/)

The Coral display houses many beautiful fish favorites including the lionfish, chambered nautilus, and giant clams! A new interactive display has been added that showcases the research that the Scripps Institute has been performing around the world. The coral reefs in the Pacific and Caribbean displays have been constructed through a technique very similar to that of plant propagation. By carefully dividing the spawning coral, the researchers at Scripps can grow new reef colonies. By understanding how the reef colonies work, more advanced steps can be taken to save coral reefs all over the world!

Are you brave enough to visit the shark tank? You'll see blacktip and epaulette sharks in this 13,000 gallon exhibit!

Tickets can be purchased in advance or on-site at the ANS Registration Desk for \$75.00 per person.

## SPOUSE/GUEST TOURS

### WHISTLE WHILE YOU WALK: A WALKING TOUR OF BEAUTIFUL CORONADO ISLAND

MONDAY, NOVEMBER 12, 2012

1:00 P.M. – 5:00 P.M.



*Historic "Hotel Del"*

What better way to discover the magic of Coronado Island than on a leisurely guided walking tour?

Coronado, once the playground of Presidents and Princes, is an island rich with natural splendors and historical delights—truly one of San Diego's finest, most unspoiled gems. On this unique outing, guests will enjoy a strolling tour led by a knowledgeable and humorous guide, who will fill you in on anecdotes and little known facts along the way.

Your fascinating day begins at the house of John D. Spreckles— San Francisco Sugar Baron who once owned most of the island—his summer house where the Prince of Wales was entertained, and his mansion, the largest home in Coronado with 17 bedrooms and 13 bathrooms.

Following this "sweetest" of sights, guests will get an up-close-and-personal tour of the world famous Hotel del Coronado—the signature icon of the island. The charming, resplendent "Hotel Del" has reigned as monarch of the Pacific Coast resort hotels since its opening in 1888. No other hotel in North America, perhaps in the world, enjoys more fame than "The Del." In addition to The Del, guests will stroll past the Crown Manor mansion and even the Wizard of Oz house, once home of author L. Frank Baum.

Lace up your walking shoes and set yours sights on island delights as Destination Concepts brings you a sightseeing sojourn chock full of intriguing island strolling on the isle that embodies the beauty of San Diego—Coronado!

Tickets can be purchased in advance or on-site at the ANS Registration Desk at \$57.00 per person.

## CAPTURING THE CULTURE: BALBOA PARK MUSEUM PASSPORT

TUESDAY, NOVEMBER 13, 2012

1:00 P.M. – 5:00 P.M.

Nowhere is the allure of San Diego's countless eclectic charms capture quite as vividly as in the city's premier colonial landmark, Balboa Park. Stretching over 1,200 acres of flower-strewn landscape nestled in the hills of Downtown, this urban park is dotted by an array of intricate and antiquated Spanish architecture housing 85 cultural and recreational organizations, including sixteen museums. Recent additions include a recreation of the emblem of the 1915 Expo on the top of the new West Arcade and a bronze replica of a B24 Liberator, a centerpiece of the Veterans Memorial Garden recently unveiled in November.



*Casa del Prado in Balboa Park*

The two World's Fairs, the Panama-California Exposition of 1915-1916 and the California Pacific International Exposition of 1935-36, transformed Balboa Park into the cultural Mecca it is today, the largest concentration of museums and cultural institutions outside The Mall in Washington D.C.

Balboa Park countless wonders include:

- Museum of Man
- Natural History Museum
- Reuben H. Fleet Science Center
- Museum of Photographic Arts
- Mingei International Art Museum
- Aerospace Museum
- Centro Cultural de la Raza; WorldBeat Center
- Japanese Friendship Garden
- House of Pacific Relations
- Hall of Champions
- Midel Railroad Museum
- Automotive Museum
- Veteran's Memorial Center Museum

Tickets can be purchased in advance or on-site at the ANS Registration Desk at \$78.00 per person.

## TECHNICAL TOURS:

### SCRIPPS INSTITUTE OF OCEANOGRAPHY / GENERAL ATOMICS DIII-D FUSION EXPERIMENT

WEDNESDAY, NOVEMBER 14, 2012  
12:30 P.M. – 5:00 P.M.

We will have a tour on Wednesday, November 14, 2012 that will include the Scripps Institute of Oceanography and the DIII-D Tokamak Fusion Experiment at General Atomics.

With more than a century of exploration and discovery in global sciences, Scripps Institute of Oceanography is the world's preeminent center for ocean and earth research, teaching, and public education. A department of University of California - San Diego, Scripps' leadership in many scientific fields reflects its continuing commitment to excellence in research, modern facilities and ships, distinguished faculty, and outstanding graduate and undergraduate students - and the horizons continue to expand.



*Research Vessel Roger Revelle*

Our tour will take participants into the ocean-front research labs at Scripps for explanations of their current research by the scientists leading that work.



*Scripps Institute of Oceanography Pier*

Next, a tour will be given of the DIII-D National Fusion Research Facility, located at General Atomics. DIII-D is the largest magnetic fusion research device in the US.



*Interior of DIII-D Tokamak plasma reaction chamber*

The DIII-D Tokamak is a magnetic plasma confinement device used by teams of researchers from all over the US and around the world, and is developing the plasma physics knowledge needed to move forward on the International Thermonuclear Experimental Reactor (ITER) fusion demonstration project.

**ATTENTION! ALL NON-U.S. CITIZENS WHO WISH TO PARTICIPATE IN THE DIII-D TOUR MUST E-MAIL OR FAX THEIR ID/VISA/PASSPORT INFORMATION TO THE TECHNICAL TOURS CHAIR, DR. HENRY CHIU**

fax (858) 222-8803 e-mail [henry@iera-lj.com](mailto:henry@iera-lj.com)

***Note: Completed Technical Tour Registration Form Is Required to Participate in the Tour.***

Tickets can be purchased online at [www.ans.org](http://www.ans.org) for \$20.00 per person.

## NAVY BASE POINT LOMA

WEDNESDAY, NOVEMBER 14, 2012  
2:15 P.M. – 5:30 P.M.

***THIS TOUR IS FOR U.S. CITIZENS, ONLY.***



In 1959 Fort Rosecrans was turned over to the U.S. Navy. The Navy Submarine Support Facility was established in November 1963 on 280 acres of the land. On November 27, 1974 the base was re-designated a shore command, serving assigned submarines, Submarine Group Five, Submarine Squadron Three, Submarine Development Group One, the Submarine Training Facility and later, Submarine Squadron Eleven. On October 1, 1981 the base was designated as Naval Submarine Base.



*Submarine Tour*

Starting in April 1995, several commands were decommissioned or their homeports were changed to meet the down-sizing requirements of the Navy. Commands throughout San Diego were regionalized in an effort to provide equal or better base services while managing a reduced budget. The six naval installations on Point Loma were consolidated as Naval Base Point Loma on 1 October, 1998.

***Note: Completed Technical Tour Registration Form Is Required to Participate in the Tour.***

Tickets can be purchased online at [www.ans.org](http://www.ans.org) for \$20.00 per person.



(Asterisks indicate special sessions. Parentheses indicate cosponsorship)

## SPECIAL SESSIONS

\*Opening Plenary: “Future Nuclear Technologies: Resilience and Flexibility,” Mon. a.m.

\*ANS President’s Special Session: “Ten Years Since the Generation IV Roadmap: Progress and Future Directions for New Reactor Technologies,” Tues. p.m.

## ACCELERATOR APPLICATIONS (AAD)

(Biology and Medicine: General, Mon. p.m.)

Accelerator Applications: General, Mon. p.m.

(Advances in Non-HEU  $^{99}\text{Mo}/^{99m}\text{Tc}$  Production Technologies—III, Wed. a.m.)

## AEROSPACE NUCLEAR SCIENCE AND TECHNOLOGY (ANSTD)

Aerospace Nuclear Science and Technology: General, Tues. a.m.

(Physics Issues for Small, Compact Reactors, Thurs. p.m.)

## BIOLOGY AND MEDICINE (BMD)

Biology and Medicine: General, Mon. p.m.

Advances in Non-HEU  $^{99}\text{Mo}/^{99m}\text{Tc}$  Production Technologies—I, Tues. a.m.

Advances in Non-HEU  $^{99}\text{Mo}/^{99m}\text{Tc}$  Production Technologies—II, Tues. p.m.

Advances in Non-HEU  $^{99}\text{Mo}/^{99m}\text{Tc}$  Production Technologies—III, Wed. a.m.

(Tritium in Fission and Fusion—I, Wed. p.m.)

(Tritium in Fission and Fusion—II, Thurs. a.m.)

## DECOMMISSIONING, DECONTAMINATION, AND REUTILIZATION (DDRD)

Small Modular Reactors (SMR) Planning—Designing in Optimal Decommissioning Performance—Panel, Mon. p.m.

## EDUCATION, TRAINING, AND WORKFORCE DEVELOPMENT (ETWDD)

Student Design Competition, Mon. p.m.

The Innovations in Fuel Cycle Research Awards Program—A Student Competition, Tues. a.m.

Becoming a Nuclear Spokesperson—Paper/Panel, Tues. p.m.

Telling the Nuclear Story Using Online Video and Broadcast—Panel, Tues. p.m.

Cutting Edge Techniques in Education, Training, and Distance Learning, Wed. a.m.

Education, Training, and Workforce Development: General, Wed. p.m.

## ENVIRONMENTAL SCIENCES (ESD)

Environmental Sciences: General, Tues. p.m.

## FUEL CYCLE AND WASTE MANAGEMENT (FCWMD)

Progress in DOE’s Fuel Cycle Research and Development Program—Panel, Mon. p.m.

Creating a New Entity to Manage Used Fuel—Panel, Tues. a.m.

(The Innovations in Fuel Cycle Research Awards Program—A Student Competition, Tues. a.m.)

Development of Advanced Safeguards Monitoring for Industrial Scale Fuel Cycle Facilities, Tues. p.m.

Nuclear Fuel Cycle Resources, Sustainability, Reuse, and Recycle, Wed. a.m.

Advances in Separation Methods for the Recycle of Used Fuels, Wed. p.m.

Fuel Cycle and Waste Management: General—I, Thurs. a.m.

Fuel Cycle and Waste Management: General—II, Thurs. p.m.

## HUMAN FACTORS, INSTRUMENTATION, AND CONTROLS (HFICD)

Highlights of NPIC & HMIT 2012—I, Wed. a.m.

Highlights of NPIC & HMIT 2012—II, Wed. p.m.

Human Factors, Instrumentation, and Controls: General, Thurs. p.m.

## ISOTOPES AND RADIATION (IRD)

Isotopes and Radiation: General, Mon. p.m.

(Advances in Non-HEU  $^{99}\text{Mo}/^{99m}\text{Tc}$  Production Technologies—I, Tues. a.m.)

(Advances in Non-HEU  $^{99}\text{Mo}/^{99m}\text{Tc}$  Production Technologies—II, Tues. p.m.)

(Advances in Non-HEU  $^{99}\text{Mo}/^{99m}\text{Tc}$  Production Technologies—III, Wed. a.m.)

Tritium in Fission and Fusion—I, Wed. p.m.

Tritium in Fission and Fusion—II, Thurs. a.m.

## MATERIALS SCIENCE AND TECHNOLOGY (MSTD)

Nuclear Fuels and Materials: SiC and TRISO, Tues. a.m.

Discussion of Low-Energy Nuclear Reactions—Paper/Panel, Wed. a.m.

Materials Science and Technology: General, Wed. p.m.

Nuclear Fuels and Materials, Thurs. p.m.

## MATHEMATICS AND COMPUTATION (MCD)

High Performance Computing (HPC) at All Scales: Implementation of Numerical Algorithms on Heterogeneous Hardware Ranging from Laptops to Supercomputers—Panel, Mon. p.m.

Transport Methods, Tues. a.m.

Transport and Computational Methods, Tues. p.m.

(Reactor Analysis Methods—I, Wed. a.m.)

(Reactor Analysis Methods—II, Thurs. a.m.)

Computational Methods, Wed. a.m.

Mathematical Modeling, Wed. p.m.

Uncertainty Quantification, Sensitivity Analysis, and Computational Methods, Thurs. a.m.

# WINTER MEETING TECHNICAL SESSIONS BY DIVISION

## NUCLEAR CRITICALITY SAFETY (NCSD)

---

- Data Analysis in Nuclear Criticality Safety—I, Mon. p.m.
- Data Analysis in Nuclear Criticality Safety—II, Thurs. p.m.
- FY2011 Nuclear Criticality Safety Program Technical Accomplishments—I, Tues. a.m.
- FY2011 Nuclear Criticality Safety Program Technical Accomplishments—II, Tues. p.m.
- Validation and Verification—Tutorial—I, Wed. a.m.
- Validation and Verification—Tutorial—II, Wed. p.m.
- Nuclear Criticality Safety Standards—Forum, Thurs. a.m.

## NUCLEAR INSTALLATIONS SAFETY (NISD)

---

- State-of-the-Art Reactor Consequence Analyses (SOARCA) Project: Overview, Insights, and Path Forward—Panel, Mon. p.m.
- Nuclear Installations Safety: General—I, Tues. a.m.
- Nuclear Installations Safety: General—II, Tues. p.m.
- Reactor Safety System and Containment Degradation Research, Thurs. a.m.

## NUCLEAR NON-PROLIFERATION TECHNICAL GROUP (NNTG)

---

- Nuclear Nonproliferation, International Safeguards and Nuclear Security Challenges in the Middle East—Panel, Mon. p.m.
- Safeguards by Design—NNSA's Next Generation Safeguards Initiative Activities, Tues. p.m.
- Nuclear Nonproliferation: General, Wed. a.m.
- NNSA Global Threat Reduction (NA-21) Activities—Panel, Wed. p.m.
- Nuclear Nonproliferation Education Programs—Panel, Thurs. a.m.

## OPERATIONS AND POWER (OPD)

---

- Fukushima—Evaluation and Impacts—Panel, Mon. p.m.
- Standardization in a Nonstandard World—Panel, Mon. p.m.
- Small Modular Reactor Activities, Progress, Challenges—Panel, Tues. a.m.
- New Nuclear Construction Around the World—Panel, Tues. p.m.
- Small Modular Reactors, Tues. p.m.
- Generation IV International Forum: The Next Decade—I—Panel, Wed. a.m.
- Generation IV International Forum: The Next Decade—II—Panel, Wed. p.m.
- Operations and Power: General, Thurs. a.m.
- Department of Energy—Light Water Reactor Sustainability Program, Thurs. a.m.
- Advanced Reactors, Thurs. p.m.

## RADIATION PROTECTION AND SHIELDING (RPSD)

---

- Computational Resources in Radiation Protection and Shielding, Tues. a.m.
- Ethics in Engineering—Panel, Tues. p.m.
- The DOE Russian Health Studies Program: Status and Future—Panel, Wed. p.m.
- Radiation Protection and Shielding—Roundtable, Thurs. a.m.
- Radiation Protection and Shielding: General, Thurs. p.m.

## REACTOR PHYSICS (RPD)

---

- Reactor Physics: General—I, Mon. p.m.
- Reactor Physics: General—II, Tues. a.m.
- Reactor Physics Design, Validation, and Operating Experience—I, Tues. a.m.
- Reactor Physics Design, Validation, and Operating Experience—II, Tues. p.m.
- Reactor Analysis Methods—I, Wed. a.m.
- Reactor Analysis Methods—II, Thurs. a.m.
- Hybrid Monte Carlo Deterministic Methods for Reactor Analysis, Wed. a.m.
- “I Wonder If...” Special Session in Honor of John Rowlands, Wed. p.m.
- IAEA Reactor Physics and Technology Development Activities—I, Thurs. a.m.
- IAEA Reactor Physics and Technology Development Activities—II, Thurs. p.m.
- Physics Issues for Small, Compact Reactors, Thurs. p.m.

## THERMAL HYDRAULICS (THD)

---

- Computational Thermal Hydraulics—I, Mon. p.m.
- Computational Thermal Hydraulics—II, Wed. a.m.
- Young Professional Thermal-Hydraulics Research Competition, Tues. a.m.
- Thermal Hydraulics: General—I, Tues. p.m.
- Thermal Hydraulics: General—II, Wed. p.m.
- Thermal Hydraulics: General—III, Thurs. a.m.

## YOUNG MEMBERS GROUP (YMG)

---

- Nuclear Policy Debate—Panel, Thurs. p.m.



# WINTER MEETING TECHNICAL SESSIONS BY DAY: MONDAY

MONDAY • NOVEMBER 12, 2012 8:00 A.M. - 4:00 P.M.

7:30 A.M. – 5:00 P.M.	MEETING REGISTRATION
8:00 A.M. – 10:00 A.M.	SPOUSE/GUEST HOSPITALITY
8:00 A.M. – 11:30 A.M.	<b>2012 ANS WINTER MEETING: OPENING PLENARY:</b> “Future Nuclear Technologies: Resilience and Flexibility”
1:00 P.M. – 4:00 P.M.	<b>2012 ANS WINTER MEETING: TECHNICAL SESSIONS</b> <ul style="list-style-type: none"><li>• State-of-the-Art Reactor Consequence Analyses (SOARCA) Project: Overview, Insights, and Path Forward—Panel</li><li>• Progress in DOE’s Fuel Cycle Research and Development Program—Panel</li><li>• Student Design Competition</li><li>• Computational Thermal Hydraulics—I</li><li>• Nuclear Nonproliferation and International Safeguards and Nuclear Security Challenges in the Middle East—Panel</li><li>• Fukushima—Evaluation and Impacts—Panel</li><li>• Standardization in a Nonstandard World—Panel</li><li>• Reactor Physics: General—I</li><li>• Data Analysis in Nuclear Criticality Safety—I</li><li>• High Performance Computing (HPC) at All Scales: Implementation of Numerical Algorithms on Heterogeneous Hardware Ranging from Laptops to Supercomputers—Panel</li><li>• Biology and Medicine: General</li><li>• Accelerator Applications: General</li><li>• Isotopes and Radiation: General</li><li>• Small Modular Reactor (SMR) Planning—Designing in Optimal Decommissioning Performance—Panel</li></ul>
1:30 P.M. – 5:30 P.M.	<b>FUKUSHIMA 2012 MEETING: TECHNICAL SESSIONS</b> (see page 34)

MONDAY, NOVEMBER 12, 2012, 8:00 A.M.

## OPENING PLENARY: “FUTURE NUCLEAR TECHNOLOGIES: RESILIENCE AND FLEXIBILITY”

Honors and Awards Segment

### SPEAKERS:

- Pete Dietrich (*SCE*)
- Commissioner George Apostolakis (*NRC*)
- Marv Fertel (*NEI*)
- Christine King (*EPRI*)
- Cheri Collins (*Southern Company*)

MONDAY, NOVEMBER 12, 2012, 1:00 P.M.

## STATE-OF-THE-ART REACTOR CONSEQUENCE ANALYSES (SOARCA) PROJECT: OVERVIEW, INSIGHTS, AND PATH FORWARD—PANEL, sponsored by NISD

*Session Organizer:* Kevin O’Kula (*URS Safety Management Solutions*)

Accident phenomena and off-site consequences of postulated severe accidents in nuclear power plants have been the subjects of considerable research programs over the last 25 years by the U.S. Nuclear Regulatory Commission (NRC) as well as other domestic and international agencies. As a consequence of this research focus, analyses of severe accidents at nuclear power plants are more detailed, integrated, and realistic than at any time in the past. By applying state-of-the-art computational analysis computer models and best modeling practices, along with the information gained from accident phenomena and progression research, the recently concluded State-of-the-Art Reactor Consequence Analyses (SOARCA) Project has developed an improved body of knowledge regarding the realistic outcome of severe accidents in nuclear power plants. Specifically, the SOARCA study’s evaluation of accident progression, source term, and off-site consequences for selected scenarios in two currently operating plants, demonstrated in general, smaller, delayed off-site releases, with subsequent health effect risks lower than previously quantified. This panel session will discuss major features of the SOARCA Project from the perspectives of three groups of participants: NRC Staff, Sandia National Laboratories technical analysts, and independent peer review.

### PANELISTS:

- Edward L. Fuller (*NRC*)
- Robert E. Henry [*Fauske & Associates LLC (retired)*]
- Randall O. Gauntt (*SNL*)
- Nathan E. Bixler (*SNL*)

## PROGRESS IN DOE’S FUEL CYCLE RESEARCH AND DEVELOPMENT PROGRAM—PANEL, sponsored by FCWMD

*Session Organizer:* Andrew Griffith (*DOE*)

The objective of this session is to disseminate information and stimulate discussion regarding recent research and development (R&D) progress in the U.S. Department of Energy’s (DOE’s) Fuel Cycle Research and Development (FCR&D) program. The session will consist of technical presentations provided by researchers in several technical areas of the FCR&D program. Talks will cover a broad range of subjects, including but not limited to, separation technologies, waste form development, innovative fuels, systems analysis, used fuel disposition, material protection and control, and modeling/simulation.

### PANELISTS:

- Non-Ideal Solution Behavior in Liquid-Liquid Distribution Systems, Peter Zalupski (*INL*)
- Synthesis of Tc Waste Forms and Their Predicted Stability in Solution Using Polarization Techniques for Modeling Tc Release Behavior, Edward Mausolf (*UNLV*)

# WINTER MEETING TECHNICAL SESSIONS BY DAY: MONDAY

MONDAY

WINTER MEETING

- Potentiometric Sensor for Real-Time Monitoring of Multivalent Ion Concentration in LiCl-KCl, Brenda Serrano-Rodriguez (*INL*)
- Improved Safeguards at Fuel Cycle Facilities Through New Technologies and Approaches?, Ben Cipiti (*SNL*)
- TEM Analysis on the ACO-3 Duct Before and After Thermal Annealing, Osman Anderoglu (*LANL*)
- Thermochemistry of LWR Fuels and the Potential Implications of Cladding Changes During Off-Normal and Accident Conditions, Andy Nelson (*LANL*)

## STUDENT DESIGN COMPETITION, sponsored by ETWDD

Session Organizer: Travis Knight (*Univ of South Carolina*)

Student submittals are currently being evaluated, and the titles will be published in the final program.

## COMPUTATIONAL THERMAL HYDRAULICS—I, sponsored by THD

Evaluating Shear Induced Lift Force Using Interface Tracking Approach, Aaron M. Thomas, Igor A. Bolotnov (*NCSU*)

CFD Predictions of Heat Transfer in a Rod Bundle, Constantine P. Tzanos (*ANL*)

Preliminary CFD Studies of Bypass Flow and Crossflow in VHTR, Huhu Wang, Elvis Dominguez-Ontiveros, Yassin A. Hassan (*Texas A&M*)

FLUENT Simulation of Nanofluid in Subchannel of a Typical PWR, Mohammad Nazifard (*Seoul Natl Univ-Korea*), M. R. Nematollahi (*Shiraz Univ*), Kune Y. Suh (*Seoul Natl Univ-Korea*)

A Numerical Analysis on Non-Condensable Gas Flow in Piping Filled with Water, Jung Kwon Yong, Hag Ki Youm, Chang Kyun Oh (*KEPCO Engineering & Construction Company, Inc.*), Choeng Ryul Choi (*ELSOLTEC Inc.*)

Preliminary CFD Calculations for OSU Air-Ingress Experimental Facility, Tae K. Ham, David J. Arcilesi, Xiaodong Sun, Richard N. Christensen (*Ohio State*), Chang H. Oh, Eung S. Kim (*INL*)

CFD Investigating Hydraulic Characteristics in a Triangular-Pitch Rod Bundle, Cheng-Han Yeh, Yuh-Ming Ferng (*National Tsing Hua Univ*)

## NUCLEAR NONPROLIFERATION AND INTERNATIONAL SAFEGUARDS AND NUCLEAR SECURITY CHALLENGES IN THE MIDDLE EAST—PANEL, sponsored by NNTG

Session Organizer: Rian Bahrani (*RPI*)

The United Arab Emirates is set to become the first Arab country to adopt nuclear power to meet its growing domestic energy needs. Many other countries in the Middle East have publicly expressed interest in pursuing nuclear technology for generating electricity and water desalination purposes. These countries include the State of Bahrain, the Kingdom of Saudi Arabia, the Sultanate of Oman, the State of Qatar, the State of Kuwait, the United Arab Emirates, Turkey, Egypt, Algeria, Libya, Jordan, Morocco, and Yemen. This potential nuclear renaissance in the Middle East is happening at the same time as the “Arab Spring,” which is changing the political topology of the region. This distinguished panel is aimed at exploring the political, technical, and

market challenges to the development of nuclear power in a post “Arab Spring” Middle East in the context of nonproliferation, safeguards, and security. This topic is of utmost importance and tremendous interest to our community as it exemplifies the importance of flexibility and resilience in the approach to such challenges.

### PANELISTS:

- Abdelmajid Mahjoub (*Arab Atomic Energy Agency*)
- Khammar Mrabit (*IAEA Office of Nuclear Security*)
- Amir Shahkarami (*Exelon Nuclear Partners*)
- Tom Shea (*Retired, Formerly with the IAEA and PNNL*)

## FUKUSHIMA—EVALUATION AND IMPACTS—PANEL,

sponsored by OPD

Numerous regulatory bodies and plant owners have performed evaluations of the events at Fukushima and are assessing changes in regulatory requirements and features needed for beyond-design-basis events due to the events at Fukushima. The U.S. Nuclear Regulatory Commission (NRC), U.K., China, and EU countries have issued reports detailing their findings and recommendations. This session will provide updates on the results from these and other evaluations. It is planned to draw speakers from the U.S. Nuclear Regulatory Commission, U.K. Nuclear Installations Inspectorate, IAEA, EU, and U.S. Utilities.

### PANELISTS:

- Gary Pavis (*Exelon-Constellation Nuclear, LLC*)
- Philip Webster (*Canadian Nuclear Safety Commission*)
- James Lyons (*IAEA*)
- Chuck Casto (*NRC*)
- Nigel Thornton (*ATKINS*)
- A representative from China National Nuclear Safety Administration to be determined.
- A representative from UK Nuclear Installations Inspectorate to be determined.

## STANDARDIZATION IN A NONSTANDARD WORLD—PANEL,

sponsored by OPD

The concept of standardization for new nuclear plant designs has significant roadblocks in a number of countries. Regulatory requirements, design requirements, codes, and standards differ substantially between countries that are considering new nuclear plants. This requires significant time and expenditures to develop the design and obtain regulatory approvals for plants that have already been fully developed and approved in the country or origin. This session will identify the impacts that such requirements have had on new plant development and discuss the efforts that are underway to develop international standardization. Planned speakers include key people from nuclear suppliers, architect engineer firms, international codes and standards committees, plant owners, and regulators.

### PANELISTS:

- Representatives from AREVA-NP, Westinghouse, Hitachi-GE, Toshiba Power Systems, B&W mPower, Korea Electric Power Corp, NRC, France Nuclear Safety Authority, MDEP, American National Standards Institute to be determined.

