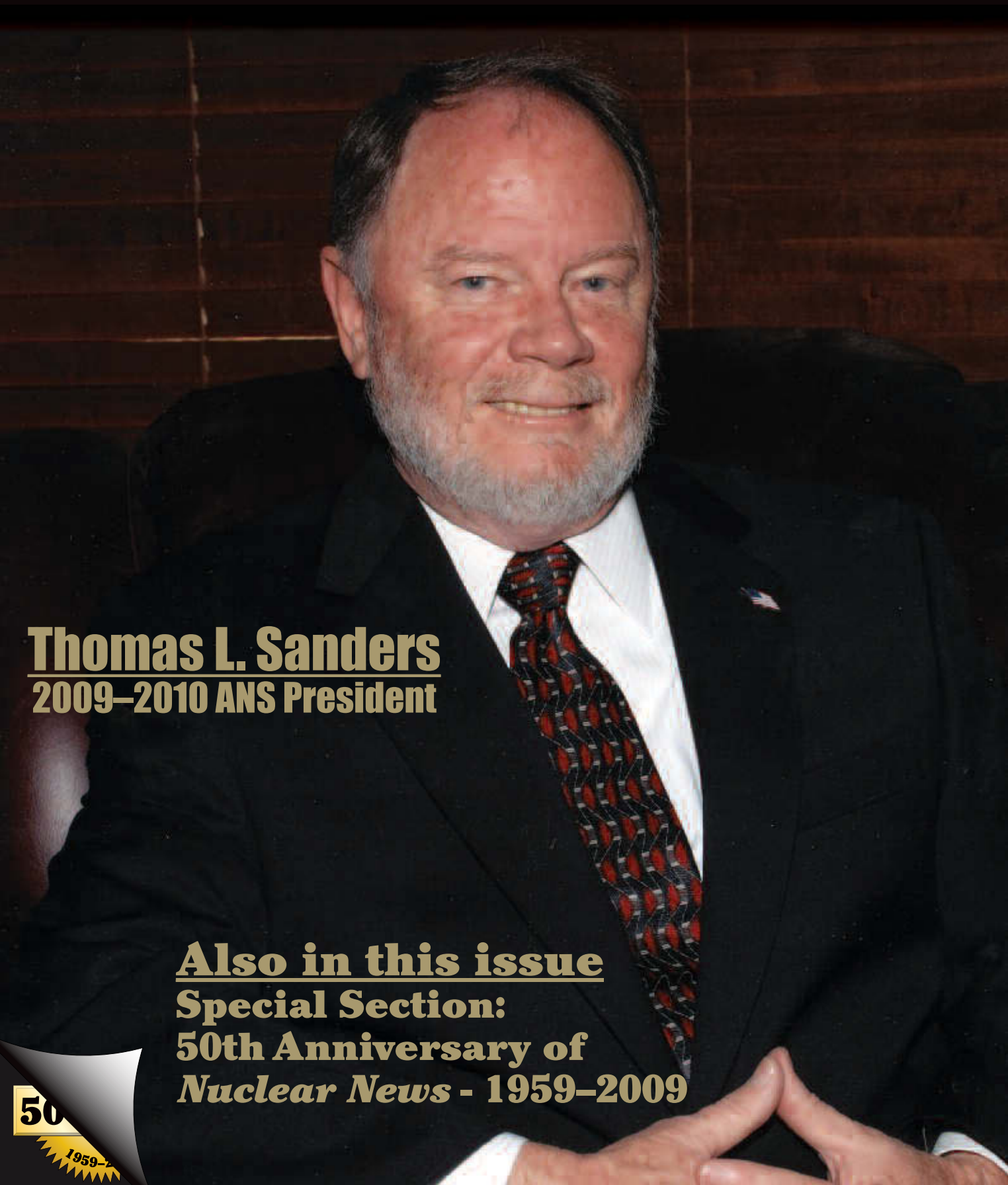
Nuclear News

A PUBLICATION OF THE AMERICAN NUCLEAR SOCIETY

July 2009



Thomas L. Sanders
2009–2010 ANS President

Also in this issue
Special Section:
50th Anniversary of *Nuclear News* - 1959–2009

Nuclear News

50 Years

1959–2009

Special Section: 50th Anniversary of *Nuclear News* - 1959–2009

Special Section begins on p. 51

Westinghouse AP1000™

On schedule for 2013

WESTINGHOUSE ELECTRIC COMPANY LLC

With the on-time completion of the first pour of basemat structural concrete, the first of four Westinghouse Electric Company AP1000™ nuclear power plants is on schedule to be completed by 2013 in China.

Westinghouse, the nuclear industry technology leader, provides an unparalleled range of nuclear technology and services for customers in China and around the world. The AP1000 has passed all the steps for compliance with European Utility Requirements. And, the AP1000 is the only Generation III+ plant to receive design certification by the United States Nuclear Regulatory Commission.

Westinghouse nuclear technology will help provide future generations with safe, clean and reliable electricity.

Check us out at **www.westinghousenuclear.com**

Westinghouse

A Toshiba Group Company

You can be sure...
if it's Westinghouse

Decommissioning?
Demolishing?
Disposing?

Why not do what others have done and use our certified IP containers? Our IP container design allows you effortless loading of your site waste and ensures proper containment during transportation and long-term storage.

We have supported the decommissioning of various sites around the country by supplying containers; including over 1000 IP-1 / IP-2 containers and 2020 SWB's used at the Rocky Flats site. With our current quality certifications of ASME U, U2, S, R, NQA-1, and ISO9001-2000, we can work most projects for any industry. Our high quality and workmanship is unsurpassed in the industry.

Using the IP-1 / IP-2, Strong-Tight, SWB, RLC, and TDOP containers built by Petersen Inc. you can ensure that your entire site waste is easily contained and transitioned from your site to the storage site. If you have hazardous buildings to remove, and waste to contain, call Petersen Inc. We have ALL the containers you need!

ASME U, U2, S, R • NQA-1 • ISO9001-2000

www.peterseninc.com • 801-732-2000

Woman Owned Small Business.

PETERSEN® INCORPORATED

"A Winning Combination."

Utah and Idaho

Manufacturing • Fabrication • Large Precision Machining • Small Precision Machining • Field Services • Warehousing & Distribution

ANS Headquarters

GENERAL NUMBER
708/352-6611
Fax 708/352-0499
Web site <www.ans.org>

NUCLEAR NEWS ADVERTISING
708/579-8226, 800/NUC-NEWS
Fax 708/352-6464
Web site <www.ans.org/advertising>
e-mail <advertising@ans.org>

NUCLEAR NEWS EDITORIAL
708/579-8245
Fax 708/352-6464
e-mail <nucnews@ans.org>

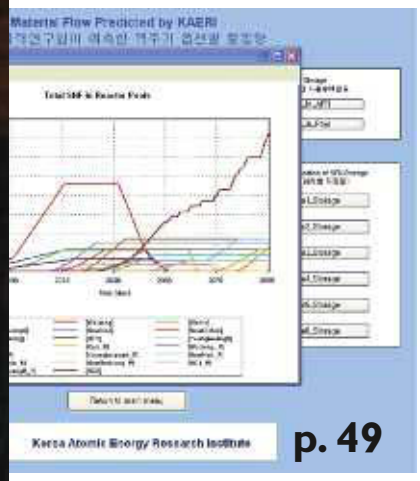
INTERNATIONAL EDITOR (DICK KOVAN)
+44 1737 842687
e-mail <dkovan@compuserve.com>

Nuclear News

July 2009 Volume 52, Number 8

p. 51


p. 85



p. 49

DEPARTMENTS

Coming up . . .

August—15th Annual Vendor/Contractor Profile Issue

October—Special Section on Plant Maintenance

Audit Bureau of Circulations

Nuclear News (ISSN: 0029-5574), Volume 52, Number 8. Published monthly (except during the month of April when issued twice monthly) by the American Nuclear Society, Incorporated, with business, executive, and editorial offices at 555 N. Kensington Ave., La Grange Park, Illinois 60526; telephone 708/352-6611. Subscription rate is $400 for 2009; overseas subscribers add $65 per year for postage and handling. Single copy price is $40; $12 additional for overseas postage and handling (except for the Buyers Guide issue, which is $110; $15 additional for overseas postage and handling). Individual ANS members receive *NN* as part of membership. Replacement copies may be obtained at the single copy price, as long as copies are available. Inquiries about the distribution and delivery of *Nuclear News* and requests for changes of address should be directed to the American Nuclear Society. Allow six weeks for a change to become effective. POSTMASTER: Send change of address orders to *Nuclear News*, American Nuclear Society, 555 N. Kensington Ave., La Grange Park, Illinois 60526, or <nucnews@ans.org>.

Nuclear News is printed in New Richmond, Wis. 54017, by St. Croix Press, Inc. Nonprofit periodicals postage paid at La Grange, Illinois, and at additional mailing offices.

From my vantage point

The once-in-a-lifetime event that we are celebrating this month—the 50th anniversary of *Nuclear News*—is one in which I am truly honored to participate. Back when I graduated from college, I never could have foreseen where I am today, working for the American Nuclear Society (at an insular age 22, I didn't even know that such an organization existed), and leading a talented and creative staff through each month's adventure of planning, writing, editing, and laying out the society's monthly news magazine. And although my father spent a good part of his career with one company, I don't recall giving a thought to the likelihood of my spending what now amounts to 30-plus years on the staff of *Nuclear News.*

I learned the publishing and nuclear businesses on the job and from the bottom up. From Chris FitzGerald and Jon Payne—both of whom interviewed me and ultimately collaborated to hire me—I learned about concise writing, the correct use of the word "comprise," the manual pasteup of pages, the use of color, camera-ready page preparation, photo cropping, decision-making, and so many other things that I couldn't possibly list them all. I really have done almost everything on the magazine that a person could do, from proofreading to copyediting, from pasteup to camera-ready page prep, from department and news writing to feature writing—and I've gone from being the new kid on staff to being the longest-tenured and the leader of the Commercial Publications team. All those years of experience, and all the people I have worked with and for, have helped to shape me and my career and have also contributed to the development and evolution of *Nuclear News.*

As Nuclear News *celebrates its first 50 years, we take the time to look back at its history and ahead to its future while enjoying this once-in-a-lifetime event.*

(As an aside but related to my many years at *NN,* it has been determined that I hold the record for the number of titles an *NN* staffer has had. They range from editorial assistant [where I started] to assistant editor, assistant editor/art, art/production editor, associate editor/art, associate editor, senior editor, and managing editor, to editor and publisher [where I am today]. That makes nine—or 10, if you consider "editor" and "publisher" separately!)

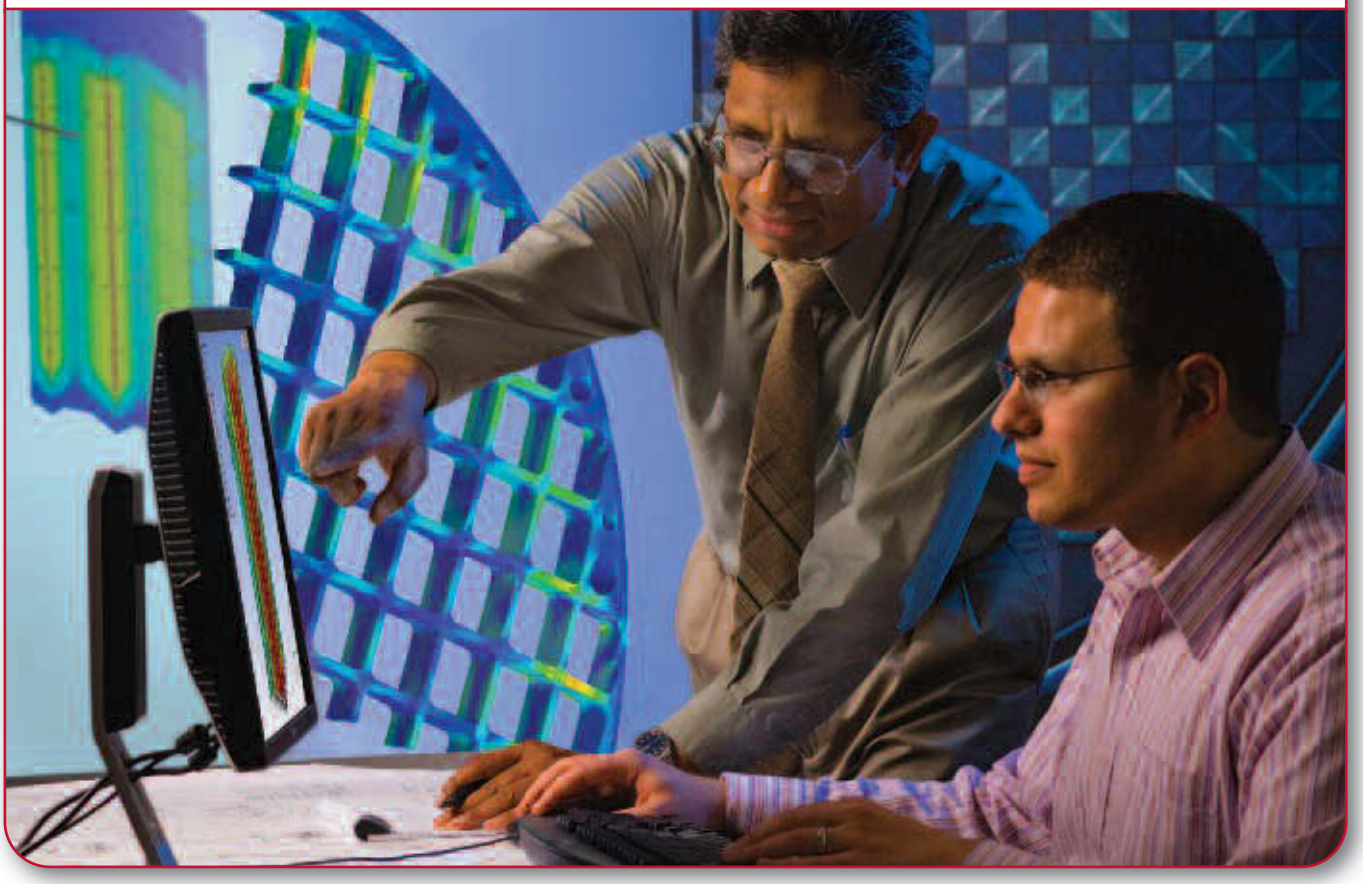
Over its 50 years, the magazine certainly has taken its various editors and readers on quite a ride as it covered the early years of a newly formed society and a promising young industry, through more difficult times when respect and credibility were hard won and growth was virtually nonexistent, through years of improved plant operations and excellent performance, to what is hoped will be a resurgence in the implementation of nuclear power, both in the United States and worldwide. *Nuclear News*, with its goal of disseminating information, has covered the good news and the bad, and everything in between: the retirement of old reactors and the designs of new; the opening and successful operation of one U.S. waste facility and what looks like the demise of another; developments in nuclear medicine and incidents involving medical radioactive sources; plant startups, and plant shutdowns and decommissionings. You can read about the history of the magazine and visit the 50 years of its existence decade by decade in the 50th Anniversary Special Section, which begins on page 51 of this issue.

Some might look back at "the good old days"; others—especially the young men and women who are entering the nuclear field—are looking to the future and where they can take this storied industry. I have the advantage of being in the middle of these two vantage points, reflecting on the past and looking to the future. I thank all those who have taught me, shown patience with me, forgiven my errors, noted my successes, and worked with me and before me to build the legacy of *Nuclear News.*

On behalf of the magazine's staff, I thank all those who read the magazine, point out when we've made a mistake (such as calling a B-29 bomber a B-52 [see page 20]; it's good to know that you *are* reading!), compliment us when we've covered a timely topic, and support our efforts to bring you the details of what's happening in the nuclear industry through news and feature articles. As *Nuclear News* enters its sixth decade, we look ahead to what promises to be a bright future for nuclear science and technology.—*Betsy Tompkins, Editor and Publisher*

KEY QUESTION FOR THE FUTURE

How can I improve plant performance?



Look to AREVA NP for the engineering expertise to deliver a full spectrum of innovative, integrated solutions.

For your peace of mind, we have the right resources to deliver the best value and quality engineering solutions. With U.S. market leadership and global resources, AREVA NP provides unmatched project expertise and predictable cost and schedule performance. With the opening of our BWR Center of Excellence in San Jose, we deliver complete, plant-wide engineering solutions to improve performance.

Expect certainty. Count on AREVA NP. www.us.areva.com

AREVA

Calendar

July

July 20–24 **2009 IEEE Nuclear and Space Radiation Effects Conference (NSREC 2009),** Hilton Quebec, Quebec City, Quebec, Canada. Sponsored by IEEE, with others. Contact: Mark Hopkins, The Aerospace Corp., P.O. Box 80360, Albuquerque, NM 87198; phone 505/872-6201; fax 505/872-6211; e-mail <mark.a.hopkins@aero.org>; Web <www.nsrec.com>.

July 20–24 **U.S. Women in Nuclear and Global WIN Conference,** Grand Hyatt Washington, Washington, D.C. Sponsored by the Nuclear Energy Institute. Contact: Linda Wells, Nuclear Energy Institute, 1776 I St. NW, Ste. 400, Washington, DC 20006; phone 202/739-8039; e-mail <registrar@nei.org>; Web <www.nei.org>.

July 21 **Nuclear Fuel Supply Forum,** Willard InterContinental Washington, Washington, D.C. Sponsored by the Nuclear Energy Institute. Contact: Linda Wells, Nuclear Energy Institute, 1776 I St. NW, Ste. 400, Washington, DC 20006; phone 202/739-8039; e-mail <ljw@nei.org>; Web <www.nei.org>. ●

July 22–23 **Australian Uranium Conference,** Esplanade Hotel Fremantle, Fremantle, Western Australia. Organized by Vertical Events. Contact: Vertical Events, Ste. 15, 186 Hay St., Subiaco, Western Australia 6008; phone +61 8 9388 2222; fax +61 8 9381 9222; e-mail <info@verticalevents.com.au>; Web <www.verticalevents.com.au/uranium2009/>.

July 26–30 **2009 ASME Pressure Vessels and Piping Conference (PVP),** Hilton Prague, Prague, Czech Republic. Organized by the American Society of Mechanical Engineers. Contact: John Varrasi, American Society of Mechanical Engineers, 3 Park Ave., New York, NY 10016; phone 212/591-8158; e-mail <varrasij@asme.org>; Web <www.asmeconferences.org/pvp09/>.

