NED
NUCLEAR ENGINEERING DIVISION

1993 Marx Issacs Award Recipient

NEWSLETTER

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Charles Forsberg Wins 2005 Robert E. Wilson Award

The Nuclear Engineering Division is proud to announce that Charles Forsberg is the winner of NED's Robert E. Wilson award for 2005. Dr. Forsberg works for UT-Battelle at Oak Ridge National Laboratory. Charles served as a Director of NED from 2000 through 2002, and he is a registered Professional Engineer. He is being recognized for his outstanding contributions in the areas of nuclear waste management and processing, nuclear fuel disposition, and energy systems development.

Charles will receive his award on April 12 at a special luncheon at the Atlanta meeting. See also the separate article on the meeting in this edition of the newsletter. We hope you'll join us in recognizing Charles for his achievements and for this honor.

The Wilson award was first presented by the Nuclear Engineering Division in 1967, and it is awarded to an individual for outstanding chemical engineering contribution in the nuclear industry. The award is given in memory of Dr. Robert E. Wilson, a noted chemical engineer, long-time member of AIChE, board chairman of Standard Oil of Indiana, and member of the former U.S. Atomic Energy Commission (AEC).

AIChE and NED Return to Hot'lanta

You're invited to join AIChE and the Nuclear Engineering Division at the AIChE Spring 2005 National Meeting, to be held April 10-14 at the Hyatt Regency Hotel in Atlanta. The AIChE Nuclear Engineering Division program will feature 40 papers on diverse nuclear chemical topics. Session topics and presentations are listed below. Also, NED is sponsoring a topical conference on the production of hydrogen from nuclear energy with an additional 40 papers; see the description below. For complete

information on the meeting, you can visit the AIChE web site at the following web address: http://www.aiche.org/conferences/spring/index.htm.

AIChE Spring 2005 National Meeting (Hyatt Regency, Atlanta, April 10 - 14)

NED Technical / Social / Business Program

Monday, April 11, 2005, 8:00 A.M.

Session 178: Rheology, Mixing, Transport, and Treatment of Non-Newtonian Slurries for Nuclear Waste Disposition

- Pulse Jet Mixer Hybrid Mixing System Development to Support the Hanford Tank Waste Treatment and Immobilization Plant
- Non-Newtonian Slurry Simulant Development and Selection for Pulse Jet Mixer Program
- Technical Basis for Testing Scaled Pulsed Jet Mixing Systems in Non-Newtonian Slurries
- Measurement Methods and Apparatus to Investigate Fluid Motion in Non-Newtonian Fluids
- Results of Single Sparge Tube Non-Newtonian Fluid Mixing Tests
- Yield Stress Reduction of Radioactive Waste Slurries by Addition of Surfactants
- Kaolin Rheology Modifier Study for SRNL WTP Pulse Jets Tank Pilot Work in Support of RPP at Hanford
- Physical Properties of Hanford Radioactive Low Activity Waste Melter Feed Slurries

Monday, April 11, 2005, 2:00 P.M.

Session 179: Generation, Retention, Release, and Control of Flammable/Toxic Materials at Defense Nuclear Facilities I

- A Study of Gas Generation Rates for Selected HLW Processing Conditions
- Gas Retention and Release in Pulse Jet Mixed Non-Newtonian Slurries
- Large-Scale Non-Newtonian Gas Release Experiments
- Hydrogen Hazards and Controls in High Level Waste
- Gas Retention and Release Tests in Non-Newtonian Simulants at the Florida International University in Support of the Waste Treatment Plant at Hanford, WA
- Radiation and Nitric Acid Exposure Stability of Resorcinol-Formaldehyde
- Ultrasonic Measurement of Gas Volume Fraction in Slurries
- A Model for Air Stripping of Ammonia in an Agitated Vessel

Tuesday, April 13, 2005, 8:30 A.M.