## REACTOR PHYSICS: GENERAL—I, sponsored by RPD

The “Virtual Density” Principle of Neutronics and Its Application to Perturbation Theory, Mark Reed, Kord Smith, Benoit Forget (*MIT*)  
Further GPT-Free Developments for Monte Carlo Models, Zeyun Wu, Hany S. Abdel-Khalik (*NCSU*)

PyNE: Python for Nuclear Engineering, Anthony Micaheal Scopatz (*Univ of Chicago*), Paul K. Romano (*MIT*), Paul P. Wilson, Kathryn D. Huff (*Univ of Wisconsin, Madison*)

Effect of Homogenization and Group Condensation on Kinetics Parameters of Natural-Uranium-Fuelled CANDU Lattices, Eleodor Nichita (*Univ of Ontario Inst of Tech*), Dumitru Serghiuta, Serguei Podobed (*Canadian Nucl Safety Comm*)

Temperature Interpolation of Thermal Neutron Incoherent Inelastic Scattering Data in Monte Carlo Calculations, Timothy H. Trumbull, T. E. Fieno (*BMPC-Knolls Atomic Power Laboratory*)

Pin Cell Benchmark Calculations of MICROX-2 Library, Jia Hou (*Penn State*), Hangbok Choi (*General Atomics*), Kostadin N. Ivanov (*Penn State*)

MCNP and SCALE 6.1 Cross Section Evaluation for ATR-C Verification and Validation Applications, Jorge Navarro (*INL/Univ of Utah/Center for Space Nuclear Research*), Mark D. DeHart (*INL*)

Thermal Total Cross Sections of Europium from Neutron Capture and Transmission Measurements, Gregory Leinweber, R. C. Block, D. P. Barry (*Bechtel Marine Propulsion Corp., KAPL*), Y. Danon (*RPI*), M. J. Rapp (*Bechtel Marine Propulsion Corp., KAPL*), R. M. Bahrn, D. G. Williams (*RPI*), J. A. Geuther (*Kansas State Univ*), F. J. Saglime (*RPI*)

## DATA ANALYSIS IN NUCLEAR CRITICALITY SAFETY—I,

sponsored by NCSU

Session Organizer: Allison D. Miller (*SNL*)

Continuous-Energy Sensitivity Coefficient Capability in MCNP6, Brian C. Kiedrowski, Forrest B. Brown (*LANL*)

Verification of MCNP5-1.60 and MCNP6-Beta2 for Criticality Safety Applications, Brian C. Kiedrowski, Forrest B. Brown, Jeffrey S. Bull (*LANL*)

Comparison of MCNP-Based Transport Codes for Subcritical Calculations, Kimberly L. Clark (*UNLV*), Avneet Sood, William L. Myers, Jesson Hutchinson (*LANL*), Denis Beller (*UNLV*)

Generation of an S(alpha,beta) Covariance Matrix by Monte Carlo Sampling of the Phonon Frequency Spectrum, Jesse C. Holmes, Ayman I. Hawari (*NCSU*), Luiz C. Leal (*ORNL*)

Modeling Uranium Slurry Experiments with the MCNP5 Stochastic Geometry Card, Jerry J. Lichtenwalter, Alexander Lang, Jennifer Carney (*Y-12 NSC*)

Generating List-Mode Data for Simulated Subcritical Neutron Measurements Using MCNP, Avneet Sood, Jesson D. Hutchinson, William L. Myers, Clell J. Solomon (*LANL*), *invited*

Data Adjustment Exercises for Fast Reactor Benchmark Problems Using SCALE, Christopher M. Perfetti (*Univ of Michigan*), Bradley T. Rearden (*ORNL*)

## HIGH PERFORMANCE COMPUTING (HPC) AT ALL SCALES: IMPLEMENTATION OF NUMERICAL ALGORITHMS ON HETEROGENEOUS HARDWARE RANGING FROM LAPTOPS TO SUPERCOMPUTERS—PANEL, sponsored by MCD

Session Organizer: Tom Evans (*ORNL*)

### PANELISTS:

- Andrew Seigel (*ANL*)
- Chris Baker (*ORNL*)
- Tim Kelley (*LANL*)

## BIOLOGY AND MEDICINE: GENERAL,

sponsored by BMD; cosponsored by AAD

Session Organizer: Rolf Zeisler (*NIST*)

Accelerator Applications in Medicine, Carol J. Johnstone (*Fermilab/Particle Accelerator Corporation*)

Proton and Light Ion Accelerators for Cancer Therapy, George Coutrakon (*Northern Illinois Univ*), *invited*

Radiation Therapy Using a Short Lived Beta-Decay Source, Robert O’Brien, William Culbreth (*UNLV*)

Investigation Using the Peak-to-Valley Method for Positron Emission Tomography, Mohammed Alkhorayef, Khalid S. Alzimami (*King Saud Univ*), Mary Pik-Wai Chin (*CERN*), Nicholas M. Spyrou (*Univ of Surrey*), *invited*

Radiation Therapy Implications of Anomalous Variations of the Nuclear Decay Law, James Sherman Welsh (*Fermilab*), Daniel Javorsek (*National Intelligence Univ*), George J. Buse (*David Grant Medical Center*), Ephraim Fischbach (*Purdue Univ*), Nicholas Flores (*Scottsdale Radiation Oncology Center*), Thomas Gruenwald, Jere H. Jenkins (*Purdue Univ*), Robert H. Lee (*Air Command and Staff College, Maxwell AFB*), Daniel W. Mundy (*Mayo Clinic*), Peter A. Sturrock (*Stanford Univ*)

## ACCELERATOR APPLICATIONS: GENERAL, sponsored by AAD

Session Organizer: Erich Schneider (*The Univ of Texas at Austin*)

Quasi-Differential Neutron Scattering Measurements of U-238, Adam M. Daskalakis, R. M. Bahrn, E. J. Blain, B. J. McDermott, S. Piela, Y. Danon (*Gaertner LINAC Center, RPI*), D. P. Barry, G. Leinweber, R. C. Block, M. J. Rapp (*Bechtel Corp., KAPL*)

Linear Accelerator Bremsstrahlung Source Modeling for Active Interrogation Systems, Hirotatsu Armstrong, Erich A. Schneider (*Univ of Texas, Austin*)



## ISOTOPES AND RADIATION: GENERAL, sponsored by IRD

Session Organizer: Kenan Ünlü (*Penn State*)

MCNP Estimation of Trace Elements in Lithium-Ion Batteries Subjected to Neutron Irradiation, Keith Holbert, Amy Kaczmarowski, Tyler Stannard (*Arizona State Univ*), Erik B. Johnson (*Radiation Monitoring Devices Inc*)

Minimum Identifiable Activity, William R. Russ, Brian Young, John Kirkpatrick (*Canberra Industries, Inc.*)

Design of a EJ-301 Spectrometer for Cosmic Neutron Measurement, William H. Miller (*Univ of Missouri, Columbia*), Eliot Myers, Anthony Caruso (*Univ of Missouri— Kansas City*), Chul S. Gwon, Mark S. Strickman (*Naval Rsch Lab*)

Characterization of Spent Nuclear Fuel Using Multivariate Analysis, Kenneth J. Dayman (*Univ of Texas, Austin*), Christopher Orton, Jamie Coble, Jon Schwantes (*PNNL*)

The Evaluation of GaN for Neutron Detector with Cathodoluminescence Spectroscopy, Jie Qiu, Evan Katz, Lei Cao, Leonard J. Brillson (*Ohio State*)

Radiative Capture Cross Section Measurement of Copper for EXFOR Database, Ekaterina D. Paramonova (*MIT*)

Development of Cross-Correlation Based Position Reconstruction Algorithm for Radioactive Particle Tracking Technique, Vaibhav B. Khane (*Missouri Univ Sci. Tech*), Sfurti Ruge (*Independent Consultant*), Muthanna H. Al-Dahhan (*Missouri Univ Sci Tech*)

Development of Modular Robotic Design for Hot Cell Applications, Ahmed Sherif El-Gizawy, Annemarie Hoyer, Zhentao Xie (*Univ of Missouri, Columbia*)

## SMALL MODULAR REACTOR (SMR) PLANNING—DESIGNING IN OPTIMAL DECOMMISSIONING PERFORMANCE—PANEL, sponsored by DD&RD

Session Organizer: Mark Campagna (*ABS Consulting-Nuclear Sector*)

During the development of the 21st Century small modular reactors (SMRs), there is a requirement to ensure all the nuclear safety, security, and quality aspects are properly incorporated into the engineering designs and licensing documents/plans. With much emphasis being placed on the up-front business case and life cycle value proposition, certainly the element of decommissioning performance needs to be built into the design from the very start. Essentially, this aspect touches upon three of the four main “worries” typically expressed regarding nuclear power: high capital cost, nuclear fuel, nuclear waste, and security. By using modern materials/methods, defense-in-depth, and planning for a green field at the end of life, the overall value of SMRs becomes enhanced from the very beginning and is therefore a more attractive option.

### PANELISTS:

- Vince Gilbert (*EXCEL*)
- Philip Moor (*Highbbridge Associates*)
- Mark Campagna (*ABS Consulting*)

## TUESDAY • NOVEMBER 13, 2012 8:00 A.M. - 4:00 P.M.

7:30 A.M. – 5:00 P.M.

MEETING REGISTRATION

8:00 A.M. – 10:00 A.M.

SPOUSE/GUEST HOSPITALITY

8:30 A.M. – 12:30 P.M.

FUKUSHIMA 2012 MEETING: TECHNICAL SESSIONS

(see page 35)

8:30 A.M. – 12:00 P.M.

2012 ANS WINTER MEETING: TECHNICAL SESSIONS

- Nuclear Installations Safety: General—I
- Creating a New Entity to Manage Used Fuel—Panel
- The Innovations in Fuel Cycle Research Awards Program—A Student Competition
- Young Professional Thermal-Hydraulics Research Competition
- Reactor Physics: General—II
- SMR Activities, Progress, Challenges—Panel
- Reactor Physics Design, Validation, and Operating Experience—I
- FY2011 Nuclear Criticality Safety Program Technical Accomplishments—I
- Transport Methods
- Computational Resources in Radiation Protection and Shielding
- Advances in Non-HEU <sup>99</sup>Mo/<sup>99m</sup>Tc Production Technologies—I
- Aerospace Nuclear Science and Technology: General
- Nuclear Fuels and Materials: SiC and TRISO

1:00 P.M. – 2:00 P.M.

ADVANCES IN THERMAL HYDRAULICS: OPENING PLENARY: SMR PROGRAMS: Status and Perspectives

(see page 38)

1:30 P.M. – 5:30 P.M.

FUKUSHIMA 2012 MEETING: TECHNICAL SESSIONS

(see page 35)

1:00 P.M. – 4:00 P.M.

2012 ANS WINTER MEETING: TECHNICAL SESSIONS

- New Nuclear Construction Around the World—Panel
- Development of Advanced Safeguards Monitoring for Industrial Scale Fuel Cycle Facilities
- Nuclear Installations Safety: General—II
- Becoming a Nuclear Spokesperson—Paper/Panel
- Telling the Nuclear Story Using Online Video and Broadcast—Panel
- Thermal Hydraulics: General—I
- Safeguards by Design—NNSA’s Next Generation



TUESDAY • NOVEMBER 13, 2012 8:00 A.M. - 4:00 P.M. *continued*

- Small Modular Reactors
- Reactor Physics Design, Validation, and Operating Experience—II
- FY2011 Nuclear Criticality Safety Program Technical Accomplishments—II
- Transport and Computational Methods
- Ethics in Engineering—Panel
- Advances in Non-HEU  $^{99}\text{Mo}/^{99m}\text{Tc}$  Production Technologies—II
- Environmental Sciences: General

4:00 P.M. – 6:00 P.M.

**ANS PRESIDENT'S SPECIAL SESSION:**  
 “Ten Years Since the Generation IV Roadmap: Progress and Future Directions for New Reactor Technologies”

**TUESDAY, NOVEMBER 13, 2012, 8:30 A.M.**

## NUCLEAR INSTALLATIONS SAFETY: GENERAL—I,

sponsored by NISD

Session Organizer: Charles (Chip) Martin (*DNFSB*)

A New Method for Quantification of Risk Perception, Steven A. Arndt (*NRC*)

Modeling Fire Induced Electrical Cable Failure in Cable Bundles, Matthew D. Bucknor, Richard S. Denning, Tunc Aldemir (*Ohio State*)

A Method to Find the Importance of Piping Segments by Using One Shot Quantification Algorithm in Risk-Informed In-Service Inspection, Kilyoo Kim, Joon-Eon Yang (*KAERI-Korea*)

A New Approach to Quantify Level 2 SPAR Models in SAPHIRE 8, Zhegang Ma, John Schroeder, Curtis Smith, Ted Wood, Martin Sattison (*INL*)

Methodology for Incorporating Dynamic Behavior into Fault Trees Using System Dynamics, Matthew R. Denman, Arlo Ames (*SNL*)

## CREATING A NEW ENTITY TO MANAGE USED FUEL—PANEL,

sponsored by FCWMD

Session Organizer: Dan Stout (*TVA*)

It has been about a year since the Blue Ribbon Commission recommended creating a new federal entity with focused responsibility to manage used nuclear fuel and with access to the nuclear waste fund fees. The election just happened. Can real progress be made now? What steps should be taken during the next couple of years? What are the opportunities, and what are the challenges? What should be in the scope of responsibility of the new entity? Can policy making (e.g., Nuclear Waste Policy Act Amendment) be separate from implementation performed by the new entity?

### PANELISTS:

- Brew Barron (*Constellation*)
- Per Peterson (*Berkeley & BRC*)
- Debra Knopman (*Rand Corp*)
- Steve Nesbit (*Duke*)

## THE INNOVATIONS IN FUEL CYCLE RESEARCH AWARDS PROGRAM—A STUDENT COMPETITION,

sponsored by ETWDD; cosponsored by FCWMD

Session Organizer: Cathy Dixon (*West Texas A&M Univ*)

Assessment of Radiological and Chemical Risks of the Once-Through U-235 Fuel Cycle, Bethany Lee Smith, James H. Clarke, Steven L. Krahn (*Vanderbilt Univ*), Albert J. Machiels, Andrew G. Sowder (*EPRI*), *invited*

Validation of  $^{11}\text{B}(d,n)^{12}\text{C}$  Neutron Production Using MCUNED, Mark Andrew Norsworthy, Shaun D. Clarke, Cameron A. Miller, Sara A. Pozzi (*Univ of Michigan*), Timothy A. Antaya (*Ionetix Corporation*)

Recycling SFR Uranium Startup Fuel, Joshua G. Richard, Tingzhou Fei, Michael J. Driscoll (*MIT*)

Thermal Parameter Study for TRISO Fuel Particles Containing a Burnable Absorber Layer, Jeremy Washington, Jeffrey King, Zeev Shayer (*CSM*)

Tc Containing Waste Forms—An Innovators Perspective, Edward John Mausolf (*UNLV*), *invited*

An Ab Initio Study of Ti-Y-O Nanocluster Energetics in Nanostructured Ferritic Alloys, Leland R. Barnard (*Univ of Wisconsin, Madison*), G. Robert Odette (*University of California-Santa Barbara*), Izabela Szlufarska, Dane Morgan (*Univ of Wisconsin, Madison*)

Computational Model of the Mark-IV Electrorefiner—2D Potential and Current Distributions, Robert O. Hoover, Supathorn Phongikaroon (*Univ of Idaho*)

Supported Liquid Membrane Extraction Studies on Separation of Used Nuclear Fuel, Ko Nee, Mikael Nilsson (*Univ of California, Irvine*)

## YOUNG PROFESSIONAL THERMAL-HYDRAULICS

RESEARCH COMPETITION, sponsored by THD

CFD Simulations of NSTF, Akshay Dave (*Univ of Michigan*), Rui Hu (*ANL*), Annalisa Manera (*Univ of Michigan*), Elia Merzari, William Pointer (*ANL*)

Impact of Crossflow on the Flow Field of Twin Jets Injecting into a Staggered Rod Bundle, Noushin Amini, Yassin A. Hassan (*Texas A&M*)

Characteristics of Heat Transfer in a Packed Pebble-Bed Reactor, Rahman Abdulmohsin, Muthanna H. Al-Dahhan (*Missouri Univ Sci Tech*)

Preliminary Investigation on Vortical Structure Influence of Trailing Plate in Axial Flow, Brian Jackson, Trevor Howard, Etienne Mullin, Wade R. Marcum (*Oregon State Univ*)

CFD Analysis of Flow Through Expansions and Contractions in Pipes, Michael Z. Podowski (*Rensselaer Polytechnic Inst*), Brian Waite, Dillon Shaver (*RPI*)

Analysis of Long-Term Cooling of a LOCA by Coupling RELAP5-3D and MELCOR, Rodolfo Vaghetto, Bradley A. Beeny, Yassin A. Hassan (*Texas A&M*)

Analysis of Interfacial Forces on the Physics of Two-Phase Flow and Hyperbolicity of the Two-Fluid Model, Arthur Talpaert, Tomasz Kozłowski (*Univ of Illinois*)

Research of a New Passive Instrument Density Lock, Shengfei Wang (*North China Electric Power Univ*), Changqi Yan (*Harbin Engineering Univ*), Yu Yu, Fenglei Niu (*North China Electric Power Univ*)

## REACTOR PHYSICS: GENERAL—II, sponsored by RPD

Propagation Velocity of a Fission Front in a Traveling Wave Reactor, Andrew G. Osborne, Geoff D. Recktenwald, Mark Deinert (*Univ of Texas, Austin*)

Effect of Neutron Moderator on Protected Plutonium Production in Fast Breeder Reactor Blanket, Koji Matsumoto, Hiroshi Sagara, Chi Young Han (*Tokyo Inst Technol*), Takashi Ohnishi (*JAEA-Japan*), Masaki Saito, Ippei Yamauchi (*Tokyo Inst Technol*)

Neutronics Performance of Pebble Fuel for  $^{233}\text{U}$  Production in Fusion Driven Systems, Alberto Talamo, Yousry Gohar (*ANL*)

Effect of Particle Type Burnable Poisons in HTGR, Toru Obara, Taiki Onoe (*Tokyo Inst Technol*)

Metal Matrix Microencapsulated (M3) Fuel Neutronics Performance in PWRs, Massimiliano Fratoni, Kurt A. Terrani (*Penn State*)

Application of Multi-Target to Accelerator-Driven System Experiments in the Kyoto University Critical Assembly, Cheolho Pyeon, Takahiro Yagi, Tsuyoshi Misawa (*Kyoto Univ*)

Cross-Power Spectral Analysis Between Beam Current and Neutron Detection Signals for a Thermal Accelerator-Driven System, Kengo Hashimoto, Atsushi Sakon (*Kinki Univ*), Cheol Ho Pyeon (*Kyoto Univ*)

Development and V&V Strategy of COSINE-LATC/CORE/KIND Code Package, Yixue Chen, Zhanquan Liu, Hui Yu, Bin Zhang, Chunhua Qiu, Changhui Wang, Su Wang, Xiaoyu Hu, Hua Xu, Shuo Li, Zhiyan Liu, Guoping Quan, Yeshuai Sun, Yuhang Yan, Feng Shen, Yanhua Yang [*State Nuclear Power Software Development Center (SNPSDC)*]

## SMR ACTIVITIES, PROGRESS, CHALLENGES—PANEL, sponsored by OPD

sponsored by OPD

The attention, interest, and potential advantages of the deployment of small modular reactors is a dynamic development with global possibilities including new types of owners and utilizations of nuclear power generation. A variety of actions are underway to address this possible significant expansion of nuclear plant deployment. This session includes coverage of how these possibilities are moving forward, technical and performance issues that need to be met, and other key elements of success. Representative topics include technology demonstrations and validations, regulatory matters, manufacturing, and economic success.

### PANELISTS:

- Michael Anness (*Westinghouse*)
- Robert Schleicer (*General Atomics*)
- Peter Hastings (*Generation mPower*)
- Stewart Magruder (*NRC*)
- Ron Schroeder (*DOE/Savannah River Site*)

## REACTOR PHYSICS DESIGN, VALIDATION, AND OPERATING EXPERIENCE—I, sponsored by RPD

New Reactor Physics Benchmark Data in the March 2012 Edition of the IRPhEP Handbook, John D. Bess, J. Blair Briggs (*INL*), Nigel (Jim) T. Gulliford (*OECD/Nuclear Energy Agency*)

Stationary Liquid Fuel Fast Reactor Concept for TRU Burning, Won Sik Yang (*Purdue Univ*), Christopher Grandy (*ANL*)

Design of Small-Size Ultra-Long Cycle Fast Reactor UCFR-100, Tae Woo Tak, Deokjung Lee (*UNIST*)

Inherently Safe Cores Employing Duplex Pellets with Absorber for Preventing Re-criticality Accidents, Tsugio Yokoyama (*Toshiba Nuclear Engineering Services Corp*), Toshio Wakabayashi (*Tohoku Univ*)

Restart of Transient Fuels Testing at the Annular Core Research Reactor (*ACRR*), William J. Martin, Edward J. Parma (*SNL*)

Modernizing Computational Methods and Validation Protocols for Complex Research Reactor Operations—Turning the Aircraft Carrier, Emily T. Swain, Samuel E. Bays, David W. Nigg (*INL*)

## FY2011 NUCLEAR CRITICALITY SAFETY PROGRAM

### TECHNICAL ACCOMPLISHMENTS—I, sponsored by NCSD

Session Organizer: Nichole Ellis (*Contractor*), All invited

Revisiting the Level of Readiness for a Nuclear Criticality Accident Using an Event Timeline, Bruce Scott Carlisle, Andrew Prichard (*PNNL*)

US DOE Nuclear Criticality Safety Program Hands-On Subcritical and Critical Experiments Training and Education Course, Sedat Goluoglu (*Univ of Florida*), Calvin M. Hopper [*ORNL (retired)*]

New Hands-On Training and Research with the LLNL TACS, Catherine M. Percher (*LLNL*)

Hands-On Criticality Safety Training at Sandia National Laboratories, Gary A. Harms, Ronald A. Knief, Allison D. Miller, John T. Ford (*SNL*)

First Critical Experiment at National Criticality Experiment Research Center (NCERC), Rene G. Sanchez, David K. Hayes, Joetta Goda, William L. Myers (*LANL*)

How to Design a Critical Experiment aka “CED-1 and CED-2”, Richard D. McKnight (*ANL*)

## TRANSPORT METHODS, sponsored by MCD

Session Organizer: Brian Franke (*SNL*)

Efficient Massively Parallel Transport Sweeps, W. Daryl Hawkins, Timmie Smith, Michael P. Adams, Lawrence Rauchwerger, Nancy M. Amato, Marvin L. Adams (*Texas A&M*)

A Spatial Convergence Study on Unstructured Meshes, Troy L. Becker (*Knolls Atomic Power Lab*)

S2SA Preconditioning for the  $S_n$  Equations with Strictly Positive Spatial Discretization, Donald E. Bruss, Jim E. Morel, Jean C. Ragusa (*Texas A&M*)

Kernel Density Estimators for Monte Carlo Tallies on Unstructured Meshes, Kerry L. Dunn, Paul P. Wilson (*Univ of Wisconsin, Madison*)

Fission Matrix Capability for MCNP Monte Carlo, Sean E. Carney (*Univ of Michigan*), Forrest B. Brown, Brian C. Kiedrowski (*LANL*), William R. Martin (*Univ of Michigan*)

The Method of Moments Applied to Spatially Continuous Transport Problems Involving Grids: Time-Dependent Problems, Jeffery D. Densmore (*LANL*)

An Implicit Monte Carlo Method Based on BDF-2 Time Integration for Simulating Nonlinear Radiative Transfer, Ryan G. McClarren (*Texas A&M*), Todd J. Urbatsch (*LANL*)

## COMPUTATIONAL RESOURCES IN RADIATION

### PROTECTION AND SHIELDING, sponsored by RPSD

Session Organizer: Eric Burgett (*ISU*)

A Green's Function Approach for Determining Dose Rates for Small Gram Quantities in Shipping Packagings, Steven J. Nathan (*Savannah River Nuclear Solutions*)

A New Approach for Shielding Calculation on Clinac iX Linear Accelerator Vault Using Discrete Ordinates Radiation Transport Method, Mi Huang, Kevin L. Manalo, Glenn E. Sjoden (*Georgia Tech*)

Automatic Mesh Adaptivity for Hybrid Monte Carlo/Deterministic Neutronics Modeling of Difficult Shielding Problems, Ahmad M. Ibrahim (*ORNL*), Paul P. Wilson, Mohamed E. Sawan (*Univ of Wisconsin, Madison*), Douglas E. Peplow, John C. Wagner, Scott W. Mosher, Thomas M. Evans (*ORNL*)

Delayed Neutron and Photon Energy Biasing in MCNP6, Hiroatsu Armstrong (*Univ of Texas, Austin*), Michael R. James, Gregg W. McKinney (*LANL*)

MCNP6 Compton Image Tally Option, Gregg W. McKinney (*LANL*)

Testing the Lawrence Livermore National Laboratory Multiplicity Capability in MCNPX 2.7.0, Robert Allen Weldon (*Penn State*), Michael Lorne Fensin, Gregg W. McKinney (*LANL*)

## ADVANCES IN NON-HEU <sup>99</sup>Mo/<sup>99m</sup>Tc PRODUCTION

### TECHNOLOGIES—I, sponsored by BMD; cosponsored by IRD

Session Organizer: Dave Robertson (*Univ of Missouri*)

GTRI'S Efforts to Minimize the Use of Highly Enriched Uranium in Molybdenum-99 Production, Parrish Staples, Rilla Hamilton, Joan Dix, Joseph Gintner, Laurence Lewis (*National Nuclear Security Administration*), *invited*

The Market Impacts of Converting to Low-Enriched Uranium Targets for Medical Isotope Production, Ron Cameron, Chad Westmacott (*OECD-Nuclear Energy Agency*)

Experience from Routine Commercial Use of LEU-Produced Mo-99 in Technelite® Generators, Teresia Moller, Ira Goldman, Shannon Paltinavich (*Lantheus Medical Imaging*)

Australian Experience with LEU Mo-99 Production, Michael James Druce (*Australian Nuclear Science and Technology Organisation*)

Radioisotopes Production for Medical Use: Jules Horowitz Reactor Facilities, Jean-Pierre Coulon, Jean-Pierre Chauvin, Gilles Bignan (*CEA DEN*)

Activities and Technologies of the GSG-Group on Establishing LEU-Based <sup>99</sup>Mo-Production, Gerd Juergen Beyer (*GSG-int GmbH*)

## AEROSPACE NUCLEAR SCIENCE AND TECHNOLOGY: GENERAL,

sponsored by ANSTD

Session Organizer: Martin Sattison (*INL*)

Developing an Alternative Radioisotope Supply for Heat and Power Sources, Timothy Peter Tinsley, Mark Sarsfield (*National Nuclear Lab*)

Cermet Nuclear Fuel Development for Space Applications, Shannon M. Bragg-Sitton, Jonathan A. Webb, Jason M. Harp (*INL*)

Uncertainty Quantification for CFD Simulations of NTR Fuel Elements, Bradley C. Appel (*Texas A&M*)

## NUCLEAR FUELS AND MATERIALS: SiC AND TRISO,

sponsored by MSTD

Session Organizer: Ken Geelhood (*PNNL*)

Effect of Neutron Irradiation on Carbon Fiber Reinforced SiC Matrix Composite, Chunghao Shih, Yutai Katoh (*ORNL*), John Steinbeck (*Physical Sciences Inc*)

Joining Silicon Carbide for Advanced LWR Fuel Cladding, Yutai Katoh, Lance L. Snead (*ORNL*), Charles H. Henager (*PNNL*), Tatsuya Hinoki (*Kyoto Univ*), Monica Ferraris (*Politecnico di Torino-Italy*), Stephen T. Gonczy (*Gateway Materials Technology, Inc.*)

FE Modeling and Verification Experiments for TRISO Fuel Irradiation in a Research Reactor, Moon Sung Cho (*KAERI-Korea*), Young Shin Lee (*Choongnam National Univ*)

TRISO Fuel Thermal Conductivity Measurements, Charles Folsom, Changhu Xing, Colby Jensen, Heng Ban (*Utah State Univ*), Douglas Marshall (*INL*)

## TUESDAY, NOVEMBER 13, 2012, 1:00 P.M.

### NEW NUCLEAR CONSTRUCTION AROUND THE

### WORLD—PANEL, sponsored by OPD

This session will provide an overview of progress and planning for new reactor construction in the U.S. and around the world. Key issues include the ability of the regulatory framework to address all aspects of licensing including siting, design certification and reference, and subsequent combined operating license (COL) issue. Speakers will be from the U.S. Nuclear Regulatory Commission (NRC), energy companies, and industry consortiums that are supporting the growth of nuclear energy in the U.S. and around the world.

#### PANELISTS:

- David Matthews (*NRC*)
- Doug Walters (*NEI*)
- Other panelists to be determined.