August

Aug. 2–6 **Utility Working Conference and Vendor Technology Expo,** Amelia Island Plantation, Amelia Island, Fla. Organized by the ANS Operations & Power Division. Contact: Donna Jacobs, Entergy, 1340 Echelon Pkwy., M-ECH-61, Jackson, MS 39213; phone 601/368-5517; e-mail <djacob2@entergy.com>; Web <www.new.ans.org/meetings/m_58>. ■

Aug. 9–12 **Nuclear Information and Records Management Association 2009 Conference (NIRMA 2009),** JW Marriott Las Vegas Resort and Spa, Summerlin, Nev. Sponsored by NIRMA, in cooperation with the International Atomic Energy Agency. Contact: Jane Hannum, NIRMA, 10 Almas Rd., Windham, NH 03087; phone 603/432-6476; fax 603/432-3024; Web <nirma.sharepointsite.net>.

Aug. 9–14 **20th International Conference on Structural Mechanics in Reactor Technology,** Dipoli Congress Center, Espoo, Finland. Organized by the International Association of Structural Mechanics in Reactor Technology, with others. Contact: VTT Technical Research Center of Finland, P.O. Box 1000, FI-02044 VTT, Espoo, Finland; phone +358 20 722 111; fax +358 20 722 7053; e-mail <smirt20@vtt.fi>; Web <www.iasmirt.org>.

Aug. 16–19 **Health Physics Forum,** Laguna Cliffs Marriott, Dana Point, Calif. Sponsored by the Nuclear Energy Institute. Contact: Linda Wells, Nuclear Energy Institute, 1776 I St. NW, Ste. 400, Washington, DC 20006; phone 202/739-8039; e-mail <ljw@nei.org>; Web <www.nei.org>. ●

Aug. 23–27 **14th International Conference on Environmental Degradation of Materials in Nuclear Power Systems,** Hilton Virginia Beach, Virginia Beach, Va. Organized by the ANS Materials Science & Technology Division, with others. Contact: Todd Allen, University of Wisconsin–Madison, 1500 Engineering Dr., Madison, WI 53706; phone 608/265-4083; fax 608/263-7451; e-mail <allen@engr.wisc.edu>; Web <www.new.ans.org/meetings/m_59>. ■

September

Sept. 2–4 **China International Nuclear Power Industry Expo 2009,** China International Exhibition Center, Beijing, China. Organized by Beijing Qifa Exhibition and Service Co. Contact: Winder Wang, Beijing Qifa Exhibition and Service Co., C-1301, No. 60 Middle Rd. of East Fouth Ring Rd., Chaoyang Dist., Beijing, 100025 China; phone +86 10 85863866; e-mail <winderwang@163.com>; Web <www.cine010.com.cn/>.

Sept. 6–11 **Global 2009 and Top Fuel 2009,** Palais des Congrès de Paris, Paris, France. Organized by the French Nuclear Energy Society, with the American Nuclear Society, the European Nuclear Society, and others. Contact: Sylvie Delaplace, French Nuclear Energy Society, 5 rue des Morillons, F75015 Paris, France; phone +33 01 53 58 32 16; fax +33 01 53 58 32 11; e-mail <global2009@sfen.fr>; Web <www.sfen.fr>. □

Sept. 7–12 **14th International Conference on Fusion Reactor Materials (ICFRM-14),** Sapporo Convention Center, Sapporo, Japan. Supported by the Japan Society for the Promotion of Science. Contact: ICS Convention Design Inc., Sumitomo Corp. Jinbocho Bldg., 3-24, Kanda-Nishikicho, Chiyoda-ku, Tokyo 101-8449, Japan; phone +81 3 3219 3600; fax +81 3 3219 3626; e-mail <icfrm-14@eng.hokudai.ac.jp>; Web <www.icfrm-14.com>. ●

Sept. 8–11 **3rd Annual RadWaste Summit,** JW Marriott, Las Vegas, Nev. Sponsored by ExchangeMonitor Publications and Forums. Contact: ExchangeMonitor Meeting and Forums Services, P.O. Box 39289, Washington, DC 20016; phone 877/303-7367, ext. 109; fax 202/296-2805; e-mail <forums@exchangemonitor.com>; Web <www.radwastesummit.com>.

Sept. 9–11 **34th Annual World Nuclear Association Symposium,** Central Hall Westminster, London, England. Organized by the World Nuclear Association. Contact: Stuart Cloke, World Nuclear Association, Carlton House, 22a St. James's Square, London SW1Y 4JH, England; phone +44 0 20 7451 1547; fax +44 0 20 7839 1501; e-mail <symposium_admin@world-nuclear.org>; Web <www.wna-symposium.org>.

Sept. 13–17 **Nuclear Criticality Safety Division Topical Meeting (NCSD 2009),** Shilo Inn, Richland, Wash. Sponsored by the ANS Eastern Washington Section and Nuclear Criticality Safety Division, with the Canadian Nuclear Society. Contact: Michaele Brady Raap, Pacific Northwest National Laboratory, 902 Battelle Blvd., P.O. Box 999, MSIN K8-34, Richland, WA 99352; phone 509/375-3781; fax 509/372-6421; e-mail <michaele.bradyraap@pnl.gov>; Web <www.ncsd2009.com>. ■

Sept. 14–17 **Nuclear Energy for New Europe 2009**, Bled, Slovenia. Sponsored by the Nuclear Society of Slovenia with others, including the ANS Operations & Power Division. Contact: Nuclear Society of Slovenia, Jamova cesta 39, SI-1000 Ljubljana, Slovenia; phone +386 1 588 53 31; fax +386 1 588 53 77; e-mail <bled2009@ijs.si>; Web <www.nss.si/bled2009/>. □

Sept. 20–25 **12th International Conference on the Chemistry and Migration Behavior of Actinides and Fission Products in the**

● First time listed, or significant change made.
■ ANS event.
□ Non-ANS event cosponsored by ANS.

TOSHIBA
Leading Innovation

Toshiba's nuclear power technology is helping to cut the world's CO_2 emissions by an estimated 700 million tons annually.*1

How can we produce enough energy to survive the next 1000 years without harming the Earth?
The Toshiba Group is confident to be entrusted with such a vitally important job.

Nuclear energy is capable of generating vast amounts of power without the byproduct of CO_2 emissions.
And as the world's leading producer of commercial nuclear power,*2 having built 112 nuclear power plants across 10 countries, the Toshiba Group is helping to reduce global CO_2 emissions by 700 million tons*1 a year.

Today we are focused on creating safe, reliable energy for daily life, but we are also looking ahead to the environment of 1000 years in the future. That's why we're developing new technologies today that will help to prevent global warming tomorrow.

*1 According to Toshiba research (as of August 2008). *2 World's No.1 share of nuclear energy production capability (as of August 2008).

1000 YEARS OF ENERGY

Focused on the future. Toshiba's Nuclear Technology

http://www.toshiba.co.jp/nuclearenergy/english/

SEPTEMBER—CONT'D

Geosphere, Three Rivers Convention Center, Kennewick, Wash. Organized by the Pacific Northwest National Laboratory, with others. Contact: Kristin Lerch, e-mail <kristin.lerch@pnl.gov>; Web <www.pnl.gov/migration09/>.

Sept. 21–22 **OECD-NEA Workshop on Future Criticality Safety Research Needs,** Idaho State University's Rendezvous Complex, Pocatello, Idaho. Sponsored by the Organization for Economic Cooperation and Development, the Nuclear Energy Agency, and the Idaho National Laboratory, with others. Contact: Lori Braase, e-mail <lori.braase@inl.gov>; Web <https://secure.inl.gov/oecdneaws09/>.

Sept. 21–23 **6th International Symposium on the Release of Radioactive Materials from Regulatory Requirements,** Wiesbaden, Germany. Organized by Tüv Nord SysTec, with support from others. Contact: Jörg Feinhals, Grosse Bahnstrasse 31, 22525 Hamburg, Germany; phone +49 40 8557 2253; fax +49 40 8557 2429; e-mail <jfeinhals@tuev-nord.de>; Web <www.tuev-nord.com/english/clearance.asp>.

Sept. 27–Oct. 2 **4th International Nuclear Atlantic Conference (INAC 2009),** Windsor Barra Hotel Convention Center, Rio de Janeiro, Brazil. Sponsored by the Brazilian Nuclear Energy Association. Contact: Brazilian Nuclear Energy Association, Rua Mena Barreto, 161-Botafogo, 22271-100 Rio de Janeiro-RJ, Brazil; phone +55 21 3797 1751; fax +55 21 2286 6646; e-mail <aben@aben.com.br>; Web <www.inac2009.com.br>.

Sept. 27–Oct. 2 **13th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-13),** Kanazawa, Japan. Organized by the Atomic Energy Society of Japan and the ANS Thermal Hydraulics Division, with others. Contact: Hisashi Ninokata, Tokyo Institute of Technology, N1-5 2-12-1 O-okayama, Meguro-Ku, Tokyo 152-8550, Japan; phone +81 3 5734 3056; fax +81 3 5734 3056; Web <www.nureth13.org>. □

Sept. 28–30 **8th LOWRAD International Conference,** Rio de Janeiro, Brazil. Organized by the World Council of Nuclear Workers and the Low Radiation International Center. Contact: Carlos Bonacossa de Almeida, Institute of Radioprotection and Dosimetry, Av. Salvador Allende s/n, Recreio, 22780-160 Rio de Janeiro-RJ, Brazil; phone +55 21 2173 2815; e-mail <lowrad2009@ird.gov.br>; Web <www.wonuc.org>.

Sept. 28–Oct. 2 **4th International Nuclear Forum on Safety of Nuclear Technologies: Transport of Radioactive Material (ATOM-TRANS-2009) and 9th Specialized Exhibition on Nuclear Industry,** St. Petersburg, Russia. Organized by Rosatom State Nuclear Energy Corporation and the Federal Atomic Energy Agency, with others. Contact: Marina Labyntseva, Atomprof Institute, Aerodromnaya st., 4, St. Petersburg, 197348, Russia; phone +7 812 394 7115; fax +7 812 394 5006; e-mail <marina.labyntseva@atomprof.spb.ru>, <forum2009@atomprof.spb.ru>; Web <www.restec.ru>. ●

Sept. 29–Oct. 2 **2nd International Workshop on Nuclear Data Evaluation for Reactor Applications (WONDER 2009),** Château de Cadarache, Saint-Paul-lez-Durance, France. Organized by the Commissariat à l'Énergie Atomique and the Nuclear Energy Agency. Contact: Geneviève Arroyo, CEA Cadarache, Bldg. 230, F-13108 Saint-Paul-lez-Durance, France; phone +33 0 4 42 25 75 49; fax +33 0 4 42 25 70 09; e-mail <genevieve.arroyo@cea.fr>; Web <www.nea.fr/html/science/meetings/WONDER2009/>.

October

Oct. 5–8 **2nd International Workshop on Compound Nuclear Reactions and Related Topics (CNR '09),** Le Mercure Cité Mondiale, Bordeaux, France. Supported by the Commissariat à l'Énergie Atomique, with others. Contact: Pascale Chambon, e-mail <contact@cnr09.com>; Web <www.cnr09.com>.

Oct. 5–9 **2009 Inter Jura Congress of the International Nuclear Law Association,** Four Seasons Hotel Toronto, Toronto, Ontario, Canada. Organized by the Canadian Nuclear Law Organization. Contact: Cathy Sison, Ontario Power Generation, 700 University Ave., 18th Fl., Toronto, Ontario, Canada M5G 1X6; phone 416/592-9225; fax 416/592-1466; e-mail <cathy.sison@opg.com>; Web <www.cnlo.ca>. ●

Oct. 6–8 **EPRI International Decommissioning and Radioactive Waste Management Workshop,** Le Méridien Hamburg, Hamburg, Germany. Sponsored by the Electric Power Research Institute. Contact: Linda Nelson, phone 518/374-8190; e-mail <lnelson@nycapp.rr.com>; Web <www.epri.com>.

Oct. 7–9 **Computational Medical Physics Working Group (CMPWG III),** Georgia Institute of Technology, Atlanta, Ga. Sponsored by the ANS Mathematics & Computation and Biology & Medicine divisions and the ANS Georgia Section. Contact: Farzad Rahnema, Naz Consulting, 8640 Sentinae Chase Dr., Roswell, GA 30076; phone 404/451-4686; e-mail <farzad@nazconsulting.com>. □

Oct. 11–15 **12th International Conference on Environmental Remediation and Radioactive Waste Management (ICEM '09),** Liverpool Arena and Conference Center, Liverpool, England. Organized by the American Society of Mechanical Engineers, with others. Contact: Shari Brabham, Conference Industry Support Solutions, P.O. Box 57296, Tucson, AZ 85732-7296; phone 520/571-6047; fax 520/445-8011; e-mail <cisscorporation@yahoo.com>; Web <www.icemconf.com>.

Oct. 11–16 **9th International Symposium on Fusion Nuclear Technology (ISFNT9),** Dalian, China. Organized by the Dalian University of Technology, with others. Contact: J. Z. Sun, School of Physics and Optoelectronic Technology, Dalian University of Technology, Dalian 116024, China; phone +86 411 84706731; fax +86 411 84708389; e-mail <isfnt9@isfnt-9.org>; Web <www.isfnt-9.org>.

Oct. 12–16 **International Symposium on Nuclear Energy (SIEN 2009),** Ramada Parc Hotel, Bucharest, Romania. Organized by the Romanian Nuclear Energy Association (AREN) and the Romanian Atomic Forum (Romatom). Contact: Mihaela Stiopol, Romanian Nuclear Energy Association, Polona St., nr. 65, 010494 Bucharest, Sector 1, Romania; phone +40 21 203 82 53; fax +40 21 316 94 00; e-mail <mstiopol@nuclearelectrica.ro>; Web <www.aren.ro/ro_sien_2009.htm>.

Oct. 13–15 **2009 ISOE International ALARA Symposium,** Vienna, Austria. Organized by the International Atomic Energy Agency. Contact: Ingeborg Pucher, Division of Radiation, Transport, and Waste Safety, International Atomic Energy Agency, P.O. Box 100, Wagramer Strasse 5, 1400 Vienna, Austria; phone +43 1 2600 22717; e-mail <i.pucher@iaea.org>; Web <www.isoe-network.net>.

Oct. 13–16 **21st Annual *Weapons Complex Monitor* Waste Management and Cleanup Decisionmakers' Forum,** Amelia Island Plantation Executive Conference Center, Jacksonville, Fla. Sponsored by ExchangeMonitor Publications and Forums. Contact: ExchangeMonitor Meeting and Forums Services, P.O. Box 39289, Washington, DC 20016; phone 877/303-7367, ext. 109; fax 202/296-2805; e-mail <forums@exchangemonitor.com>; Web <www.decisionmakersforum.com>.

Oct. 18–21 **NEI International Uranium Fuel Seminar,** Hilton Austin, Austin, Texas. Sponsored by the Nuclear Energy Institute. Contact: Linda Wells, Nuclear Energy Institute, 1776 I St. NW, Ste. 400, Washington, DC 20006; phone 202/739-8039; e-mail <registrar@nei.org>; Web <www.nei.org>. ●

Oct. 19–21 **18th Annual Meeting of the Council on Ionizing Radiation Measurements and Standards (CIRMS 2009),** National Institute of Standards and Technology, Gaithersburg, Md. Organized by the Council on Ionizing Radiation Measurements and Standards. Contact: Teresa Vicente, National Institute of Standards and Technology, 100 Bureau Dr., Mail Stop 1071, Gaithersburg, MD 20899-1070; phone 301/975-3883; fax 301/948-2067; e-mail <teresa.vicente@nist.gov>; Web <www.cirms.org>. ●

Oct. 19–23 **4th Russian International Conference on Nuclear Material Protection, Control, and Accounting,** Obninsk, Russia. Hosted by the State Corporation for Atomic Energy of the Russian Federation (Rosatom), with others. Contact: Gennady Pshakin, Institute for Physics and Power Engi-

neering, State Scientific Center of the Russian Federation, Bondarenko Sq. 1, RU-249033, Obninsk, Kaluga Region, Russia; phone +7 48439 9 81 28; fax +7 48439 9 48 12; e-mail <pshakin@ippe.ru>; Web <mpca2009.atominfo.ru>.

Oct. 27–30 **International Conference on Opportunities and Challenges for Water-Cooled Nuclear Power Plants in the 21st Century,** Vienna, Austria. Sponsored by the International Atomic Energy Agency, with others. Contact: Irina Orlova, Division of Conference and Document Services, International Atomic Energy Agency, P.O. Box 100, Wagramer Strasse 5, 1400 Vienna, Austria; e-mail <i.orlova@iaea.org>; Web <www.iaea.org>.

Oct. 27–30 **International Workshop on Advances in Applications of Burnup Credit for Spent Fuel Storage, Transport, Reprocessing, and Disposition,** Hotel Hesperia Córdoba, Córdoba, Spain. Organized by the Nuclear Safety Council of Spain, in cooperation with the International Atomic Energy Agency. Contact: International Atomic Energy Agency, P.O. Box 100, Wagramer Strasse 5, 1400 Vienna, Austria; e-mail <buc-2009@csn.es>; Web <www.iaea.org>.

November

Nov. 2–6 **Nuclear Data Week at Brookhaven National Laboratory,** Upton, N.Y. Sponsored by Brookhaven National Laboratory. Contact: Yvette Malavet-Blum, National Nuclear Data Center, Bldg. 197D, Brookhaven National Laboratory, Upton, NY 11973-5000; phone 631/344-5591; fax 631/344-2806; e-mail <malavet@bnl.gov>; Web <www.nndc.bnl.gov/meetings/csewg2009/>.

Nov. 8–11 **4th International Conference on Education and Training in Radiological Protection (ETRAP 2009),** Novotel Lisboa Malhoa, Lisbon, Portugal. Organized by the Instituto Tecnológico e Nuclear and the European Nuclear Society. Contact: Kirsten Epskamp, European Nuclear Society, Rue Belliard 65, B-1040 Brussels, Belgium; phone +32 2 505 30 54; fax +32 2 502 39 02; e-mail <etrap2009@euronuclear.org>; Web <www.etrap2009.org>.