Session 180: Generation, Retention, Release, and Control of Flammable/Toxic Materials at Defense Nuclear Facilities II

- Radiolytic Hydrogen Generation in Savannah River Site (SRS) High Level Waste Tanks – Comparison of SRS and Hanford Modeling Predictions
- Copper-Catalyzed Peroxide Oxidation Testing for Tetraphenylborate Decomposition in SRS Tank 48H
- NRC Involvement with the Proposed MOX Facility
- Regulatory Applications of Top-Level Fault Tree Analysis
- Fire Protection Overview for the Mixed Oxide Fuel Fabrication Facility
- Analysis of Oxidation of Plutonium Alloys in Savannah River Site FB-Line Furnaces
- Evaluation Of Wetting Agents To Mitigate Dusting When Transferring Dry Glass Former Chemicals

Tuesday, April 12, 2005

Robert E. Wilson Award Luncheon

Meet the 2005 Robert E. Wilson award recipient, Dr. Charles Forsberg of Oak Ridge National Laboratory, and join your fellow attendees and discover the new Pittypat's Porch, Atlanta's landmark Southern restaurant. Enjoy unique regional cuisine in an atmosphere of southern charm and hospitality in one of Atlanta's most well-known restaurants. All NED members and other interested parties are invited to the luncheon, which will include presentation of the award and a speech by Dr. Forsberg.

- *Time:* 12:00 noon to 1:30 p.m.
- *Location:* Pittypat's Porch, 25 International Boulevard, Atlanta
- *Price:* $30 (Ticketed Item #202 on the meeting program)

Tuesday, April 12, 2005, 2:00 P.M.

Session 181: Advances in Separation and Immobilization of Nuclear Wastes

- Hydraulic Testing of Ion Exchange Resins for Cesium Removal from Hanford Tank Waste
- Alternative Ultrafiltration Membrane Testing for the SRS Baseline Process
- Removal of Cesium from Nuclear Waste Solution Using Coarse SuperLig Resin
- Separations of a Simulated Waste Stream in a Pilot Waste Treatment Plant
- Spherical Resorcinol-Formaldehyde Resin Testing for Cesium Removal from Hanford Tank Waste Simulants

- Thermodynamic Modeling of Comparative Melt Rates
- Development of a Rotary Microfilter to Increase Throughput in Solid-Liquid Separation Processes

Wednesday, April 13, 2005, 8:30 A.M.

***Session 182:* Chemical Engineering Advances in the Nuclear Fuel Cycle I**

- Objectives, Strategies, and Challenges for the Advanced Fuel Cycle Initiative
- Process Development and Testing for Electrometallurgical Treatment of Spent Fuel
- Dissolution of Zircaloy Clad BWR Fuel
- Development of Technologies for the Simultaneous Separation of Cesium and Strontium from Spent Nuclear Fuel as Part of an Advanced Fuel Cycle
- Design and Demonstration of the UREX+2 and UREX+4 Processes
- Design Attributes and Scale-up Testing of Annular Centrifugal Contactors

Wednesday, April 13, 2005, 2:00 P.M.

***Session 183:* Chemical Engineering Advances in the Nuclear Fuel Cycle II**

- Transmutation Fuel Fabrication at Los Alamos National Laboratory
- Modeling of Multivalent Ion Exchange Between Molten Chloride Salt and Zeolite-A
- High-Heat Generating Engineered Products and Facilities for Radioactive Decay Storage
- Beneficial Uses of Tails from Nuclear Fuel Production into Spent Fuel Storage Cask Manufacturing

Open Invitation to AIChE Hydrogen Topical Meeting in Atlanta, April 11-13, 2005

The following letter from NED Chair Bill Rhodes appears in the March issue of Chemical Engineering Progress *magazine.*

Whether you believe that hydrogen is tomorrow's fuel or feel compelled to "demystify the hydrogen myth," NED extends to you an open invitation to the upcoming topical conference, *Path Forward to a Hydrogen Economy*, April 11-13, 2005, at the Spring 2005 AIChE meeting in Atlanta. Instead of spending seemingly endless hours reading through tomes of opinionated, contrived chaff sifting out the wheat to be found floating on seas of pedantic verbosity, join us as researchers from across the globe discuss the latest technological breakthroughs toward the application of advanced nuclear energy concepts to produce hydrogen.