## DEVELOPMENT OF ADVANCED SAFEGUARDS MONITORING FOR INDUSTRIAL SCALE FUEL CYCLE FACILITIES,

sponsored by FCWMD

Session Organizer: Emory Collins (ORNL)

Structural Health Monitoring with Piezoelectric Wafer Active Sensors, Applications in Facility Verification and Online Monitoring, Adrian E. Mendez Torres (SRNL)

Optimization of the Uranyl Nitrate Calibration Loop Equipment (UNCLE) for Simulating Front-End Commercial Facility Conditions for Safeguards Instrumentation, Denise L. S. Lee (UT-Battelle), Shaheen Azim Dewji (Georgia Tech), Megan Ketron (East Tennessee State Univ)

Electrical Characterization of High Temperature SiC Alpha-Particle Detectors for Pyroprocessing, Timothy R. Garcia, Benjamin T. Reinke, Ashutosh Kumar, Thomas E. Blue, Wolfgang Windl (Ohio State)

## NUCLEAR INSTALLATIONS SAFETY: GENERAL—II,

sponsored by NISD

Session Organizer: Charles (Chip) Martin (DNFSB)

Failure Mode Analysis in Seismic Situation for PRHR in AP1000, Yu Yu, Shengfei Wang, Fenglei Niu (North China Electric Power Univ)

Sodium Fast Reactor Research Plan, Matthew R. Denman, Jeffrey LaChance (SNL), Tanju Sofu (ANL), George F. Flanagan (ORNL), Roald Wigeland (INL), Robert Bari (BNL)

Adaptive Sampling Using Support Vector Machines, Diego Mandelli, Curtis L. Smith (INL)

Comprehensive Safety Assessment of HANARO Research Reactor, Hoansung Jung, Incheol Lim, Hyungkyu Kim (KAERI-Korea)

The Basic Discussion on Nuclear Power Safety Improvement Based on Nuclear Equipment Design, Feiyun Zhao, Yangui Yao, Hao Yu, Yinbiao He, Lei Gao, Weida Yao (Shanghai Nucl Eng Research Design Inst)

## BECOMING A NUCLEAR SPOKESPERSON—PANEL,

sponsored by ETWDD

Session Organizer: Mimi Holland Limbach (Potomac Communications Group)

Professionals in science and engineering are trained to be precise and accurate. Learning to do media often involves undoing those habits to speak in clear, simple ways that convey to nontechnical audiences. ANS members will discuss their experiences and lessons learned as they become effective nuclear spokespeople. This session will explore how professionals improve their abilities to assess what audiences want or need to know about nuclear science and technology and which tools they use to get their ideas across in those situations.

### PANELISTS:

- Kathryn McCarthy (INL)
- Margaret Harding (Four Factor Consulting)
- Cassie Hagan (AREVA)

## TELLING THE NUCLEAR STORY USING ONLINE VIDEO AND BROADCAST—PANEL, sponsored by ETWDD

Session Organizer: Laura Hermann (Potomac Communications Group)

Improved consumer quality cameras and editing software have made video-based storytelling accessible to a new generation of amateur and professional storytellers. As a result, video-based storytelling has become increasingly popular with the growth of sharing sites like YouTube and Storify. Discover how ANS members and TV/Film professionals are using video as both a marketing and education tool.

### PANELISTS:

- Kate McAlpine (Large Hadron Collider rapper and artist formerly known as Alpinekat)
- Paul Bowersox (ANS)
- Cara Santa Maria (Host of "Talk Nerdy to Me")
- Other panelists to be determined.

## THERMAL HYDRAULICS: GENERAL—I, sponsored by THD

An Experimental Study of Sub-Cooled Flow Boiling CHF with Atmospheric Pressure Plasma Treatment on Heating Surface, Seung-Jun Kim (Univ of Illinois), Barclay G. Jones (Univ of Illinois Urbana Champaign)

Critical Heat Flux on Downward Hemisphere with APR1400 Thermal Insulation, Sang W. Noh, Kune Y. Suh (Seoul Natl Univ-Korea)

Critical Heat Flux in Natural Convection Cooled TRIGA Reactors with 2x2 Bundle, Jun Yang, Matthew V. DeAngelis, Michael S. Greenwood (Univ of Wisconsin, Madison)

Experimental Measurement with CHF Characteristics on a Downward-Facing Plane, Huai En Hsieh, Yuh-Ming Ferng, Mei-Shiue Chen, Bau-Shi Pei (Natl Tsing Hua Univ)

Condensation Experiment of an Inclined Single-Tube for Passive Auxiliary Feedwater System of APR+, Chang Wook Shin, Hee Cheon No (KAIST), Bong Yo Yun (KAIST, KHNP), Byong Guk Jeon (KAIST)

Experimental Study on the Effect of a Spacer Grid in Two-Phase Flow through a 1x3 Rod Bundle, Chad R. Green, Theodore S. Worosz, Seungjin Kim (Penn State)

Development and Testing and Validation of Multidimensional Model of Subcooled Boiling, Michael Z. Podowski (Rensselaer Polytechnic Inst), Dillon Shaver, Steven Antal (RPI)

## SAFEGUARDS BY DESIGN—NNSA'S NEXT GENERATION,

sponsored by NNTG

Session Organizer: John Gunning (ORNL)

Implementing Safeguards by Design at Gas Centrifuge Enrichment Plants, Mark D. Laughter, Janie McCowan, Brent R. McGinnis (ORNL), Jim Morgan (InSolves Associates), J. Michael Whitaker, Ann C. Pederson (ORNL)

Implementing Safeguards by Design at Natural Uranium Conversion Plants, Lisa G. Loden, John M. Begovich, Ann C. Pederson (ORNL)



An Assessment of the NuScale SMR Design Using the Facility Safeguardability Assessment Methodology, Michael David Zentner, G. Coles, E. Gitau (*PNNL*), J. Hockert (*XE Corporation*), B. Boyer, E. Rauch (*LANL*), D. Ingersoll (*NuScale Power*)

Safeguards by Design for Research Reactors and Critical Assemblies, Scott DeMuth, Brian D. Boyer, Paul Pan, Chantell Murphy (*LANL*)

Safeguards-by-Design Guidance for Pebble Fuel HTGR, Philip Casey Durst (*Durst Nuclear*), *invited*

Safeguards-by-Design Guidance for Prismatic Fuel HTGR, Philip Casey Durst (*Durst Nuclear*), *invited*

Safeguards-by-Design Guidance for Independent Spent Fuel Storage Installations (ISFSI), Philip Casey Durst (*Durst Nuclear*), *invited*

NGSI Safeguards by Design: Where Are We and What's Next?, Karyn Rebecca Durbin, Dunbar Lockwood (*U.S. National Nuclear Security Administration*), *invited*

## SMALL MODULAR REACTORS, sponsored by OPD

A System Optimization Study on MHR-50/100is Toward Establishing an Inherent Safety Feature, Isao Minatsuki (*Mitsubishi Heavy Industries, Ltd.*)

The Frequency Response Analysis of the MHR-50is Core, Hiroki Tsukamoto (*Mitsubishi Heavy Industries, Ltd.*)

A Simulink Nuclear Power Plant Simulator for EM2, David L. Ryan (*UCSD/General Atomics*), Hangbok Choi (*General Atomics*)

Energy Multiplier Module: Overcoming the Nuclear Economic Hurdle, Robert Schleicher, Puja Gupta, Timothy Creston Bertch (*General Atomics*)

In-situ Condition Monitoring of Components in Small Modular Reactors, Belle R. Upadhyaya, Chaitanya Mehta, Victor Lollar, Wes Hines (*Univ of Tennessee*), Brian Damiano (*ORNL*)

Integrated Passive Safety and Security Design for SMART, Sung Yeop Joung, Soon Heung Chang (*KAIST*)

## REACTOR PHYSICS DESIGN, VALIDATION, AND OPERATING EXPERIENCE—II, sponsored by RPD

A Proposed Technique for 3-Dimensional Neutron Flux Mapping, William L. Myers, Timothy E. Beller, John A. Bounds, Joetta M. Goda, Evan A. Rose, Rene G. Sanchez (*LANL*)

Implementation of a New Burnup Solver Based on the Krylov Subspace Method in SCOPE2, Masahiro Tatsumi (*Nuclear Fuel Industries, Ltd.*), Kento Yamamoto, Yasuhiro Kodama, Yasunori Ohoka (*Nuclear Fuel Industries Ltd.*)

Uncertainty Assessment for the Experimental Validation of a Depletion Code, Wim Haeck, Bertrand Cochet (*IRSN*)

Geometrical Data Generation Using SILENE GUI for FUBILA Experimental Program, Zarko Stankovski, Patrick Blaise (*CEA*)

An Adaptive Scheme to Minimize Feed Fuel Assembly Enrichment in Reload Cycle Core Design of PWR, Tongkyu Park (*FNC*), Han Gyu Joo, Chang Hyo Kim (*Seoul Natl Univ-Korea*)

## FY2011 NUCLEAR CRITICALITY SAFETY PROGRAM

### TECHNICAL ACCOMPLISHMENTS—II, sponsored by NCSD

*Session Organizer:* Nichole Ellis (*Contractor*), *All invited*

Release of the ENDF/B-VII.1 Evaluated Nuclear Data File, David A. Brown (*BNL*)

LANL Evaluation and Data Testing Support for ENDF/B-VII.1, Albert C. Kahler, R. E. MacFarlane, R. D. Mosteller, B. C. Kiedrowski, M. B. Chadwick, P. Talou, T. Kawano, G. Hale, J. Lestone, M. MacInnes, D. K. Parsons, J. L. Conlin (*LANL*)

ORNL Neutron Cross-Section Measurements Activities, Klaus Heinrich Guber (*ORNL*)

Nuclear Data for Criticality Safety and Reactor Applications at the Gaerttner LINAC Center, Yaron Danon (*Gaerttner LINAC Center, Rensselaer Polytechnic Institute*), R. M. Bahran, E. J. Blain, A. M. Daskalakis, B. J. McDermott, D. G. Williams (*RPI*), D. P. Barry, G. Leinweber, M. J. Rapp, R. C. Block (*Bechtel Corp., KAPL*)

MCNP Monte Carlo Progress— Nuclear Criticality Safety, Forrest B. Brown, Brian C. Kiedrowski, Jeffrey S. Bull (*LANL*)

Evaluation of Measured and Simulated List-Mode Data for Subcritical Systems, Jesson D. Hutchinson, Clell J. Solomon, Avneet Sood, William L. Myers (*LANL*)

## TRANSPORT AND COMPUTATIONAL METHODS,

sponsored by MCD

*Session Organizer:* Brian Franke (*SNL*)

Prediction of Pebble Motion in Pebble Bed Reactors Using Monte Carlo Molecular Dynamics Simulation, Kyoung O. Lee, Robin P. Gardner (*NCSU*), Mark Mills Award winner, *invited*

Comparison of Hybrid Methods for Global Variance Reduction in Shielding Calculations, Douglas E. Peplow (*ORNL*)

A Constrained Sampling Methodology for TRISO Microspheres with Continuous Distributions of Diameters, William Martin, John C. Lee, Andrew T. Pavlou, Benjamin Robert Betzler, Timothy P. Burke (*Univ of Michigan*)

Reducing Parallel Communication in Monte Carlo Simulations via Batch Statistics, Paul Kollath Romano, Benoit Forget (*MIT*)

2D Mono-Energetic Monte Carlo Particle Transport on a GPU, Ryan M. Bergmann, Jasmina L. Vujic, Noah A. Fischer (*Univ of California, Berkeley*)

A GPU-Based Local Acceleration Strategy for Monte Carlo Neutron Transport, Qi Xu, Ganglin Yu, Xiaofei Wu, Kan Wang (*Tsinghua Univ*)

Research on Acceleration Method of Reactor Physics Based on FPGA Platforms, Li Chenglong, Yu Ganglin, Wang Kan (*Tsinghua Univ*), Liu Yuanyuan (*Nuclear and Radiation Safety Center*)

## ETHICS IN ENGINEERING—PANEL, sponsored by RPSD

Session Organizer: Robert Hayes (*Washington TRU Solutions*)

### PANELISTS:

- Keynote, Promoting Ethics, Donald Hoffman (*ANS President-elect, Excel Services Corp*)
- Starting with Me, Ethics in Everything, Vic Uotinen (*Past Chair of ANS Ethics Committee*)
- Ethics in My Company, How to Improve It, Paul Lorenzi (*Nuscale*)
- Ethics in Industry, Robert Wilson (*DOE*)
- Are We Deceiving Ourselves?, John Metzger (*Univ of Pittsburgh*)
- When and Where is the Grey Area ok?, Paul Edelman (*LANL*)
- Is Ethics the Only Way?, Nolan Hertel (*Georgia Tech*)

## ADVANCES IN NON-HEU <sup>99</sup>Mo/<sup>99m</sup>Tc PRODUCTION

TECHNOLOGIES—II, sponsored by BMD; cosponsored by IRD

Session Organizer: Dave Robertson (*Univ of Missouri*)

Brazilian Strategies to Overcome <sup>99</sup>Mo Supply Crisis, Joao Alberto Osso, Carla R. B. R. Dias, Rodrigo Teodoro, Marcela F. Catanoso, Josiane Zini, Regina R. L. Bezerra, Luiz A. Villela, Jeremias L. Correia, Fatima M. S. Carvalho, Peterson L. Squair, Jair Mengatti (*IPEN-CNEN/SP*)

Selective Gaseous Extraction for Low Waste LEU-Based Economic Isotope Production, Timothy Creston Bertch, Benjamin Russ, Lloyd Brown (*General Atomics*), J. David Robertson, Cathy Cutler, Alan Ketring, Silvia Jurisson (*Univ of Missouri, Columbia*)

Development Activities in Support of Accelerator Production of Mo-99 Production Through the  $\gamma/n$  Reaction on Mo-100, Sergey Chemerisov, Peter Tkac, Charles Jonah, George Vandegrift, Vakhtang Makarashvili, Bradley Micklich (*ANL*), Gregory Dale, Keith Woloshun, Michael Holloway, Frank Romero, Dale Dalmas (*LANL*), James Harvey (*NorthStar Medical Technologies, LLC*), *invited*

Highly Efficient Production of Mo-99 Using a Non-Fission Technology, Yuriy Leon Tsoglin (*Society of Sciences & Engineering of Dresden, Germany*), Valery Shevel [*Institute for Nuclear Research (KINR) Kiev, Ukraine*]

Development of the Mini-SHINE/MIPS Experiments at ANL, Sergey Chemerisov, Amanda Youker, Andrew Hebden, Nickolas Smith, Peter Tkac, John Krebs, Charles Jonah, James Bailey, Vakhtang Makarashvili, Bradley Micklich, Michael Kalensky, George Vandegrift (*ANL*), *invited*

Manufacturing of Annular LEU Mo-99 Targets by Sputtering, Tobias Hollmer, Christian Steyer, Winfried Petry [*Forschungs-Neutronenquelle Heinz Maier-Leibnitz (FRM II)*]

## ENVIRONMENTAL SCIENCES: GENERAL, sponsored by ESD

An International Assessment of the Role of Nuclear Energy in a Low Carbon Future, Henri Jacques Paillere, Ron Cameron (*OECD Nuclear Energy Agency*)

Chernobyl and Fukushima: Differences and Similarities, a Biological Perspective, Timothy Mousseau (*Univ of South Carolina*), Anders P. Møller (*Université Paris-Sud*)

Environmental Study for a New Nuclear Unit in Armenia, Lief W. Erickson (*Sciencetech*), Robert B. Samworth (*Sciencetech, a business unit of Curtiss Wright Flow Control*), Aram Gevorgyan (*Ministry of Energy and Natural Resources of the Republic of Armenia*)

Key Processes and Parameters in a Generic Clay Disposal System Model, Kathryn D. Huff (*Univ of Wisconsin, Madison*), Mark Nutt (*ANL*)

Light-Water-Reactor Renewable Shale-Oil Systems for Variable Electricity Production and Liquid Fuels, Charles W. Forsberg (*MIT*)

Proposed Assessment Process for Desalination Facility Interfaced with a High Capacitor NPP, Dong Wook Kim (*Korea Hydro Nuclear Company-Central Research Institute*)

Research into the Public Perception of Nuclear Design [RESPOND], Martin John Goodfellow (*Univ of Manchester*), Jonathan Wortley (*Rolls-Royce Plc*), Adisa Azapagic (*Univ of Manchester*)

The Effect of the Phase of the Moon on Variations in Background Radiation—An Interesting Occurrence, John E. Gunning, Alexander L. Enders (*ORNL*)

## TUESDAY, NOVEMBER 13, 2012, 4:00 P.M.

### ANS PRESIDENT'S SPECIAL SESSION: "TEN YEARS SINCE THE GENERATION IV ROADMAP: PROGRESS AND FUTURE DIRECTIONS FOR NEW REACTOR TECHNOLOGIES"

#### SPEAKERS:

- William Magwood (*NRC*)
- Jacques Bouchard (*former Chair, Gen IV Int'l Forum*)
- Christophe Behar (*CEA, Vice-Chair of GIF*)
- Yutaka Sagayama (*Japan Ministry of Education, Culture, Sports, Science & Technology, Chair of the GIF*)

WEDNESDAY • NOVEMBER 14, 2012 8:00 A.M. - 4:00 P.M.

- 7:30 A.M. – 5:00 P.M.** MEETING REGISTRATION
- 8:00 A.M. – 10:00 A.M.** SPOUSE/GUEST HOSPITALITY
- 8:30 A.M. – 12:35 P.M.** **ADVANCES IN THERMAL HYDRAULICS: TECHNICAL SESSIONS**  
(see page 39)
- 8:30 A.M. – 12:30 P.M.** **FUKUSHIMA 2012 MEETING: TECHNICAL SESSIONS**  
(see page 36)
- 8:30 A.M. – 12:00 P.M.** **2012 ANS WINTER MEETING: TECHNICAL SESSIONS**
- Highlights of NPIC & HMIT 2012—I
  - Nuclear Fuel Cycle Resources, Sustainability, Reuse, and Recycle
  - Cutting Edge Techniques in Education, Training and Distance Learning
  - Computational Thermal Hydraulics—II
  - Nuclear Nonproliferation: General
  - Generation IV International Forum: The Next Decade—I—Panel
  - Reactor Analysis Methods—I
  - Validation and Verification—Tutorial—I
  - Computational Methods
  - Hybrid Monte Carlo Deterministic Methods for Reactor Analysis
  - Advances in Non-HEU <sup>99</sup>Mo/<sup>99m</sup>Tc Production Technologies—III
  - Discussion of Low-Energy Nuclear Reactions—Papers/Panel
- 1:30 P.M. – 6:30 P.M.** **ADVANCES IN THERMAL HYDRAULICS: TECHNICAL SESSIONS**  
(see page 39)
- 1:30 P.M. – 5:30 P.M.** **FUKUSHIMA 2012 MEETING: TECHNICAL SESSIONS**  
(see page 36)
- 1:00 P.M. – 4:00 P.M.** **2012 ANS WINTER MEETING: TECHNICAL SESSIONS**
- Highlights of NPIC & HMIT 2012—II
  - Advances in Separation Methods for the Recycle of Used Fuels
  - Education, Training, and Workforce Development: General
  - Thermal Hydraulics: General—II
  - NNSA Global Threat Reduction (NA-21) Activities—Panel
  - Generation IV International Forum: The Next Decade—II—Panel
  - “I Wonder If ...” Special Session in Honor of John Rowlands
  - Validation and Verification—Tutorial—II
  - Mathematical Modeling
  - The DOE Russian Health Studies Program: Status and Future—Panel
  - Tritium in Fission and Fusion—I
  - Materials Science and Technology: General

WEDNESDAY, NOVEMBER 14, 2012, 8:30 A.M.

## HIGHLIGHTS OF NPIC & HMIT 2012—I,

sponsored by HFICD

Papers to be selected by NPIC & HMIT 2012 Program Committee.

## NUCLEAR FUEL CYCLE RESOURCES, SUSTAINABILITY, REUSE, AND RECYCLE, sponsored by FCWMD

Session Organizer: Bill Del Cul (ORNL)

Dry Pretreatment of Used Nuclear Fuel to Simplify Storage or Recycle—Shearing or Chemical Decladding and Voloxidation, Guillermo Daniel DelCul, Jared A. Johnson, Barry B. Spencer, Emory D. Collins, Robert T. Jubin (ORNL), James C. Bresee (U.S. DOE)

Kinetic Studies of NO<sub>2</sub> Oxidation of Uranium Oxides, J. S. Johnson (ORNL), C. J. Rawn (Univ of Tennessee), G. D. DelCul, B. B. Spencer, E. D. Collins (ORNL)

Dry Pretreatment of Used Nuclear Fuel to Simplify Storage of Recycling-Zirconium Recycling from Cladding, Emory D. Collins, G. D. DelCul, B. B. Spencer, R. T. Jubin, R. R. Brunson, J. A. Johnson (ORNL)

Dry Pretreatment of Used Nuclear Fuel to Simplify Storage or Recycling: Off-Gas Treatment and Volatile Radionuclide Capture, Barry B. Spencer, Robert T. Jubin, S. H. Bruffey, Guillermo Daniel DelCul, Emory D. Collins (ORNL)

Material Compatibility Testing for BWR Fuel with Methanol Injection, Mike G. Pop (AREVA NP), Hans-Juergen Sell (AREVA GmbH), Merl Bell (AREVA NP)

Electrical Conductivities of LiCl-KCl Molten Salts with Various Compositions of Uranium and Lanthanides, Jong-Yun Kim, Sang-Eun Bae, Yong Suk Choi, Jei-Won Yeon, Kyuseok Song (KAERI-Korea)

Oxidation State Shift of Actinides and Lanthanides Ions During Potential Control in LiCl-KCl Melt, S.-E. Bae, D.-H. Kim, Jong-Yun Kim, Y. H. Cho, J.-W. Yeon, K. Song (KAERI-Korea)

Energy Return on Investment—Fuel Recycle, Patrick R. Schwab (U. S. Department of Energy), William Halsey, A. J. Simon, Massimiliano Fratoni, Clara Smith (LLNL), Paul Murray (AREVA Federal Services)

The Economic Feasibility of Multiple Mixed Oxide Fuel Recycling in Current Generation LWRs, Jason D. Williams, Mark A. Pierson, Robert E. Masterson (Virginia Tech)

Once-Through Benchmarks with CYCLUS, a Modular, Open-Source Fuel Cycle Simulator, Matthew J. Gidden, Paul P. H. Wilson, Kathryn D. Huff, Robert W. Carlsen (UW-Madison)

## CUTTING EDGE TECHNIQUES IN EDUCATION, TRAINING AND DISTANCE LEARNING,

sponsored by ETWDD

Session Organizer: John Bennion (GEH)

Leveraging Simple and Universally Scalable Collaborative Models for Nuclear Engineering Education and Research, Rian Bahran, Matthew J. Riblett, Justin A. Vazquez, Melissa Urquhart (RPI)



Teaching Experience on PTS Analysis for Safety Analysis of Nuclear Power Plants, Marco Beghini, Calogero Sollima (*Univ of Pisa*), James F. Stubbins (*Univ of Illinois*)

Development of a Web-Based Energy Industry Fundamentals Curriculum Supporting Workforce Development, Gayla M. Neumeyer (*MURR*), William H. Miller (*Univ of Missouri, Columbia*), Valerie D. Taylor (*Center for Energy Workforce Development*), Elizabeth McAndrew-Benavides (*Nuclear Energy Institute*), I. Gelu Ionas, Matthew A. Easter (*Univ of Missouri, Columbia*)

Incorporating Instructional Technology into a Distance Teaching Opportunity, Gregory Maxwell (*Iowa State Univ*), Margaret Harding (*4 Factor Consulting*)

Next Generation E-Education: Fully-Interactive Virtual Labs for Training and Education, Imran J. Haddish, Rizwan Uddin (*Univ of Illinois*)

Android Mobile Computing Methods and Examples for the Nuclear Industry, Thomas R. Hubbard (*AMPS, LLC*)

## COMPUTATIONAL THERMAL HYDRAULICS—II,

sponsored by THD

Development of a CAD-Based, Uniform, Cartesian Mesh Generator for Lattice Boltzmann Method, James Nathan Cantrell (*Univ of Tennessee*), Eric J. Inclan (*Florida International Univ*), Abhijit S. Joshi, Emilian L. Popov, Prashant K. Jain (*ORNL*)

Parallel Simulation of Turbulent Flow Using Lattice Boltzmann Models, Abhijit S. Joshi, Prashant K. Jain (*ORNL*), Jaime A. Mudrich (*Florida International Univ*), Emilian L. Popov (*ORNL*)

TRACE/PARCS Analysis of Loss of Feedwater Heater ATWS for ABWR, Peter Yarsky (*NRC*)

Reduce Numerical Diffusion in TRACE Using the High-Resolution Numerical Method ENO, Dean Wang (*ORNL*)

Application of Upwind Scheme and Staggered Grid to COBRA Algorithm, Chongkuk Chun, Jongseon Lim, Keeyil Nahm (*KEPCO NF*)

Modeling the Flowing Characteristics and Corrosion Rates Using CFD Approach for the Piping Systems of Pressurized Water Reactor Power Plant, Wen Shih Feng, Chih-Hung Lin, Yuh-Ming Ferng (*National Tsing Hua Univ*)

Investigating the Thermal-Hydraulic Behavior of RHR Heat Exchanger by Realistic and Porous Approach CFD Simulation, Ting Kang Tseng, Yun-Ming Ferng (*National Tsing-Hua Univ.*)

## NUCLEAR NONPROLIFERATION: GENERAL,

sponsored by NNTG

*Session Organizer:* Susan Turner (*Y-12*)

Sensitivity Analysis of Low-Volatile FPs and Cm-244 Inventory in Irradiated Nuclear Fuel for Nuclear Material Quantification in Fuel Debris, Hiroshi Sagara (*JAEA-Japan*), Hirofumi Tomikawa, Masaru Watahiki, Yusuke Kuno (*JAEA*)

Comparative Analysis of Nuclear Nonproliferation Proliferation Resistance Approaches, Royal A. Elmore, William S. Charlton, Sunil Chirayath (*Texas A&M*)

Fission Fragment Spectrometer Development, Adam Hecht, Rick Blakeley, Drew Mader (*Univ of New Mexico*)

Computational Optimization of a Synthetic Aperture SNM Detector Array, Ce Yi, Christopher Edgar, Michael Chin, Jessica Paul, Kevin Manalo, Mi Huang, Glenn Sjoden, Matthew Molinar (*Georgia Tech*)

Fuel Assembly Neutron Computed Tomography Using Monte Carlo Simulation, Chad Pope (*INL*)

## GENERATION IV INTERNATIONAL FORUM: THE NEXT DECADE—I-PANEL, sponsored by OPD

The Generation IV International Forum was created in 2000 to foster international collaboration at the working level of advanced nuclear fuel cycle research and development. Over the next 3 years, 10 countries signed the GIF Charter and participated in these joint activities. This session looks back at the past 10 years of accomplishments, specifically focusing on the achievements of 3 topical working groups, the establishment of Safety Design Criteria for SFRs, and the input received from industry. The session then switches focus to the next 10 years with thoughts from young professionals and a process for updating the strategic plan.

The Generation IV International Forum Advancements and Objectives, Yutaka Sagayama, Japan, GIF Chair

Panel discussion on the Application Experience of Three Horizontal Working Groups

- Tim Leahy, USA, Risk & Safety Working Group cochair
  - Bob Bari, USA, Proliferation Resistance & Physical Protection Working Group cochair
  - Alike van Heek, Economic Modeling Working Group member
- Safety Design Criteria for Sodium Fast Reactors, Ryodia, Nakai, Japan, Sodium Fast Reactor

The Role of the Senior Industry Advisory Panel in GIF, Peter Wakefield, France, SIAP chair

GIF: The Future Generation, panel of GIF graduate student researchers, Art Wharton, moderator

GIF Strategic Planning: The Next Ten Years, John Kelly, USA, GIF cochair

Question and Answer period with panelists

## REACTOR ANALYSIS METHODS—I,

sponsored by RPD; cosponsored by MCD

Depletion GPT-Free Sensitivity Analysis for Eigenvalue Problems, Chris B. Kennedy, Hany S. Abdel-Khalik (*NCSU*)

Perturbation and Sensitivity Tool Based on the VARIANT Option of DIF3D, Micheal Addison Smith (*ANL*), Won Sik Yang (*Purdue Univ*), Amr Mohamed (*ANL*), Elmer E. Lewis (*Northwestern Univ*)

Mu-bar Sensitivities, Gerardo Aliberti, Richard D. McKnight (*ANL*)

On the Possible Dependence of the Decay Ratio on the Void Reactivity Feedback, Victor Dykin, Christophe Demazière, Paolo Vinai (*Chalmers Univ of Techn*)



Higher Order Treatment on Temporal Derivative of Angular Flux for Time-Dependent MOC, Kosuke Tsujita, Tomohiro Endo, Akio Yamamoto (*Nagoya Univ*), Yohei Kamiyama, Kazuki Kirimura (*Mitsubishi Heavy Industries, Ltd.*)

Efficient Calculation Scheme with Preservation of Transmission Probabilities in the Method of Characteristics, Masato Tabuchi (*Nuclear Engineering Ltd.*), Naoki Sugimura (*Nuclear Engineering, Ltd./Design Service Division*), Akio Yamamoto, Tomohiro Endo (*Nagoya Univ*)

SP3 Nodal Core Calculation with Alternating Direction One-Dimensional Semi-Analytic Nodal Solutions, Hee Jeong, Yeon Sang Jung, Dong Wook Lee, Han Gyu Joo (*Seoul Natl Univ-Korea*)

A New Semi-Implicit Direct Kinetics Method with Analytical Representation of Delayed Neutrons, James E. Banfield (*Univ of Tennessee*), Steven P. Hamilton, Kevin T. Clarno (*ORNL*), G. Ivan Maldonado (*Univ of Tennessee*)

## VALIDATION AND VERIFICATION—TUTORIAL—I,

sponsored by NCSD

*Session Organizer:* Katherin Goluoglu (*Univ of Florida*)

This tutorial session will discuss the requirements and techniques for a successful validation effort.