Nov. 8–11 **6th CNS International Steam Generator Conference,** Hilton Toronto, Toronto, Ontario, Canada. Sponsored by the Canadian Nuclear Society. Contact: Denise Rouben, Canadian Nuclear Society, 480 University Ave., Ste. 200, Toronto, Ontario M5G 1V2, Canada; phone 416/977-7620; fax 416/977-8131; e-mail <cns-snc@on.aibn.com>; Web <www.cns-snc.ca/SG2009.html>. ●

Nov. 8–12 **Integrated Radioactive Waste Management in Future Fuel Cycles,** Charleston, S.C. Organized by Engineering Conferences International. Contact: Jim Marra, phone 803/725-5838; e-mail <james.marra@srnl.doe.gov>; Web <www.engconfintl.org/9ar.html>.

Nov. 11–13 **International Exhibition on Atomic Energy and Electrical Engineering: Power Machinery Construction 2009,** Expocentre, Moscow, Russia. Organized by Russia's Ministry of Energy and the World Nuclear Association, with others. Contact: International Conferences & Exhibition, phone +7 495 739 55 09; fax +7 495 641 22 38; e-mail <electronica@inconex.ru>; Web <www.inconex.ru>. ●

Nov. 13–19 **2009 ASME International Mechanical Engineering Congress and Exposition,** Lake Buena Vista, Fla. Sponsored by the American Society of Mechanical Engineers. Contact: Melissa Torres, American Society of Mechanical Engineers, 3 Park Ave., MS 22E5, New York, NY 10016; phone 212/591-8257; fax 212/591-7856; e-mail <torresm@asme.org>; Web <www.asmeconferences.org/congress09/>.

Nov. 15–19 **2009 ANS Winter Meeting and Nuclear Technology Expo,** Omni Shoreham Hotel, Washington, D.C. Sponsored by the American Nuclear Society. Contact: Carl Rau, Bechtel Nuclear Power, 5275 Westview Dr., Frederick, MD 21703; phone 301/228-8740; fax 301/698-4776; e-mail <tapolloc@bechtel.com>; Web <www.new.ans.org/meetings/m_64>. ■

Continued

NOVEMBER—CONT'D

Nov. 15–19 **Embedded Topical: 2009 Risk Management for Tomorrow's Challenges (RM4TC),** Omni Shoreham Hotel, Washington, D.C. Sponsored by the ANS Nuclear Installations Safety Division. Contact: Ronald Knief, XE Corp., P.O. Box 90818, Albuquerque, NM 87199; phone 505/284-6593; fax 505/284-3537; e-mail <raknief@sandia.gov>; Web <meetings.ans.org/riskmanagement/>. ■

Nov. 15–19 **Embedded Topical: 2009 Young Professionals Congress (YPC2009),** Omni Shoreham Hotel, Washington, D.C. Sponsored by the ANS Young Members Group and the North American Young Generation in Nuclear. Contact: David Pointer, Argonne National Laboratory, 9700 S. Cass Ave., Argonne, IL 60439; phone 630/252-1052; e-mail <david.pointer@anl.gov>; Web <www.ans-ypc.org>. ■

Nov. 29–Dec. 4 **95th Radiological Society of North America Scientific Assembly and Annual Meeting (RSNA 2009),** McCormick Place Convention Center, Chicago, Ill. Sponsored by the Radiological Society of North America. Contact: Robert Hope, Radiological Society of North America, 820 Jorie Blvd., Oak Brook, IL 60523; phone 630/571-7854; fax 630/571-7837; e-mail <bhope@rsna.org>; Web <rsna2009.rsna.org>.

December

Dec. 1–4 **2nd Annual Nuclear Deterrence Summit,** Washington, D.C. Sponsored by ExchangeMonitor Publications and Forums. Contact: ExchangeMonitor Meeting and Forums Services, P.O. Box 39289, Washington, DC 20016; phone 877/303-7367, ext. 109; fax 202/296-2805; e-mail <forums@exchangemonitor.com>; Web <www.exchangemonitor.com>.

Dec. 2–3 **Fusion Power Associates 30-Year Anniversary Meeting and Symposium,** Washington, D.C. Sponsored by Fusion Power Associates. Contact: Fusion Power Associates, 2 Professional Dr., Ste. 249, Gaithersburg, MD 20879; phone 301/258-0545; fax 301/975-9869; e-mail <fusionpwrassoc@aol.com>; Web <www.fusionpower.org>. ●

Dec. 7–11 **International Conference on Fast Reactors and Related Fuel Cycles: Challenges and Opportunities (FR09),** Kyoto International Conference Center, Kyoto, Japan. Sponsored by the International Atomic Energy Agency, with others, including the ANS Fuel Cycle & Waste Management Division. Contact: Martina Khaelss, Conference Services Section, International Atomic Energy Agency, P.O. Box 100, Wagramer Strasse 5, 1400 Vienna, Austria; phone +43 1 2600 21315; fax +43 1 2600 7; e-mail <m.khaelss@iaea.org>; Web <www.fr09.org>. □

Dec. 8–10 **Nuclear Power International,** Las Vegas Convention Center, Las Vegas, Nev. Produced by PennWell Corp. Contact: Libby Smith, phone 918/831-9560; e-mail <nuclearconference@pennwell.com>; Web <www.nuclearpowerinternational.com>.

Dec. 14–18 **International Conference on Effective Nuclear Regulatory Systems,** Cape Town, South Africa. Organized by the International Atomic Energy Agency. Contact: Ellen Fraser, Conference Services Section, International Atomic Energy Agency, P.O. Box 100, Wagramer Strasse 5, 1400 Vienna, Austria; phone +43 1 2600 21321; fax +43 1 2600 7; e-mail <e.fraser@iaea.org>; Web <www.iaea.org>.

And coming up (ANS meetings) . . .

PHYSOR 2010, May 9–14, 2010, Sheraton Station Square Hotel, Pittsburgh, Pa.

2010 ANS Annual Meeting, June 13–17, 2010, Town and Country Hotel, San Diego, Calif.

Continued

Nuclear Experts

Kinectrics offers unique testing and assessment capabilities to help utilities and suppliers make and validate critical decisions for both existing nuclear plant operations and, new station design / build projects. Kinectrics delivers proven solutions that provide reliable cost-effective support throughout the entire component and plant life cycle.

Life Cycle Management Solutions

NEW PLANT DESIGN AND CONSTRUCTION SUPPORT

- Advanced Reactor Equipment Qualification & Type Testing
- Seismic Qualification & Testing
- EMI / RFI Testing
- Non-Destructive Evaluation (NDE)
- Environmental Testing & Studies

OPERATING PLANT ISSUES SUPPORT

Nuclear Safety Margins & Performance Demonstration

- Equipment Qualification Testing & Studies
- Operability Simulations & Testing
- Probability Risk Assessment Analysis
- Licensing & Regulatory Affairs Support

Sustaining or Improving Equipment Reliability

- Field NDE (VT to Phased Array UT methods)
- Electrical Equipment & Cable Condition Assessment
- Mechanical Testing
- Rotating Machine Monitoring & Condition Assessment
- Root Cause Failure Analysis & Forensic Evaluation
- Concrete Structure Assessment, Repair & Rehabilitation
- Obsolescence Management & Reverse Engineering

Enhanced Radiation & Environmental Protection

- Tritium Management
- Radioactive Materials Characterization
- Fish Protection / 316 (a)&(b) Solutions
- Environmental Assessment & Thermal Studies

Product Quality & Performance Validation

- Commercial Grade Dedication (CGD)
- Seismic Qualification
- EMI / RFI Testing

Advanced Services by Kinectrics Companies

- Field Inspection – CGSB & ASNT NDT & Level III Services by **Axiom NDT Corp.**
- Nuclear Regulatory, Safety, Licensing, Health & Environmental Services by **Candesco Corporation**

KINECTRICS

Nuclear Knowledge

www.kinectrics.com

AND COMING UP (ANS MEETINGS)—CONT'D

Decommissioning, Decontamination, and Reutilization 2010 (DD&R 2010), Aug. 29–Sept. 2, 2010, Idaho Falls, Idaho.

2010 LWR Fuel Performance Meeting/Top Fuel, Sept. 26–29, 2010, Hyatt Regency Grand Cypress, Orlando, Fla.

2010 ANS Winter Meeting, Nov. 7–11, 2010, Riviera Hotel and Casino, Las Vegas, Nev.

2011 ANS Annual Meeting, June 26–30, 2011, The Westin Diplomat Resort and Spa, Hollywood, Fla.

Short Courses & Seminars

Seismic Probabilistic Risk Assessment Training Course, July 27–31, Newport Beach, Calif. Offered by the Electric Power Research Institute (fee: $1000). Contact: Barbara Ryan, Electric Power Research Institute, phone 650/855-2029; e-mail <bryan@epri.com>; Web <www.epri.com>.

Nuclear Power Probabilistic Risk Assessment, Aug. 25–26, Hyatt Regency Chicago, Chicago, Ill. (fee: $1395). Offered by Electric Utility Consultants Inc. Contact: Electric Utility Consultants Inc., phone 303/770-8800; fax 303/741-0849; Web <www.euci.com>.

EPRI Groundwater Protection Workshop, Sept. 15–16, Charleston, S.C. Offered by the Electric Power Research Institute, in collaboration with the Nuclear Energy Institute (fee: $725 for registration before Aug. 21). Contact: Linda Nelson, phone 518/374-8190; e-mail <lnelson@nycap.rr.com>; Web <www.epri.com>.

EPRI-NRC Fire Probabilistic Risk Assessment Course, Oct. 12–16, Glen Allen, Va. Offered by the Electric Power Research Institute and the U.S. Nuclear Regulatory Commission's Office of Nuclear Regulatory Research (no fee). Contact: Carol Holt, Electric Power Research Institute, phone 650/855-2436; e-mail <cholt@epri.com>; Web <www.epri.com>.

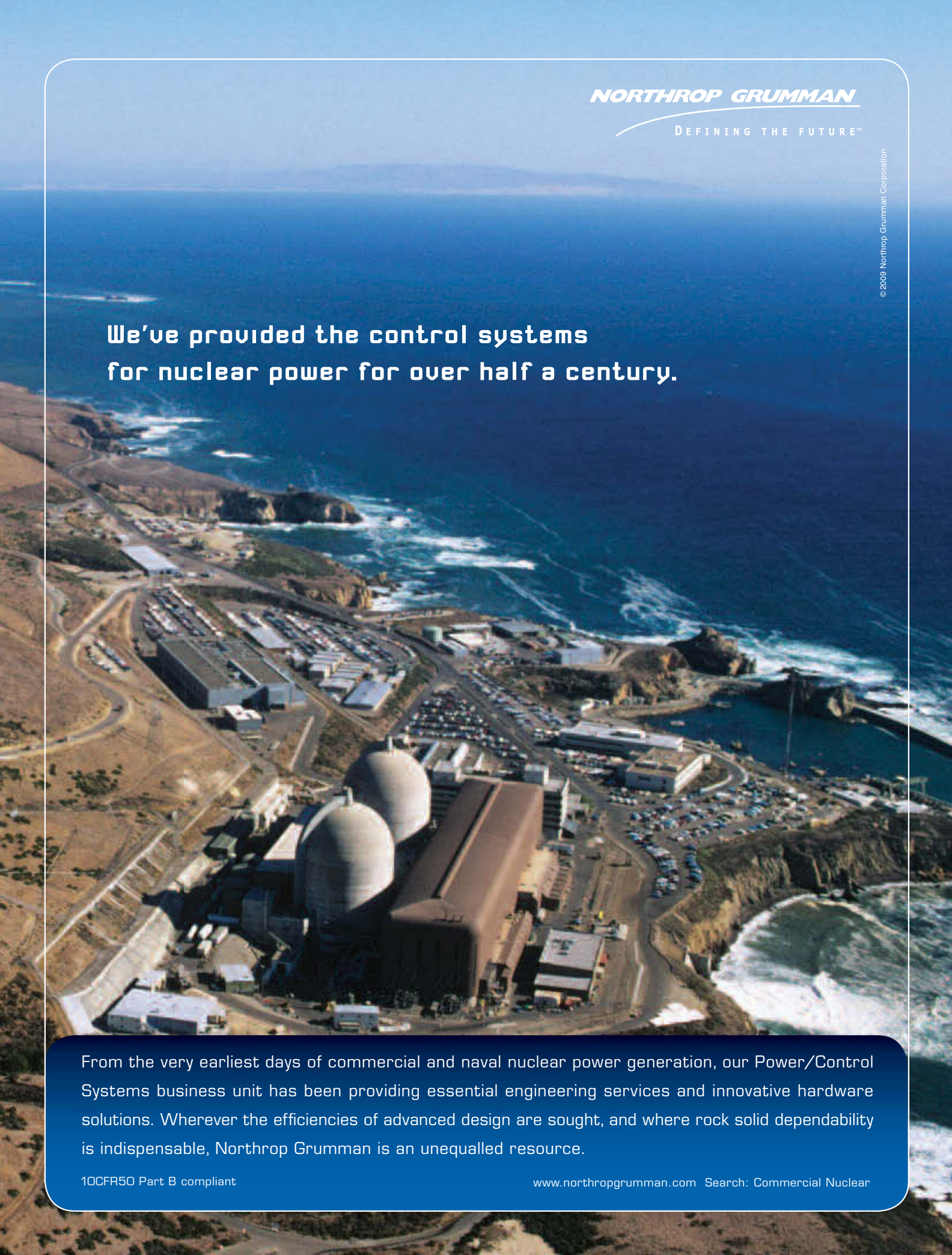
Quality Assurance Considerations for New Nuclear Facility Construction, Nov. 2–4, Omni Orlando Resort at Champions Gate, Orlando, Fla. Offered by the American Society of Mechanical Engineers (fee: $1595). Contact: American Society of Mechanical Engineers, phone 800/843-2763; fax 973/882-1717; e-mail <infocentral@asme.org>; Web <www.asme.org>.

Calls for Papers

First International Workshop on Technology and Components of Accelerator Driven Systems, Mar. 15–17, 2010, Karlsruhe, Germany. Sponsored by the OECD Nuclear Energy Agency. **Deadline for abstracts: Sept. 1.** Author notification: Oct. 1. Final papers due: Mar. 1, 2010. Format and submit abstracts per the instructions at <www.nea.fr/html/science/wpfc/tcads/1st>.

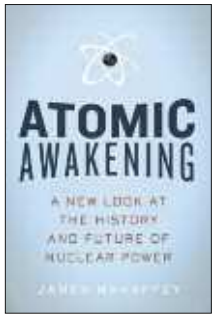
2nd Canada-China Joint Workshop on Supercritical Water-cooled Reactors (CCSC-2010), Apr. 25–28, 2010, Courtyard by Marriott Toronto Downtown, Toronto, Ontario, Canada. Sponsored by the Canadian Nuclear Society. **Deadline for abstracts: Oct. 19.** Author notification: Nov. 13. Draft papers due: Feb. 8, 2010. Final papers due: Mar. 22, 2010. Format and submit abstracts per the instructions at <www.cns-snc.ca/CCSC-2010.html>.

2010 LWR Fuel Performance Meeting/Top Fuel, Sept. 26–29, 2010, Hyatt Regency Grand Cypress, Orlando, Fla. Sponsored by the American Nuclear Society, with others. **Deadline for extended abstracts: Dec. 15.** Author notification: Jan. 31, 2010. Draft papers due: Mar. 31, 2010. Final papers due: June 30, 2010. Format and submit abstracts per the instructions at <www.ans.org/goto/fuel10>. NN


NORTHROP GRUMMAN
DEFINING THE FUTURE™
© 2009 Northrop Grumman Corporation
We've provided the control systems
for nuclear power for over half a century.
From the very earliest days of commercial and naval nuclear power generation, our Power/Control Systems business unit has been providing essential engineering services and innovative hardware solutions. Wherever the efficiencies of advanced design are sought, and where rock solid dependability is indispensable, Northrop Grumman is an unequalled resource.
10CFR50 Part B compliant
www.northropgrumman.com Search: Commercial Nuclear

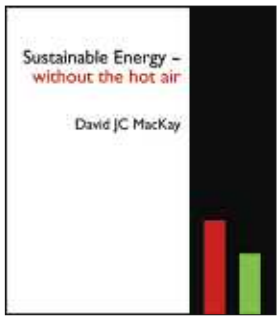
Publications

Recently Published



Atomic Awakening: A New Look at the History and Future of Nuclear Power, by James Mahaffey. Outlining the history of nuclear science from medieval alchemy to Marie Curie, Albert Einstein, and the Manhattan Project, this look at the "paradox" of nuclear power addresses the American public's fixation on bombs and how it has affected the development of this nonpolluting, renewable energy source. Written by a former researcher at the Georgia Tech Research Institute, the book aids in the understanding of how atomic science is far from the spawn of a wicked weapons program and how nuclear power will shape the 21st century, in which renewable energy and climate change have become defining concerns. (368 pp., HB, $27, ISBN 978-1-60598-040-9. Order from Pegasus Books, phone 800/233-4830; fax 800/458-6515; e-mail <claiborne@pegasusbooks.us>; Web <www.pegasusbooks.us>.)

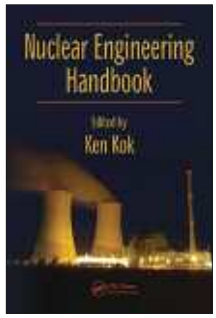
Sustainable Energy—Without the Hot Air, by David J. C. MacKay. Written by a physics professor at the University of Cambridge, this examination of the world's sustainable energy crisis analyzes the relevant numbers, explains calculations of energy expenditure per person, and explores various strategies for change on both a personal level and an international scale to eliminate the gap between energy consumption and renewable energy production. In case-study format, the book debunks myths about energy conservation efforts and answers questions regarding the potential of sustainable fossil fuels, the possibility of sharing renewable power among various countries, and the role of nuclear energy. (384 pp., PB, $50, ISBN 978-0-9544529-3-3. Order from Independent Publishers Group, phone 800/888-4741; fax 312/337-5985; e-mail <orders@ipgbook.com>; Web <www.ipgbook.com>. Also available free in PDF format at <www.withouthotair.com/download.html>.)