We will discuss a technology on the cusp of influencing mankind in three far-reaching areas: energy supply independence at home and in developing countries, global warming, and emerging business

innovations and transportation. Although most hydrogen today is made by steam reforming of natural gas, significant R&D programs in Japan and expanding programs in the United States and Europe are developing the technology to use nuclear energy systems to produce hydrogen from water. With world hydrogen consumption for fertilizer production and oil refining at about 50 million metric tons per year and projected to grow by as much as 10 percent per year, development of hydrogen production from nuclear systems will foster our nation's energy independence. In addition, nuclear hydrogen production does not produce carbon dioxide or other greenhouse gases; convincing data and models show that increasing amounts of these gases in the Earth's atmosphere will lead to a 2-10°F increase in average global warming by the end of the century. Finally, abundant sustainable fuels will lead to emerging business opportunities and innovations addressing pressing transportation needs at home and abroad.

The NED program in Atlanta will showcase advanced hydrogen production technologies, assess their viability, and foster discussions and debate on the R&D needed to enable the demonstration of nuclear hydrogen production. Production technologies to be discussed include both thermochemical cycles and high-temperature electrolysis. In addition to production technologies, the meeting will address several related issues: (1) crucial interface issues between the nuclear reactor and the chemical plant, (2) systems analysis, (3) economics, and (4) hydrogen purification/sensor development.

Please join us in Atlanta!

William D. Rhodes
Chair, Nuclear Engineering Division, AIChE
Aiken, South Carolina

Sessions in the hydrogen topical conference are listed below.

Topical TD: Path Forward to a Hydrogen Economy

- ***Session 72:*** Path Forward to a Hydrogen Economy Plenary
- ***Session 73:*** Plant Design and System Analysis for Nuclear Hydrogen Production
- ***Session 77:*** Hydrogen Purification and Sensing/Leak Detection
- ***Session 74:*** Developments in Electrolytic and Hybrid Routes to Hydrogen Production
- ***Session 75:*** Developments in Thermochemical Routes to Hydrogen Production I
- ***Session 76:*** Developments in Thermochemical Routes to Hydrogen Production II

Also, NED is cosponsoring two sessions on fuel cells with the Process Development Division:

- ***Session 174:*** Innovation in Fuel Cell Development
- ***Session 172:*** Fuel Cell and Gas to Liquid Fuels Pilot Plants

Future Meetings

Upcoming AIChE meetings are listed below. NED will be presenting technical sessions at the spring 2006 meeting, so make your plans now!

- ***2005 Annual Meeting:*** October 30 through November 4, 2005, Cincinnati Convention Center
- ***2006 Spring National Meeting:*** April 23 through 27, 2006, Walt Disney World Dolphin Resort, Orlando
- ***2006 Annual Meeting:*** November 12 through 17, San Francisco Hilton

Additional information on future AIChE meetings is available on the AIChE Conferences web page at http://www.aiche.org/conferences/.

Message from the Chair

Bill Rhodes

The American Institute of Chemical Engineers has provided a professional base for government, industrial, and academic chemical engineers for many years. Within it, the Nuclear Engineering Division has provided opportunities for continued learning, for networking with colleagues worldwide, for presenting one's own work to respected peers, and opportunities to serve the profession and society. After more than fifty years, NED continues to do this in an ever more challenging and demanding environment. Indeed, in the just the past couple of years, NED has experienced resurgence in technical programming at national meetings – due mainly to the world's growing interest (and need) to utilize hydrogen to combat a myriad of societal and technological ailments.