The tutorial will touch on several topics important to validating a code system. These topics include an overview of the requirements of ANS 8.24. The tutorial will discuss the use of a global validation versus process specific validations and the importance of defining an appropriate area of applicability for the validated code system. Statistical methods for determining a subcritical limit will be reviewed, as well as how much added margin is appropriate for a particular application. Appropriate sources of benchmarks will be discussed, and when it is appropriate to develop benchmark cases not currently available.

## COMPUTATIONAL METHODS, sponsored by MCD

*Session Organizer:* Brian Franke (*SNL*)

Is Convergence Acceleration an Advantage for Neutron Transport Algorithms?, Barry Ganapol (*Nuclear Consultants*), Y. Wang, R. C. Martineau, F. N. Gleicher (*INL*)

Variational Nodal Method with Heterogeneous Nodes: Application to Reactor Analyses, Marco Marchetti, Andrei Rineiski (*KIT*)

A Spectral Verification of the HELIOS-2 Lattice Physics Code, Barry Ganapol (*Nuclear Consultants*), David Nigg (*INL*), Charles Wemple (*Studvik*), Douglas Crawford (*INL*)

Immersed Finite Element Method Versus Immersed Finite Volume Method for the Simulation of Fluid Flow Problems, Angelo Frisani, Yassin A. Hassan (*Texas A&M*)

A Scattering Correction Scheme for Image Reconstruction of Flash Radiography, Liangzhi Cao, Mengqi Wang, Hongchun Wu, Youqi Zheng (*Xi'an Jiaotong Univ*)

Research on Layer-Related Acceleration Algorithm in RMC Complex Geometry, JiaLong Sun, Ganglin Yu, Kan Wang (*Tsinghua Univ*)

New Approach to Creation of Geometrical Module for Nuclear Reactor Simulation Analysis, Tamara Semeonovna Poveschenko (*NRC Kurchatov Institute*), Oksana Poveschenko (*KIAM RAS*)

## HYBRID MONTE CARLO DETERMINISTIC METHODS FOR REACTOR ANALYSIS, sponsored by RPD

*Session Organizer:* John C. Wagner (*ORNL*), Hany Abdel-Khalik (*NCSU*)

Extending the SUBSPACE Hybrid Method for Eigenvalue Problems, Qiong Zhang, Hany S. Abdel-Khalik (*NCSU*)

Response Expansion of Incident Angular Flux and Current for Transport Calculations, Kevin J. Connolly (*Georgia Tech*), Farzad Rahnema (*Naz Consulting LLC*)

Global Variance Reduction for Monte Carlo Reactor Physics Calculations, Qiong Zhang, Hany S. Abdel-Khalik (*NCSU*)

Multi-Set CMFD Acceleration of Source Convergence for Three-Dimensional Monte Carlo Reactor Calculations, Min Jae Lee, Han Gyu Joo (*Seoul Natl Univ-Korea*), Deokjung Lee (*UNIST*), Kord S. Smith (*MIT*)

A Prototype for Coupling Deterministic DRAGON and Monte-Carlo MORET Codes for Criticality Calculations, Alexis Jinaphanh, Joachim Miss (*IRSN*)

Multi-Physics Coupling Scheme in the Serpent 2 Monte Carlo Code, Jaakko I. Leppanen, Tuomas Viitanen (*VTT Technical Research Centre of Finland*), Ville Valtavirta (*Aalto University, Finland*)

## ADVANCES IN NON-HEU <sup>99</sup>Mo/<sup>99m</sup>Tc PRODUCTION TECHNOLOGIES—III,

sponsored by BMD; cosponsored by AAD, IRD

*Session Organizer:* Dave Robertson (*Univ of Missouri*)

Thermal-Mechanical Analysis of a Low-Enriched Uranium Foil Based Annular Target for Molybdenum-99 Production, Srisharan Garg Govindarajan, Gary L. Solbrekken (*Univ of Missouri, Columbia*)

Robust Technology for Handling LEU-Foil Targets for Large Scale Production of Mo-99, Ahmed Sherif El-Gizawy, Brian Graybill, Annemarie Hoyer, James Berlin (*Univ of Missouri, Columbia*)

Thermal-Mechanical Response of a Non-Uniformly Heated Nominally Flat and Curved Low Enriched Uranium Foil Based Molybdenum-99 Production Target, Kyler Kriens Turner, Gary L. Solbrekken (*Univ of Missouri, Columbia*)

Domestic Production of Mo-99: LEU Solution Technologies, Amanda J. Youker, Dominique Stepinski, Sergey Chemerisov, George Vandegrift (*ANL*)

Radioisotope Production Technology Demonstration Unit, Anatoly Blanovsky (*Westside Environmental Technol*)

Test Plan for Qualification of Annular LEU Foil-Based Molybdenum-99 Production Targets, Philip F. Makarewicz (*Univ of Missouri, Columbia*), John T. Creasy, Jonathan S. Morrell (*Be&W Y-12*), Lloyd J. Jollay (*Y-12 NSC*)

Efficient and Timely Production of Valuable Radioisotopes, Alexander DeVolpi (*retired, former ANL*), Itacil Gomes (*I.C. Gomes Consulting & Investment Inc.*)

## DISCUSSION OF LOW-ENERGY NUCLEAR

### REACTIONS—PAPERS/PANEL, sponsored by MSTD

Session Organizer: Steven Krivit (*New Energy Times*)

#### PAPERS

The Big Picture of Low-Energy Nuclear Reaction Research, Steven B. Krivit (*New Energy Times*)

Electroweak Neutron Production via  $e + p \rightarrow n + \nu$  and Capture During Lightning Discharges, Lewis G. Larsen (*Lattice Energy LLC*)

Slow Neutron Generation by Plasma Excitation in Electrolytic Cell, Domenico Cirillo (*Cirillo\_lab*)

Transmutation Reactions Induced by Deuterium Permeation Through Nano-Structured Pd Multilayer Thin Film, Yasuhiro Iwamura, Takehiko Itoh (*Mitsubishi Heavy Industries, Ltd.*), Yasuko Terada (*Japan Synchrotron Radiation Research Institute*), Tetsuya Ishikawa (*Coherent X-ray Optics Laboratory, SPring-8/RIKEN*)

#### PANEL DISCUSSION

This session will explore the surprising possibility that highly energetic nuclear reactions and elemental transmutations result from low-energy nuclear reactions (LENRs). Although the term was not used a century ago, examples of LENRs go back that far. LENRs are weak interactions and neutron-capture processes that occur in nanometer-to-micron scale regions on surfaces in condensed matter at room temperature. Although nuclear, LENRs are not based on fission or any kind of fusion, both of which primarily involve the strong interaction.

## WEDNESDAY, NOVEMBER 14, 2012, 1:00 P.M.

### HIGHLIGHTS OF NPIC & HMIT 2012—II,

sponsored by HFICD

Papers to be selected by NPIC & HMIT 2012 Program Committee.

## ADVANCES IN SEPARATION METHODS FOR THE

### RECYCLE OF USED FUELS, sponsored by FCWMD

Session Organizer: Jack Law (*INL*)

Nuclear Fuel Cycle R&D in the UK, Fiona Rayment, Timothy Peter Tinsley (*National Nuclear Lab*)

Recovery of Americium and Curium from Mark-42 Materials for Heavy Actinide Production, Bradley D. Patton, Dennis Benker, Emory Collins, Sharon Robinson (*ORNL*)

An In-situ Alpha Radiolytic Study of Tributyl Phosphate, Jeremy Pearson, Oliver Jan, Alicia Wariner, George Miller, Mikael Nilsson (*Univ of California, Irvine*)

Scale-Up Effect of Oil-Water Countercurrent Centrifugal Extractor on Extraction Performance, Masahiko Nakase, Kenji Takeshita (*Tokyo Inst Technology*)

UCI3 Binary Systems Findings Related to the Pyroprocessing Electrolyte, Frances Sutherland, Amber Hames, Leonard Leibowitz, James Willit, Mark Williamson (*ANL*)

Kinetics of Fission Product Fluorination with Sulfur Hexafluoride, Ricardo Daniel Torres, Michael J. Martinez-Rodriguez, Joshua R. Gray, Paul S. Korinko, Thad M. Adams (*SRNL*)

Alternate Fluorination Approaches for Reactive Gas Recycle of Used Nuclear Fuel, Dillon Inabinett (*SRNL*), Gary Cerefice (*UNLV*), Travis Knight (*Univ of South Carolina*), Thad Adams, Joshua R. Gray (*SRNL*)

Smart Nanophase Extractors for Tailored Fission Product Sequestration, Ricardo Daniel Torres, Lindsay T. Sexton, Steven M. Serkiz (*SRNL*), Silvia S. Jurisson (*Univ of Missouri, Columbia*), Charles R. Martin (*Univ of Florida*)

## EDUCATION, TRAINING, AND WORKFORCE

### DEVELOPMENT: GENERAL, sponsored by ETWDD

Session Organizer: John Bennion (*GEH*)

Creative Writing on the History of Nuclear Technology, Mark Reed (*MIT*)

Undergraduate Nuclear Science Programs at a Historically Black University, Dimitri Tamalis, Rose Stiffin, Ayivi Huisso (*Florida Memorial Univ*), Sheldon Landsberger (*Univ of Texas, Austin*)

Nuclear Engineering Master Thesis Projects at Politecnico di Torino, Andrea Barbarino, Sandra Dulla, Piero Ravetto (*Politecnico di Torino-Italy*)

Improving Nuclear Education in Armenia, Lief W. Erickson (*Sciencetech*), Aram Gevorgyan (*Ministry of Energy and Natural Resources of the Republic of Armenia*), Vostanik Marukhyan [*State Engineering University of Armenia (Polytechnic)*]

Public Acceptance of Nuclear in Slovenia After the Fukushima Accident, Igor Jencic (*Jožef Stefan Institute*)

Developing an Educational and Experiential Pipeline for the Next Generation of Nuclear Security Professionals, Howard L. Hall, Bruce R. Shelander (*Univ of Tennessee*), James N. Sumner, Alan S. Icenhour (*ORNL*), Joseph Stainback, Chris Clark, Chris Robinson (*Y-12 NSC*), Eric Abelquist, Cathy Fore, Arlene Garrison (*Oak Ridge Associated Universities*), Steve E. Skutnik (*Univ of Tennessee*), M. Dawn Eipeldauer (*ORNL*)

## THERMAL HYDRAULICS: GENERAL—II, sponsored by THD

Thermal Safety Assessment for LEU Conversion of ORNL's High Flux Isotope Reactor, Vaibhav B. Khane (*Missouri Univ Sci Technol*), Prashant K. Jain, James D. Freels (*ORNL*)

A MATLAB Code for the Thermal Performance Evaluation of a Low-Temperature DRACS Test Facility, Qiuping Lv, I. Adams, X. Wang, X. Sun, R. N. Christensen, T. E. Blue (*Ohio State*), G. Yoder, D. Wilson (*ORNL*), P. Sabharwall (*INL*)

Development of VHTR Thermal Fluids PIRT and Deduction of Demonstration Test Items, Seong Su Jeon, Su Hyun Hwang, Soon Joon Hong, Byung Chul Lee (*FNC Technology Co., Ltd.*), Chang Wook Huh, Chang Yong Jin (*KINS*)

Fluid to Fluid Modeling of Critical Heat Flux for SMART Rod Bundles, Seong-Jin Kim, Kyong Won Seo, Hyuk Kwon, Dae Hyun Hwang (*KAERI-Korea*)

Modeling on Hydrogen Diffusion at a Multi-Compartment in the Containment Building with Experimental Study, Hsun-Chia Lin, Chih-Hung Lin, Yuh-Ming Ferng (*National Tsing Hua Univ*)

Study on Sea Salt Solution on Reflood Heat Transfer During LOCA in a Long Vertical Tube, Seung Won Lee, Seong Man Kim, In Cheol Bang (*UNIST*)

Using CFD Couple with Visual Basic to Investigate the Thermal Behavior for Fuel Rod Bowing Problem, Wei-Keng Lin (*National Tsing Hua Univ*), Jong-Rong Wang (*INER*), Yung-Shin Tseng, Jui-En Chang (*National Tsing Hua Univ*)

A Mixed-Averaging Homogenization Method for Temperature Distribution in the Fuel Compact of HTGRs, Achmad Jaka Bramantya Adji, Hee Cheon No (*KAIST*)

## NNSA GLOBAL THREAT REDUCTION (NA-21)

**ACTIVITIES—PANEL**, sponsored by NNTG

*Session Organizer:* John Dewes (*SRNL*)

This panel will consist of representatives from various programs within the Office of Defense Nuclear Nonproliferation (NA-20) within the National Nuclear Security Administration. The panelists will provide an overview of recent progress on the front line of nuclear nonproliferation in the areas of fissile materials management, recovery, treaties and agreements, export control, and safeguards development.

### PANELISTS:

- Sarah Dickerson (*Director of the Office of FSU and Asian Threat Reduction*)
- Other participants to be determined.

## GENERATION IV INTERNATIONAL FORUM:

**THE NEXT DECADE—II—PANEL**, sponsored by OPD

Six advanced reactor concepts (systems) were chosen for further investigation and development in the original Gen IV selection process. GIF members engaged voluntarily and to various degrees in collaborative research and development to address key challenges to deployment. This panel features an overview of each of the systems, the progress made, and challenges that remain as viewed by lead researchers from the international teams.

Sodium Fast Reactor, Dohee Hahn, Republic of Korea, System Steering Committee (SSC) chair and Francois Gauche, France, SSC cochair, presented by D. Hahn

Very High Temperature Reactor, Fu Li, China, VHTR SSC chair  
Super Critical Water Cooled Reactor, Hideki Matsui, Japan, SCWCR SSC cochair

Gas Fast Reactor, Richard Stainsby, United Kingdom, GFR chair

Lead Fast Reactor, Craig Smith, USA, LFR SSC member

Molten Salt Reactor, to be determined

Followed by question and answer period with all panelists.

## “I WONDER IF ...” SPECIAL SESSION IN HONOR OF

**JOHN ROWLANDS**, sponsored by RPD

*Session Organizers:* Massimo Salvatores (*CEA*), Giuseppe Palmiotti (*INL*).  
*All invited.*

Reactor Physics Development from the Early Sixties to Yesterday:  
John Rowlands Contribution, Jacques Bouchard, Massimo Salvatores (*CEA France*)

Memories of John Rowlands and an Overview of His Contributions to the UK Reactor Programme, Nigel (Jim) T. Gulliford (*OECD/NEA*)

John Rowlands' Contribution to the Development of Nuclear Science and Engineering, Phillip J. Finck, David J. Hill (*TWL*)

The Ongoing Impact of the U.S. Fast Reactor Integral Experiments Program, John D. Bess (*INL*), Michael A. Pope (*Battelle Energy Alliance*), Harold F. McFarlane (*INL*)

John Rowlands and the Journey to the Roots of Transport Equation Solvers, Ron Dagan (*KIT Germany*)

On Perturbation Components Correspondence Between Diffusion and Transport, Giuseppe Palmiotti (*INL*)

Improvement of Reactivity Temperature Coefficient Calculation. Contribution of John Rowlands, Alain Santamarina (*CEA*)

I Wonder If the CADENZA Assemblies Can Resolve Pin-Plate Discrepancies, Richard D. McKnight (*ANL*)

John L. Rowlands Contributions to Reactor Physics, Gerald Rimpault (*CEA, Cadarache*)

## VALIDATION AND VERIFICATION—TUTORIAL—II,

sponsored by NCSD

*Session Organizer:* Katherin Goluoglu (*Univ of Florida*)

This tutorial session will discuss the requirements and techniques for a successful validation effort.

The tutorial will touch on several topics important to validating a code system. These topics include an overview of the requirements of ANS 8.24. The tutorial will discuss the use of a global validation versus process specific validations and the importance of defining an appropriate area of applicability for the validated code system. Statistical methods for determining a subcritical limit will be reviewed, as well as how much added margin is appropriate for a particular application. Appropriate sources of benchmarks will be discussed, and when it is appropriate to develop benchmark cases not currently available.

## MATHEMATICAL MODELING

, sponsored by MCD

*Session Organizer:* Brian Franke (*SNL*)

A New Chord Length Distribution Model for Chord Length Sampling Simulations, Chao Liang, Wei Ji (*RPI*)

A New Analytical Model to Evaluate Dancoff Factors in Stochastic Media, Elise N. Pusateri, Wei Ji (*RPI*)

A Flux-Limited Diffusion Method for Simulating Radiative Shocks, Ryan G. McClarren, Taylor K. Lane (*Texas A&M*)

Stochastic Optimization of Nuclear Fuel Cycle Deployment Scenarios Using VISION, Ross D. Hays, Paul Turinsky (*NCSU*)

On Efficient Surrogate Model Construction for Criticality Problems, Shota Soga, Hany S. Abdel-Khalik (*NCSU*)

Modeling Wall-Resolved Turbulent Flows Using Spectral Cascade-Transport Approach, Cameron S. Brown, Igor A. Bolotnov (*NCSU*)

Scattered Photon Transport Simulation in X-ray Imaging System, Xin Liu (*Missouri University of S&T*)



## THE DOE RUSSIAN HEALTH STUDIES PROGRAM:

**STATUS AND FUTURE—PANEL**, sponsored by RPSD

*Session Organizer:* Nolan Hertel (*Georgia Tech*)

The Department of Energy's (DOE) Russian Health Studies Program assesses worker and public health risks from radiation exposure resulting from nuclear weapons production activities in the former Soviet Union. U.S./Russian cooperation was initiated in 1994 under a bi-national agreement. The work is conducted under the management of Joint Coordinating Committee for Radiation Effects Research (JCCRER), of which DOE is the lead U.S. agency and the Federal Medical Biological Agency (FMBA) is the lead Russian agency. The goals of this program are to clarify the relationship between health effects and chronic, low-to-medium dose radiation exposures; estimate cancer risks from exposure to gamma, neutron, and alpha radiation; and provide information to the national and international organizations that determine radiation protection standards and practices. Presently, DOE supports epidemiologic studies, radiation dose reconstruction studies, and a tissue repository. All research is focused on workers at the Mayak Production Association (Mayak), which is Russia's first nuclear weapons production facility, and on the residents of the communities surrounding this facility. This session of invited panelists will discuss the present status of the Russian Health Studies Program dosimetry, epidemiological results, and their potential impact.

### PANELISTS:

Overview of the DOE Russian Health Studies Program, Barrett Fountos (*DOE*)

Radiation Dosimetry for the Techa River Population and Radiation Dosimetry for the Mayak Production Association Workers, Bruce Napier (*PNNL*)

Techa River Population Cancer Morbidity, Faye Davis (*Univ of Alberta*)

## TRITIUM IN FISSION AND FUSION—I,

sponsored by IRD; cosponsored by BMD

*Session Organizer:* Tom Voss (*Cybermesa*)

Discussion of Tritium Safety in Fusion Reactors, Satoshi Fukada (*Kyushu Univ*), *invited*

Commercial Light Water Production of Tritium: Update and Path Forward, Cheryl K. Thornhill, Ed Love, Dave Senor (*PNNL*), *invited*

Neutronics Experiments for the European ITER Test Blanket Modules, Axel Klix (*KIT*), Paola Batistoni (*ENEA C.R. Frascati*), Daniel Gehre (*Technical University of Dresden*), Wladislaw Pohorecki (*AGH-University of Science and Technology Cracow*), *invited*

Production Methods and Uses of Tritium, James T. Voss (*Technical Associates*)

Monitoring Tritiated Water Vapor with Silica Gel: Error Corrections, Rodney Melgard (*Eberline Service*), Robert L. Rosson, Bernd Kahn (*Georgia Tech Research Institute*), *invited*

The Standardization of Tritiated Water at NPL by Internal Gas Proportional Counting, Hilary Christine Phillips (*National Physical Laboratory*), L. Johansson, A. Pearce (*NPL*), *invited*

## MATERIALS SCIENCE AND TECHNOLOGY: GENERAL,

sponsored by MSTD

*Session Organizer:* Ken Geelhood (*PNNL*)

Characteristics of Liquidus Variations in the Low-Carbon Regime of the Uranium-Carbon System, Nathan R. Gubel, Jonathan Morrell, Ashley Stowe (*Y-12 NSC*)

Chemical Reactivity Suppression of Liquid Sodium by Suspended Nanoparticles, Jun-ichi Saito, Kuniaki Ara (*JAEA-Japan*)

Corrosion Resistance of Materials at High Temperature Under Gas Phase of Sulfuric Acid for IS Cycle, Youngsoo Kim, Jinyoung Choi, In Jin Sah, Hee C. No, Changheui Jang (*KAIST*)

Current and Ongoing Cable Aging Research to Support Life Extension Decisions, Gregory Von White, Robert Bernstein, Kenneth T. Gillen (*SNL*)

Finite Element Simulation of Steam Generator Tube Rupture under Severe Accident Condition, Subhasish Mohanty (*ANL*)

In-Situ Raman Spectroscopic Analysis of Surface Oxide Films on Ni-Base Alloy/LAS Dissimilar Metal Weld Interfaces, Jong Jin Kim, Kyoung Joon Choi (*Ulsan Natl Inst Sci Tech*), Ji Hyun Kim (*UNIST*)

Metal Corrosion Resistances in High Temperature Hydriodic Acid Gas Environment for SI Cycle, Jinyoung Choi, Young Soo Kim, In Jin Sah, Hee C. No, Changheui Jang (*KAIST*)

Simulation of the Aggressive Loading Influence on Increased Materials Durability, Alexander I. Ksenofontov (*National Research Nuclear Universit -Moscow Engineering Physics Institute*), A. M. Agapov, E. I. Kurbatova (*Moscow Engineering Physics Institute*), J. L. Regens (*University of Oklahoma Health Sciences Center*)

Three-Dimensional Positron Annihilation Momentum Spectroscopy (3DPAMS) of Nuclear Detection Materials, Stefan Brian Fagan-Kelly (*Air Force Institute of Technology*), Christopher S. Williams (*SNL*), Larry W. Burggraf (*Air Force Institute of Technology*)

THURSDAY • NOVEMBER 15, 2012 8:00 A.M. - 4:00 P.M.

- 7:30 A.M. – 5:00 P.M.**      **MEETING REGISTRATION**
- 8:00 A.M. – 12:30 P.M.**      **ADVANCES IN THERMAL HYDRAULICS: TECHNICAL SESSIONS**  
(see page 40)
- 8:30 A.M. – 12:30 P.M.**      **FUKUSHIMA 2012 MEETING: TECHNICAL SESSIONS**  
(see page 37)
- 8:30 A.M. – 12:00 P.M.**      **2012 ANS WINTER MEETING: TECHNICAL SESSIONS**
- Operations and Power: General
  - Fuel Cycle and Waste Management: General—I
  - Reactor Analysis Methods—II
  - Thermal Hydraulics: General—III
  - Department of Energy—Light Water Reactor Sustainability Program
  - IAEA Reactor Physics and Technology Development Activities—I
  - Nuclear Criticality Safety Standards—Forum
  - Uncertainty Quantification, Sensitivity Analysis, and Computational Methods
  - Radiation Protection and Shielding—Roundtable
  - Tritium in Fission and Fusion—II
  - Reactor Safety System and Containment Degradation Research
  - RSICC: Celebrating 50 Years of Service to the Nuclear Research Community—Panel
- 1:30 P.M. – 6:05 P.M.**      **ADVANCES IN THERMAL HYDRAULICS: TECHNICAL SESSIONS**  
(see page 40)
- 1:00 P.M. – 4:00 P.M.**      **2012 ANS WINTER MEETING: TECHNICAL SESSIONS**
- Advanced Reactors
  - Fuel Cycle and Waste Management: General—II
  - Human Factors, Instrumentation, and Controls: General
  - IAEA Reactor Physics and Technology Development Activities—II
  - Data Analysis in Nuclear Criticality Safety—II
  - Physics Issues for Small, Compact Reactors
  - Radiation Protection and Shielding: General
  - Nuclear Fuels and Materials

THURSDAY, NOVEMBER 15, 2012, 8:30 A.M.