International Perspectives on Energy Policy and the Role of Nuclear Power, edited by Lutz Mez, Mycle Schneider, and Steve Thomas. This collection of in-depth analyses by energy economists assesses the energy policies of 31 countries and the role of nuclear power. Crediting concern over climate change and recent public relations activities by the nuclear industry for

bringing nuclear power issues to the forefront of policy discussions in nuclear renaissance countries, the book also examines the reasons for some countries' having divested themselves of their nuclear legacy and analyzes the approach to nuclear issues in industrializing countries. Throughout these analyses, common themes include nuclear plant safety, the impacts of nuclear accidents, and the adequacy of nuclear power expertise. (576 pp., PB, $146, ISBN 978-1-907132-11-7. Order from Multi-Science Publishing Company, phone +44 0 1277 224632; fax +44 0 1277 223453; e-mail <info@multi-science.co.uk>; Web <www.multi-science.co.uk/nuclear_power.htm>.)

U.S. Nuclear Weapons Policy, Council on Foreign Relations Independent Task Force Report No. 62. This report maintains that nuclear weapons will continue to be a fundamental element of U.S. national security in the near term and makes recommendations on how to ensure the safety, security, and reliability of the U.S. deterrent nuclear force, prevent nuclear terrorism, and strengthen the nuclear nonproliferation regime. Based on the work of an independent task force sponsored by the Council on Foreign Relations and cochaired by William J. Perry, former secretary of defense, and Brent Scowcroft, former national security advisor, the report also gives specific advice regarding Russia and China and calls for renewed American leadership from the Obama administration to shape U.S. nuclear weapons policy. (144 pp., $15, ISBN 978-0-87609-420-4. Order from Brookings Institution Press, phone 800/537-5487; fax 410/516-6998; Web <www.brookings.edu/press/bookstore.htm>; or from Council on Foreign Relations, phone 212/434-9516; e-mail <publications@cfr.org>; Web <www.cfr.org>. Also available free in PDF format at <www.cfr.org/content/publications/attachments/Nuclear_Weapons_TFR62.pdf>.)

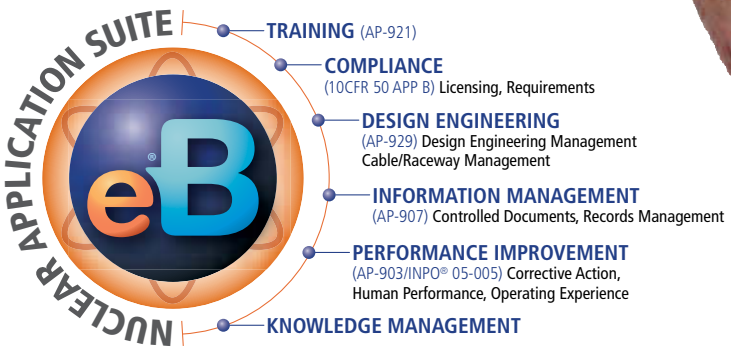


Nuclear Engineering Handbook, edited by Kenneth D. Kok. This text offers a broad introduction to nuclear power and nuclear engineering development by providing an overview of the history, current state, and future direction of nuclear reactors and technology, as well as a description of all aspects of the nuclear fuel cycle, from mining, enrichment, and fabrication to transportation, reprocessing, and disposal. In addition, the handbook presents analytical techniques for addressing issues such as safety, shielding, thermo hydraulics, and health physics. (768 pp., HB, $140, ISBN 978-1-4200-5390-6. Order from CRC Press, phone 800/272-7737; fax 800/374-3401; e-mail <orders@crcpress.com>; Web <www.crcpress.com>.) NN

Change is inevitable.
How well you control it is purely optional.

> “With eB we’ve been able to improve the rigor of our engineering design change process in accordance with INPO® AP-929 and can ensure that we are compliant with our licensed design basis requirements.”
>
> *— Janice Hoerber, IT Supervisor, AmerenUE/Callaway Plant*

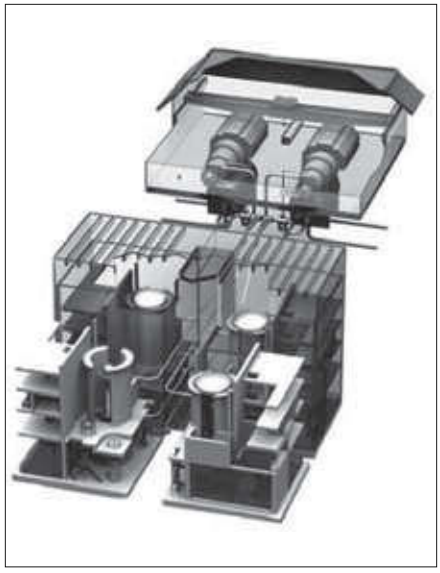
In this industry, where access to relevant and accurate information is key to your plant’s maintenance and operations, Enterprise Informatics’ integrated eB Nuclear Application Suite is your most viable option.



Enterprise Informatics
Information Management for the Intelligent Enterprise

Download the AmerenUE Callaway Case Study at
www.ebfornuclear.com/ameren

Late News



Babcock & Wilcox's mPower reactor design

Late News This Month:

B&W WILL SEEK APPROVAL FOR A NEW MODULAR PWR that is intended to be manufactured entirely by North American suppliers, built underground, and able to store in a containment-enclosed pool all of the spent fuel arising from its 60-year operation. The Babcock & Wilcox Company announced on June 10 that it would apply to the Nuclear Regulatory Commission in 2011 for design certification for what the company calls the mPower reactor, a 125-MWe pressurized water reactor. B&W also hopes in 2011 to "engage a commercial customer" that would apply to the NRC for a combined construction and operating license (COL) in 2012. The COL would, ideally, be issued in 2015, allowing for plant operation to begin in 2018. The announcement came during an event at Nuclear Energy Institute headquarters in Washington, D.C., where the participants included representatives from the Tennessee Valley Authority and Exelon, along with Sens. George Voinovich (R., Ohio), Lamar Alexander (R., Tenn.), and Bob Corker (R., Tenn.), and Reps. Lincoln Davis (D., Tenn.) and Zach Wamp (R., Tenn.). The Tennessee involvement has to do with a TVA–B&W letter of intent to explore the use of the Clinch River site near Oak Ridge as a lead plant site for the mPower reactor. TVA and Exelon have both expressed support for the mPower initiative, B&W said, but neither has committed to filing a COL application.

Both TVA and an Exelon predecessor, Commonwealth Edison Company, were involved in the last nuclear project at that location, the Clinch River Breeder Reactor, a liquid-metal fast-breeder reactor project spurred by the federal government through the Atomic Energy Commission but never completed. The involvement of power reactor licensees in the mPower campaign may be intended to show customer interest in the design. The NRC has been reluctant to devote resources to the certification of reactor models for which electricity providers have not sought licenses, as well as to small, "grid-appropriate" reactors.

B&W refers to the mPower design as "Generation III++" but stresses the aspects of the design that most closely fit in with the nuclear industry that exists now. The core would be a 17 × 17 array of fuel assemblies essentially the same as those used in current power reactors, only shorter. No ultraheavy forgings would be required, thus averting long-lead bottlenecks at Japan Steel Works and allowing every component to be manufactured in North America. B&W said that its existing supply chain can provide everything needed. The major departures from current practice are in the long duty cycle (five years between refuelings), the provision for pool storage of the reactor's entire 60-year buildup of spent fuel, underground construction, and low water use (makeup water for the nuclear steam supply system, but air cooling for the rest of the plant). B&W said it believes that two to six modules could operate at a typical site, providing power in increments reasonable for mid-sized or small utilities. Although the company did not give cost estimates, it said that mPower's scalability would make it competitive.

B&W had notified the NRC in an April 28 letter of its plans to apply for design certification in the first quarter of 2011. The NRC replied on May 27 that the mPower reactor design would come under the agency's Advanced Reactor Program, "which not only needs to consider licensing reviews in future fiscal years, but also the development of infrastructure related to new and different reactor technologies." B&W had asked to begin pre-licensing activities in June 2009. The NRC replied that for budgetary reasons, through September 2010 "the NRC staff will need to limit interactions with the designers of small power reactors to occasional meetings or other nonresource-intensive activities. As such, any requested work on the mPower reactor design that goes beyond these limitations will be placed on hold."

THE CANADIAN GOVERNMENT PLANS TO RESTRUCTURE AECL and give it a new mandate, according to a May 28 announcement. "The ultimate objective of this restructuring," said Minister of Natural Resources Lisa Raitt, "is to leverage Canada's long-term investment in nuclear energy and strengthen Canada's nuclear industry at a time of global expansion." While specific measures were not provided, the government did note that there is substantial private sector interest in Atomic Energy of Canada Limited's commercial operations, offering the possibility of developing a new commercially viable structure. Private companies have also expressed interest in being involved in the management of the Chalk River Laboratories.

A November 2007 review of AECL concluded that the two halves of the corporation—the CANDU Reactor Division and the Research and Technology Division, which includes the Chalk River Laboratories—have distinct mandates and resource and management needs, and that both would operate and develop better under different management structures. According to a summary report of the review, although there are good opportunities for AECL at home and abroad, the reactor division is too small and lacks the financial strength to establish a strong presence in the key markets needed to ensure its success.

The report says that AECL is, for the first time, facing competition from some large, "well-capitalized and integrated" companies, such as Areva and Westinghouse-Toshiba, for contracts in AECL's home market. The report also notes that "AECL has not been

profitable for the last five years . . . despite the commercial revenue it has generated and the infusion of significant government funding." Moreover, the report says, the company's reliance on government funding and approval processes in managing commercial projects valued at billions of dollars places it at a further disadvantage. Remaining a niche player, the report also notes, will not produce sufficient demand to make the reactor division a viable business. Given the significant private sector interest in taking part in AECL's operations, the government has hired N.M. Rothschild and Sons to develop a restructuring plan and to provide external financial advice.

Miller

▶ **OBAMA INTENDS TO NOMINATE WARREN "PETE" MILLER,** an ANS Fellow and member since 1973, to be the director of the Department of Energy's Office of Civilian Radioactive Waste Management (OCRWM), the White House announced on June 18. President Barack Obama had announced on June 10 that he would nominate Miller for assistant secretary of the DOE's Office of Nuclear Energy, and there is speculation that the nuclear energy office and OCRWM, which is in charge of the Yucca Mountain repository program, will be combined into one office. By press time, the White House had not responded to a request from *NN* to confirm or deny the speculation. A graduate of the U.S. Military Academy at West Point and a Vietnam veteran, Miller holds a Ph.D. in nuclear engineering from Northwestern University. He served for many years as a researcher and administrator at Los Alamos National Laboratory, retiring in 2001, and currently serves as a part-time nuclear engineering research professor at Texas A&M University. Miller was named a Fellow of the American Nuclear Society in 1982 and was elected to membership in the National Academy of Engineering in 1996. Both of Miller's appointments require confirmation by the U.S. Senate.

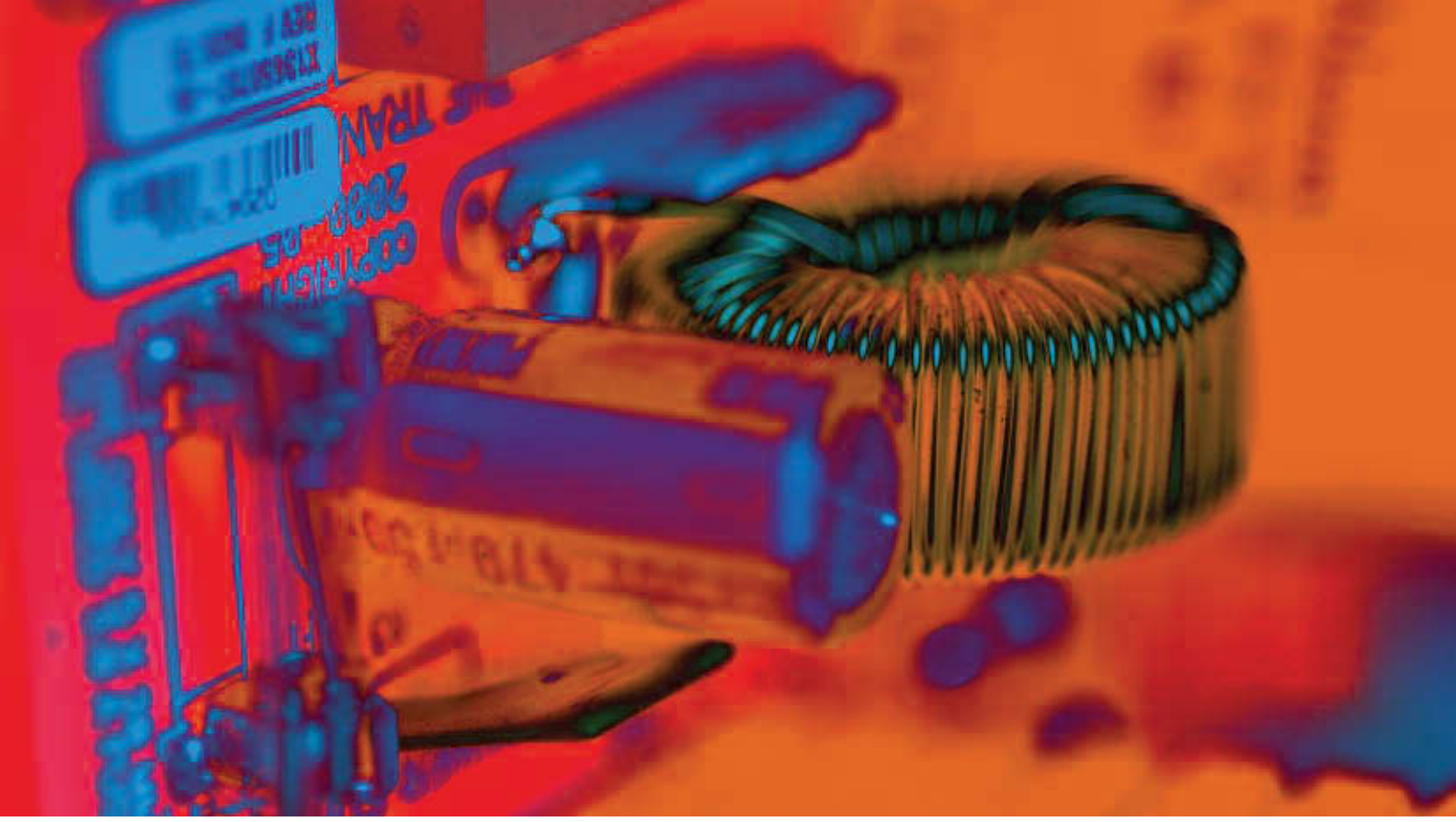
A RULING IN FAVOR OF THE VOGTLE EARLY SITE PERMIT (ESP) was issued on June 22, likely clearing the way for the issuance of the permit later this year. The Atomic Safety and Licensing Board (ASLB) presiding over Southern Nuclear Operating Company's application for an ESP for two new power reactors at the Vogtle site near Waynesboro, Ga., rendered a partial initial decision on the contested portion of the hearing, finding in Southern Nuclear's favor on all three contentions from intervenors. The decision will become final on August 3 unless an appeal is filed with the Nuclear Regulatory Commission. The ASLB had yet to issue a decision on the other part of the proceeding, the mandatory hearing required under 10 CFR Part 52. Along with the ESP, Southern Nuclear has applied for a limited work authorization (LWA) to begin site preparation activities for the twin Westinghouse AP1000 pressurized water reactors that would be built at the site where two Westinghouse PWRs are already in operation. Charles Pierce, Vogtle deployment licensing manager, said at a June 17 session of the American Nuclear Society's Annual Meeting in Atlanta that the company expects to begin safety-related work under the LWA in February. (A report on the 2009 ANS Annual Meeting will appear in the August issue of *NN*.)

NRG ENERGY LOST ITS COURT CHALLENGE TO EXELON on June 19, when the U.S. District Court for the Southern District of New York ruled that the charges in NRG's suit against Exelon were without merit. In the suit filed in March (*NN,* Apr. 2009, p. 63), NRG charged that Exelon's offer to buy shares of NRG was based on misleading statements and alleged that Exelon's strategy is to expand the NRG board and run candidates for board seats, but not to actually buy a controlling interest, which would trigger the immediate payment of about $4 billion in outstanding NRG debt. Exelon has extended its offer to buy shares of NRG to July 21, the scheduled date of NRG's annual meeting. NRG owns the largest share of STP Nuclear Operating Company, which operates two power reactors and is seeking to build two new reactors. Exelon owns and operates 17 power reactors and has applied for licenses to build two more, but has suspended the application.

Separately, Exelon announced in June that in an effort to reduce operations and maintenance expenses by $350 million in 2010, the company will lay off 500 employees—about 400 in corporate support positions and the rest in management-level positions.

DUKE AND AREVA WILL EXPLORE NEW-REACTOR SITING IN OHIO as part of an effort to find new uses for the closed Portsmouth Gaseous Diffusion Plant. On June 18, Ohio Gov. Ted Strickland joined representatives of Duke Energy, Areva, USEC Inc., and the Southern Ohio Diversification Initiative (SODI) in Piketon, Ohio, to announce the formation of an alliance to pursue the development of an energy park at the Portsmouth site. James Rogers, chairman, president, and chief executive officer of Duke Energy, has sent a proposal to the Department of Energy seeking as-yet-unspecified financial support in line with the DOE's stated interest in energy parks and in making productive use of DOE sites that have lost their original missions.

Continued on page 115



If you need it, we can design and build it.

Design. Build. Test. Install. Support. As a company, NLI didn't start out to become an original equipment manufacturer. But it's been a natural progression, since our goal has always been to supply the most comprehensive services and equipment to the nuclear industry. With our experience and suppliers, we are able to provide the equipment nuclear utilities need. Whether it's standby power, electrical distribution, HVAC, or ASME III equipment and systems that are needed, we can design and build to custom parameters, quickly and efficiently, from scratch, with precise engineering and state-of-the-art technology. And then install everything seamlessly. From wiring the smallest componentry on circuit boards to the manufacture of large hardware, we've got control over the entire process. NLI stands poised to set new standards of excellence in the trade as we rise to the challenge of helping our customers supply the world with nuclear power.

> Our name says it all.