Nevertheless, I believe that our division needs to evolve and capitalize on our core capabilities. All of us have witnessed the effect of fiscal cost constraints and reductions. Many, if not all, NED members do not have the luxury of devoting the type of effort they would like toward the growth and improvement of our division. Further, our membership level has been stagnant and on a downward slope. In this type of environment, a small contributory effort on your part will send ripples throughout the NED constituency. As a specific example, our division will host an embedded topical meeting at the Spring 2005 AIChE meeting in Atlanta: "Path Forward to a Hydrogen Economy." This topical will feature over forty presentations, including leading government and industrial speakers from the U.S. and abroad, and is garnering a great deal of attention from the leaders of AIChE, amongst others. This type of "grass roots" effort will play out on a large landscape, and it enables us to speak out and provide a response to those that believe a future hydrogen economy is a mystical myth (see the November 2004 and January through especially March 2005 issues of *Chemical Engineering Progress*), enabling policy makers to make well-informed decisions. Incorporation of nuclear hydrogen programming into the NED program began just a few years ago when an NED member volunteered to organize a single session into a programming structure for which it was thought that only DOE nuclear waste cleanup subjects were appropriate. Indeed, the nuclear hydrogen series of sessions (at the Spring 2005 AIChE meeting) is now equivalent in size to the traditional chemical nuclear processing series of sessions. You too can make such a difference!

Contributions to Newsletter Welcome from All NED Members

NED welcomes contributions from all its membership for future editions of this newsletter. Potential topics include the following:

- Profiles of outstanding members
- Industry news
- News from your company
- Local section news
- DOE site news
- Relevant political or regulatory developments
- Engineers' Week activities
- Any other topics of potential interest to your fellow members

Please send your ideas or contributions to newsletter editor Keith Hampton via e-mail at bryan_k_keith_hampton@rl.gov.

New Vice Chair for NED

Please welcome Bond Calloway as the new Vice Chair of NED. Bond has been in involved in the field of nuclear waste treatment for over 20 years. He participated in the successful development, design, construction, startup and hot operation of the Defense Waste Processing Facility, which is the world's largest radioactive waste vitrification plant, which has produced over seven million pounds of vitrified radioactive waste since hot startup in 1996. Mr. Calloway is currently the Principal Investigator for various nuclear waste research and development projects in support of the Department of Energy Office of River Protection Waste Treatment Plant and the DOE Office of Science Program. Bond is also the Manager for the Savannah River National Laboratory's Process Development activities in support of the Office of River Protection. He holds a chemical engineering degree from Auburn University. He has authored numerous external publications on various aspects of nuclear waste treatment. Bond will advance to the Chair position in 2006.

NED Contacts: 2005 Officers

Executive Committee

- CHAIR: William Rhodes, Savannah River National Laboratory / US DOE Savannah River Site, (803) 208-3001
- VICE CHAIR: Bond Calloway, Savannah River National Laboratory / US DOE Savannah River Site, (803) 819-8412
- SECRETARY-TREASURER: Ronald Denney, Bechtel BWXT Idaho / US DOE Idaho National Engineering and Environmental Laboratory, (208) 526-3102
- PAST CHAIR: Paul d'Entremont, Westinghouse Savannah River Company / US DOE Savannah River Site, (803) 208-8727
- CTOC LIAISON: Jack Watson

Nominating Committee

- CHAIR: Robert Wham, UT-Battelle / US DOE Oak Ridge National Laboratory, (423) 576-7783
- R. E. WILSON AWARD: Nathan Chipman, Bechtel BWXT Idaho / Idaho National Engineering and Environmental Laboratory, (208) 526-1424

Programming Committee

- CHAIR: Ronald Denney, Bechtel BWXT Idaho / US DOE Idaho National Engineering and Environmental Laboratory, (208) 526-3102
- NUCLEAR HYDROGEN GENERATION AND APPLICATIONS: Charles Forsberg, UT-Battelle / Oak Ridge National Laboratory, (865) 574-6783

Newsletter

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