**OPERATIONS AND POWER: GENERAL**, sponsored by OPD

RBWRs for Fissioning Almost All Uranium and Transuraniums, Renzo Takeda (*Hitachi, Ltd. / Hitachi Research Laboratory*), Junichi Miwa (*Hitachi, Ltd., Hitachi Research Laboratory*), Kumiaki Moriya (*GE-Hitachi Nuclear*)

Hybrid Thorium Reactor for Safe, Abundant Power Generation, Terry Kammash (*Univ of Michigan*)

A Combined Cycle Power Conversion System for the Next Generation Nuclear Power Plant, Patrick McDaniel, Cassiano R. de Oliveira, Bahman Zohuri, James Cole (*Univ of New Mexico*)

Study of Pebbles Residence Time Distributions in a Pebble Bed Test Reactor, Vaibhav B. Khane, Muthanna H. Al-Dahhan (*Missouri Univ Sci Tech*)

Development of Reliable In-Core Power Monitoring System, Yuriy Leon Tsoglin (*Society of Sciences & Engineering of Dresden, Germany*), Anatoly Blantovsky (*Westside Environmental Technology*)

Development of Functional Equipment Group for Phased On-Line Maintenance, Jung Wun Kim, Tae-Young Song, Dong-Un Yeom (*KHNP Central Research Institute*)

A Development Plan of 3rd Generation PRA Software (HAPS), Jiyong Oh, Jin-Woo Hyun, Ho-Rim Moon (*KHNP Central Research Institute*)

Equipment/Procedure for Cleaning Remote Process Jumper Internal Passage, Jeffrey Thomas Coughlin (*SRNL*)

Remote Robotic Installation of Fuel Guide Tube Standpipe Extension Collars, Aaron Huber (*Diakont Advanced Technologies*), Edward Petit de Mange (*Diakont*)

**FUEL CYCLE AND WASTE MANAGEMENT: GENERAL—I**, sponsored by FCWMD

*Session Organizer:* Jack Law (*INL*)

A Characteristics-Based Approach to Waste Classification in Advanced Nuclear Fuel Cycles Using the Fuel-Cycle Integration and Tradeoffs (FIT) Model, Denia Djokic (*Univ of California, Berkeley*), Steven James Piet, Layne Pincock, Nick R. Soelberg (*INL*)

Plugging of Deep Boreholes Used for HLW Disposal, Michael J. Driscoll (*MIT*)

What Should Be Collocated at Repository Sites for Once-Through Fuel Cycles?, Charles W. Forsberg (*MIT*)

Evaluation of Disposition Options for the Special Actinides in the Mark-42 and Mark-18A Target Materials, Sharon Robinson (*ORNL*), Jeff S. Allender (*SRNL*), Charles W. Alexander, Emory D. Collins, Bradley D. Patton (*ORNL*)

Separation of Ruthenium by Electro Oxidation Method Using Redox Catalyst, Pravati Swain, S. Annapoorani, R. Srinivasan, C. Mallika, U. Kamachi Mudali, R. Natarajan (*Indira Gandhi Centre for Atomic Rsch*)

Separation Study of Spent Fuel Hull on Vol-Oxidizer Reactor in a Hotcell, Young-Hwan Kim, Jae Won Lee, Han Soo Lee, Geun Il Park, Jung Won Lee, Kwang Hun Cho (*KAERI-Korea*)

## REACTOR ANALYSIS METHODS—II,

sponsored by RPD; cosponsored by MCD

Overlapping Local/Global Iteration Method Applied to 2-D Whole-Core Transport Calculation, Seungsu Yuk, Nam Zin Cho (*KAIST*)

On Pin-by-Pin Discontinuity Factors, Giorgio Dante (*Univ of Michigan*), Richard Sanchez, Igor Zmijarevic (*CEA*)

On-the-Fly Generation of Differential Resonance Scattering PDF, Eva Elizabeth Sunny, William R. Martin (*Univ of Michigan*)

Preliminary Assessment of Resonance Interference Consideration by Using 0-D Slowing Down Calculation in the Embedded Self-Shielding Method, Kang Seog Kim, Mark L. Williams (*ORNL*)

Eliminating Flux Updates from the Discrete Generalized Multigroup Method, Nathan A. Gibson, Benoit Forget (*MIT*)

Modeling of BWR Control Blades to Capture Skin Effect, Walid A. Metwally (*GNF*), Leonid Pogosbekyan (*Global Nuclear Fuel-Americas*)

Effectiveness of the Nodal Equivalence Theory in CANDU Reactor, Yonghee Kim, Woo Song Kim, Donny Hartanto, Bum Hee Cho (*KAIST*)

Correction of Spectral Interference Effect on Pin-by-Pin BWR Core Analysis, Tatsuya Fujita, Tomohiro Endo, Akio Yamamoto (*Nagoya Univ*)

## THERMAL HYDRAULICS: GENERAL—III, sponsored by THD

An Analysis of Multidimensional Models of Gas/Liquid Flows, Michael Z. Podowski (*Rensselaer Polytechnic Inst*), Hong Jiao (*RPI*)

First Validation of the FRENETIC Code Thermal-Hydraulic Model Against the ENEA Integral Circulation Experiment, Roberto Zanino, Roberto Bonifetto (*Politecnico di Torino-Italy*), Andrea Ciampichetti, Ivan di Piazza (*enea brasimone*), Laura Savoldi Richard (*Politecnico di Torino-Italy*), Mariano Tarantino (*enea brasimone*)

Analysis of Thermal-Hydraulic Features for Ultra-Long Cycle Fast Reactor Using MATRA-LMR, Han Seo, Sarah Kang (*Ulsan Natl Inst Sci Tech*), In Cheol Bang (*UNIST*)

Pressure Drop Correction Factor for a Tight Lattice Bundle, Hyuk Kwon, S. J. Kim, K. W. Seo, D. H. Hwang, W. J. Lee (*KAERI-Korea*)

Investigate the Geometric Influence of Model for Thermal-Hydraulic Characteristics in Rod Bundle Simulation, Yung-Shin Tseng, Ting-Kang Tseng, Yun-Ming Ferng (*National Tsing-Hua Univ*)

Experimental Observations with Thermal Mixing Characteristics In T-junction Piping, Mei Shiue Chen, Yuh-Ming Ferng, Huai-En Hsieh, Bau-Shi Pei (*Natl Tsing Hua Univ*)

Bubbly Flow Analysis Using Tomographic KT2 Signature, Snehlata Shakya, Prabhat Munshi (*IIT*)

Thermal Hydraulics Characteristics on the Decling Section of SG Secondary Side, Xiangbin Li, Mengchao Zhang (*North China Electric Power Univ*)

## DEPARTMENT OF ENERGY—LIGHT WATER REACTOR

### SUSTAINABILITY PROGRAM, sponsored by OPD

Session Organizer: Cindie Jensen (*INL*)

Harvesting Materials from the Decommissioned Zion 1 & 2 Nuclear Power Plants for Aging Degradation Evaluation, Thomas M. Rosseel, Randy K. Nanstad, Dan J. Naus (*ORNL*)

Simulation of Component Aging for Nuclear Plant Lifetime Extension, Benjamin Spencer, Richard C. Martineau (*INL*), Jeremy T. Busby (*ORNL*), Brian D. Wirth (*Univ of Tennessee*), Bulent Biner (*INL*)

Design and Validation of Control Room Upgrades Using a Research Simulator Facility, Ronald Laurids Boring (*INL*), J. J. Persensky (*Univ of Pittsburgh*), Jeffrey Clark Joe, Vivek Agarwal (*INL*)

Integrating Safety Assessment Methods Using the Risk Informed Safety Margins Characterization (RISMC) Approach, Curtis L. Smith, Diego Mandelli (*INL*)

Engineering Challenges of LWR Advanced Fuel Cladding Technology in Preparation for In-Reacto Demonstrations, Kristine E. Barrett, M. P. Teague, I. J. van Rooyen, S. M. Bragg-Sitton, K. D. Ellis, C. R. Glass, G. A. Roth, K. M. McHugh, J. E. Garnier, G. W. Griffith, M. C. Teague (*INL*), G. L. Bell, L. L. Snead, Y. Katoh (*ORNL*)

## IAEA REACTOR PHYSICS AND TECHNOLOGY

### DEVELOPMENT ACTIVITIES—I, sponsored by RPD

Session Organizers: Danas Ridikas (*IAEA*), Alexander Stanculescu (*INL*)  
All invited.

Nuclear Data Needs in Nuclear Reactor Physics, Andrej Trkov (*Jozef Stefan Inst*), Danas Ridikas (*IAEA-Austria*)

RERTR Programme on Core Conversion of MNSR from HEU to LEU, Sunday A. Jonah (*Centre for Energy Research and Training, A.B.U., Zaria*)

From Benchmarking to Core Conversion of Sub-Critical Assemblies in Belarus within the IAEA Coordinated Activities on ADS, Hanna Kiyavitskaya, Ch. Routkovskaya, Yu. Fokov (*Joint Institute for Power & Nuclear Research - SOSNY*), P. Adelfang, Danas Ridikas (*IAEA-Austria*)

Overview of the Recent IAEA Activities on Reactor Physics under Sub-programme Research Reactors, Danas Ridikas, Pablo Adelfang, Amgad Shokr (*IAEA-Austria*)

IAEA Coordinated Research Project on Benchmarking of RR Experiments from 10 Facilities World-wide, Alicia Silvia Doval (*INVAP*), Pablo Adelfang, Danas Ridikas, Amgad Shokr (*IAEA*)

Advanced Materials Research in Nuclear Energy Sector Using Neutron Beams, Roberto Coppola (*ENEA-Casaccia*), Danas Ridikas, Victor Inozemtsev (*IAEA-Austria*)



## NUCLEAR CRITICALITY SAFETY STANDARDS—FORUM,

sponsored by NCSD

Session Organizer: Davis Reed (ORNL)

Speakers to be determined.

## UNCERTAINTY QUANTIFICATION, SENSITIVITY ANALYSIS, AND COMPUTATIONAL METHODS, sponsored by MCD

Session Organizer: Brian Franke (SNL)

Advanced Methods for Eigenvalue Sensitivity Coefficient Calculations, Christopher M. Perfetti, William R. Martin (*Univ of Michigan*), Bradley T. Rearden, Mark L. Williams (ORNL)

Subspace Methods for Markov-Chain Monte Carlo, Jason Michael Hite, Hany S. Abdel-Khalik (NCSU)

Pre-Processing of Cross-Sections Using Dimensionality Reduction Techniques, Diego Mandelli, Cristian Rabiti, Andrea Alfonsi (INL)

Reduced Order Modeling for Multi-Physics Problems, Youngsuk Bang, Hany S. Abdel-Khalik (NCSU)

Sparse Approximation of POD-Galerkin Generalized Polynomial Chaos, Shota Soga, Hany S. Abdel-Khalik (NCSU)

Combining Projection Pursuit and Hybrid Subspace Methods for Reduced Order Modeling, Mohammad Gamal M. Mostafa Abdo, Youngsuk Bang, Hany S. Abdel-Khalik (NCSU)

Mesh-Refinement Effects on GPT-Free Sensitivity Analysis, Chris B. Kennedy, Hany S. Abdel-Khalik (NCSU)

iModeling: A New Paradigm for Irreducible Solution of Complex Engineering Models, Hany S. Abdel-Khalik (NCSU)

## RADIATION PROTECTION AND SHIELDING—ROUNDTABLE,

sponsored by RPSD

Session Organizer: Arzu Alpan (Westinghouse)

Everyone is invited to give a short presentation on any radiation protection and shielding topic of interest. Ten-minute time slots will be allotted on first-come/first-serve basis. This session is meant to be fast, informal, and fun.

## TRITIUM IN FISSION AND FUSION—II,

sponsored by IRD; cosponsored by BMD

Session Organizer: Tom Voss (Cybermesa)

Tritium Fuel Cycle for Direct Drive Inertial Fusion Reactors Using Microfluidics, Walter T. Shmayda (*Univ of Rochester*)

Dependence of Tritium Release from Metals on Temperature and Water Vapor, Walter T. Shmayda, M. Sharpe (*Univ of Rochester*)

Tritium Management in Fluoride-Salt-Cooled High-Temperature Reactors (FHRs), Nathan Christopher Andrews, Charles W. Forsberg (MIT)

Tritium Capture and Storage Methods, Brant A. Ulsh, Robert L. Morris, Melton H. Chew (*M.H. Chew and Associates*)

Validation Test: Measuring Tritium Oxide in Presence of Noble Gases, Dell Williamson (*Overhoff Technology*)

Retrospective Dose Estimate of Metallic Tritium Compounds, Robert Lyle Morris, Melton Chew, Samuel Chu, Billy Smith, Eugene Potter, Leo Faust (*M. H. Chew & Associates, Inc.*)

## REACTOR SAFETY SYSTEM AND CONTAINMENT

### DEGRADATION RESEARCH, sponsored by NISD

Session Organizer: Charles (Chip) Martin (DNFSB)

ECCS Water Management Initiative at Catawba and McGuire Nuclear Stations, Frederick J. Twogood (*Duke Energy*)

Application of Modern CSAU to Reactor System Safety Analysis Using IET Data, Brian Todd Hallee, Hu Luo, Jeffrey M. Luitjens, Qiao Wu (*Oregon State Univ*)

Multi-Objective Optimization of Surveillance Requirements for Ageing Equipment, Dusko Kancev (*Jozef Stefan Institute*), Marko Cepin (*Univ of Ljubljana*), Blaze Gjorgiev (*Jozef Stefan Institute*)

Aging Management Program for Tehran Research Reactor Concrete Containment, Mahsa Ebrahimi (*Seoul Natl Univ-Korea*), Rahman Eghbali (IKIU), Kune Y. Suh (*Seoul Natl Univ-Korea*)

## RSICC: CELEBRATING 50 YEARS OF SERVICE TO THE NUCLEAR RESEARCH COMMUNITY—PANEL,

sponsored by RPSD

Session Organizer: Timothy Valentine (ORNL)

### PANELISTS:

- Tim Goorley (LANL)
- Brad Rearden (ORNL)
- Yousry Azmy (NCSU)

# WINTER MEETING TECHNICAL SESSIONS BY DAY: THURSDAY

THURSDAY, NOVEMBER 15, 2012, 1:00 P.M.

## ADVANCED REACTORS, sponsored by OPD

FHR Direct Reactor Air Cooling System for Decay Heat Removal Initiated by Salt Thawing and Warming, Charles W. Forsberg (*MIT*)

Process Heat Characteristics of Fluoride-Salt-Cooled High-Temperature Reactors with Air-Brayton Combined-Cycle Power Systems, Charles W. Forsberg (*MIT*)

Passive Decay Heat Removal Systems with Low-Temperature Shutdown for Fluoride-Salt-Cooled High-Temperature Reactors (FHRs), Andira Ramos (*Florida International Univ*), Charles W. Forsberg (*MIT*)

Preventing Large Radionuclide Releases During Severe Accidents in Fluoride-Salt-Cooled High-Temperature Reactors, A. Maragh, M. J. Minck, Charles W. Forsberg (*MIT*)

Fluoride-Salt-Cooled High-Temperature Reactor (FHR) with Silicon-Carbide-Matrix Coated-Particle Fuel, Charles W. Forsberg (*MIT*), Kurt A. Terrani, Lance L. Snead, Yutai Katoh (*ORNL*)

Development of Risk Metrics for the Fluoride Salt-Cooled High Temperature Reactor, Edward D. Blandford (*Stanford*), Per F. Peterson, Michael Laufer (*Univ of California, Berkeley*)

Passive Decay Heat Removal Strategies for the Fluoride Salt-Cooled High-Temperature Reactor (FHR), Edward D. Blandford (*Stanford*), Charles W. Forsberg (*MIT*), Per F. Peterson (*Univ of California, Berkeley*)

Chemical Separation of Primary and Intermediate Salts after Heat Exchanger Failures in Fluoride-Salt-Cooled High-Temperature Reactors, Mark Massie, Charles W. Forsberg (*MIT*)

## FUEL CYCLE AND WASTE MANAGEMENT: GENERAL—II,

sponsored by FCWMD

Session Organizer: Jack Law (*INL*)

U.S. Chemical Safety Board Reports and Relevant Guidance for Nuclear Chemical Facilities, Lyndsey Fern Morgan (*Vanderbilt Univ*), James Hutton (*DOE*), James H. Clarke, Steven L. Krahn (*Vanderbilt Univ*)

A Monte Carlo Approach to Uranium Front End Market Analysis, Erich Schneider, Urairisa Birdy Phathanapirom (*Univ of Texas, Austin*), Roderick Eggert, Eric Segal (*CSM*)

Evaluation of the Radiation Source Term for Used Nuclear Fuel During Long Term Storage, Adrian E. Mendez Torres (*SRNL*)

Practicable Performance Criteria for the Volatile Radionuclide Removal Efficiencies, Robert T. Jubin (*ORNL*), Denis M. Strachan (*PNNL*), Nick R. Soelberg (*INL*), Germina Ilas (*ORNL*)

CFD Heat Transfer Analysis and Scaling Law Development for the Air Passage of a Vertical Concrete Cask, Hyeun Min Kim, Hee Cheon No (*KAIST*), Ki Seog Seo (*KAERI-Korea*)

CFD Analysis of Effective Thermal Conductivity of a Spent Nuclear Fuel Assembly in Vertical Dry Storage Casks, Hyeun Min Kim, Hee Cheon No (*KAIST*), Ki Seog Seo (*KAERI-Korea*)

## HUMAN FACTORS, INSTRUMENTATION, AND CONTROLS:

### GENERAL, sponsored by HFICD

The Application of Low Pressure-Loss APT Flow Meter in ACME Test Facility, Zhang Tao, Fang Fangfang (*State Nuclear Power Technology R&D Centre*)

Analysis on Human and Organizational Factors Regarding Initial Responses of Shift Teams and Field Workers to the Fukushima Daiichi NPP Accident, Koike Hiroko, Takaya Hata, Ryuji Kubota (*Incorporated Administrative Agency Japan Nuclear Energy Safety Organization*)

Extending Sensor Calibration Intervals in Nuclear Power Plants, Jamie B. Coble, Ryan M. Meyer, Pradeep Ramuhalli, Leonard J. Bond (*PNNL*), Brent Shumaker (*AMS*), Hashem M. Hashemian (*Analysis & Measurement Services Corp.*)

Development of High Risk Inducible Task Evaluator, Seunghwan Kim, Jinkyun Park, Wondea Jung, Jaewhan Kim (*KAERI-Korea*)

Operating Voltage Dependence of Detector Deadtime - GM Counter, Tayfun Akyurek (*Missouri Univ Sci Tech*), Muhammad Yousaf (*University of Missouri/Rolla*), Shoab Usman (*Missouri Univ Sci Tech*)

RAVEN as Control Logic and Probabilistic Risk Assessment Driver for RELAP-7, Cristian Rabiti, Andrea Alfonsi, Joshua Cogliati, Richard C. Martineau (*INL*)

Hands on HRA: Developing a Human Reliability Course, Atul Gupta, Rachel Benish, Brian Hajek, Carol Smidts (*Ohio State*)

Validating THERP: An Approach to Experimentally Validating the Human Error Prediction Rates in the THERP Tables, Atul Gupta, Rachel Benish, Meng Li, Carol Smidts (*Ohio State*)

Nuclear Structural Materials Degradation Assessment Using Advanced Nondestructive Examination Methods, Pradeep Ramuhalli, Ryan M. Meyer, Matt Prowant, Jacob Fricke, Tyler Kafentzis, Charles Henager (*PNNL*)

## IAEA REACTOR PHYSICS AND TECHNOLOGY

### DEVELOPMENT ACTIVITIES—II, sponsored by RPD

Session Organizers: Danas Ridikas (*IAEA*), Alexander Stanculescu (*INL*)

IAEA CRP on HTGR Uncertainty Analysis: Benchmark Definition and Test Cases, Gerhard Strydom (*INL*), Frederik Reitsma (*Calvera Consultants*), *invited*

Overview of the Recent IAEA Activities on Fast Reactor Physics Under Sub-programme on Technology Development of Advanced Reactors, Stefano Monti, Antonio Toti (*IAEA-Austria*)

The IAEA CRPs Lessons for the Reactivity Insertion Accidents Analysis, Evgeny A. Ivanov, Sophie Pignet, Ludovic Maas, Fabrice Ecrabet (*IRSN*)

IAEA CRP on Reactivity Effect Uncertainties in BN-600 Type Cores with MOX Fuel, Andrei Rineiski (*KIT*)

The New IAEA Concept of International Centres of Excellence Based on Research Reactors: Example of European Strategy Around JHR Project, Gilles Bignan (*CEA*), *invited*

Education and Training in the Field of Reactor Physics and Technology Through Research Reactor Networks & Coalitions, Lubomir Sklenka, Jan Rataj (*Czech Technical Univ*), *invited*

## DATA ANALYSIS IN NUCLEAR CRITICALITY SAFETY—II,

sponsored by NCSD

Session Organizer: Allison D. Miller (SNL)

Updating the Format of ACE Data Tables, Jeremy L. Conlin, Forrest B. Brown, A. C. Kahler, M. Beth Lee, D. Kent Parsons, Morgan C. White (LANL)

Total Cross Section Measurements of Highly Enriched Isotopic Mo in the Resolved and Unresolved Energy Region, Rian Bahrán, Adam Dasklakis, Brian McDermott, Ezekiel Blain, Yaron Danon (RPI), Devin Barry, Greg Leinweber, Michael Rapp, Robert Block (KAPL), Dave Williams (US Military Academy)

Reproducibility of Subcritical Measurements: Five Years of Plutonium Sphere Data, Jesson D. Hutchinson, William L. Myers, Mark Smith-Nelson, Derek Dinwiddie, Brian Rooney (LANL)

An Updated Analysis of Uranium Metal in Birdcage Storage, Travis Zipperer, Jerry J. Lichtenwalter, Alex Lang (Y-12 NSC)

CAAS Detector Placement Using MAVRIC, Larry L. Wetzell, Brandon O'Donnell (Babcock & Wilcox, NOG-L), William D. Newmyer (Nuclear Safety Associates)

Subcriticality Measurement by Neutron Source Multiplication Method with Detected-Neutron Multiplication Factor, Tomohiro Endo (Nagoya Univ)

Simulation of Criticality Accident Transients in Uranyl Nitrate Solution with COMSOL Multiphysics, Christopher J. Hurt (Univ of Tennessee), Peter L. Angelo (Y-12 NSC), Ronald E. Pevey (Univ of Tennessee)

## PHYSICS ISSUES FOR SMALL, COMPACT REACTORS,

sponsored by RPD; cosponsored by ANSTD

Session Organizers: Blair Bromley (AECL), Shannon Bragg-Sitton (INL)

Burnup Concept of a Long Life Fast Reactor Using MCNPX, Thomas V. Holschuh, Edward J. Parma, Gary E. Rochau (SNL)

Comments on Physics Issues of a High-Burnup Small Gas-Cooled Fast Reactor, Hangbok Choi, Robert W. Schleicher (General Atomics)

Physics and Design Studies for a Small Breed-and-Burn Reactor, Donny Hartanto, Yonghee Kim (KAIST)

Boron-Free Core Design for Innovative 4.5% and 8.0% Enriched MASLWR Fuel, Alexey I. Soldatov, Todd S. Palmer, Alexey I. Soldatov (Oregon State Univ)

Effect of SiC Coating Over Graphite Structure in HTGR, Piyatida Trinuruk, Toru Obara (Tokyo Inst Technol)

Graphite and Beryllium Reflected Critical Assemblies of UO<sub>2</sub> (Benchmark Experiments 2 and 3), Margaret A. Marshall (INL), John D. Bess (Battelle Energy Alliance)

Neutron Spectrometry for the University of Pavia TRIGATM Thermal Neutron Source Facility for Nuclear Medical Research, David W. Nigg (INL), Nicoletta Protti, Silva Bortolussi, Michele Prata, Piero Bruschi, Saverio Altieri (University of Pavia)

Nuclear Hybrid Energy System Architectures, Shannon M. Bragg-Sitton (Texas A&M), Humberto E. Garcia, Richard Boardman (INL)

## RADIATION PROTECTION AND SHIELDING: GENERAL,

sponsored by RPSD

Session Organizer: Eric Burgett (ISU)

A Preliminary Study on the Use of Motion-Capture Technology and Computational Phantoms Towards Virtual-Reality-Based Nuclear Safety Simulations, Justin A. Vazquez, Ashley Rhodes, Peter F. Caracappa, X. George Xu (RPI)

Characterization and Simulation of Thin Polymeric Films for Portal Monitors, Matthew Urffer, Rohit Uppal, Andrew Mabe, Dayakar Penumadu, Laurence F. Miller (Univ of Tennessee)

Krško Neutron Streaming Evaluation for Radiation Doses in Containment, Jianwei Chen (Westinghouse), Arnold H. Fero (Westinghouse NS)

Nuclear Incident Monitors Design Cost Savings, Derrick Faunce, Robert Eble (Shaw AREVA MOX Services)

Scintillation Detector Integration with the Android Platform, Edward Norris, Xin Liu (Missouri Univ Sci Tech)

Shielding Evaluations for Radioactive Material Packages at the Y-12 National Security Complex, Pran K. Paul (BWXT Y-12), S. N. Cramer (Navarro Research and Engineering, Inc.)

Long Duration, Deep Space Mission Radiation Engineering Analysis of Materials and Astronaut Protection, Robert C. Singleterry (NASA, Langley)

Preliminary Comparative Shielding Analysis for Refabricating Different Fuel Vectors, Michael T. Wenner (Univ of Florida), Fausto Franceshini, Joel Kulesza (Westinghouse)

## NUCLEAR FUELS AND MATERIALS, sponsored by MSTD

Session Organizer: Ken Geelhood (PNNL)

Consumable Material Compatibility Testing with Methanol Application in BWR Plants, Mike G. Pop, Merl Bell, Beverly Cyrus (AREVA NP)

Effect of Neutron Irradiation on Ultra-Fine Grained Steel, Ahmad H. Alsabbagh, K. Linga Murty (NCSSU)

Friction Consolidation of an Oxide Dispersion Strengthened Steel, Djamel Kaoumi, David Catalini, Anthony Reynolds (Univ of South Carolina), Glenn Grant (PNNL)

Modeling of Irradiation Creep of U-Mo Alloy Fuel, Yeon Soo Kim (ANL), J. S. Cheon (KAERI-Korea), G. L. Hofman (ANL)

Molecular Dynamics Simulation of Structure and Transport Properties of Molten LiF-ThF<sub>4</sub>, Leslie Dewan (MIT), Mathieu Salanne (Universite Pierre et Marie Curie), Linn Hobbs (MIT)

Synthesis of Minor Actinide Bearing Nuclear Fuels, Joseph Somers, John McGinley, Patrick Lajarge, Sebastien Gardeur, Herwin Hein, Marc Couland, Ivana Bianchi, Serge Fourcaudot, Sven Pffirmann, Andrea Cambriani, Antony Guiot, Sarah Stohr, Marika Vespa, Jacobus Boshoven, Michael Holzhaeuser (EC-JRC-ITU)

Creep Damage Analysis in Welded Joints of Modified 9Cr-1Mo Steel, Mehdi Basirat, Triratna Shrestha, Gabriel Potirniche, Indrajit Charit, Karl Rink (Univ of Idaho)



Embedded Topical Meeting: *International Meeting on Severe Accident Assessment and Management: Lessons Learned from Fukushima Daiichi: Meeting Officials*



GENERAL CO-CHAIR:  
**DR. MICHAEL CORRADINI**  
*University of Wisconsin*



TECHNICAL PROGRAM CHAIR (TPC):  
**PROF. JACOPO BUONGIORNO**  
*MIT*



TECHNICAL PROGRAM CHAIR (TPC):  
**DR. AKIRA TOKUHIRO**  
*University of Idaho*

MONDAY • NOVEMBER 12, 2012 8:00 A.M. - 4:00 P.M.

7:30 A.M. – 5:00 P.M.	<b>MEETING REGISTRATION</b>
8:00 A.M. – 10:00 A.M.	<b>SPOUSE/GUEST HOSPITALITY</b>
8:30 A.M. – 12:00 P.M.	<b>2012 ANS WINTER MEETING: TECHNICAL SESSIONS</b> <i>(see page 13)</i>
1:00 P.M. – 4:00 P.M.	<b>2012 ANS WINTER MEETING: TECHNICAL SESSIONS</b> <i>(see page 13)</i>
1:30 P.M. – 3:30 P.M.	<b>FUKUSHIMA 2012 MEETING: NEAR- AND LONG-TERM REGULATORY CHANGES AFTER FUKUSHIMA:</b>  Does the Accident in Japan Call for a Major Overhaul of Nuclear Safety Regulations?—Panel
4:00 P.M. – 5:30 P.M.	<b>FUKUSHIMA 2012 MEETING:</b>  Lessons Learned from Fukushima Daiichi and Other Japanese Plants (Tokai, Daini)—I

MONDAY, NOVEMBER 12, 2012, 1:30 P.M.

**NEAR- AND LONG-TERM REGULATORY CHANGES AFTER FUKUSHIMA: DOES THE ACCIDENT IN JAPAN CALL FOR A MAJOR OVERHAUL OF NUCLEAR SAFETY REGULATIONS?—PANEL**

*Session Organizer:* Jacopo Buongiorno (*MIT*)

**PANELISTS:**

- George Apostolakis (*NRC*)
- Masaya Yasui (*METI*)
- Nils Diaz (*U-Florida*)
- Giovanni Bruna (*IRSN, France*)

MONDAY, NOVEMBER 12, 2012, 4:00 P.M.

**LESSONS LEARNED FROM FUKUSHIMA DAIICHI AND OTHER JAPANESE PLANTS (TOKAI, DAINI)—I**

*Session Organizers:* Jacopo Buongiorno (*MIT*), Akira Tokuhiro (*U-Idaho*)

What Fukushima Taught Us About Nuclear Power Risks?, Bal-Raj Sehgal (*KTH*)

Lessons Learned from our Accident at Fukushima Nuclear Power Stations, Akira Kawano (*Tokyo Electric Power Company*)

How Fukushima Daiichi Severe Accidents Could Have Been Avoided, Salomon Levy (*Levy & Associates*)

The Canary, the Ostrich, and the Black Swan: An Historical Perspective on Our Understanding of BWR Severe Accidents and Their Mitigation, Sherrell R. Greene (*EnergX, LLC*)

TUESDAY • NOVEMBER 13, 2012 8:00 A.M. - 4:00 P.M.