NLI

NUCLEAR LOGISTICS INC

The new acronym for OEM.

www.nuclearlogistics.com • 800.448.4124

Letters

Industrial safety's pace

After reading the May 2009 feature article, "U.S. capacity factors: Can older reactors keep up the pace?" I started thinking as a safety professional: How is industrial safety performance in the nuclear industry "keeping up the pace"? How can the nuclear industry take personnel safety to the next level? With a challenging economic climate, rising costs in occupational health expenses, and an ever-increasing focus on striving for improvement, progressive companies are finding themselves asking, "Are we measuring the right things?"

With respect to industrial safety, some organizations have relied on the OSHA record-keeping rate methodology as the sole means of measuring overall performance. Others, however, have included more advanced, sophisticated methods of measuring industrial safety performance, including measuring not just lagging indicators (such as injury rates), but leading indicators, too.

The Diablo Canyon power plant, for example, has begun implementing elements of the Stablein Index, a comprehensive performance health index that looks at a combination of leading and lagging indicators to measure overall plant health with respect to industrial safety.

One of the elements of the Stablein Index that Diablo Canyon has implemented—the Industrial Safety Hazard Backlog Index (ISHBI)—was recently recognized by the Institute of Nuclear Power Operations as an industry Beneficial Practice. The ISHBI measures an organization's effectiveness at resolving identified safety issues by due dates that are based on the severity and frequency of exposure. The Stablein Index also includes indicators to measure a station's performance around quality industrial safety observations, causal factors analysis, and incident severity analysis.

By continually challenging and asking ourselves if we are measuring the right things, we as an industry can ensure that we are staying ahead of the curve, striving for excellence, and "keeping up the pace" with respect to industrial safety.

Joe Stablein
San Luis Obispo, Calif.

Correction

A number of our sharp-eyed readers (probably of military background) have informed us that the airplane shown in a photograph on page 55 of the June 2009 issue is not a B-52 bomber, as we had noted. The plane, which is parked on the grounds of the National Museum of Nuclear Science & History, in Albuquerque, N.M., is in fact a B-29, according to a museum official. *Nuclear News* regrets the error.

LETTERS TO THE EDITOR on any aspect of the contents of *Nuclear News*—or on related nuclear industry issues—are welcome. Letters (which should not exceed 700 words and may be subject to editing for length/clarity) should be addressed to:

Nuclear News Letters
555 N. Kensington Ave.
La Grange Park, IL 60526
Fax: 708/352-6464
e-mail: btompkins@ans.org (do not send with an attached file)

Letter should include the writer's full name, address, and daytime phone and fax numbers.

www.tranter.com

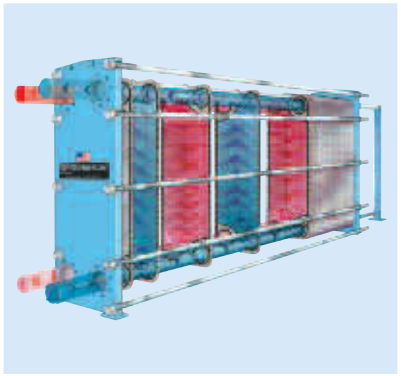
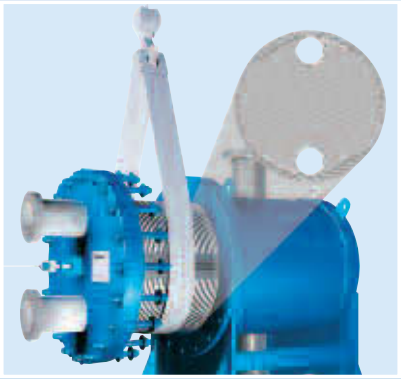
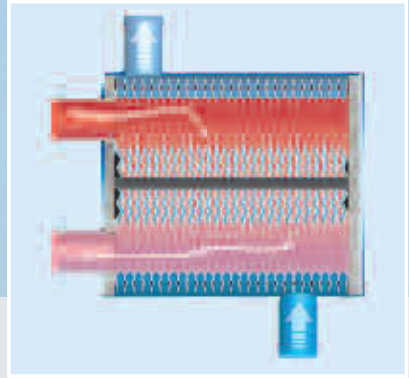


Plate HEs can be easily expanded by 40–50% and serviced within their own footprint.



SUPERMAX removable core reduces service time, equipment needs and access space requirements.



SUPERMAX corrugated plate turbulence and countercurrent flow combine for high heat transfer rates.

RENAISSANCE-READY HEAT TRANSFER

Manage thermal processes more efficiently with Tranter plate HEs.

With Green initiatives driving the Nuclear Renaissance, it's more important than ever to maximize your heat conversion efficiencies. And it also just makes good business sense. Fortunately, Tranter continues to lead the way by offering a wide range of gasketed and welded heat exchangers that deliver cost-effective efficiency for pressures and temperatures up to 1000 psig and 1000°F.

Compared to shell & tube, these compact, plate-type units typically take up only 1/10 the installed footprint and save weight, material and maintenance costs. Their proven performance in feedwater heating, condensing, thermal isolation circuits, component cooling and many other applications translates into a tighter thermal loop.

Our products are manufactured 100% in the USA, and we are ready to meet your needs from production facilities in Germany, Sweden, China, Brazil and India. Call or visit our factory for more information.

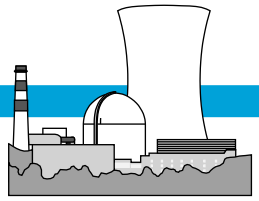
Technically superior, Tranter SUPERCHANGER® Plate & Frame and SUPERMAX® Shell & Plate out-perform shell & tube in countless applications.

Tranter, Inc.
P.O. Box 2289
Wichita Falls, TX 76307
Tel: (940) 723-7125 • Fax: (940) 723-5131
E-mail: nuclearheatexchangers@tranter.com

GO GREEN. THINK BLUE.

TRANTER®
The heat transfer people

650763



Plant sites shown on this map are involved in news stories in this section. Light type on a dark background indicates an existing plant; dark type on a light background indicates a licensing project.

LICENSE RENEWAL

Pilgrim, Vermont Yankee challenges blunted

The NRC has denied a Massachusetts challenge to the use of high-density spent fuel racks at both reactors but will consider briefs regarding severe accident mitigation alternatives at Pilgrim.

On June 4, the Nuclear Regulatory Commission issued orders regarding requests for the review of rulings by the Atomic Safety and Licensing Boards (ASLB) presiding over the license renewal proceedings for Entergy Nuclear's Pilgrim and Vermont Yankee reactors, effectively setting aside one challenge and limiting another to the opportunity to submit further briefs.

The Commonwealth of Massachusetts has challenged the use of high-density storage racks in the spent fuel pools at Pilgrim, sited near Plymouth, Mass., and Vermont Yankee, sited near Vernon, Vt., about three miles north of the Massachusetts border. The commonwealth posited accident risks and consequences from terrorist acts that it alleged were not considered in the environmental impact statements. The NRC's position, with which the ASLBs concurred, is that the use of high-density storage racks has been resolved as a generic issue for all license renewals. The NRC last August denied a petition from Massachusetts for a rulemaking to change the generic finding, and a challenge by the commonwealth to the denial is now pending in the U.S. Court of Appeals for the Second Circuit, in New York.

Massachusetts then requested that the NRC either suspend the license renewal proceedings until the court case is decided or pledge to condition the renewals on the outcome of the court case. In its June 4 order, the NRC stated that it cannot anticipate in advance of a court decision the remedies that may be appropriate but that it would "respond accordingly" if the denial of the rulemaking petition is overturned, and so ruled that the commonwealth's requested relief is unnecessary.

The other order concerned a petition by one of the parties in the Pilgrim renewal proceeding, the citizen organization Pilgrim Watch. In a 2–1 vote last October, the ASLB ruled against a Pilgrim Watch contention on the adequacy of Entergy's severe accident mitigation alternatives (SAMA) because of the use of a straight-line Gaussian plume model input to the MELCOR Accident Consequence Code System 2. In her dissent, Judge Ann Marshall Young said that while the board's admission of the contention for consideration barred generic challenges to probabilistic risk assessment techniques, it did not exclude specific challenges. The commissioners have requested that the parties provide additional briefs on whether the ASLB's majority position was correct and whether a different approach would have produced a significantly more cost-beneficial SAMA. The commissioners requested that briefs be submitted by June 25, and that responsive briefs be filed within 10 days of the initial briefs' filing.

Pilgrim, rated at 690 MWe, and Vermont Yankee, rated at 617 MWe, are both boiling water reactors. Their current licenses expire in 2012. If approved, renewal will delay expiration until 2032.

■ Another issue for Vermont Yankee is the validity of metal fatigue calculations on the reactor containment spray nozzle and the reactor vessel recirculation outlet nozzle. On May 21, the NRC staff issued a supplemental safety evaluation report based on confirmatory analyses carried out by Entergy, with calculations known to be consistent with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code. In the supplement, the staff concluded from Entergy's analyses that the fatigue

values are acceptable, that Entergy has accounted adequately for reactor water chemistry effects, and that the analyses are in accordance with ASME Code.

Vogtle-1 and -2 renewed; Beaver Valley EIS, SER

In addition to the events in the previous story, the following are recent developments regarding license renewal applications for other plants:

■ On June 3, the Nuclear Regulatory Commission renewed the operating licenses of Southern Nuclear Operating Company's *Vogtle-1 and -2,* twin 1169-MWe Westinghouse pressurized water reactors sited near Waynesboro, Ga. The 20-year renewal extends the license expiration dates to January 16, 2047, for Unit 1, and February 9, 2049, for Unit 2. The renewal proceeding was completed in just over 23 months, and because no contentions were admitted from petitioners, no public hearings were held.

■ The last of the major NRC staff paperwork has been completed on FirstEnergy Nuclear Operating Company's application to renew the licenses for *Beaver Valley-1 and -2,* Westinghouse PWRs sited near Shippingport, Pa. The final environmental impact statement (EIS) was issued on May 19 in the form of Supplement 36 to NUREG-1437, *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, and the final safety evaluation report (SER) was issued on June 8. Both documents support renewal, which would extend the license expiration dates to 2036 for the 911-MWe Unit 1, and 2047 for the 868-MWe Unit 2. FirstEnergy applied for renewal in August 2007. A final decision is currently scheduled for September.

■ On June 4, the NRC staff issued the SER with open items for the renewal application for *Prairie Island-1 and -2,* which are owned by Northern States Power Company–Minnesota. The twin 536-MWe Westinghouse PWRs are sited near Red Wing, Minn. The owner applied for renewal in April 2008, and a final decision is currently scheduled for next February. The current licenses expire in 2013 and 2014.

■ Arizona Public Service Company's application to renew *Palo Verde-1, -2, and -3* was docketed by the NRC on May 11. The owner applied last December to renew the licenses of the Combustion Engineering PWRs (rated at 1333 MWe, 1336 MWe, and 1339 MWe, respectively) near Wintersburg, Ariz., and the NRC staff has determined that the application contains sufficient information for the review process to begin. Petitions to intervene in the renewal proceeding will be accepted through July 10, but anyone seeking to submit a petition would have had to request by June 30 a digital ID certificate and an electronic docket. In the May 26 *Federal Register,* the NRC staff announced the start of the process to determine the scope of the EIS; public meetings were scheduled for June 25, and written comments will be accepted through July 27 by the Chief, Rulemaking and Directives Branch, Division of Administrative Services, Office of Administration, Mailstop TWB 5B-01M, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to <PaloVerde.EIS@nrc.gov>. Palo Verde-1, -2, and -3 are currently licensed until 2024, 2025, and 2027, respectively.

PLANNING

Energy Northwest may be considering new nuclear

A June 3 Associated Press article stated that Energy Northwest, the public power

Vogtle: Operating licenses for both units renewed in June by NRC

agency that owns and operates the Columbia boiling water reactor near Richland, Wash., has requested that its member utilities and municipalities contribute funding for research into the addition of new nuclear generating capacity.

Writer Shannon Dininny stated that the AP had obtained a copy of a May 27 letter to the 25 members asking each to contribute $25 000 for further research into building "one or more small reactors." The letter reportedly stated that members who contribute funding to the study would have first rights to the power produced from the new nuclear capacity if it is built.

At this writing, Energy Northwest had not commented on the AP article or publicly expressed interest in pursuing new nuclear capacity. Speculation by online commentators suggested a connection to the NuScale reactor design, a spin-off of work at nearby

Maximizing the Assets

A status report on license renewal and power uprates

Owners of power reactors now in operation can maximize their investments by taking advantage of either, or both, of two options available through the Nuclear Regulatory Commission: license renewal, which can add 20 more years to the term of an operating license; and power uprates, which can allow higher power output from the original fundamental reactor hardware. Both options require a licensee to show that its plant can continue to operate safely, involve NRC staff reviews, and include the possibility of public hearings. The license renewal process generally takes about 22 months for an uncontested proceeding, and about 30 months for one with hearings. There are three different kinds of power uprates—a reactor might, in theory, be given one, two, or all three—and the NRC process is more case-by-case and less subject to rigorous scheduling in advance than the license renewal process. Both options can also be influenced generically by developments in industry-backed projects, from organizations such as the Nuclear Energy Institute and reactor vendors.

Latest developments: License renewal for Vogtle-1 and -2 was approved on June 3. Exelon has allowed the NRC to identify its license renewal application planned for September 2011 as intended for Limerick-1 and -2. Exelon has also altered its schedule for other license renewal applications, with submissions now planned for July 2013, July 2015, and April 2017. NextEra Energy Resources has applied for a 17 percent power uprate at each of its two Point Beach reactors; at this writing, the NRC had not announced acceptance of the application for review.

In some cases, Exelon has planned submission dates for renewal but has not specified the reactors. "STARS plant" indicates an unspecified participant in the Strategic Teaming and Resource Sharing (STARS) alliance. The only STARS members not already specified are Comanche Peak and Diablo Canyon, so with three dates reserved, STARS may develop an application for a plant that is not currently a STARS member.

More details can be found on the following pages at the NRC Web site: for license renewal, <www.nrc.gov/reactors/operating/licensing/renewal/applications.html>, and for power uprates, <www.nrc.gov/reactors/operating/licensing/power-uprates/approved-applications.html> and <www.nrc.gov/reactors/operating/licensing/power-uprates/pending-applications.html>.

License renewal

Approved (with new expiration years)

Calvert Cliffs-1, 2034	*North Anna-2,* 2040	*McGuire-2,* 2043	*Cook-1,* 2034	*Nine Mile Point-1,* 2029
Calvert Cliffs-2, 2036	*Surry-1,* 2032	*Robinson-2,* 2030	*Cook-2,* 2037	*Nine Mile Point-2,* 2046
Oconee-1, 2033	*Surry-2,* 2033	*Summer,* 2042	*Millstone-2,* 2035	*Monticello,* 2030
Oconee-2, 2033	*Peach Bottom-2,* 2033	*Ginna,* 2029	*Millstone-3,* 2045	*Palisades,* 2031
Oconee-3, 2034	*Peach Bottom-3,* 2034	*Dresden-2,* 2029	*Point Beach-1,* 2030	*FitzPatrick,* 2034
ANO-1, 2034	*St. Lucie-1,* 2036	*Dresden-3,* 2031	*Point Beach-2,* 2033	*Wolf Creek,* 2045
Hatch-1, 2034	*St. Lucie-2,* 2043	*Quad Cities-1,* 2032	*Browns Ferry-1,* 2033	*Harris,* 2046
Hatch-2, 2038	*Fort Calhoun,* 2033	*Quad Cities-2,* 2032	*Browns Ferry-2,* 2034	*Oyster Creek,* 2029
Turkey Point-3, 2032	*Catawba-1,* 2043	*Farley-1*, 2037	*Browns Ferry-3,* 2036	*Vogtle-1,* 2047
Turkey Point-4, 2033	*Catawba-2,* 2043	*Farley-2,* 2041	*Brunswick-1,* 2036	*Vogtle-2,* 2049
North Anna-1, 2038	*McGuire-1,* 2041	*ANO-2,* 2038	*Brunswick-2,* 2038	

Applications under review (with submission dates)

Pilgrim, 1/27/2006	*Beaver Valley-1 & -2,* 8/28/2007	*Cooper,* 9/29/2008
Vermont Yankee, 1/27/2006	*Three Mile Island-1,* 1/8/2008	*Arnold,* 10/1/2008
Susquehanna-1 & -2, 9/15/2006	*Prairie Island-1 & -2,* 4/15/2008	*Palo Verde-1, -2, & -3,* 12/15/2008
Indian Point-2 & -3, 4/30/2007	*Kewaunee,* 8/14/2008	*Crystal River-3,* 12/18/2008

Expected applications (with projected submission dates)

Hope Creek/Salem, 9/2009	*South Texas Project-1 & -2,* 10–12/2010	*Grand Gulf-1,* 1/2012	*Perry,* 8/2013
STARS plant, 10–12/2009	*Waterford-3,* 1/2011	*STARS plant,* 10–12/2012	*Exelon plant,* 7/2015
Columbia, 1/2010	*Limerick-1 & -2,* 9/2011	*River Bend-1,* 1/2013	*Exelon plant,* 4/2017
Seabrook, 4–6/2010	*Callaway-1,* 10–12/2011	*Exelon plant,* 7/2013	
Davis-Besse, 8/2010		*STARS plant,* 7–9/2013	

Power uprates

Approved (since the start of 2007, with percentage of thermal power increase)

Browns Ferry-1, 5.0	*Susquehanna-2,* 13.0	*Hope Creek,* 15.0	*Cooper,* 1.6
Crystal River-3, 1.6	*Vogtle-1,* 1.7	*Comanche Peak-1,* 4.5	*Davis-Besse,* 1.6
Susquehanna-1, 13.0	*Vogtle-2,* 1.7	*Comanche Peak-2,* 4.5	*Millstone-3*, 7.0

Applications under review (with percentage of thermal power increase)

Browns Ferry-1, 15.0	*Browns Ferry-3,* 15.0	*Calvert Cliffs-2,* 1.4	*Point Beach-1,* 17.0
Browns Ferry-2, 15.0	*Calvert Cliffs-1,* 1.4	*Monticello,* 12.9	*Point Beach-2,* 17.0

Providing practical clean energy.

With 50 years of nuclear experience in designing and manufacturing nuclear equipment, B&W is now developing a scalable nuclear reactor, featuring zero-emission operations.

The modular **B&W mPower™** reactor will provide affordable, efficient, passively safe and flexible power. As a single 125 MWe reactor, or as multiple units, B&W is leading the way in providing a progressive nuclear energy solution.

B&W mPower reactor design

Manufactured in North America.
Creating jobs. Generating energy.

www.babcock.com
1.800.babcock

B&W thebabcock&wilcoxcompany
a McDermott company

Oregon State University, but that could be one of five options for someone in the market for small power reactors. The Nuclear Regulatory Commission staff has received presentations from Toshiba for its 4S design and Hyperion Power Generation for the Hyperion reactor, as well as NuScale, and may receive design certification applications in 2011 from GE Hitachi Nuclear Energy for the PRISM design and Babcock & Wilcox for the mPower design, which was announced on June 10 and reported on page 17.

NORTH ANNA

One contention denied, another tried on Unit 3

The Blue Ridge Environmental Defense League (BREDL), a citizen organization that has intervened in a number of licensing proceedings for new power reactors, has been keeping itself and others busy. On June 2, the Atomic Safety and Licensing Board (ASLB) presiding over Dominion Generation's application for a combined construction and operating license (COL) for a new power reactor at the North Anna site in Virginia denied BREDL's ninth proposed contention in the proceeding. A few days later, BREDL submitted its 10th contention to the ASLB.

BREDL had submitted eight contentions when the hearing opportunity for North Anna-3 opened in early 2008. In August of that year, the ASLB admitted one contention in part and denied the others. In March 2009, BREDL submitted its ninth contention, which questioned the safety of long-term on-site spent fuel storage in the absence of a high-level waste repository, and argued that the Nuclear Regulatory Commission's proposed revision to its waste confidence decision and a related proposed rule, both issued last October, constitute new information and justify reopening the record to new contentions. The ASLB disagreed, concurring with a similar finding by the ASLB for the Tennessee Valley Authority's Bellefonte-3 and -4, regarding a similar request by BREDL, that the waste confidence information was based on materials distributed much earlier and thus was not "new" in the sense of justifying new contentions.

BREDL's 10th contention is based on Revision 2 of Dominion's final safety analysis report (FSAR), which notes that the radwaste building could store as much as six months' output of low-level waste from North Anna-3. BREDL noted that the FSAR had previously stated that temporary storage would not be used to support plant operation. BREDL added that it is "aware of a motion to dismiss Contention One," which pointed out the project's current lack of access to an LLW disposal site. This was the only contention admitted in the proceeding, and so if it is stricken, the contested hearing will not have to take place at all. BREDL requested "to submit a new modified contention with supporting expert opinion regarding low-level radioactive waste management" at North Anna-3. At this writing, the ASLB had not responded to the request.

In some respects, North Anna-3 has progressed farther in the licensing process than any other COL application, but the project's prospects have been difficult to assess ever since Dominion announced in January that it had halted talks with GE Hitachi Nuclear Energy and would open the process to other vendors—even though the application has continued to go forward based on the ESBWR design, which is available only from GE Hitachi. The NRC staff has begun issuing chapters of the safety evaluation report with open items, based on the use of an ESBWR. Chapters 1, 4, 6, 7, 15, 17, 18, and 19 were issued on May 19, and chapter 8 on May 26.

Section continued

Power Briefs

GE HITACHI MAY SEEK TO LICENSE PRISM IN 2011, according to a letter from the company to the Nuclear Regulatory Commission. In response to an earlier NRC request that the agency be notified in advance of plans to submit applications for new reactor licenses, design certifications, and manufacturing licenses, GE Hitachi Nuclear Energy's senior vice president, Robert E. Brown, summarized the company's already established activities on the ABWR and ESBWR reactor designs. He also stated that GE Hitachi is "considering submittal of a PRISM reactor design review application as early as mid-2011" and that it may also request a manufacturing license. PRISM (Power Reactor Inherently Safe Module) is a design for a sodium-cooled fast-neutron reactor that had been developed in the 1980s and 1990s as part of the Department of Energy's Advanced Liquid Metal Reactor Program. It was later refined by GE Hitachi as part of the Global Nuclear Energy Partnership, and the company may pursue the design further because of "industry and DOE interest in the PRISM reactor as part of efforts to close the nuclear fuel cycle" through the use of advanced fuels and the burnup of minor actinides. The letter, dated March 19, was posted on May 22 in the ADAMS document retrieval system on the NRC's Web site, at <www.nrc.gov>, with the accession number ML091330056.

TWO REACTORS SWITCHED OVERSIGHT COLUMNS in May. Luminant Power's Comanche Peak-1 had been in the "regulatory response" column of the action matrix of the Nuclear Regulatory Commission's reactor oversight process, but the agency has promoted it to the "licensee response" column, which denotes the lightest level of regulation by the NRC. Moving the other way, from "licensee" to "regulatory," was Northern States Power Company–Minnesota's Prairie Island-2 because of a white finding (low to moderate safety significance) in the public radiation safety cornerstone during the first quarter of 2009.

THE SENATE CONFIRMED SIX DOE APPOINTEES during mid-May. Now on the job at the Department of Energy are Deputy Secretary Daniel Poneman, Under Secretary for Energy Kristina Johnson, Under Secretary for Science Steven Koonin, General Counsel Scott Blake Harris, Assistant Secretary for Policy and International Affairs David Sandalow, and Assistant Secretary for Environmental Management Ines Triay.

ENTERGY WANTS MORE TIME TO START ITS SPINOFF. Entergy Nuclear Operations owns seven reactors outside of its regulated-utility territory, and it has planned to create a separate company, to be called Enexus, to take charge of them. (Entergy and Enexus would then share ownership of another company, to be called Equagen, that would operate the reactors.) The Nuclear Regulatory Commission approved the necessary license transfers in July 2008, but approvals have not yet been granted by state agencies in New York and Vermont, and the NRC approval expires on July 28. On May 15, Entergy asked the NRC to extend the order for six months, and the NRC stated on May 27 that it will consider the request.

THE MINNESOTA NEW-REACTOR BAN WILL STAY IN EFFECT. On May 15, the Minnesota state legislature sent Gov. Tim Pawlenty its final omnibus energy bill, without a provision to repeal the state's ban on the construction of new power reactors. A final attempt in a House-Senate conference by senators hoping to repeal the ban did not sway enough House conferees.

Bechtel Nuclear: Building on the Past Powering the Future

Bechtel Power has been the active world leader in the nuclear industry for more than 60 years with more than 74,000 MW of nuclear design, construction and operating plant support experience. We have designed and/or built more than half of the nuclear power plants in the United States and 150 nuclear power plants worldwide.

Today, we are leading the nuclear renaissance in the United States. From plant restarts and completions to steam generator replacements and extended power uprates, we're helping customers get the most out of existing assets. We also offer a full range of services for new-generation nuclear plants, including construction and operating license applications, EPC, and owner's engineer/program management.

Bechtel Power

Frederick, Maryland, USA ◆ 1-301-228-8364 ◆ bechtel.com

San Francisco ◆ Houston ◆ London ◆ New Delhi ◆ Shanghai

BECHTEL

LEGISLATION

Small gains for nuclear in energy bill markups

The development of energy-related legislation in the 111th Congress is subject to constant change, and *Nuclear News*'s policy is generally to reserve coverage for bills that have been completed and enacted. This spring, however, some events that may have lingering significance merit brief mentions. In general, while majority support has not yet been mustered to define nuclear power as a renewable energy source, amendments have been adopted that reduce the extent to which renewable-energy requirements could penalize power reactor operators.

In the House, the Waxman-Markey bill, which includes a "cap-and-trade" system for carbon emissions from electricity generation, would give partial credit to new power reactors as renewable energy sources, but would not extend this to existing reactors.

Focus on Finance

by Linda C. Byus

Yucca Mountain—dead or alive?

The U.S. Department of Energy's proposed fiscal year 2010 budget requests $197 million for the Office of Civilian Radioactive Waste Management and the Yucca Mountain Project, a reduction of about $90 million from the prior year. The budget document that the DOE submitted to Congress states that the request "implements the administration's decision to terminate the Yucca Mountain program while developing nuclear waste disposal alternatives."

Under the leadership of Energy Secretary Steven Chu, the DOE's big-picture agenda is "transforming the energy economy through science and innovation." The DOE requested a 2010 budget totaling $26.4 billion in addition to the $38.7 billion included in the American Recovery and Reinvestment Act, providing a total of $65.1 billion to invest in the transformation of the U.S. energy industry. What does the DOE budget mean for the Yucca Mountain program and the broader issue of radiation waste disposal in the United States?

Nevada senator and Senate Majority Leader Harry Reid declared that the budget announcement by the Obama administration "reaffirms its strong commitment to the death of the failed Yucca Mountain idea." The situation, however, is not as simple or clear cut as Senator Reid suggests. The Nuclear Waste Policy Act (NWPA) passed by Congress in 1982 established a contractual agreement under which the DOE would remove and store used nuclear fuel in exchange for a fee of 1 mill per kilowatt-hour of nuclear-generated electricity, paid by nuclear utilities' customers. In 1987, Congress amended the NWPA and designated Yucca Mountain the only site for DOE consideration as a commercial spent fuel and high-level waste repository. The "death" of the Yucca Mountain program requires federal legislative action.

The majority of the 2010 Yucca Mountain budget is designated to be spent on a commission that will examine alternatives for meeting the federal responsibility to manage and ultimately dispose of spent nuclear fuel and other HLW from both commercial and defense activities. The budget also provides funding to continue the repository licensing proceeding that is currently before the Nuclear Regulatory Commission. Secretary Chu has indicated that there is scientific value in continuing to review the license application for the Yucca Mountain site, even though the administration's policy is that it will never be used. The 2010 budget proposal does not provide funding to continue work on Yucca Mountain, but the door has not been slammed shut.

In the state of Nevada, the fight over Yucca Mountain continues. For the past several years, the state's Agency for Nuclear Projects has received $5 million from the DOE for its legal battles against the Yucca Mountain Project. The proposed DOE 2010 budget that cut funding for Yucca Mountain also cut the agency's funding to $3.2 million. Nevertheless, the state agency no doubt will continue its legal opposition until the license application is withdrawn or terminated and will continue to seek federal funding for the legal battle.

The potential financial implications of the Yucca Mountain debate are enormous for both the nuclear generating utilities and the U.S. government. Nuclear utilities' customers have been paying the nuclear waste fee since 1983, and the collected funds have been paid to the U.S. Treasury. The NWPA obligated the DOE to begin collecting used fuel from reactor sites by 1998, which has not yet occurred.

And so, the DOE has been in breach of contract since 1998. As a result, more than 40 commercial reactors have exceeded their existing storage capacity and have been forced to purchase dry storage systems, and an additional 12 decommissioned reactors are using dry cask storage. The utilities are currently absorbing the costs of storage in addition to paying the DOE fee. More than 60 lawsuits have been brought against the DOE for its failure to meet its obligation to collect used fuel, and the DOE's liability accrues at an average rate of $500 million per year. To date, utilities have been awarded judgments of about $750 million, and the DOE estimates that it will have to pay $10 billion in the future. If the Yucca Mountain Project is scrapped entirely, the liabilities could be much higher. One congressional review estimates that the liability could reach $40 billion.

A related issue is the Nuclear Waste Fund balance, which is the amount of the total accumulated nuclear waste fees less the funds used for the Yucca Mountain Project. The current balance is approximately $22 billion, and nuclear utilities are paying about $760 million into the fund annually. Compare this with the proposed 2010 budget funding of $197 million for Yucca Mountain. Because the funds collected for nuclear fuel disposal are not set aside for future use, the $22-billion Nuclear Waste Fund balance represents a growing liability of the federal government to pay for nuclear fuel disposal.

Secretary Chu has suggested that the commission that is to be established to evaluate radioactive waste issues could submit recommendations before the end of 2009. While work on Yucca Mountain has been effectively halted through the budget process, there appears to be little urgency to resolve the issue. Alternative dry cask storage capability provides some time to move slowly as nuclear utilities absorb the incremental storage costs. The DOE, however, has a contractual obligation to the utilities, and its financial liability continues to mount. Senator Reid's proclaiming the death of Yucca Mountain could serve as a catalyst for the federal government to acknowledge and address its legal obligation to manage HLW in the United States. **FoF**

Linda C. Byus (<LCByus@aol.com>) is a Chartered Financial Analyst and currently runs her own business, BYI Consulting, established in 2004. As a consultant, she provides feedback to utilities' senior management regarding industry trends and investor concerns as a basis for their strategic discussions and planning.

An amendment offered by Rep. Cliff Stearns (R., Fla.) would have included existing reactors, but it was defeated by the Energy and Commerce Committee on May 20 by a vote of 30–26. Of the committee's 36 Democrats, five voted for the amendment, 29 voted against it, and two did not vote. Of the 23 Republicans, 21 voted for the amendment, one (Joe Barton, of Texas) voted against it, and one did not vote.

Things have gone somewhat better in the Senate, with the markup by the Energy and Natural Resources Committee of a bill that would require electric utilities to derive at least 15 percent of power generation from renewable sources such as hydro, solar, and wind. The practical effect of this is that a baseline generation amount would be set, and renewables would have to account for at least 15 percent of that amount. Although nuclear power is not included in the renewables category, Sen. Lisa Murkowski, of Alaska, and other Republicans have succeeded in adding a provision whereby any new nuclear capacity—from new reactors and power uprates at existing reactors—would not be considered part of the baseline from which the renewable amount would be computed. Therefore, even though this part of nuclear capacity would not be counted toward the renewable amount, it would be excluded from the baseline, with a status that is neither renewable nor nonrenewable.


Murkowski

On June 10, House Republicans introduced their own energy bill, which omits cap-and-trade and sets no formal reduction of greenhouse gas emissions. The bill calls for the construction of 100 new power reactors in the next 20 years—a goal that has been stated frequently by Sen. Lamar Alexander (R., Tenn.)—and reduced barriers to oil and gas development on land and offshore. This may ultimately influence some of the coming debate, but neither this bill nor any of the others is likely to be passed in its current form and sent to the White House for signature.

SUMMER

New reactors challenged in S.C. Supreme Court

On May 22, the environmental organization Friends of the Earth filed an appeal with the South Carolina Supreme Court, challenging the February decision of the South Carolina Public Service Commission (PSC) to permit South Carolina Electric & Gas Company (SCE&G) to build two new power reactors at the Summer plant site and to recover some of the costs from ratepayers during construction, as allowed under the state's Baseload Review Act of 2007. Friends of the Earth had challenged the decision before the PSC itself, which denied the appeal in March. The plaintiff has stated that the court suit may be the first in any state to challenge a law allowing rate recovery during construction.

Summer-2 and -3 would be Westinghouse AP1000s, at the site near Parr, S.C., where SCE&G operates a 972.7-MWe Westinghouse pressurized water reactor. SCE&G would own 55 percent of the units, and the state-owned South Carolina Public Service Authority, also known as Santee Cooper, would own the remaining 45 percent. The Nuclear Regulatory Commission is carrying out technical reviews of the application for combined construction and operating licenses, and the owners have signed an engineering, procurement, and construction contract with Westinghouse and its part-owner/architect-engineer, Shaw Stone & Webster.

Soon after the appeal was filed, SCE&G applied to the PSC for a 1.1 percent rate increase that would go into effect in the fall. Santee Cooper is not under the PSC's jurisdiction, and its board is to decide in August whether to put a 4.4 percent rate hike into effect this fall.

Section continued

INDIAN POINT

License renewal ASLB acts on three motions

On May 28, the Atomic Safety and Licensing Board presiding over Entergy Nuclear Operations' request for the renewal of the operating licenses for its Indian Point reactors denied two motions from intervenors in the proceeding and accepted an intervenor request that one of its accepted contentions be applied to the draft environmental impact statement (EIS).

The operating licenses for Indian Point-2 and -3 expire in 2013 and 2015, respectively. The renewal application, filed in 2007, has become the most contested to date, with 17 contentions having been accepted for consideration in the upcoming hearings. The plant, sited near Buchanan, N.Y., has long been the subject of intense controversy because of its proximity to New York City, less than 50 miles away.

The ASLB denied a petition by a citizen organization, Hudson River Sloop Clearwater, which noted that the New York State Department of Conservation has announced that it will be the lead agency on an unrelated application to build a desalination plant on the Hudson River. The petitioner argued that the prospect of the Hudson River's being used as a source of potable water should be considered in the environmental assessment of the Indian Point license renewal. In the ASLB's view, what the petitioner submitted does not constitute new information that would make the new contention admissible.

The ASLB also dismissed a filing by another petitioner, Riverkeeper Inc., seeking to preserve the right to amend a previously admitted contention on flow-accelerated corrosion. The ASLB said that the request amounted to a motion and as such was not adequately supported for consideration. The ASLB did, however, grant Riverkeeper's request that a joint contention from Riverkeeper and Clearwater be applied to the Nuclear Regulatory Commission staff's assessment of spent fuel pool leakage from the closed Unit 1.

The NRC staff is still developing the necessary documents relating to the renewal application, with the final safety evaluation report expected in late July and the final EIS next February. The hearings will be held after these documents are issued.

DESIGN CERTIFICATION

AP1000 sump strainer issue said to be resolved

On May 15, Westinghouse Electric Company submitted to the Nuclear Regulatory Commission the first of five reports that the reactor vendor stated "document the resolution of discussions with the NRC staff" on generic safety issue 191 (GSI-191, sump pump performance under debris accumulation) as it applies to Westinghouse's AP1000 reactor design. In the company's view, the five reports, all to have been submitted by June 30, address the NRC's requests for additional information on the AP1000's containment recirculation and in-containment refueling water storage tank screens.

GSI-191 had emerged by 2004 as an item of significant concern for both operating reactors and new reactor designs. In some loss-of-coolant accident scenarios, debris buildup in the reactor coolant system could clog screens, such as that of the sump strainer, and impede coolant flow to the point of depriving the system of sufficient "head" (pressure) to maintain adequate cooling.

The AP1000 was certified in 2006, based on Revision 15 of the design control document, but subsequent revisions developed to meet the needs of prospective buyers prompted the NRC to carry out an extensive review of Westinghouse's requested amendment to the certification. The GSI-191 review has been more detailed for the new version (Revision 17) than it was for the previous one.