7:30 A.M. – 5:00 P.M.	<b>MEETING REGISTRATION</b>
8:00 A.M. – 10:00 A.M.	<b>SPOUSE/GUEST HOSPITALITY</b>
8:30 A.M. – 12:00 P.M.	<b>2012 ANS WINTER MEETING: TECHNICAL SESSIONS</b> <i>(see page 16)</i>
	<b>FUKUSHIMA 2012 MEETING: TECHNICAL SESSIONS</b>
8:30 A.M. – 10:30 A.M.	<ul style="list-style-type: none"> <li>Severe Accident Progression and Scenario Reconstruction—I</li> <li>Communicating After Fukushima: What We Learned and What We Need to Change—Panel</li> </ul>
11:00 A.M. – 12:30 P.M.	<ul style="list-style-type: none"> <li>TMI, Chernobyl, and Fukushima: Three Accidents in Perspective—Panel</li> </ul>
1:00 P.M. – 2:00 P.M.	<b>ADVANCES IN THERMAL HYDRAULICS: OPENING PLENARY: SMR PROGRAMS:</b> Status and Perspectives <i>(see page 38)</i>
1:00 P.M. – 4:00 P.M.	<b>2012 ANS WINTER MEETING: TECHNICAL SESSIONS</b> <i>(see page 19)</i>
	<b>FUKUSHIMA 2012 MEETING: TECHNICAL SESSIONS</b>
1:30 P.M. – 3:30 P.M.	<ul style="list-style-type: none"> <li>Lessons Learned from Fukushima Daiichi and other Japanese Plants (Tokai, Daini)—II</li> <li>Key Severe Accident Phenomena in Fukushima (H2, Pool Scrubbing, Corium, RPV Failure...)—I</li> </ul>
4:00 P.M. – 5:30 P.M.	<ul style="list-style-type: none"> <li>Safety System and Containment Performance and Improvement</li> <li>Emergency and Severe Accident Response, Procedures, and Analyses: EOPs, SAMGs, SAMA, SAMDA</li> </ul>

**TUESDAY, NOVEMBER 13, 2012, 8:30 A.M.**

## SEVERE ACCIDENT PROGRESSION AND SCENARIO RECONSTRUCTION—I

*Session Organizers:* Luis Herranz (*CIEMAT*), Kevin Robb (*ORNL*), Kenji Tateiwa (*TEPCO*)

The Accident Analysis for Unit 1-3 at Fukushima Daiichi Nuclear Power Station, Yasunori Yamanaka (*Tokyo Electric Power Company*)

Simulation of the Core-Degradation Phase of the Fukushima Accidents Using the ASTEC Code, Herve Bonneville (*IRSN*)

Markov Model of Accident Progression at Fukushima Daiichi, Robert A. Bari, Lap-Yan Cheng, Arantxa Cuadra, Theodore Ginsberg, John Lehner, Gerardo Martinez-Guridi, Vinod Mubayi, W. Trevor Pratt, Meng Yue (*BNL*)

Termination of the Fukushima Station Blackout Through Dynamic Natural Circulation, Winfried Reinsch (*DYNAC Systems*)

## COMMUNICATING AFTER FUKUSHIMA: WHAT WE LEARNED AND WHAT WE NEED TO CHANGE—PANEL

*Session Organizer:* Paul Dickman (*ANL*)

### PANELISTS:

- Scott Campbell (*The Howard Baker Forum*)
- Mimi Limbaugh (*Potomac Communications*)
- Darius Dixon (*Politico*), *invited*
- Steve Kerekes (*NEI*)
- A representative from the Japanese trade media to be determined.

## TMI, CHERNOBYL, AND FUKUSHIMA: THREE ACCIDENTS IN PERSPECTIVE—PANEL

*Session Organizer:* Jacopo Buongiorno (*MIT*)

### PANELISTS:

- Raj Sehgal (*KTH*)
- Lake Barrett (*Consultant*)
- Curt J. Robert (*GE*)

**TUESDAY, NOVEMBER 13, 2012, 1:30 P.M.**

## LESSONS LEARNED FROM FUKUSHIMA DAIICHI AND OTHER JAPANESE PLANTS (TOKAI, DAINI)—II

EPRI Fukushima-Related Research Activities, B. Clark, J. Hamel, J. Heishman, K. Huffman, S. Lewis, J. P. Surssock, R. Wachowiak, R. Yang, K. Kim, N. Muthu, A. Sowder, K. Canavan, C. Mengers, B. Schimmoller (*EPRI*)

IDCOR Lessons Unlearned from Long Ago, Anthony R. Buhl, Mario H. Fontana (*EnergX, LLC*)

Finding Purpose in the Aftermath of Fukushima Daiichi, Kathryn A. Higley (*Oregon State Univ*), *invited*

Fukushima: Public Risks from Nuclear Accidents Grossly Overstated, Vojin Joksimovich (*Univ of Pittsburgh*)

## KEY SEVERE ACCIDENT PHENOMENA IN FUKUSHIMA (H2, POOL SCRUBBING, CORIUM, RPV FAILURE...)—I

*Session Organizers:* Randy Gauntt (*SNL*), Susan Pickering (*SNL*), Jesse Phillips (*SNL*), Christophe Journeau (*CEA*), Phil Ellison (*GE*)

Post-Accident Analysis of Hydrogen Explosion During Fukushima Daiichi Accident, Mike Kuznetsov, Jorge Yanez, Thomas Jordan (*Institute for Nuclear and Energy Technologies of the Karlsruhe Institute of Technology, Germany*)

Impact of Radiolysis on Hydrogen Production in a BWR Severe Accident, Flavio Parozzi, Edoardo Corsetti (*RSE*)

Fuel-Coolant-Interaction Mixing Analysis for Corium Molten Materials, Michael L. Corradini (*Univ of Wisconsin, Madison*), R. H. Chen (*Xi'an Jiao Tong Univ*)

Material Effect in the Nuclear Fuel - Coolant Interaction: Analyses of Prototypic Melt Fragmentation and Solidification in the KROTOS Facility, Vaclav Tyrpekl (*Nuclear Research Institute Rez plc, Nuclear Safety and Reliability Division*), Pascal Piluso (*CEA, Cadarache*), Snezana Bakardjjeva (*UACH AV CR, v.v.i.*), Olivier Dugne (*CEA, Marcoule*)

Prospects for In-Containment Cesium Capture for Light Water Reactors, John Stempien, Charles W. Forsberg (*MIT*)

Severe Accident Research at ITU, Karlsruhe: A Review of Past Experience and Its Application by Future Challenges, D. Bottomley, D. Papaioannou, C. T. Walker, J-P Glatz, S. Bremier, P. Pöml, S. van Winckel, B. Christiansen, P. van Uffelen, D. Manara, V. V. Rondinella (*European Commission*)

## SAFETY SYSTEM AND CONTAINMENT PERFORMANCE AND IMPROVEMENT

A Reassessment of Low Probability Containment Failure Modes, Acacia Brunett, Richard Denning, Tunc Aldemir (*Ohio State*)

Applicabilities and Effects on Safety Improvement of Containment Filtered Vent System in OPR1000, Sang Won Lee, Mi Ro Seo, Hyeong Taek Kim (*Central Research Institute of Korea Hydro & Nuclear Power Co., Ltd.*), Chan Kook Moon (*KHNP CRI*)

TMI, LOFT, and Fukushima Loss-of-Coolant: Lessons NOT Learned, Alexander DeVolpi (*Retired*), Itacil C. Gomes (*IC Gomes Consulting & Investment Inc.*)

Combined Photovoltaic-Wave Power Generation During Complete Station Blackout, Kyung-Ho Cha, Jung-Taek Kim, Jae-Chang Park (*KAERI-Korea*)

## EMERGENCY AND SEVERE ACCIDENT RESPONSE, PROCEDURES, AND ANALYSES: EOPS, SAMGS, SAMA, SAMDA

*Session Organizers:* Shawn St. Germain (*INL*), Dennis Bley (*Buttonwood Consulting*), Frank Rahn (*EPRI*)

Insights and Perspectives on Severe Accident Regulatory Decisions, Hossein P. Nourbakhsh (*NRC*)

Nuclear Power Plant Accident Handbook, A CNSC Emergency Operations Centre Tool, Christopher John Cole (*Canadian Nucl Safety Comm*), T. Nitheanandan, M. J. Brown, S. M. Petoukhov, A. Wood (*AECL*)

Severe Accident Management Guidelines—Technical Basis Report, J. R. Gabor (*ERIN Eng & Rsch*), R. E. Henry (*Fauske & Assoc*), S. R. Lewis (*EPRI*), D. L. Luxat (*ERIN Eng & Resch*)

Successful Cold Shutdown of Onagawa: The Closest NPS to the 3/11/11 Epicenter, Akiyoshi Obonai, Takao Watanabe (*Tohoku Electric Power Co., Inc.*), *invited*

## WEDNESDAY • NOVEMBER 14, 2012 8:00 A.M. - 4:00 P.M.

7:30 A.M. – 5:00 P.M.	<b>MEETING REGISTRATION</b>
8:00 A.M. – 10:00 A.M.	<b>SPOUSE/GUEST HOSPITALITY</b>
8:30 A.M. – 12:35 P.M.	<b>ADVANCES IN THERMAL HYDRAULICS: TECHNICAL SESSIONS</b> (see page 39)
8:30 A.M. – 12:00 P.M.	<b>2012 ANS WINTER MEETING: TECHNICAL SESSIONS</b> (see page 23)
8:30 A.M. – 10:30 A.M.	<b>FUKUSHIMA 2012 MEETING: TECHNICAL SESSIONS</b> <ul style="list-style-type: none"> <li>• Severe Accident Progression and Scenario Reconstruction—II</li> <li>• Prediction of External Events and Severe Accidents—I</li> </ul>
11:00 A.M. – 12:30 P.M.	• Economic Impacts of Fukushima on the Nuclear Industry—Panel
1:30 P.M. – 6:30 P.M.	<b>ADVANCES IN THERMAL HYDRAULICS: TECHNICAL SESSIONS</b> (see page 39)
1:00 P.M. – 4:00 P.M.	<b>2012 ANS WINTER MEETING: TECHNICAL SESSIONS</b> (see page 26)
1:30 P.M. – 3:30 P.M.	<b>FUKUSHIMA 2012 MEETING: TECHNICAL SESSIONS</b> <ul style="list-style-type: none"> <li>• Key Severe Accident Phenomena in Fukushima (H2, Pool Scrubbing, Corium, RPV Failure...)—II</li> </ul>
4:00 P.M. – 5:30 P.M.	• Prediction of External Events and Severe Accidents—II

## WEDNESDAY, NOVEMBER 14, 2012, 8:30 A.M.

### SEVERE ACCIDENT PROGRESSION AND SCENARIO RECONSTRUCTION—II

*Session Organizers:* Luis Herranz (*CIEMAT*), Kevin Robb (*ORNL*), Kenji Tateiwa (*TEPCO*)

A Tentative Reconstruction of the Fukushima Daiichi Unit 1 Accident Scenario with the MAAP4 Code, Vincent Faure, Laurence Godin-Jacqmin (*CEA*), Christophe G. Journeau (*CEA, Cadarache*)

MELCOR Simulations of the Severe Nuclear Accident at the Fukushima 1F1 Reactor, Donald Kalinich, Randall Gauntt, Jeffrey Cardoni, Jesse Phillips, Andrew Goldmann (*SNL*)

Analysis of Accident Progression of Fukushima Daiichi with SAMPSON Code—(1) Unit 1, M. Naitoh, H. Suzuki, H. Okada (*The Institute of Applied Energy*)

Estimation of the Depressurization Process of Fukushima Daiichi NPP Unit 1 with SAMPSON, Maolong Liu, Yuki Ishiwatari, Koji Okamoto (*Univ of Tokyo*)

From a LOOP to a Fukushima-like SBO: Assessment of the Effect of BWR3-MarkI Safety Systems, Luis Enrique Herranz, Monica Garcia, Claudia Lopez (*CIEMAT*)

EPRI Fukushima Technical Evaluation Project MAAP5 Fukushima Daiichi Accident Simulations, David L. Luxat (*ERIN Eng and Rsch*), F. Rahn, R. Yang (*EPRI*), J. R. Gabor (*ERIN Eng & Resch*)

### PREDICTION OF EXTERNAL EVENTS AND SEVERE ACCIDENTS—I

*Session Organizers:* Randy Gauntt (*SNL*), Susan Pickering (*SNL*)

Post Fukushima - Establishing a Systematic Approach to Characterize Natural Hazards, Badi Uz-Zaman Khan (*AMEC NSS Ltd.*), Mark Gerchikov (*AMEC NSS*)

Expert Advice for External Hazard Assessment, Anthony James Donaldson, Andrew Hillesdon (*Rolls-Royce Civil Nuclear*)

Past Tsunami Evaluation and Tsunami of March 11th at Fukushima Daiichi NPS, Makoto Takao (*TEPCO*)

MAAP5 Enhancements Related to Fukushima Events, Chan Paik (*Fauske & Assoc*), Martin G. Plys (*Fauske & Associates, LLC*), Robert Henry (*Fauske & Assoc*)

### ECONOMIC IMPACTS OF FUKUSHIMA ON NUCLEAR INDUSTRY—PANEL

*Session Organizer:* Brooke Traynham (*PricewaterhouseCoopers LLP*)

#### PANELISTS:

- Tom Magette (*Energysolutions*)
- Lake Barrett (*consultant*)
- Mark Rauckhorst (*Vogtle*)
- Daryl Walcroft (*PWC*)

## WEDNESDAY, NOVEMBER 14, 2012, 1:00 P.M.

### KEY SEVERE ACCIDENT PHENOMENA IN FUKUSHIMA (H2, POOL SCRUBBING, CORIUM, RPV FAILURE...)—II

*Session Organizers:* Randy Gauntt (*SNL*), Susan Pickering (*SNL*), Jesse Phillips (*SNL*), Christophe Journeau (*CEA*), Phil Ellison (*GE*)

Evaluations of MCCI Risks for the Fukushima Events; Related IRSN R&D Strategy on Corium Retention and Coolability, Christian Mun, Michel Cranga, Karine Chevalier-Jabet, Catherine Marchetto (*IRSN*).



Corium Erosion of Concrete: Dependence on Concrete Composition, Stephen W. Lomperski (*ANL*)

Main Lessons Learnt from Fission Product Release Analyses, for the Understanding of Fukushima Daiichi NPP Status, G. Ducros, Y. Pontillon, R. Eschbach, J. M. Vidal, G. Le Petit, G. Douyset, C. Poinssot (*CEA*)

Evaluation of Aerosol Pool Scrubbing Efficiencies in Fukushima Daiichi Unit 1, Sonia Morandi, Ada Del Corno, Flavio Parozzi (*RSE*)

Counter-Intuitive Nitrogen Occupancy in Tetragonal Zirconia, Ping Wu, Zhi Gen, Jia Zhang (*Inst of High Performance Computing*)

## PREDICTION OF EXTERNAL EVENTS AND SEVERE ACCIDENTS—II

*Session Organizers:* Randy Gauntt (*SNL*), Susan Pickering (*SNL*)

NRC's Significant Determination Process: Current Status and Future Trends in Assessing Risks Attributed to External Events, Sunil D. Weerakkody (*NRC*)

MAAP Parametric Sensitivity and Uncertainty Analysis for Level 1 & 2 Probabilistic Risk/Safety Assessment, Eugene van Heerden, Michael Chai, Keith Dinnie (*AMEC*)

Simulation Technology for Severe Accidents Training, Assessment and Management, Norberto Rivero, Pablo Rey, Jose Antonio Ruiz (*TECNATOM S.A.*)

### THURSDAY • NOVEMBER 15, 2012 8:00 A.M. - 4:00 P.M.

7:30 A.M. – 5:00 P.M.	MEETING REGISTRATION
8:00 A.M. – 10:00 A.M.	SPOUSE/GUEST HOSPITALITY
8:00 A.M. – 12:30 P.M.	ADVANCES IN THERMAL HYDRAULICS: TECHNICAL SESSIONS (see page 40)
8:30 A.M. – 12:00 P.M.	2012 ANS WINTER MEETING: TECHNICAL SESSIONS (see page 29)
8:30 A.M. – 10:30 A.M.	FUKUSHIMA 2012 MEETING: TECHNICAL SESSIONS • Severe Accident Progression and Scenario Reconstruction—III • Japanese and International Perspectives on the Fukushima Accident—Panel
11:00 A.M. – 12:30 P.M.	• International Response and Impacts • Environmental Modeling and Site Cleanup
1:30 P.M. – 6:05 P.M.	ADVANCES IN THERMAL HYDRAULICS: TECHNICAL SESSIONS (see page 40)
1:00 P.M. – 4:00 P.M.	2012 ANS WINTER MEETING: TECHNICAL SESSIONS (see page 32)

### THURSDAY, NOVEMBER 15, 2012, 8:30 A.M.

## SEVERE ACCIDENT PROGRESSION AND SCENARIO RECONSTRUCTION—III

*Session Organizers:* Luis Herranz (*CIEMAT*), Kevin Robb (*ORNL*), Kenji Tateiwa (*TEPCO*)

MELCOR Simulations of the Severe Nuclear Accident at the Fukushima 1F2 Reactor, Jesse Phillips, Jeffrey Cardoni, Randall Gauntt, Don Kalinich, Andrew Goldmann (*SNL*)

Analysis of Accident Progression of Fukushima Daiichi with SAMPSON Code—(2) Unit 2, H. Suzuki, M. Naitoh, H. Okada (*The Institute of Applied Energy*)

MELCOR Simulations of the Severe Nuclear Accident at the Fukushima 1F3 Reactor, Jeffrey Neil Cardoni, Donald A. Kalinich, Jesse Phillips, Randall O. Gauntt (*SNL*)

Fukushima Daiichi Unit 3 MELCOR Investigation, Kevin Richard Robb, Matthew W. Francis, Larry J. Ott (*ORNL*)

Investigation Safety Issue on Fukushima Unit-3 Accident by MELCOR and RELAP Codes, Francesco Lino Venturi, Guido Mazzini, Antonio Manfredini, Marino Mazzini (*DIMNP - University of Pisa*)

Analysis of Accident Progression of Fukushima Daiichi with SAMPSON Code—(3) Unit 3, M. Pellegrini, H. Suzuki, H. Mizouchi, M. Naitoh (*IAE*)

## JAPANESE AND INTERNATIONAL PERSPECTIVES ON THE FUKUSHIMA ACCIDENT—PANEL

*Session Organizer:* Akira Tokuhiko (*U-Idaho*)

### PANELISTS:

- Hisashi Ninokata (*Politecnico Milano*)
- Woody Epstein (*Consultant*)

## INTERNATIONAL RESPONSE AND IMPACTS

*Session Organizer:* Rich Denning (*OSU*)

Session Chair Introduction and Summary of the Various Regulatory and Policy Actions Taken by Different Countries

A Teutonic Shift: Will the Japanese Earthquake -Nuclear Plant Disaster and the Merkel Government Lead Europe to a Non-Nuclear Future?, Nadra O. Hashim (*Jindal School of International Affairs*)

Local Response to the Fukushima Daiichi Nuclear Accident at Tokyo: Technical Support to the French Embassy and Risk Communication to the French Community Living in Japan, Olivier Isnard (*Institut de Radioprotection et de Surete Nucleaire*), O. Chabanis, P. Dubiau (*IRSN*)

United States Nuclear Regulatory Commission Actions as a Result of the Fukushima Daiichi Accident, David Skeen (*NRC*)

The Fukushima Daiichi Accident Study Information Portal, Shawn W. St.Germain (*INL*)

## ENVIRONMENTAL MODELING AND SITE CLEANUP

*Session Organizers:* Dana Powers (*SNL*), Ron Baskett (*LLNL*)

Atmospheric Dispersion Modeling and Analysis of the Fukushima Daiichi Nuclear Power Plant Accident, John S. Nasstrom, G. Sugiyama, B. Pobanz, K. T. Foster, M. Simpson, P. Vogt, F. Aluzzi, M. Dillon, S. Homann (*LLNL*)

Using Gamma Dose Rate Observations with Inverse Modelling Techniques to Estimate the Atmospheric Release of a Nuclear Power Plant Accident: Application to the Fukushima Case, Olivier Saunier, Anne Mathieu, Damien Didier, Marilyne Tombette, Denis Quelo (*IRSN*), Victor Winiarek, Marc Bocquet (*CEREA*).

Reconstruction of Airborne Activity Concentrations from Radiation Exposure Records, Peter F. Caracappa (*Rensselaer Polytechnic Inst*)

Evaluation of Prospective Dosimetry for Members of the Public, Peter F. Caracappa (*Rensselaer Polytechnic Inst*)

Severe Accident Cleanup: The Continental-Shelf Seabed Disposal Option, Charles W. Forsberg (*MIT*)

## Embedded Topical Meeting: *Advances in Thermal Hydraulics (ATH '12): Meeting Officials*

HONORARY CHAIR:  
**BAL-RAJ SEHGAL**  
*Royal Institute of Technology*



GENERAL CO-CHAIR:  
**DR. YASSIN A. HASSAN**  
*Texas A&M University*



GENERAL CO-CHAIR:  
**DR. HISASHI NINOKATA**  
*Tokyo Institute of Technology*



GENERAL CO-CHAIR:  
**PROF. FRANCESCO D'AURIA**  
*University of Pisa*



TECHNICAL PROGRAM  
CHAIR:  
**DR. KURSHAD MUFTUOGLU**  
*GE Hitachi Nuclear Energy*



TECHNICAL PROGRAM  
CHAIR:  
**PROF. S. H. CHANG**  
*Korea Advanced Institute of  
Science and Technology*



TECHNICAL PROGRAM  
CHAIR:  
**PROF. HENRYK ANGLART**  
*Royal Institute of Technology*



ASSISTANT TECHNICAL  
PROGRAM CHAIR:  
**DR. DONNA P. GUILLEN**  
*Idaho National Laboratory*



ASSISTANT TECHNICAL  
PROGRAM CHAIR:  
**DR. BRIAN G. WOODS**  
*Oregon State University*

**TUESDAY • NOVEMBER 13, 2012 8:00 A.M. - 4:00 P.M.**

<b>7:30 A.M. – 5:00 P.M.</b>	<b>MEETING REGISTRATION</b>
<b>8:00 A.M. – 10:00 A.M.</b>	<b>SPOUSE/GUEST HOSPITALITY</b>
<b>8:30 A.M. – 12:00 P.M.</b>	<b>2012 ANS WINTER MEETING: TECHNICAL SESSIONS</b> <i>(see page 16)</i>
<b>8:30 A.M. – 12:30 P.M.</b>	<b>FUKUSHIMA 2012 MEETING: TECHNICAL SESSIONS</b> <i>(see page 35)</i>
<b>1:00 P.M. – 2:00 P.M.</b>	<b>ADVANCES IN THERMAL HYDRAULICS: OPENING PLENARY: SMR PROGRAMS: Status and Perspectives</b> Opening Remarks Invited Speaker: CASL 2011 THD TAA Winner's Presentation 2012 THD TAA Winner's Presentation Speakers to be determined.
<b>1:00 P.M. – 4:00 P.M.</b>	<b>2012 ANS WINTER MEETING: TECHNICAL SESSIONS</b> <i>(see page 19)</i>
<b>1:30 P.M. – 5:30 P.M.</b>	<b>FUKUSHIMA 2012 MEETING: TECHNICAL SESSION</b> <i>(see page 35)</i>

**TUESDAY, NOVEMBER 13, 2012, 1:00 P.M.**

### OPENING PLENARY: SMR PROGRAMS: STATUS AND PERSPECTIVES

Opening Remarks

Invited Speaker: CASL

2011 THD TAA Winner's Presentation

2012 THD TAA Winner's Presentation

Speakers to be determined.

WEDNESDAY • NOVEMBER 14, 2012 8:00 A.M. - 4:00 P.M.

7:30 A.M. – 5:00 P.M.	<b>MEETING REGISTRATION</b>
8:00 A.M. – 10:00 A.M.	<b>SPOUSE/GUEST HOSPITALITY</b>
8:30 A.M. – 12:00 P.M.	<b>2012 ANS WINTER MEETING: TECHNICAL SESSIONS</b> (see page 23)
8:30 A.M. – 12:30 P.M.	<b>FUKUSHIMA 2012 MEETING: TECHNICAL SESSIONS</b> (see page 36)
8:30 A.M. – 12:35 P.M.	<b>ADVANCES IN THERMAL HYDRAULICS: TECHNICAL SESSION</b>  •Fundamental Research in Two-Phase Flow and Heat Transfer
1:00 P.M. – 4:00 P.M.	<b>2012 ANS WINTER MEETING: TECHNICAL SESSIONS</b> (see page 26)
1:30 P.M. – 5:30 P.M.	<b>FUKUSHIMA 2012 MEETING: TECHNICAL SESSION</b> (see page 36)
1:00 P.M. – 6:30 P.M.	<b>ADVANCES IN THERMAL HYDRAULICS: TECHNICAL SESSIONS</b>  •Numerical Applications and Reactor Operation/Safety  •Thermal-Hydraulics of Waste Management and Non-Power Systems

## WEDNESDAY, NOVEMBER 14, 2012, 8:30 A.M.

### FUNDAMENTAL RESEARCH IN TWO-PHASE FLOW AND HEAT TRANSFER

Mechanistic Modeling of Boiling Heat Transfer, Michael Z. Podowski (*Rensselaer Polytechnic Inst*)

Validation of Experimental Measurement Using Infrared Thermometry for the Subcooled Boiling Flow Experiment, Junsoo Yoo, Carlos E. Estrada-Perez, Yassin A. Hassan (*Texas A&M*)

Comparative Study on Condensation Model in Horizontal Tube, Seong-Su Jeon, Byung-Chul Lee (*FNC Technol*), Ju-Yeop Park, Young-Seok Bang (*KINS-Korea*)

Unsteady Numerical Simulations of Single-Phase Turbulent Mixing Between Subchannels, Maolong Liu, Yuki Ishiwatari (*Univ of Tokyo*)

Numerical Research on Turbulent Mixing and Crossing Flow Characteristics Under Supercritical Fluid Conditions, Kazuyuki Takase, Takeharu Misawa, Hiroyuki Yoshida (*JAEA*)

On the Turbulence Modeling in Bubbly Gas/Liquid Flows, Igor A. Bolotnov, Michael Z. Podowski (*RPI*)

Large Scale Simulation of Turbulent Bubbly Flows, Anand V. Mishra, Brandon L. Wilkins (*NCSU*), Igor A. Bolotnov (*RPI*)

Effects of Turbulence Modeling on Coupled CFD-Neutronics Calculations, Christopher R. Hughes, Matthew Marzano, DuWayne L. Schubring (*Univ of Florida*)

Direct Numerical Simulation of Debris Sedimentation Using the Immersed Boundary-Lattice Boltzmann Method, Shin Kyu Kang, Yassin A. Hassan (*Texas A&M*)

Proper Orthogonal Decomposition Analysis of CFD Study of Air-Ingress with a Double-Ended Guillotine Break, Hong-Chan Wei, Yassin A. Hassan (*Texas A&M*)

Dynamic Simulation and Control of the S-CO<sub>2</sub> Cycle: from Full Power to Decay Heat Removal, Anton Moisseytsev, James J. Sienicki (*ANL*)

## WEDNESDAY, NOVEMBER 14, 2012, 1:00 P.M.

### NUMERICAL APPLICATIONS AND REACTOR OPERATION/SAFETY

Calculation of LSSS Limits for Use of LEU Fuel in the MITR-II Reactor, Floyd E. Dunn (*ANL*), Lin-Wen Hu, Keng-yen Chiang (*MIT*), Erik H. Wilson (*ANL*), Thomas H. Newton (*MIT*), John G. Stevens (*ANL*)

Methodologies for Transient DNB Prediction During PWR Reactivity Insertion Accidents, Giancarlo Lenci, Kord Smith, Neil Todreas (*MIT*)

Developmental Analysis of a Scaled-Down Test Facility for a VHTR Air-ingress Accident, David J. Arcilesi, Tae Kyu Ham, Xiaodong Sun, Richard Christensen (*Ohio State*), Chang Oh (*INL*)

Analysis of the Steady-State Phase of the Reactor Cavity Cooling System Experimental Facility, Rodolfo Vaghetto, Saya Lee, Yassin A. Hassan (*Texas A&M*)

Numerical Analysis for the Natural Circulation in a Passive Cooling Tank Using the CUPID Code, Seung-Jun Lee, Hyoung-Kyu Cho, Kyung-Ho Kang, Han-Young Yoon (*KAERI-Korea*)

Uncertainty Analysis for Two-Layer and Three-Layer IVR Model in Passive PWR, Xu Hong, Gang Zhi, Zhou Zhiwei, Chang Huajian (*State Nuclear Power Technology Research Center, Beijing, China*)

Unified Analysis of Sodium Oxide Deposit Growth and Sodium Plugging, James J. Sienicki (*ANL*)

### THERMAL-HYDRAULICS OF WASTE MANAGEMENT AND NON-POWER SYSTEMS

Blending Analysis for Radioactive Salt Waste Processing Facility, Si Y. Lee, Robert A. Leishear (*SRNL*)

A Study of Grout Flow Pattern Analysis, Si Y. Lee (*SRNL*), S. Hyun (*Mercer Univ*)

Waste Heat Recovery from the Advanced Test Reactor Secondary Coolant Loop, Donna P. Guillen (*INL*)

Axial Thermal Conduction Effects upon Local Heat Flux in the High Flux Isotope Reactor, James J. Sienicki (*ANL*)

Development of Dedicated Nuclear Heat Only Desalination System for UAE, Yong Hun Jung, Yong Hoon Jeong (*KAIST*)



THURSDAY • NOVEMBER 15, 2012 8:00 A.M. - 4:00 P.M.