The NRC's review of the Revision 17 amendment request is now at the stage where separate chapters of the safety evaluation report with open items are being issued by the staff. The staff issued chapters 18 and 19 on May 12 and 13, respectively. Both have open items that have not yet been resolved, and although chapter 18 does not address changes added by Westinghouse between Revisions 16 and 17, chapter 19 does.

LICENSING

Reviews scheduled for Callaway, Bell Bend

In addition to the developments reported elsewhere in this section, the following actions have been taken in connection with license applications for new power reactors.

Callaway-2

While AmerenUE has suspended work on this project, in part because it failed to gain rate recovery authorization from the Missouri legislature, the company has asked that the Nuclear Regulatory Commission continue its review of the application for a combined construction and operating license (COL) in order to keep the project viable while AmerenUE assesses its options (*NN,* June 2009, p. 20). On May 26, the NRC issued the schedule for technical reviews of the COL application, which is based on Areva's U.S. EPR.

The target dates for the safety review are as follows: *Phase A, requests for additional information (RAI),* June 21, 2010; *Phase B, advanced safety evaluation report (SER) without open items,* August 15, 2011; *Phase C, Advisory Committee on Reactor Safeguards (ACRS) review,* December 20, 2011; *Phase D, final SER,* April 12, 2012. The environmental review dates are as follows: *Phase 1, environmental impact statement (EIS) scoping summary report,* September 14, 2009; *Phase 2, draft EIS,* April 23, 2010; *Phase 3, response to public comments on draft EIS,* October 13, 2010; *Phase 4, final EIS,* April 18, 2011.

On May 20, the Atomic Safety and Licensing Board (ASLB) presiding over the Callaway-2 licensing proceeding issued an order revising the initial stages of the hearing process. The prehearing conference will begin on July 28 in Fulton, Mo., and the ASLB has set a target date of August 28 for reaching a decision on intervention petitions and hearing requests.

Bell Bend

The technical review schedule has also been issued for PPL Bell Bend's application for a COL for a U.S. EPR that would be built on land adjacent to the Susquehanna plant near Berwick, Pa. On May 27, the NRC set the following target dates: For the safety review, *Phase A, RAIs,* June 30, 2010; *Phase B, advanced SER with no open items,* July 20, 2011; *Phase C, ACRS review,* November 28, 2011; *Phase D, final SER,* March 21, 2012. For the environmental review, *Phase 1, EIS scoping summary report,* August 5, 2009; *Phase 2, draft EIS,* April 23, 2010; *Phase 3, response to public comments on draft EIS,* November 4, 2010; *Phase 4, final EIS,* March 31, 2011.

On May 28, an ASLB was named to consider petitions to intervene and requests for a hearing on Bell Bend. William J. Froehlich chairs the ASLB, with Michael F. Kennedy and Randall J. Charbeneau also as judges.

Levy-1 and -2

On May 28, the NRC issued the scoping summary report for Progress Energy's planned twin Westinghouse AP1000 reactors at a site in Levy County, Fla. This completed the first of the four phases of the environmental review for the project. The second phase, the draft EIS, is scheduled to be issued in October. This is the eighth project to complete this phase, although among the others, one has been suspended at the applicant's request (Grand Gulf-3) and three have had their environmental reviews prolonged or delayed (Bellefonte-3 and -4, Calvert Cliffs-3, and Lee-1 and -2).

Continued

Fast, safe, reliable solutions for your toughest repair challenges.

Now that's what we call nuclear news.

No one can top Aquilex WSI Nuclear Services in providing advanced engineered solutions to meet the significant change out, repair, modification and upgrade challenges posed by the nuclear industry.

We provide a comprehensive range of services, including:

- Repair and refurbishment of critical and safety-related valves
- Installation, repair or replacement of corroded piping
- Spent Fuel canister sealing
- Heat exchanger and component repair
- Feeder tube overlay
- Alloy 600 cracking mitigation and repair

And we do it all with one of the highest levels of safety, speed and reliability. To learn more about how Aquilex WSI Nuclear Services can help you solve your toughest repair and refurbishment needs, call **687-728-9100** or visit **www.aquilex.com**.

aquilex® WSI NUCLEAR SERVICES

Technology. Safety. Results.℠

Nine Mile Point-3

The NRC has begun the scoping process for the EIS for UniStar Nuclear Energy's second proposed Areva U.S. EPR reactor, which would be built at the site near Scriba, N.Y., where UniStar partner Constellation Energy operates two boiling water reactors. Two meetings were scheduled on June 10 in Oswego, N.Y. (one in the afternoon, one in the evening), to receive input on the scope of the EIS. Written comments on the scope will be accepted through July 20, by mail to the Chief, Rulemaking and Directives Branch, Division of Administrative Services, Office of Administration, Mail Stop TWB-05-B01M, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to <NMP3.COLEIS@nrc.gov>.

Comanche Peak-3 and -4

The presiding ASLB scheduled oral argument to begin June 10 in Granbury, Texas, on Luminant Power's application for COLs for two Mitsubishi US-APWRs at the Comanche Peak site near Glen Rose, Texas.

South Texas-3 and -4

The presiding ASLB scheduled oral argument to begin June 23 in Bay City, Texas, regarding STP Nuclear Operating Company's COL application for two Toshiba ABWRs at the South Texas site near Palacios, Texas.

TRITIUM

Elevated levels found at Hatch and Dresden

Recent licensee event reports submitted to the Nuclear Regulatory Commission have indicated higher than expected levels of tritium in samples taken from groundwater monitoring wells at Southern Nuclear Operating Company's Hatch plant in Georgia and Exelon Generation's Dresden plant in Illinois. In both cases, the elevated levels were detected on plant property, not at off-site locations or in nearby potable water wells.

A monitoring well at the Hatch site was found to have a tritium level of 36 500 picocuries per liter in a sample reported to Southern Nuclear on May 5. A reading from this same well in March was 5400 pCi/L. The sampling was repeated on May 6, and the May 11 report of this sampling indicated 34 300 pCi/L, confirming a significant elevation. Southern Nuclear then began developing a plan to determine the cause, and at this writing the NRC had not posted an updated report. The Environmental Protection Agency's limit for tritium in potable water wells is 20 000 pCi/L.

Exelon was less specific about its sample results at Dresden, stating that "some of the monitoring wells have indicated elevated levels of tritium requiring notification of the state of Illinois," which was done on June 6. State agencies require notification when off-site tritium readings exceed 200 pCi/L (1 percent of the EPA drinking water limit), or on-site readings exceed 0.002 Ci/L. Exelon stated: "Based upon the monitoring well results and the volume and concentration of groundwater infiltration into the nearby storm sewer, it is likely that the 0.002 curie on-site threshold has been exceeded." At this writing, Exelon had not identified the source of the tritium.

Hatch: Elevated levels of tritium detected on the plant's property, not off site

OPERATIONS

Pump problems at Ginna, Indian Point, Prairie Island

In June, the Nuclear Regulatory Commission sent a special inspection team to Constellation Energy's Ginna power plant in upstate New York to investigate the tripping of an auxiliary feedwater pump during a quarterly test. The same pump had tripped again several hours later when the test was repeated. Constellation identified and corrected some problems, but at this writing had not found the definitive cause of the trips. The pump was subsequently tested successfully without tripping.

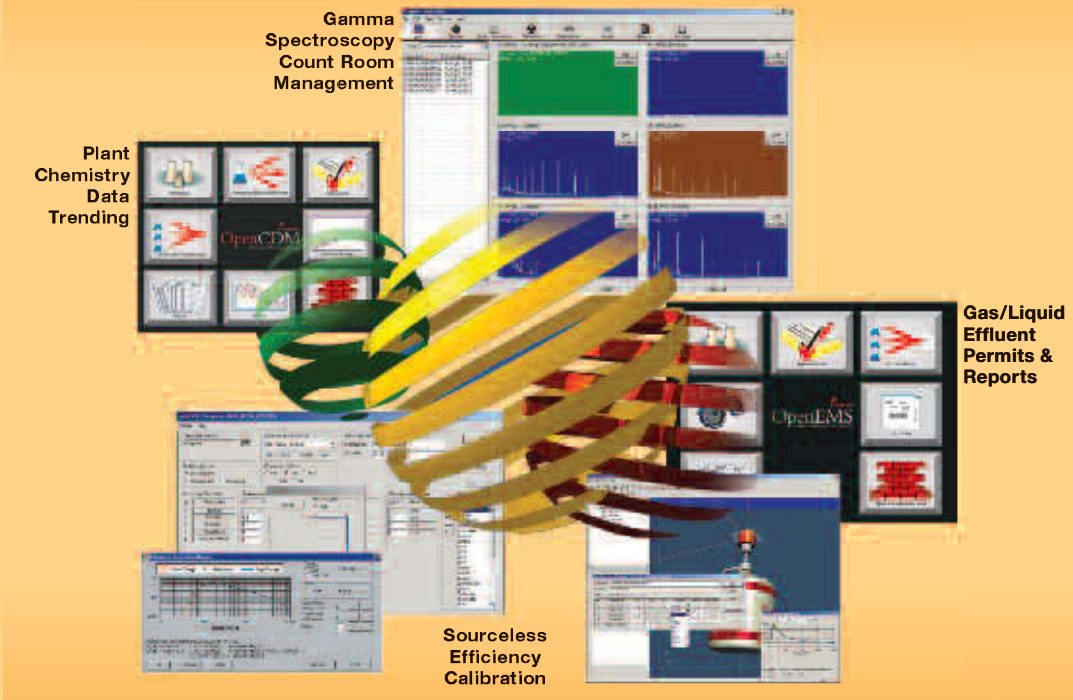
This was one of three pump-related problems that occurred at power reactors in May; the others were at Indian Point and Prairie Island. While Ginna remained in power operation despite its pump issue, Indian Point-3 and Prairie Island-1 were forced off line by reactor trips.

The four-person inspection team from the NRC's Region I Office was dispatched to Ginna, a 585-MWe pressurized water reactor near Ontario, N.Y., in part because the pump had also tripped during a quarterly test last December. The failure then was attributed to a stuck linkage in the turbine speed control system. NRC inspectors found that Constellation had not adequately implemented its maintenance program, and on June 8, the company was cited for a violation of NRC requirements.

Indian Point-3, a 1048-MWe PWR near Buchanan, N.Y., had been tripped manually by Entergy Nuclear personnel on May 15, after a main feedwater regulating valve failed open, causing a water level rise in a steam generator that could not be controlled. The reactor was restarted the next day, but on May 28, high vibrations were detected on a main boiler feed pump (designated 32), and despite efforts to control the situation, water rose excessively in another steam generator, causing a turbine trip, which in turn tripped the reactor. Three days later, after restart, a different main boiler feed pump (designated 31) exhibited speed oscillations, so operators shut down the reactor manually. In the 31 pump, particulate contamination was found in the control oil, but after cleanup there were still speed oscillations. Later, a mechanical feedback issue on the high-pressure governor valve was found and corrected, and this time the speed oscillations did not recur. Power operation resumed on June 4, and the 31 pump was started the next day, but power was kept below 60 percent while maintenance was done on the 32 pump.

Prairie Island-1, a 536-MWe PWR near Red Wing, Minn., shut down automatically on May 18. A circulating water pump tripped, leading to a condenser A/B differential pressure trip of the main turbine, which caused a reactor trip. Northern States Power Company–Minnesota personnel later found a ground fault on the circulating pump's power supply cable. Power operation resumed on May 22, and the reactor was at full power by May 27. NN

Need **integration** of count room data with your effluent and chemistry data?



We've got the perfect solution.

- **> Apex-Gamma™ Lab Productivity Suite**
- **> LabSOCS™ Sourceless Calibration Software**
- **> OpenEMS Effluent Management Software**
- **> OpenCDM Chemistry Data Management Software**

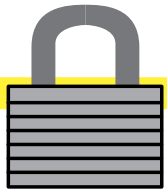
CANBERRA is the only company to offer all four applications – gamma spectroscopy sample counting, sourceless efficiency calibration, effluent management and chemistry data management – seamlessly integrated for power reactor operations.

To find our more: www.canberra.com/DMS


Integrated Count Room

CANBERRA

CANBERRA is an AREVA company. The AREVA Group, worldwide leader in nuclear power.



RULE PROPOSAL

NRC proposes revisions to emergency preparedness requirements

The NRC is seeking comments on its proposal to amend emergency preparedness requirements for licensed nuclear facilities.

The Nuclear Regulatory Commission is seeking public comments on its proposed rule change for emergency preparedness (EP) requirements at licensed nuclear facilities. The comment period, originally set to end 75 days after the proposed rule's May 18 publication in the *Federal Register,* has been extended to a 150-day deadline, October 15. This action was taken because of requests from several stakeholders who said that because the proposed rule change is so extensive in nature, additional time was needed to evaluate the impact it would have on their emergency preparedness programs.

Once the comment period ends and the NRC has reviewed all the comments received, the NRC staff plans to submit a proposed final rule to the commission by mid-2010.

The proposed rule, including associated guidance documents, would change EP requirements for currently operating nuclear power plants, for those that may be licensed and built in the future, and for operating research and test reactors. The NRC said that the rule proposal would limit the duties of a plant's on-site emergency responders to ensure that they are not overburdened during an emergency event. It also would require specific provisions to protect responders and other plant personnel during a hostile-action event and would require all nuclear power plants to incorporate hostile-action scenarios in their drills and exercises, which currently focus primarily on nuclear-related scenarios. New requirements for backup measures for alerting and notification systems are also included in the proposed rule.

The NRC scheduled public meetings on the proposed rule in Pennsylvania, Georgia, Florida, Illinois, Maryland, and Texas. The meetings were hosted jointly by the NRC and the Federal Emergency Management Agency, and staff from both agencies were available to answer questions about the proposed rule and draft guidance.

The NRC said on June 2 that a notice on the comment extension would be published in the *FR*. Comments on the proposed rule and associated documents can be submitted over the federal e-Rulemaking Portal at <www.regulations.gov> (Docket ID NRC-2008-0122); by e-mail to <Rulemaking.Comments@nrc.gov>; by mail to Secretary, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001, Attn.: Rulemakings and Adjudications Staff; or by fax to 301/492-3466.

Proposal specifics

The NRC said that the proposed requirements would enhance the ability of licensees to prepare for and to take certain emergency preparedness and protective measures in the event of a radiological emergency. The proposed requirements would also address, in part, security issues that were identified after the terrorist events of September 11, 2001, and would clarify regulations to effect consistent emergency plan implementation among licensees and modify certain emergency plan requirements to be more effective and efficient.

Amended under the proposal would be portions of 10 CFR Part 50.47, *Emergency plans;* Part 50.54, *Conditions of licenses;* Part 50, Appendix E, *Emergency planning and preparedness for production and utilization facilities;* and Part 52.79, *Contents of applications; technical information in final safety analysis report.*

Some specifics of the proposed rule are as follows:

- Regarding *emergency plans* in Part 50.47(b)(3), the proposal would remove the reference to a reactor site's on-site emergency operations facility (EOF) as a "near-site" facility. Criteria would be provided regarding the EOF's distance from a reactor site and for a performance-based approach for EOFs, specifying that these facilities would need to meet certain functional requirements rather than requiring them to be located within a certain distance of the plant.

  The proposal would also amend Part 50.47(b)(10) to require licensees to review and update their evacuation time estimates (ETE) periodically and submit them to the NRC for review and approval. This new requirement would ensure that any changes to the population used to determine the ETE would be taken into account, and that licensees' reviews of the ETEs would be performed routinely, would be consistent across the industry, and would be technically sound. NRC guidance would provide details of the agency's expectations for the development of an adequate ETE, as well as provide NRC reviewers with guidance on the review of ETE updates. The NRC said that it would expect the updated ETEs to be shared with offsite response organizations and incorporated into protective action strategies.
- For *license conditions,* the NRC proposes to revise Part 50.54(q) in its entirety. The revision would define four terms that would have meanings limited to application within the proposed 50.54(q). The proposal would define a "change" to the emergency plan as an action that results in the modification of, addition to, or removal from the licensee's emergency plan or the resources, capabilities, and methods identified in the emergency plan. The result would be that a change to the emergency plan would not be limited to revisions to the document labeled "emergency plan." For example, the NRC said, a proposed plant configuration change that removes a seismic instrument that is relied upon in the emergency plan would be encompassed by this definition.

  In addition, the proposed definition of "emergency plan" would encompass any document that describes the programmatic methods that the licensee uses to maintain and perform emergency planning functions and to demonstrate compliance with the requirements of the proposed rule's Appendix E, and for power reactors, the planning standards of Part 50.47(b). The proposal would also define the term "emergency planning function" in terms of a capability or resource necessary to prepare for and respond to a radiological emergency, and would define the term "reduction in effectiveness" as a change to the emergency plan that results in a reduction of the licensee's capability to perform an emergency planning function in the event of a radiological emergency.
- Regarding *emergency planning and preparedness for production and utilization fa-*

cilities, the proposed revisions deal with requiring power reactor licensees and license applicants to revise their ETEs within 180 days of the issuance of the 2010 decennial census data (expected to be available in 2011) and to submit the revisions to the NRC for review and approval. Subsequently, the licensees and license applicants would be required to review annually the changes in the population of their emergency planning zones and most populous emergency response planning areas. When the new population, including permanent residents and transient populations, is less than 90 percent or greater than 110 percent of the population that formed the basis for the currently approved ETE, the licensee or applicant would be required to update the ETE to reflect the impact of this population change.

The proposed rule is available online at <edocket.access.gpo.gov/2009/pdf/E9-10947.pdf>.

SAFEGUARDS

HEU removed from Australia, Kazakhstan

The Department of Energy's National Nuclear Security Administration announced on May 21 that it had successfully removed 14.5 kg (32 lb) of high-enriched uranium (HEU) from Australia for return to the United States. The HEU, in spent fuel, was from the Australian Nuclear Science and Technology Organization's (ANSTO) High Flux Australian Reactor (HiFAR), the country's first research reactor. HiFAR went critical in January 1958, was first run at full power of 10 MW thermal in 1960, and was permanently shut down in January 2007.

The HEU was transported by truck, rail, and ship under secure conditions with the cooperation of the government of Australia, ANSTO, and several international organizations. The material was ultimately secured at the DOE's Savannah River Site in South Carolina.