7:30 A.M. – 5:00 P.M.	MEETING REGISTRATION
8:00 A.M. – 10:00 A.M.	SPOUSE/GUEST HOSPITALITY
8:30 A.M. – 12:00 P.M.	2012 ANS WINTER MEETING: TECHNICAL SESSIONS (see page 29)
8:30 A.M. – 12:30 P.M.	FUKUSHIMA 2012 MEETING: TECHNICAL SESSIONS (see page 37)
8:30 A.M. – 12:30 P.M.	ADVANCES IN THERMAL HYDRAULICS: TECHNICAL SESSIONS •Code Developments and Simulation Applications
1:00 P.M. – 4:00 P.M.	2012 ANS WINTER MEETING: TECHNICAL SESSIONS (see page 32)
1:30 P.M. – 6:05 P.M.	ADVANCES IN THERMAL HYDRAULICS: TECHNICAL SESSIONS •Experimental Thermal Hydraulics

THURSDAY, NOVEMBER 15, 2012, 8:30 A.M.

## CODE DEVELOPMENTS AND SIMULATION APPLICATIONS

BWRCO - A Computational Approach for Monitoring Carryover/Carryunder, Bulent Alpaz, Phillip G. Ellison, John S. Bennion (*GE Hitachi Nuclear*), James J. Tusar (*Exelon*)

Westinghouse SMR Small Break LOCA Phenomena Identification & Ranking Table, Richard F. Wright (*Westinghouse*), Ramsey P. Arnold (*Defense Nuclear Facilities Safety Board*)

Effect of Vacuum Breaker on Passive Containment Cooling System During a Small Break LOCA, Jun Yang (*Univ of Wisconsin, Madison*)

Analysis of Long-Term Cooling of a LOCA Using a RELAP5-3D/MELCOR Coupling Method, Rodolfo Vaghetto, Bradley A. Beeny, Yassin A. Hassan, Karen Vierow (*Texas A&M*)

ATLAS DVI Line Break: Comparison to Experimental Data, Implications for Advanced PWR TRACE Calculations, and the Value of 3D Modeling, Scott Krepel, Ronald Harrington (*NRC*)

Simulations of SBLOCA Tests at the MIST Facility: Applicability of TRACE for B&W PWR Facilities, Scott Krepel (*NRC*)

Analysis of the OSU-MASLWR 003A Natural Circulation Test by Using the TRACE Code, Fulvio Mascari, Maria Lorena Richiusa (*Dipartimento dell'Energia- Università degli Studi di Palermo*), Giuseppe Vella, Brian G. Woods (*Oregon State Univ*), Kent Welter (*NuScale Power Inc*), Francesco D'Auria (*Univ of Pisa*)

TRACE Modeling of MSIV Closure Transient for Kuosheng BWR/6, Wen-Hsiung Wu, Jong-Rong Wang (*INER*), Chunkuan Shih (*Natl Tsing Hua Univ*)

Computational Fluid Dynamics Analysis of the Reactor Cavity Cooling System for Very High Temperature Gas-Cooled Reactors, Angelo Frisani, Yassin A. Hassan (*Texas A&M*)

PIV Accuracy and Extending the Field of View for Validation of Multi-Scale CFD Tools, Stephen W. Lomperski (*ANL*)

Coupling of Thermal-Hydraulics and I&C for Licensing Analyses, Francesco D'Auria (*Univ of Pisa*), Nikolaus Muellner, Marco Lanfredini (*GRNSPG - Univ of Pisa*), Oscar Mazzantini (*NA\_SA Argentina*)

THURSDAY, NOVEMBER 15, 2012, 1:30 P.M.

## EXPERIMENTAL THERMAL HYDRAULICS

Proof-of-Concept: Method for Identifying Fuel Plate Plastic Deformation in Real Time, Thomas Holschuh, Aaron Weiss, Philip Jensen, Wade R. Marcum (*Oregon State Univ*)

Enclosure Thermal Stratification within a Twin Jet Mixing Facility, Lane B. Carasik, Arthur E. Ruggles (*Univ of Tennessee*)

Boundary Layer Laminarization by Convex Curvature and Acceleration Effects, R. Brian Jackson, Brian G. Woods, Wade R. Marcum (*Oregon State Univ*)

Experimental Study of the Key Factors of Improving CHF to Support CAP1400 IVR Strategy, Hu Teng, Pei Jie, Chang Huajian (*State Nuclear Power Technology R&D Centre, Beijing, China*)

The Metal Layer Heat Transfer Behavior Experiment to Support CAP1400 IVR strategy, Ma Li, Hu Teng, Chang Huajian (*State Nuclear Power Technology R&D Centre*)

The Integral Test Facility ACME for CAP1400 Design, Yuquan Li (*State Nuclear Power Technology R&D Center*), Huajian Chang (*INET, Tsinghua Univ*), Qiao Wu (*Oregon State Univ*), Zishen Ye (*INET, Tsinghua Univ*), Lian Chen (*SNPTRD*)

Pressure and Magnetic Field Effects on CHF of Magnetic Nanofluids, Taeseung Lee, Jong Hyuk Lee, Yong Hoon Jeong (*KAIST*)

Experimental Study of Fibrous Debris Head Loss Through Sump Strainer, Saya Lee, Suhaeb S. Abdulsattar, Rodolfo Vaghetto, Yassin A. Hassan (*Texas A&M*)

Local Measurements in Air-Water Two-Phase Turbulent Flows, Xinquan Zhou (*Ohio State*)

Multi-Scale Experiments for the Simultaneous Measurement of Heat Transfer and Two-Phase Flow Parameters in Subcooled Boiling Flow, Carlos E. Estrada Perez, Junsoo Yoo, Saya Lee, Yassin A. Hassan (*Texas A&M*)

Experimental Investigations on Aerosol Transport and Wash-Out Behavior Under Reactor Accident Conditions, Sanjeev Gupta, Teja Kanzleiter, Gerhard Poss (*Becker Technol GmbH*)

Rod-toRod Thermal Radiation Heat Transfer Contribution Under Post CHF Conditions, Fatih Aydogan (*Univ of Idaho*), Cesare Frepoli (*Westinghouse*)

## FACILITATING SUCCESS

**SUNDAY NOVEMBER 11, 2012**

**8:00 A.M. – 10:00 A.M.**

**LOCATION: PACIFIC SALON 6**

**WORKSHOP ORGANIZER:** Gale Hauck

**WORKSHOP INSTRUCTORS:** Dr. Audeen Fentiman

**INSTRUCTOR BIO:** <http://www.purdue.edu/discoverypark/energy/directory/view.php?id=90>

**DURATION:** 2 hours

**DESCRIPTION:**

If you've ever had the pleasure of attending a meeting, then you know the importance of effective facilitation skills. Nothing is more painful than sitting through an endless meeting with no direction, no clear decisions, and no action items - except the realization that yet another hour or two of your life is gone forever. You wish that there could be a better way. Fortunately, there is.

Facilitation skills are like the special effects in a movie. They help tell the story, and if handled properly, they aren't even noticeable. However, they also have the potential to be terribly distracting. This interactive workshop will provide you with the tools needed to successfully lead your team by holding effective meetings.

The first module in this workshop will focus on how to build a winning team. It is crucial to have a clear vision and direction for your team even before you begin scheduling a barrage of meetings. The second module will delve into the mechanics of effectively running a meeting.

You are welcome and encouraged to bring questions and share your experiences, as we learn together how to facilitate success.



# 2013 Annual ANS Meeting

**June 16-20, 2013**

**Hyatt Regency**

**Atlanta, Georgia**

# COMMITTEE MEETINGS

## NATIONAL COMMITTEES

### ACCREDITATION, POLICIES & PROCEDURES

SUNDAY, 11:00 AM – 11:30 AM  
CRESCENT

### BOARD OF DIRECTORS

#### *PROFESSIONAL DIVISION REPORTS*

WEDNESDAY, 4:00 PM – 5:00 PM  
TOWNE & COUNRTY BALLROOM

#### *ANS BOD*

THURSDAY, 7:00 AM – 6:00 PM  
TOWNE & COUNRTY BALLROOM

### BYLAWS & RULES

SUNDAY, 4:30 PM – 6:00 PM  
ROYAL PALM SALON 5

### FINANCE COMMITTEE MEETING

TUESDAY, 2:00 PM – 7:00 PM  
EATON

### HONORS & AWARDS

MONDAY, 4:00 PM – 6:00 PM  
CLARENDON

### INTERNATIONAL COMMITTEE

SUNDAY, 11:30 AM – 2:30 PM  
GARDEN 1

### LOCAL SECTIONS WORKSHOP

SUNDAY, 7:30 AM – 12:00 PM  
ROYAL PALM SALON 1

### MEMBERSHIP

SUNDAY, 11:00 AM -12:00 PM  
ASCOT

### NATIONAL PROGRAM COMMITTEE

#### *NATIONAL MEETING SUB COMMITTEE*

WEDNESDAY, 11:30 AM – 1:00 PM  
GARDEN 1

#### *PROGRAM*

WEDNESDAY, 4:00 PM – 6:30 PM  
GARDEN 1

#### *SCREENING AND INTERNATIONAL*

SUNDAY, 10:00 AM – 12:00 PM  
ROYAL PALM SALON 3

### NEED COMMITTEE

SUNDAY, 7:30 PM – 9:30 PM  
PACIFIC SALON 7

### PEEC BUSINESS MEETING

SUNDAY, 3:00 PM – 5:00 PM  
CRESCENT

## PLANNING COMMITTEE

SUNDAY, 2:00 PM – 6:00 PM  
LE SOMMET

### PRESIDENT'S MEETING WITH COMMITTEE CHAIRS

SUNDAY, 8:00 AM – 9:00 AM  
GARDEN 1

### PRESIDENT'S MEETING WITH DIVISION CHAIRS

SUNDAY, 9:00 AM -10:00 AM  
GARDEN 1

### PROFESSIONAL DEVELOPMENT WORKSHOP

SUNDAY, 8:00 AM – 10:00 AM  
PACIFIC SALON 6

### PROFESSIONAL DIVISIONS

#### *COMMITTEE MEETING*

WEDNESDAY, 5:30 PM – 7:00 PM  
TOWNE & COUNRTY BALLROOM

#### *TRAINING WORKSHOP*

SATURDAY, 5:00 PM - 6:30 PM  
GARDEN 1

### PROFESSIONAL ENGINEERING EXAM

#### *COMMITTEE MEETING*

SUNDAY, 3:00 PM – 4:30 PM  
GARDEN 2

#### *ITEM WRITERS GROUP*

SATURDAY, 5:00 PM – 10:00 PM  
CRESCENT

### PROFESSIONAL WOMEN IN ANS

MONDAY, 11:30 AM – 12:30 PM  
ASCOT

### PUBLIC POLICY

WEDNESDAY, 11:30 AM – 1:30 PM  
ASCOT

### PUBLICATIONS STEERING

#### *BOOK PUBLISHING*

SUNDAY, 11:00 AM – 12:30 PM  
GOLDEN WEST

#### *MEETINGS, PROCEEDINGS AND TRANSACTIONS*

SUNDAY, 9:00 AM – 10:00 AM  
GOLDEN WEST

#### *NUCLEAR NEWS EDITORIAL ADVISORY*

SUNDAY, 4:00 PM – 5:30 PM  
GOLDEN WEST

#### *NS & E EDITORIAL ADVISORY*

SUNDAY, 11:00 AM – 12:00 AM  
ROYAL PALM SALON 6

## NT EDITORIAL ADVISORY

SUNDAY, 4:30 PM – 5:30 PM  
PACIFIC SALON 2

### PUBLICATION STEERING COMMITTEE

MONDAY, 4:30 PM – 6:30 PM  
FAIRFIELD

### TECHNICAL JOURNALS

SUNDAY, 1:00 PM – 4:00 PM  
GOLDEN WEST

### SCHOLARSHIP POLICY & COORDINATION

MONDAY, 12:00 PM – 1:00 PM  
PACIFIC SALON 7

### STUDENT SECTIONS

#### *EXECUTIVE*

MONDAY, 6:00 PM – 7:00 PM  
PACIFIC SALON 6

#### *REPORTS*

MONDAY, 7:00 PM – 8:00 PM  
PACIFIC SALON 6

## SPECIAL COMMITTEES

### CONGRESSIONAL FELLOW COMMITTEE MEETING

SUNDAY, 3:00 P.M. - 4:30 P.M.  
PACIFIC SALON 5

### SPECIAL COMMITTEE INTEGRATION OVERSIGHT

TUESDAY, 9:00 AM – 11:00 AM  
PACIFIC SALON 7

### SPECIAL COMMITTEE ON GOVERNMENT RELATIONS

TUESDAY, 1:30 PM – 3:00 PM  
FAIRFIELD

## OTHER COMMITTEES

### 19TH PBNC ORGANIZING MEETING

MONDAY, 4:00 PM – 5:00 PM  
PACIFIC SALON 5

### 2013 UWC PLANNING COMMITTEE

SUNDAY, 11:30 AM – 12:30 PM  
ROYAL PALM SALON 2

### CNF MEETING

MONDAY, 7:00 PM – 10:00 PM  
DOVER

### EAGLE ALLIANCE BOD

SUNDAY, 1:00 PM – 3:00 PM  
WINDSOR

### INSC BUSINESS MEETING

SATURDAY, 3:00 PM – 6:00 PM  
ROYAL PALM SALON 1



## JOINT BENCHMARK COMMITTEE WORKSHOP

SATURDAY, 6:00 PM – 9:00 PM  
ROYAL PALM SALON 2

## KNS MEETING

MONDAY, 4:30 P.M. - 6:00 P.M.  
PACIFIC SALON 4

## MATHEMATICS & COMPUTATION/REACTOR PHYSICS/RADIATION PROTECTION & SHIELDING JOINT BENCHMARK MEETING

SUNDAY, 11:00 AM – 1:00 PM  
ROYAL PALM SALON 4

## NEDHO

SUNDAY, 4:00 PM – 6:00 PM  
GARDEN 1

## PACIFIC NUCLEAR COUNCIL (PNC)

SUNDAY, 8:30 AM – 5:00 PM  
CLARENDON

## PSA 2013 PLANNING MEETING

MONDAY, 5:30 PM - 7:00 PM  
PACIFIC SALON 7

## RISK MANAGEMENT 2013 ORGANIZING COMMITTEE

TUESDAY, 6:30 P.M. - 8:30 P.M.  
CLARENDON

## DIVISION COMMITTEES

### ACCELERATOR APPLICATIONS

#### EXECUTIVE

MONDAY, 11:30 AM – 1:30 PM  
FAIRFIELD

### AEROSPACE NUCLEAR SCIENCE AND TECHNOLOGIES

SUNDAY, 12:00 PM – 2:00 PM  
CRESCENT

### BIOLOGY AND MEDICINE

#### COMMITTEE OF THE WHOLE

SUNDAY, 4:00 PM – 5:30 PM  
HAMPTON

#### JOINT PROGRAM COMMITTEE – I&R AND B&M

SUNDAY, 1:30 PM – 2:30 PM  
HAMPTON

#### COMPUTATIONAL MEDICAL PHYSICS WORKING GROUP

SUNDAY, 10:00 AM – 11:00 AM  
ROYAL PALM SALON 5

## DECOMMISSIONING, DECONTAMINATION AND REUTILIZATION

### EXECUTIVE COMMITTEE MEETING

SUNDAY, 4:30 PM – 5:30 PM  
SHEFFIELD

### PROGRAM COMMITTEE MEETING

SUNDAY, 3:30 PM – 4:30 PM  
SHEFFIELD

## EDUCATION, TRAINING AND WORKFORCE DEVELOPMENT

### ALPHA NU SIGMA

SUNDAY, 1:00 PM - 2:00 PM  
CALIFORNIA

### EXECUTIVE/MEMBERSHIP/HONORS AND AWARDS

SUNDAY, 1:30 PM – 4:30 PM  
SAN DIEGO

### PROGRAM

SUNDAY, 10:30 AM – 12:00 AM  
CALIFORNIA

### UNIVERSITY/INDUSTRY/GOVERNMENT RELATIONS

SUNDAY, 9:30 AM – 10:30 AM  
CALIFORNIA

## ENVIRONMENTAL SCIENCES

### SPECIAL COMMITTEE ON SUSTAINABILITY OF NUCLEAR ENERGY

SUNDAY, 1:00 PM – 3:00 PM  
GARDEN 2

### EXECUTIVE

SUNDAY, 10:00 AM – 12:00 AM  
GARDEN 2

### NUCLEAR PRODUCTION OF HYDROGEN WORKING GROUP

SUNDAY, 12:00 PM – 1:00 PM  
GARDEN 2

### PROGRAM

SUNDAY, 8:30 AM – 9:30 AM  
GARDEN 2

## FUEL CYCLE AND WASTE MANAGEMENT

### EXECUTIVE

SUNDAY, 1:00 PM – 2:30 PM  
ROYAL PALM SALON 3

### PROGRAM

SUNDAY, 12:00 PM – 1:00 PM  
ROYAL PALM SALON 3

## TECHNICAL OPERATING AND STANDARDS COMMITTEE

SUNDAY, 2:30 PM – 3:30 PM  
ROYAL PALM SALON 3

## HUMAN FACTORS, INSTRUMENTATION, AND CONTROLS

### EXECUTIVE

SUNDAY, 12:00 PM – 2:30 PM  
ROYAL PALM SALON 5

### PROGRAM

SUNDAY, 11:00 AM – 12:00 AM  
ROYAL PALM SALON 5

## ISOTOPES AND RADIATION

### EXECUTIVE

SUNDAY, 2:30 PM – 4:00 PM  
HAMPTON

### JOINT PROGRAM COMMITTEE – I&R AND B&M

SUNDAY, 1:30 PM – 2:30 PM  
HAMPTON

## MATERIALS SCIENCE AND TECHNOLOGY

### EXECUTIVE

MONDAY, 7:00 PM – 9:00 PM  
PACIFIC SALON 5

## MATHEMATICS AND COMPUTATION

### COMPUTATIONAL MEDICAL PHYSICS WORKING GROUP

SUNDAY, 10:00 AM – 11:00 AM  
ROYAL PALM SALON 4

### EXECUTIVE

SUNDAY, 2:00 PM – 4:00 PM  
ROYAL PALM SALON 4

### PROGRAM

SUNDAY, 1:00 PM – 2:00 PM  
ROYAL PALM SALON 4

## NUCLEAR CRITICALITY SAFETY

### EXECUTIVE

SUNDAY, 3:00 PM – 4:30 PM  
PACIFIC SALON 3

### PROGRAM

SUNDAY, 2:00 PM – 3:00 PM  
PACIFIC SALON 3

### PROGRAM – EDUCATION MEETING

SUNDAY, 1:00 PM - 2:00 PM  
PACIFIC SALON 3

## NUCLEAR INSTALLATION SAFETY

### *EXECUTIVE*

SUNDAY, 7:30 PM – 9:30 PM  
PACIFIC SALON 1

### *PROGRAM*

SUNDAY, 4:00 PM – 6:00 PM  
PACIFIC SALON 1

## NUCLEAR NONPROLIFERATION (TG)

### *GOVERNANCE*

SUNDAY, 3:00 PM – 4:00 PM  
PACIFIC SALON 2

### *PROGRAM*

SUNDAY, 2:00 PM – 3:00 PM  
PACIFIC SALON 2

### *SPECIAL ADVISORY COMMITTEE*

SUNDAY, 1:00 PM – 2:00 PM  
PACIFIC SALON 2

## OPERATIONS AND POWER

### *EXECUTIVE*

SUNDAY, 4:00 PM – 6:00 PM  
ROYAL PALM SALON 2

### *NUCLEAR CONSTRUCTION WORKING GROUP*

SUNDAY, 12:30 PM – 2:30 PM  
ROYAL PALM SALON 2

### *PROGRAM*

SUNDAY, 2:30 PM – 4:00 PM  
ROYAL PALM SALON 2

## RADIATION PROTECTION AND SHIELDING

### *EXECUTIVE*

SUNDAY, 1:30 PM – 2:30 PM  
WINDSOR ROSE

### *PROGRAM*

SUNDAY, 12:30 PM – 1:30 PM  
WINDSOR ROSE

### *SHIELDING STANDARDS*

SUNDAY, 12:00 PM – 12:30 PM  
WINDSOR ROSE

## REACTOR PHYSICS

### *EXECUTIVE*

SUNDAY, 4:00 PM – 6:00 PM  
BRITTANY

### *GOALS AND PLANNING*

SUNDAY, 1:00 PM – 2:00 PM  
BRITTANY

### *HONORS & AWARDS*

SUNDAY, 10:00 AM – 11:00 AM  
BRITTANY

### *PROGRAM*

SUNDAY, 2:00 PM – 4:00 PM  
BRITTANY

## ROBOTICS AND REMOTE SYSTEMS

### *EXECUTIVE*

SUNDAY, 12:00 PM – 4:00 PM  
ROYAL PALM SALON 6

## THERMAL HYDRAULICS

### *EXECUTIVE*

SUNDAY, 4:30 PM – 6:00 PM  
PACIFIC SALON 4

### *PROGRAM*

SUNDAY, 2:30 PM – 4:30 PM  
PACIFIC SALON 4

## YOUNG MEMBER GROUP (TG)

### *EXECUTIVE COMMITTEE*

MONDAY, 11:30 AM – 1:00 PM  
PACIFIC SALON 5

## STANDARDS COMMITTEES

### **ANS-10.7**

WEDNESDAY, 7:00 AM – 8:30 AM  
GALLERIA 2

### **ANS-19**

MONDAY, 8:30 AM – 10:30 AM  
ASCOT

### **ANS-19.1**

MONDAY, 10:30 AM – 11:30 AM  
ASCOT

### **ANS-19.5**

MONDAY, 1:00 PM – 5:00 PM  
ASCOT

### **ANS-50.1**

TUESDAY, 8:00 AM – 5:00 PM  
ASCOT

### **ANS-54.1**

THURSDAY, 8:00 A.M. – 5:00 P.M.  
BRITTANY

### **ANS-57.2/57.3**

THURSDAY, 9:00 AM – 11:00 AM  
LEXINGTON

### **ANS-58.16**

TUESDAY, 8:00 AM – 5:00 PM  
LEXINGTON

### **ANS-58.16**

WEDNESDAY, 8:00 AM – 5:00 PM  
STRAFFORD

### **ANS-58.16**

THURSDAY, 8:00 AM – 5:00 PM  
STRAFFORD

### **ANS-8.1**

SUNDAY, 8:00 AM – 12:00 PM  
LE SOMMET

### **ANS-8.1**

TUESDAY, 7:00 AM – 8:30 AM  
FAIRFIELD

### **ANS-8.12**

TUESDAY, 4:30 PM – 6:30 PM  
BRITTANY

### **ANS-8.26**

WEDNESDAY, 7:00 AM – 8:30 AM  
DOVER

### **ANS STANDARDS BOARD**

TUESDAY, 9:00 AM – 5:00 PM  
CLARENDON

### **N16**

MONDAY, 1:00 PM – 4:30 PM  
DOVER

### **N17**

WEDNESDAY, 7:30 AM – 8:30 AM  
LEXINGTON

### **NFSC**

MONDAY, 8:30 AM – 6:30 PM  
BRITTANY

**Sunday, November 11**

**6 - 7:30 pm**

(ANS President's Reception)

**Monday, November 12**

**11:30 am - 6 pm**

(ANS Attendee Luncheon • Prizes)

**Tuesday, November 13**

**10 am - 2 pm**

(Prizes)

The ANS Nuclear Technology Expo will be held November 11-13, 2012 in the Grand Exhibit Hall of the Town & Country Resort. The ANS Expo will be open Sunday-Tuesday with many special events taking place in the Exhibit Area.



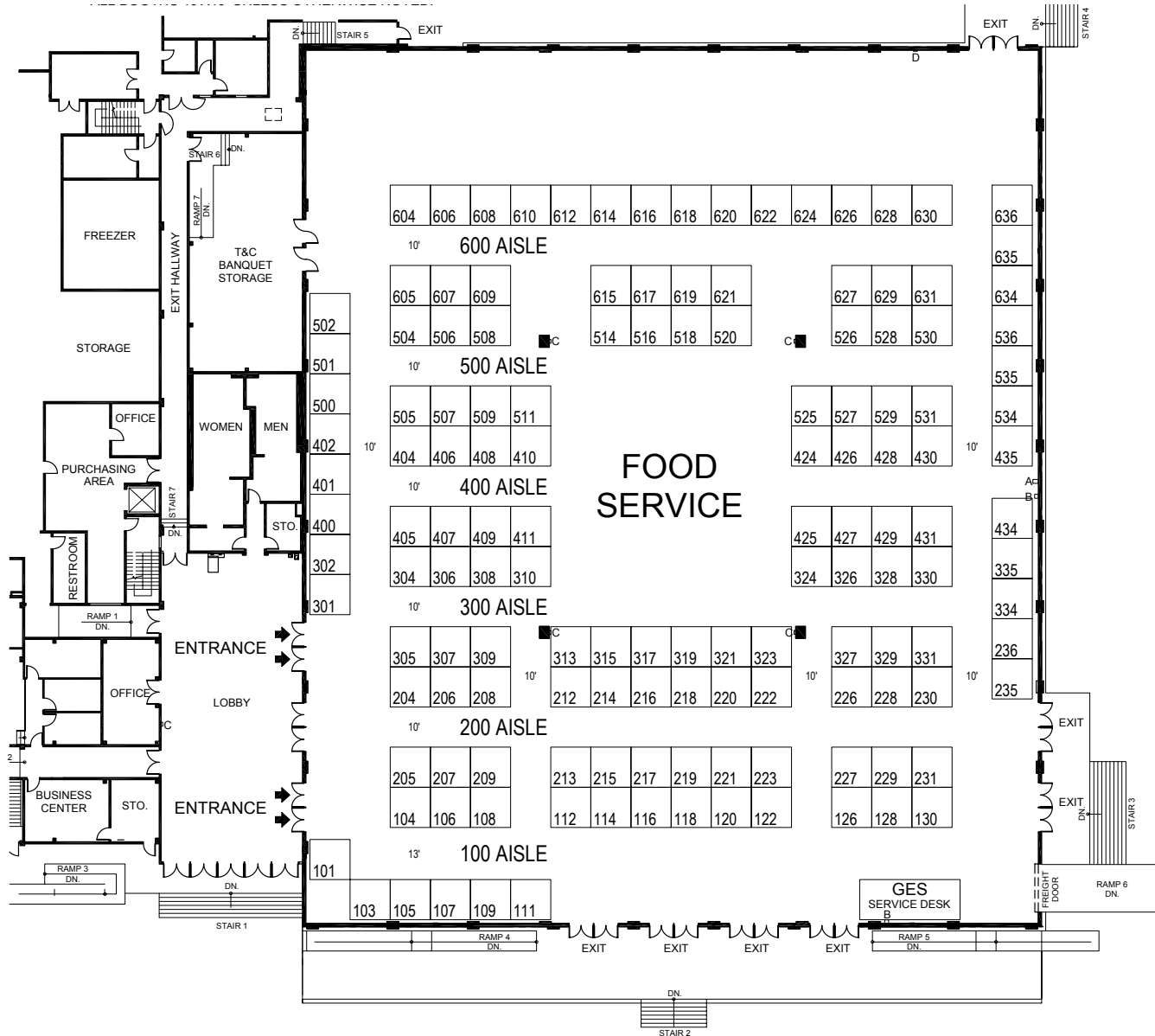
ACT, Inc./Silflex Shielding	427
Advanced Test Reactor – Nat'l Scientific User Facility	328
Alaron Nuclear Services	425
American Crane and Equipment Corporation	317
American Nuclear Society	216, 218, 220, 222
AREVA	305, 307
Argonne National Laboratory	221, 223
Bechtel Power Corporation	204
Black & Veatch	309
Ceradyne Boron Products	313, 315
Del Mar Avionics	208
Diakont	501
Doosan HF Controls	226
DRS Consolidated Controls, Inc.	508
Elmet Technologies	306
EXCEL Services Corporation	514, 516, 518, 520
Fairbanks Morse Engine	215
GE Hitachi Nuclear Energy	400, 401
Hamilton Sundstrand –Rocketdyne	319, 321, 323
The Heritage Foundation	409
IAEA Careers	209
Idaho National Laboratory	324, 326
Innovative Systems Software	111
ITD USA	301, 302
Korea Hydro & Nuclear Power (KHNP)	217

Korea Atomic Energy Research Institute (KAERI)	405, 407
Lockheed Martin	104
Major Tool & Machine Inc.	525
Mega-Tech Services, LLC	410
Merrick & Company	526
Netzsch Instruments North America LLC	304
Nuclear Energy Institute (NEI)	228
Nuclear Energy University Programs	330
Nuclear News/Radwaste Solutions	222
Nuclear Plant Journal	411
NuScale Power	101
Oak Ridge National Laboratory	205, 207
PHOTONIS	106
Private Fuel Storage	310
REEL S.A.S. – COH INC.	206
Sandia National Laboratory	213
Teledyne Brown Engineering	212
Thermo Fisher Scientific	424
Toshiba America Nuclear Energy Corporation	402, 500
TRC Engineers	214
UC Berkeley	308
UK Trade & Investment	108
U.S. Nuclear Regulatory Commission	103
University of Maryland A. James Clark School of Engineering	327
University of Missouri Research Reactor (MURR)	511
University of Tennessee Department of Nuclear Engineering	112
Westinghouse Electric Company	404, 406, 408



## FLOOR PLAN

GRAND EXHIBIT • TOWN & COUNTRY RESORT • SAN DIEGO, CA



WE THANK THE FOLLOWING COMPANIES FOR THEIR GENEROUS SUPPORT OF THE ANS EXPO SPECIAL EVENTS:

**BECHTEL NUCLEAR POWER**  
(ATTENDEE PRIZES)

**EXCEL SERVICES CORPORATION**  
(GRAND PRIZES)

EXHIBIT SPACE IS STILL AVAILABLE! FOR MORE INFORMATION, CONTACT SHARON BOHLANDER ON 1-800-250-3678 x227. VISIT OUR WEB SITE AT [WWW.EARLBECKWITH.COM](http://WWW.EARLBECKWITH.COM).

# ADVANCE MEETING REGISTRATION FORM & NUCLEAR TECHNOLOGY EXPO



**2012 ANS WINTER MEETING: "FUTURE NUCLEAR TECHNOLOGIES: RESILIENCE AND FLEXIBILITY"**

**EMBEDDED TOPICAL MEETINGS:**

- ADVANCES IN THERMAL HYDRAULICS (ATH '12)
- INTERNATIONAL MEETING ON SEVERE ACCIDENT ASSESSMENT AND MANAGEMENT: LESSONS LEARNED FROM FUKUSHIMA DAIICHI

**NOVEMBER 11 - 15, 2012 • SAN DIEGO, CA • TOWN & COUNTRY RESORT**

**FILL OUT COMPLETELY - PLEASE PRINT**

FIRST NAME/MIDDLE INITIAL: _____	ANS ID #: _____
NAME TO APPEAR ON BADGE: _____	LAST NAME: _____
JOB TITLE: _____	COMPANY/AFFILIATION: _____
STREET ADDRESS: _____	<input type="checkbox"/> COMPANY OR <input type="checkbox"/> HOME
CITY/STATE/ZIP: _____	COUNTRY: _____
TELEPHONE: _____	FACSIMILE: _____
E-MAIL: _____	E-MAIL (CC): _____

**ANS MEMBERS, PLEASE CHECK IF THIS IS YOUR:**  NEW ADDRESS (WILL CHANGE MEMBER RECORD) OR  MEETING REGISTRATION ADDRESS ONLY

PLEASE NOTE: THE INFORMATION THAT YOU PROVIDE WILL BE PRINTED ON THE MEETING REGISTRATION LIST.

- PLEASE INDICATE:  ANS NATIONAL INDIVIDUAL MEMBER    ANS FELLOW    EMERITUS MEMBER    STUDENT    EXHIBITOR  
 NON-MEMBER    ORGANIZATION MEMBER REPRESENTATIVE    DIVISION OFFICER    MEDIA

**SPECIAL ACCOMMODATIONS REQUIRED TO FULLY PARTICIPATE. IF SELECTED, ANS WILL CONTACT YOU REGARDING SPECIAL ACCOMMODATIONS**  PLEASE CONTACT ME

DIETARY RESTRICTIONS: A)  VEGETARIAN   B)  GLUTEN FREE   C)  VEGAN (MEETING ATTENDEE ONLY)

DIETARY RESTRICTIONS: A)  VEGETARIAN   B)  GLUTEN FREE   C)  VEGAN (GUEST ONLY)

**FULL MEETING AND YOUNG MEMBER ATTENDEES (PLEASE SELECT)**

- I WILL ATTEND THE ANS PRESIDENT'S RECEPTION  YES  NO      MY GUEST WILL ATTEND THE ANS PRESIDENT'S RECEPTION  YES  NO  
 I WILL ATTEND THE ATTENDEE LUNCHEON IN THE EXPO  YES  NO

**INDIVIDUAL CONFERENCE REGISTRATION - PREREGISTRATION DEADLINE FOR REDUCED FEE IS OCTOBER 19, 2012**

	FEES PAID BY OCTOBER 19, 2012		FEES PAID AFTER OCTOBER 19, 2012	
	ANS NATIONAL MEMBER	NON-MEMBER	ANS NATIONAL MEMBER	NON-MEMBER
<b>FULL ANS MEETING</b> INCLUDES 1 TICKET EACH TO THE ANS PRESIDENT'S RECEPTION & ATTENDEE LUNCHEON IN THE EXPO	[01] <input type="checkbox"/> \$770	[02] <input type="checkbox"/> \$920*	[10] <input type="checkbox"/> \$870	[11] <input type="checkbox"/> \$1020*
<b>ONE DAY ATTENDANCE</b> DOES NOT INCLUDE TICKET TO THE ANS PRESIDENT'S RECEPTION OR OTHER EVENTS CIRCLE ONE: MON TUES WED THUR	[03] <input type="checkbox"/> \$545	[04] <input type="checkbox"/> \$695	[12] <input type="checkbox"/> \$620	[13] <input type="checkbox"/> \$770
<b>ANS YOUNG MEMBER</b> APPLIES TO MEMBERS 35 YEARS OF AGE OR YOUNGER AND/OR MEMBERS WHO GRADUATED FROM A UNIVERSITY IN 2007 OR LATER. THIS RATE DOES NOT APPLY TO STUDENTS. INCLUDES 1 TICKET EACH TO THE ANS PRESIDENT'S RECEPTION & ATTENDEE LUNCHEON IN THE EXPO	[05] <input type="checkbox"/> \$570	N/A	[14] <input type="checkbox"/> \$670	N/A
<b>STUDENT</b> DOES NOT INCLUDE TICKET TO THE ANS PRESIDENT'S RECEPTION OR OTHER EVENTS	[06] <input type="checkbox"/> \$120	[07] <input type="checkbox"/> \$170	[15] <input type="checkbox"/> \$170	[16] <input type="checkbox"/> \$220
<b>ANS EMERITUS MEMBER</b> DOES NOT INCLUDE TICKET TO THE ANS PRESIDENT'S RECEPTION OR OTHER EVENTS	[08] <input type="checkbox"/> \$120	N/A	[17] <input type="checkbox"/> \$170	N/A
<b>SPOUSE/GUEST</b> INCLUDES 1 TICKET TO THE ANS PRESIDENT'S RECEPTION & ADMITTANCE TO THE SPOUSE/GUEST HOSPITALITY BREAKFAST ON MONDAY, TUESDAY, & WEDNESDAY - DOES NOT INCLUDE THE TECHNICAL SESSIONS OR OTHER EVENTS	[09] <input type="checkbox"/> \$170		[18] <input type="checkbox"/> \$215	
<b>ADDITIONAL EXHIBIT BOOTH ASSISTANT (E-PD)</b> INCLUDES 1 TICKET EACH TO PRESIDENT'S RECEPTION & EXPO LUNCHEON DOES NOT INCLUDE TECHNICAL SESSIONS, PUBLICATIONS OR OTHER EVENTS	[19] <input type="checkbox"/> \$190			

GUEST NAME (FOR BADGE): \_\_\_\_\_

PLEASE REGISTER ON-SITE AFTER TUESDAY,  
NOVEMBER 6, 2012

NAME: \_\_\_\_\_

**\*ATTENTION NON-MEMBER FULL MEETING REGISTRANTS:**

THE FULL ANS MEETING NON-MEMBER FEE ENTITLES YOU TO A FREE JAN.-DEC. 2013 MEMBERSHIP IN THE AMERICAN NUCLEAR SOCIETY. YOU MUST COMPLETE A MEMBERSHIP APPLICATION TO ACTIVATE MEMBERSHIP. AFTER YOUR APPLICATION IS PROCESSED, YOU WILL BE SENT A MEMBERSHIP CARD AND NUCLEAR NEWS MAGAZINE, BEGINNING YOUR BENEFITS. RESIDENTS OUTSIDE OF NORTH AMERICA HAVE THE OPTION TO PAY \$70 FOR NUCLEAR NEWS POSTAGE IF THEY PREFER MAILED ISSUES (THERE IS NO ADDITIONAL CHARGE TO READ NUCLEAR NEWS ONLINE ONLY). THIS OFFER ONLY APPLIES TO THOSE REGISTERED AT THE FULL ANS MEETING RATE.

[75]  I WANT TO BE A MEMBER OF ANS. PLEASE COMPLETE THE ONLINE APPLICATION AT WWW.ANS.ORG/JOIN/WINTER

[76]  I DO NOT WANT TO BE A MEMBER OF ANS

**SPECIAL EVENTS AND TOURS** PLEASE NOTE: YOU MUST BE REGISTERED FOR THE MEETING TO PURCHASE SPECIAL EVENT AND TOUR TICKETS.

**SUNDAY, NOVEMBER 11, 2012**

ADDITIONAL TICKETS: ANS PRESIDENT'S RECEPTION [21] # OF TICKETS \_\_\_\_\_ @ \$85.00 EACH = \$ \_\_\_\_\_

**MONDAY, NOVEMBER 12, 2012**

ADDITIONAL TICKETS: ATTENDEE LUNCHEON IN NUCLEAR TECHNOLOGY EXPO [23] # OF TICKETS \_\_\_\_\_ @ \$65.00 EACH = \$ \_\_\_\_\_

EVENING EVENT: DINNER AT THE SAN DIEGO ZOO [24] # OF TICKETS \_\_\_\_\_ @ \$80.00 EACH = \$ \_\_\_\_\_

SPOUSE/GUEST TOURS: WHISTLE WHILE YOU WALK: A WALKING TOUR OF BEAUTIFUL CORONADO ISLAND [25] # OF TICKETS \_\_\_\_\_ @ \$57.00 EACH = \$ \_\_\_\_\_

**TUESDAY, NOVEMBER 13, 2012**

SPOUSE/GUEST TOURS: CAPTURING THE CULTURE: BALBOA PARK MUSEUM PASSPORT [26] # OF TICKETS \_\_\_\_\_ @ \$78.00 EACH = \$ \_\_\_\_\_

**WEDNESDAY, NOVEMBER 14, 2012**

EVENING EVENT: DINNER AT THE BIRCH AQUARIUM [27] # OF TICKETS \_\_\_\_\_ @ \$75.00 EACH = \$ \_\_\_\_\_

TECHNICAL TOUR: SCRIPPS INSTITUTE OF OCEANOGRAPHY / GENERAL ATOMICS DIII-D FUSION EXPERIMENT [28] # OF TICKETS \_\_\_\_\_ @ \$20.00 EACH = \$ \_\_\_\_\_

*Note: Completed Technical Tour Registration Form Is Required to Participate in the Tour*

TECHNICAL TOUR: NAVY BASE POINT LOMA [29] # OF TICKETS \_\_\_\_\_ @ \$20.00 EACH = \$ \_\_\_\_\_

*Note: Completed Technical Tour Registration Form Is Required to Participate in the Tour*

**MEETING PUBLICATIONS**

CHOOSE ONLY ONE WITH REGISTRATION:

[41]  ANS TRANSACTIONS (VOLUME 107) CONTAINS SUMMARIES FROM THE 2012 WINTER MEETING (CD-ROM ONLY)

[42]  EMBEDDED TOPICAL PROCEEDINGS: ADVANCES IN THERMAL HYDRAULICS (ATH '12)(CD-ROM ONLY)

[43]  EMBEDDED TOPICAL PROCEEDINGS: INTERNATIONAL MEETING ON SEVERE ACCIDENT ASSESSMENT AND MANAGEMENT: LESSONS LEARNED FROM FUKUSHIMA DAIICHI (CD-ROM ONLY)

ADDITIONAL PUBLICATIONS AVAILABLE FOR PURCHASE (AVAILABLE AT SPECIAL REDUCED PRICES AT THE ANS REGISTRATION DESK ONLY):

[44]  I WANT TO PURCHASE A COPY OF THE ANS TRANSACTIONS (VOLUME 107) ON CD-ROM FOR \$85

[45]  I WANT TO PURCHASE A PRINTED COPY OF THE ANS TRANSACTIONS (VOLUME 107) FOR \$55

[46]  I WANT TO PURCHASE A COPY OF THE ADVANCES IN THERMAL HYDRAULICS (ATH '12) PROCEEDINGS ON CD-ROM FOR \$85

[47]  I WANT TO PURCHASE A COPY OF THE INTERNATIONAL MEETING ON SEVERE ACCIDENT ASSESSMENT AND MANAGEMENT: LESSONS LEARNED FROM FUKUSHIMA DAIICHI PROCEEDINGS ON CD-ROM FOR \$85

**ANS PROFESSIONAL DEVELOPMENT WORKSHOP**

PLEASE NOTE: YOU DO NOT HAVE TO BE REGISTERED FOR THE 2012 ANS WINTER MEETING TO PARTICIPATE IN THIS PROFESSIONAL DEVELOPMENT WORKSHOP.

PDW: "FACILITATING SUCCESS" SUNDAY, NOVEMBER 11, 2012.

**FEES PAID BY OCTOBER 19, 2012**

ANS NATIONAL MEMBER

[50]  \$25.00

NON-MEMBER

[51]  \$30.00

**FEES PAID AFTER OCTOBER 19, 2012**

ANS NATIONAL MEMBER

[52]  \$35.00

NON-MEMBER

[53]  \$40.00

**GRAND TOTAL AND FORM OF PAYMENT**

TOTAL OF ALL FUNCTIONS AND EVENTS

GRAND TOTAL: \$ \_\_\_\_\_

METHOD OF PAYMENT  Check  American Express  VISA  MasterCard  Diners Club  Wire Transfer

Credit Card Number: \_\_\_\_\_ Expiration Date: \_\_\_\_\_

Cardholder's Signature: \_\_\_\_\_

PRINT CARDHOLDER'S NAME IF DIFFERENT THAN REGISTRANT

**PLEASE REGISTER ON-SITE AFTER TUESDAY, NOVEMBER 6, 2012.**

MAKE CHECKS PAYABLE TO ANS IN U.S. FUNDS AND MAIL TO ANS REGISTRAR, 97781 EAGLE WAY, CHICAGO, IL 60678-9770. CREDIT CARD REGISTRATIONS MAY BE FAXED TO 708/579-8221. DO NOT MAIL REGISTRATIONS WHICH HAVE BEEN FAXED. SEND BANK FUNDS TRANSFERS TO CHASE BANK, 10. S DEARBORN ST., CHICAGO, IL 60603. BANK PHONE: 312-661-5000. BANK FAX: 312-661-6417. ANS CHECKING ACCOUNT # 824941, BANK ROUTING NUMBER (ABA) 021000021 SWIFTCODE (IBAN) CHASUS33.

PLEASE NOTE: WHEN SENDING SOMETHING TO ANS WITH EXPRESS MAIL OR WITH AN OVERNIGHT SERVICE PROVIDER SUCH AS FedEx, UPS, DHL, ETC., PLEASE USE THE FOLLOWING ADDRESS ONLY: AMERICAN NUCLEAR SOCIETY, 555 NORTH KENSINGTON AVENUE, LAGRANGE PARK, IL 60526, U.S.A. DO NOT USE THE EAGLE WAY ADDRESS IN CHICAGO FOR EXPRESS AND OVERNIGHT MAIL AS IT WILL BE RETURNED TO SENDER AND THIS WILL RESULT IN A PROCESSING DELAY.

REGISTRATION CANCELLATIONS MUST BE MADE IN WRITING PRIOR TO OCTOBER 19TH IN ORDER TO RECEIVE A REFUND MINUS A \$75 PROCESSING FEE. MEETING REGISTRATIONS AND ADDITIONAL TICKETS CANCELED AFTER OCTOBER 19TH WILL NOT BE REFUNDED; HOWEVER, YOU MAY SEND A SUBSTITUTE. PLEASE CONTACT THE ANS REGISTRAR AT TELEPHONE NUMBER: 708/579-8316 OR EMAIL: REGISTRAR@ANS.ORG WITH ANY QUESTIONS.



TECHNICAL TOUR FORM

2012 ANS WINTER MEETING  
"FUTURE NUCLEAR TECHNOLOGIES: RESILIENCE AND FLEXIBILITY"

EMBEDDED TOPICAL MEETINGS:

INTERNATIONAL MEETING ON SEVERE ACCIDENT ASSESSMENT AND MANAGEMENT:  
LESSONS LEARNED FROM FUKUSHIMA DAI-ICHI  
ADVANCES IN THERMAL HYDRAULICS (ATH '12)

NOVEMBER 11-15, 2012 • TOWN & COUNTRY RESORT • SAN DIEGO, CA

TECHNICAL TOUR: SCRIPPS INSTITUTE OF OCEANOGRAPHY / GENERAL ATOMICS DIII-D FUSION EXPERIMENT  
WEDNESDAY, NOVEMBER 14, 2012 • 12:30 P.M – 5:00 P.M.



Please note that you must be registered for the 2012 ANS Winter Meeting to participate in the Scripps Institute of Oceanography / General Atomics DIII-D Fusion Experiment. No exceptions! (PLEASE PRINT)

First Name/Middle Initial: \_\_\_\_\_ Last Name: \_\_\_\_\_

Telephone (Daytime): \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

Do you have any special needs that must be accommodated for you to participate fully in the tour? If so, please specify:

Employer's Name: \_\_\_\_\_

Employer's Address: \_\_\_\_\_

PLEASE NOTE THE FOLLOWING REQUIREMENTS ON THE DAY OF THE TOUR:

- Each visitor must produce an official government ID (or passport) at the gate; failure to do so will result in the participant not being allowed inside the protected area.
- Tour participants must be 18 years of age or older.
- Proper attire for a plant tour and other guidelines will be sent out after registration. Note that this is a walking tour and participants should expect to be on their feet for approximately an hour.
- Please provide your email address to receive information closer to the tour date.
- Completed technical tour registration form is required to participate in the tour.

Reminder to all: You will be required to present official government photo identification (passport or green card for non-U.S. citizens; government ID for U.S. citizens) before the start of the tour. Tour attendance by non-U.S. citizens may be restricted by the host organizations.

ATTENTION! ALL NON-U.S. CITIZENS WHO WISH TO PARTICIPATE IN THE DIII-D TOUR MUST E-MAIL OR FAX THEIR ID/VISA/PASSPORT INFORMATION TO THE TECHNICAL TOURS CHAIR, DR. HENRY CHIU, BY OCTOBER 1, 2012 AND COPY THE ANS REGISTRAR:

fax: (858) 222-8803 e-mail: [henry@iera-lj.com](mailto:henry@iera-lj.com) cc: [registrar@ans.org](mailto:registrar@ans.org)

Mail or fax this completed form with your advance meeting registration form, no later than October 17, 2012, to:

American Nuclear Society  
ANS Registrar  
97781 Eagle Way  
Chicago, IL 60678-9770  
Fax: 708/579-8221  
e-mail: [registrar@ans.org](mailto:registrar@ans.org)

TECHNICAL TOUR FORM

2012 ANS WINTER MEETING  
"FUTURE NUCLEAR TECHNOLOGIES: RESILIENCE AND FLEXIBILITY"

EMBEDDED TOPICAL MEETINGS:

INTERNATIONAL MEETING ON SEVERE ACCIDENT ASSESSMENT AND MANAGEMENT:  
LESSONS LEARNED FROM FUKUSHIMA DAI-ICHI  
ADVANCES IN THERMAL HYDRAULICS (ATH '12)

NOVEMBER 11-15, 2012 • TOWN & COUNTRY RESORT • SAN DIEGO, CA

TECHNICAL TOUR: NAVY BASE POINT LOMA  
WEDNESDAY, NOVEMBER 14, 2012 • 2:15 P.M. – 5:30 P.M.



Please note that you must be registered for the 2012 ANS Winter Meeting AND a U.S. Citizen to participate in the Navy Base Point Loma tour. No exceptions! (PLEASE PRINT)

First Name/Middle Initial: \_\_\_\_\_ Last Name: \_\_\_\_\_

Telephone (Daytime): \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

Do you have any special needs that must be accommodated for you to participate fully in the tour? If so, please specify:

Employer's Name: \_\_\_\_\_

Employer's Address: \_\_\_\_\_

PLEASE NOTE THE FOLLOWING REQUIREMENTS ON THE DAY OF THE TOUR:

- Each visitor must produce an official government ID (or passport) at the gate; failure to do so will result in the participant not being allowed inside the protected area.
- Tour participants must be 18 years of age or older.
- Proper attire for a plant tour and other guidelines will be sent out after registration. Note that this is a walking tour and participants should expect to be on their feet for approximately an hour.
- Please provide your email address to receive information closer to the tour date.
- Completed Technical Tour Registration Form Is Required to Participate in the Tour.
- This tour is for **U.S. CITIZENS, ONLY.**

Reminder to all: You will be required to present an officially issued government ID before the start of the tour.

Mail or fax this completed form with your advance meeting registration form, no later than October 17, 2012, to:

American Nuclear Society  
ANS Registrar  
97781 Eagle Way  
Chicago, IL 60678-9770  
Fax: 708/579-8221  
e-mail: registrar@ans.org

# Invest in Your Future

## ANS Mentoring Program

Sunday, Nov. 11, 2012  
5:00 - 6:00 pm

Location:  
Royal Palm  
Salon One

The Mentoring Program is a unique opportunity for Mentors to invest in the future by connecting with the next stars (new members, first-time meeting attendees, and student members) of the nuclear industry. It's a chance for those new to the profession to connect with "those in the know," experienced professionals with real-world knowledge to share.

What are the benefits for Mentors and Protégés?

### Mentors

- Influence the future
- Keep up to date
- Leave a legacy

### Protégés

- Fast track a career
- Get individual attention
- Build a professional relationship

If you are the next star of the nuclear industry or you wish to catch a star, sign up today to participate in the ANS Mentoring Program. You'll be given information to guide you and support from previous program participants. Of course, you'll be connected with someone whose interests match your own with the potential for lifelong learning and friendship.

**Yes. I want to be a: \_\_\_\_\_Mentor \_\_\_\_\_Protégé**

(Please print all information)

Name

Company or School

Address

City / State / Zip

Phone

Fax

Email

E-mail mentoring

Mentoring at meetings

Professional Interests:

Please list the Divisions and Committees of which you are, or would like to be, a member:

**Please mail, fax, or email this form to:**

Membership Department  
American Nuclear Society  
555 N. Kensington Avenue  
La Grange Park, IL 60526

Phone: 800-323-3044 Fax: 708-579-8295 Email: [ajiminian@ans.org](mailto:ajiminian@ans.org)

# ANS Organization Members

## **A**ECL

Alaron Corporation  
Alpiq Suisse SA  
Altran Solutions Corp.  
Ameren-UE  
American Electric Power Service Corp.  
Amer Industrial Technologies  
American Nuclear Insurers  
AREVA NP  
Arizona Public Service Co.  
AT&F Nuclear, Inc.  
ATC-Nuclear  
AXPO AG/Nuclear Energy  
    Beznau Nuclear Power Plant

## **B**abcock & Wilcox Company

Barnhart Nuclear Services  
Battelle Memorial Institute  
Bechtel Power Corp.  
Bigge Crane & Rigging Co.  
BKW FMB Energie Ltd.  
Black & Veatch  
Boron Products LLC, a Ceradyne Co.  
R. Brooks Associates, Inc.  
Burkhalter Rigging, Inc.

## **C**entral Research Laboratories

CP&L and Florida Power-Progress  
    Energy Companies

## **D**ade Moeller & Associates

Del Mar Avionics  
Detroit Edison Company  
Dominion Generation  
DuBose National Energy Service  
Duke Energy Corporation

## **E**nergy Future Holdings Corp.

(Comanche Peak Nuclear Power Plant)  
EnergySolutions  
Energy Northwest  
Entergy Operations Inc.  
EPRI  
EXCEL Services Corporation  
Exelon Nuclear Co.

## **F**ENOC

Five Star Products  
Florida Power & Light  
Fluor

## **G**eneral Atomics

GE Hitachi Nuclear Energy  
GSE Power Systems Inc.

## **H**ayward Tyler, Inc.

Indiana Michigan Power Co./  
    D.C. Cook Nuclear Power Plant  
Institute of Nuclear Safety Systems, Inc.

## **K**ernkraftwerk Leibstadt AG

Kiewit Power Nuclear Co.  
Kinectrics Inc.  
Kinometrics Inc.  
Korea Atomic Industrial Forum, Inc.  
Korea Electric Power Corp.  
Krsko Nuclear Power Plant  
KSB, Inc.

## **L**awrence Livermore National Laboratory

Los Alamos National Laboratory  
L-3 Communications MAPPS Inc.

## **M**ajor Tool & Machine, Inc.

Marshield - Div. of Mars Metal Company  
McCallum-Turner, Inc.  
Mega-Tech Services, LLC  
Metaltek Energy Products  
Mitsubishi Nuclear Energy Systems, Inc.

## **N**avarro Research & Engineering

Nebraska Public Power District  
NEI  
Newport News Shipbuilding  
Nexus Technical Services Corporation  
NFT

NGNP Industry Alliance  
Nuclear Fuel Services, Inc.  
Nuclear Plant Journal

**O**maha Public Power District  
Ontario Power Generation  
Overly Manufacturing Company

## **P**acific Gas & Electric Co.

Pakistan Atomic Energy Commission  
PaR Nuclear, Inc.  
PaR Systems, Inc.  
Phoenix Contact Inc.  
PPL Susquehanna, LLC  
Private Fuel Storage, LLC  
PSEG Nuclear, LLC

## **R**eef Industries, Inc.

## **S**.A. Technology

Sandia National Laboratories  
Sarens/Rigging International Co.  
Sargent & Lundy  
Southern California Edison  
Southern Carolina Alliance  
Southern Nuclear Operating Co.  
Stone & Webster Engineering Inc./  
    The Shaw Group

## **T**erra Power, LLC

Thermo Fisher Scientific  
Toshiba America Nuclear Energy  
    Corporation  
TradeTech, LLC  
TVA Nuclear Power Group  
TW Metals

## **U**R-Energy USA Inc.

URS Washington Division  
USEC Inc.

## **W**aste Control Specialists

Westinghouse Electric Corp.  
Wolf Creek Nuclear Operating Corp.  
Wyle Laboratories

## **About the American Nuclear Society**

The American Nuclear Society (ANS) is an international, not-for-profit, scientific and educational organization consisting of about 11,600 individual members, 1,500 organizations, 90 Organization Members, 20 professional divisions/technical groups, 51 U.S. and 9 non-U.S. local sections/affiliated societies, 14 plant branches, and 45 student sections. ANS also maintains about 30 formal agreements for cooperation with international organizations.

The Society's main objectives are the advancement of engineering and science relating to the atomic nucleus, and to the integration of the science and management disciplines constituting nuclear science and technology. Other purposes are to encourage research, establish scholarships, disseminate information, inform the general public about nuclear-related activities, conduct meetings at which scientific and technical papers are presented, and cooperate with government agencies, educational institutions, and other organizations having similar purposes.