With the completion of the shipment, the NNSA—through its Global Threat Reduction Initiative (GTRI)—said that it had successfully removed more than 100 kg (220 lb) of U.S.-origin HEU fuel from Australia since 1998.

Last September, the United States and Australia announced a 10-year extension of a cooperative agreement on international nuclear safeguards. In addition to the HEU removal, the two countries have pledged to work together to recommend policies to strengthen the international nonproliferation regime, develop more efficient and effective safeguards technologies to prevent nuclear proliferation, and help to establish safeguards infrastructure in aspiring nuclear states.

Since the inception of the U.S.-origin fuel removal program, more than 1215 kg (2679 lb) of U.S.-origin HEU fuel—the equivalent of approximately 48 nuclear weapons—have been returned in 47 shipments to the United States from 27 countries. The program has also removed all eligible U.S.-origin HEU fuel from Argentina, Australia, Brazil, Chile, Colombia, Denmark, Germany, Greece, Italy, Philippines, Portugal, Romania, Slovenia, South Korea, Spain, Sweden, and Thailand.

In other HEU-removal work done under the GTRI program, the NNSA recently assisted in removing more than 73 kg of Russian-origin HEU fuel from Kazakhstan. The NNSA said on May 19 that the material was returned to Russia by rail for storage at a secure nuclear facility in a series of four shipments between December 2008 and May 2009.

The NNSA work was done in cooperation with the Kazakhstan and Russian governments. Each shipment was packaged in Russian TUK-19 specialized transportation casks that were loaded into TK-5 railroad cars and then transported under armed guard from Kazakhstan's Institute of Nuclear Physics to Russia. Upon arrival there, the transportation casks were emptied, inspected, and returned to Kazakhstan to be loaded for the next shipment.

Continued

The shipments were made in accordance with an accelerated schedule developed from the February 2005 Bratislava Joint Statement on Nuclear Security Cooperation, which specifically calls for international cooperation to return HEU fuel from U.S.- and Russian-designed research reactors and to take other steps to reduce the threat of global nuclear terrorism.

The removal project was the second one involving Russian-origin HEU fuel within the past year. In October 2008, the NNSA removed 154.5 kg of Russian HEU fuel from Hungary. Other countries that have returned Russian-origin HEU fuel are Bulgaria, the Czech Republic, Hungary, Latvia, and Uzbekistan.

Detection equipment

The NNSA has also been involved with the following activities in recent months:

■ Radiation detection equipment installed at a high-volume transnational shipping terminal at Jamaica's Port of Kingston was put into operation on May 26. The equipment scans all import and export containers that pass through the port's Kingston Wharves Limited Terminal for the presence of nuclear and other radioactive materials.

The equipment and an associated communications system were installed by the NNSA with the cooperation of the U.S. Embassy in Kingston, the Jamaican Customs Department, the Port Authority of Jamaica, and the private operator of the terminal. The work was done under the NNSA's Megaports Initiative. The agency also provided training to customs personnel on the use of the equipment. Additional training and support will be provided by the NNSA over the next several years. The agency said that it plans in the next fiscal year to equip the port's other high-volume terminal—the Kingston Container Terminal—with radiation detection equipment.

The Megaports Initiative is part of the NNSA's Second Line of Defense Program, which aims to strengthen the capability of foreign governments to deter, detect, and interdict illicit trafficking in nuclear and other radioactive materials across international borders and through the global maritime shipping system. The Megaports Initiative provides radiation detection equipment, training, and technical support to key international seaports to scan cargo containers for nuclear and other radioactive materials.

Around the world, the Megaports Initiative is operating in 22 ports, with work under way in more than 20 additional ports in Asia, Latin America and the Caribbean, Europe, the Middle East, and Africa.

■ On April 29, the NNSA participated in a commissioning ceremony held at the Port of Cartagena in Colombia to highlight the successful operation of radiation detection equipment provided through the Megaports Initiative.

Colombia's radiation detection system became operational in September 2008. The country's Directorate of Customs and Taxation now staffs the system's central alarm station, analyzes and responds to radiation alarms, and works with port operator Sociedad Portuaria Regional de Cartagena (SPRC) to place automatic holds on suspect containers for further inspection.

Under a cost-sharing arrangement, SPRC paid for the design, construction, and installation of the system, while the NNSA provided the equipment, communications network, training, technical support, and maintenance. The NNSA commended SPRC for its "significant financial investment in and commitment to preventing nuclear smuggling and for completing the project on time."

■ The NNSA conducted a series of nuclear emergency training sessions in Singapore that involved more than 100 participants from that country's government and medical professions. The training sessions, which took place May 26–28, included a radiological search workshop, fission meter training to teach personnel how to operate equipment that identifies and pinpoints nuclear and radiological material in shipping containers, and radiation medical emergency training to provide medical personnel with procedures to address radiation emergencies and minimize contamination.

■ On April 22, the NNSA marked the 30th anniversary of the National Atmospheric Release Advisory Center (NARAC), located at the Lawrence Livermore National Laboratory, in Livermore, Calif. NARAC provides near real-time computer predictions of the transport and deposition of hazardous airborne materials.

The center opened in 1979, when the DOE and LLNL used the newly developed modeling system to generate predictions that helped guide federal and state measurement teams working to determine the impact of radiological material released from the Three Mile Island-2 nuclear power plant. Since then, NARAC has been used to predict the impacts of hazardous atmospheric releases in order to protect lives and mitigate consequences.

NARAC modeling has also been used for the Chernobyl nuclear power plant accident, industrial chemical accidents, and hypothetical events such as the Department of Homeland Security's TOPOFF series of terrorism exercises. In addition, the DHS's Interagency Modeling and Atmospheric Assessment Center at LLNL uses NARAC as its primary resource for the coordination and dissemination of the federal government's hazard prediction models during an incident.

■ The NNSA is expanding an ongoing partnership with New Zealand to help prevent nuclear terrorism around the world, the agency said on April 7. Under an agreement signed with the NNSA, New Zealand will provide $350 000 for nuclear nonproliferation work in Kazakhstan. The contribution was the second one made by New Zealand for the NNSA's work in the former Soviet Union. The first was for a nonproliferation project in Ukraine. The agreement also included provisions for New Zealand to make future contributions to go toward the NNSA's work over the next six years.

The NNSA said that international contributions, whether financial or in-kind, augment its programs that are aimed at improving nonproliferation efforts. In addition to New Zealand, contributions have come from Canada, Finland, the Republic of Korea, the Netherlands, Norway, and the United Kingdom. The contributions include over $31 million to shut down the last remaining weapons-grade plutonium production reactors in Russia; about $12 million to reduce and protect vulnerable nuclear and radiological materials located at civilian nuclear sites worldwide; and more than $10 million to strengthen security at international land borders, seaports, and airports that could be used as smuggling routes for nuclear or radiological materials. NN

Security Briefs

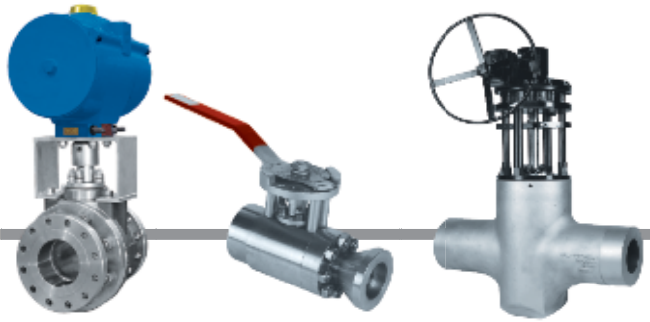
SENSITIVE INFORMATION ABOUT U.S. NUCLEAR FACILITIES was posted by mistake on the Government Printing Office's Web site, the Associated Press reported on June 3. The information, contained in a 266-page document, was published on May 6 as a transmission from President Barack Obama to Congress. The document, which was to be provided to the International Atomic Energy Agency, was removed from the Web site when the printing office was informed of the potential sensitive nature of the material. Energy Secretary Steven Chu said on June 3 that the online posting was a government "snafu" and that it was "a little embarrassing," but that no secret or classified information had been compromised. "The sites and everything are public knowledge," Chu told reporters, according to the AP. The document, marked "highly confidential safeguards sensitive," was compiled for IAEA nuclear inspectors and consists of information on hundreds of civilian nuclear sites in the United States, along with maps and details of the facilities. It also contains information on nuclear fuel fabrication plants, research facilities, and uranium storage sites.

VALVTECHNOLOGIES

Four Year Zero Leakage Guarantee.

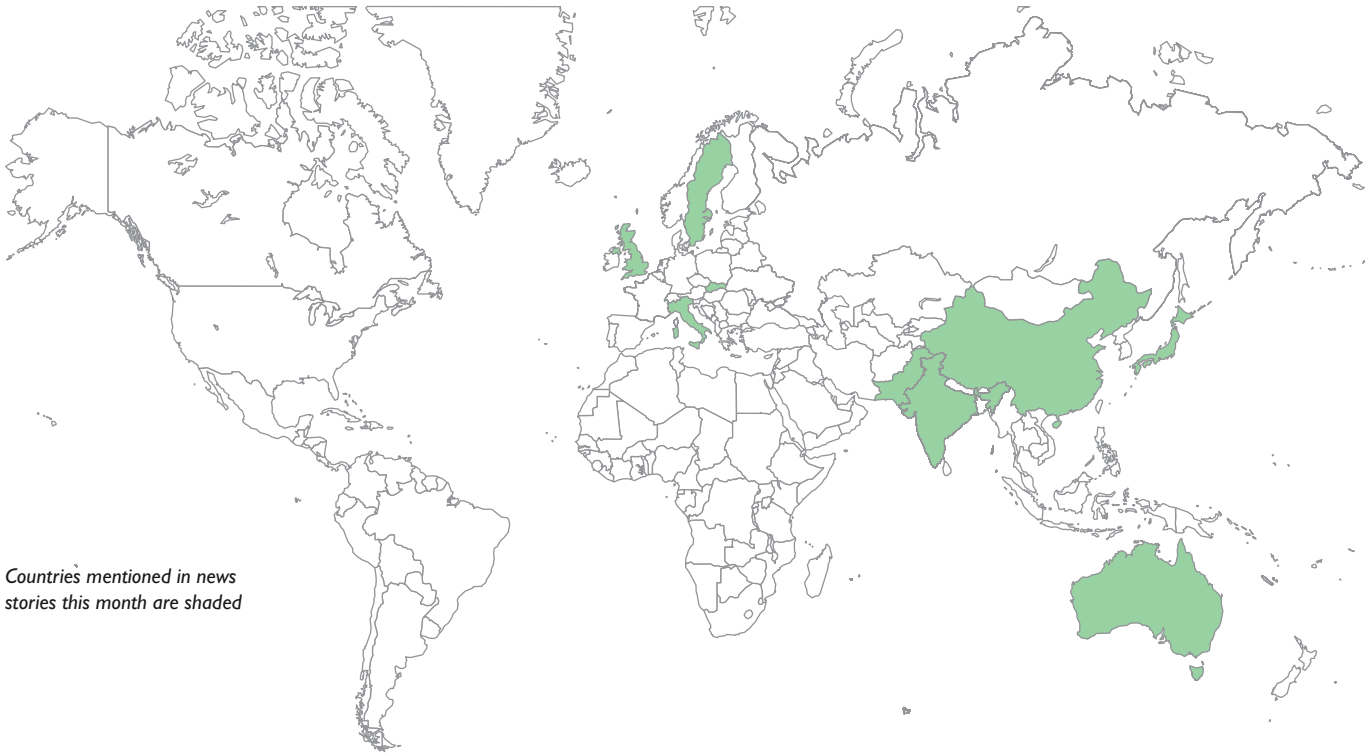
Vent, Drain, Isolation and Control Valves for the Nuclear Industry:

Integral Seat Ball, Trunnion & Parallel Slide Gate Designs
Forged & Cast Materials
End Connections SW / BW / Flanged / Special
Primary, Secondary and Auxiliary Systems
Applicable to all BWR, PWR and CANDU Designs



Zero Leakage Valve Solutions

+1 713 860 0400 www.valv.com sales@valv.com



Countries mentioned in news stories this month are shaded

CHINA

Nuclear expansion set to accelerate

In addition to what was already planned, another 20 GWe of new nuclear capacity would enter service by 2020.

ACCORDING TO A report from China's Xinhua News Agency, the Chinese government is expected to revise its nuclear power target for 2020 sharply upward, from 40 GWe to 60–75 GWe. This will be about 5 percent of the new target for total power, which is expected to rise from 1000 GWe to 1400–1500 GWe, and reflects the recent prediction that total power capacity will pass the 900-GWe mark this year.

Speaking at a June 1 press conference in Beijing, Sun Qin, deputy director of China's National Energy Administration, said that the NEA is now reworking the country's total power capacity target, which, if approved by the central government, would involve an increase of approximately 50 percent from the 1000-GWe goal, which was set in 2006. According to *China Daily,* however, he could not say when the new target would be officially approved.

When the current 40-GWe target of nuclear capacity was set, it represented only 4 percent of the total power capacity target. As part of the government's plan to invest in new energy technologies, however, including nuclear power, the nuclear part of the mix is expected to be above the 4 percent level.

According to reports from the press conference, the NEA's Liu Qi said that following instructions from the State Council, the NEA began working in April to draft a new plan as soon as possible. Liu said that a two-phase program is foreseen, involving massive investments in energy. Phase 1 will cover a strategic shift to nuclear, solar, wind, biomass, and clean coal technologies over the next three years, with investment opportunities as high as 3 trillion yuan (about $439 billion). Phase 2, encompassing the period up to 2020, will entail far greater investment. The revised targets, as well as the level of capital investment, will, however, require central government approval, Liu said.

At the press conference, Zhang Guobao, director of the NEA, said that the new energy program will be a driving force for the economy once the present fiscal stimulus has helped stabilize the overall economic situation. Liu added that the program will help spur domestic demand and boost investment and employment. It should also provide a response to climate change concerns, as well as introduce a new, more sustainable national energy structure. The plan will also raise the international competitiveness of China's energy industry.

SWEDEN

Forsmark chosen for spent fuel repository

SKB, the Swedish nuclear fuel and waste management company, has selected Forsmark as the site of a final spent fuel repository. Located in the municipality of Östhammar, Forsmark was chosen over Laxemar, in Oskarshamn. SKB will now focus on putting together a license application for the facility, planned for submittal in 2010. Assuming that there are no delays along the way, site work could begin in 2013, with the repository ready to operate in 2023. This single facility will hold all of the high-level radioactive waste from the country's nuclear power stations, which provide about 45 percent of Sweden's electricity.

Forsmark: The site will house a spent fuel repository, in addition to the nuclear power plant

The selection of Forsmark is the result of nearly 20 years of work, during which time SKB conducted surveys throughout the country and feasibility studies in eight municipalities. In 2002, the decision was made to focus on the areas of Oskarshamn and Östhammar.

"We see a clear advantage for Forsmark concerning safety," said SKB President Claes Thegerström. The Forsmark site offers crystalline bedrock, which at the repository level is dry and has few fractures, features of major significance for long-term safety. In addition, a repository at Forsmark would require less space than would a site in Laxemar, which is an advantage, since less rock will have to be excavated and less material will be needed for backfilling. The surface facilities at Forsmark, which will occupy only about 15 hectares, will be constructed in an existing industrial area. This will reduce the environmental impact of the project while providing good access to the infrastructure of the region. A storage area for excavated material will be included there.

From the surface, a long tunnel and several shafts will descend to a depth of approximately 500 meters into a system of tunnels, where copper canisters containing the spent fuel will be placed in vertical holes. The tunnel system will be successively extended during the operational phase of the facility. When completed, the repository will have approximately 50 km of tunnels. When operating at full capacity, an average of one canister per day will be transported through the 5-km-long serpentine tunnel and into a deposition tunnel.

Competition between the two communities to win the project was intense. Östhammar is home to the SFR repository for short-lived radioactive waste, as well as to the Forsmark nuclear power plant. Oskarshamn has the CLAB spent fuel interim storage facility and the encapsulation plant where spent fuel will be placed in copper canisters, as well as the Oskarshamn nuclear plant. The Äspö Hard Rock Laboratory, where much of the practical work to demonstrate the disposal method has taken place, is also in the area.

SKB and its owners had recently worked out a long-term cooperation agreement to invest in the development of both municipalities. Under the agreement, the community that won the repository project would receive about 25 percent of a SKr2-billion (about $250-million) financial package, with the rest going to the losing region, for the development of the regions' infrastructure, as well as for community activities such as business development and education. Many of the investments are expected to directly benefit SKB's own operations.

SLOVAKIA

Venture with Czech utility for new Bohunice units

An agreement to create a joint venture to construct a new nuclear power plant at the Bohunice site in Slovakia was signed in Prague on May 29 by the Czech utility CEZ and the Slovakian nuclear and decommissioning company JAVYS. Under the agreement, state-owned JAVYS will hold a 51 percent stake in the joint venture, and CEZ will hold the remaining 49 percent. A feasibility study for building a new reactor at Bohunice will be carried out, with completion expected in 2010. One particular condition set for the study is to consider only pressurized water reactors.

Until the creation of the modern Slovakia and the Czech Republic in 1993, the former Czechoslovakia had operating reactors at two sites—four units at Bohunice and four at Dukovany. At the same time, construction was begun on new reactors at Temelin, in the Czech Republic, and Mochovce, in Slovakia. Since then, CEZ finished two units at Temelin, while Slovenské elektrárne, Slovakia's largest power company, completed two reactors at Mochovce and last year began work to complete another two units. All units are Russian-designed VVER pressurized water reactors.

Of the four units at Bohunice, the two oldest reactors, known as V1, were shut down at the end of 2006 and 2008 to comply with the conditions that had been set for Slovakia's joining the European Union in 2004. Although it accepted this requirement, based on a blanket EU demand that all of the earliest of the Soviet-era VVERs be closed on safety grounds, the Slovak government and industry believed that following extensive upgrades over several years, the two units did meet acceptable levels of safety.

The Slovak government established JAVYS in 2006 to take over the V1 units and other legacy liabilities of the country's nuclear program after it had decided to partially privatize Slovenské elektrárne (selling 66 percent of its shares to Italy's Enel utility), which would retain the commercially viable nuclear assets consisting of the remaining pair of reactors at Bohunice (V2) and the Mochovce reactors. Since the closing of the V1 units, JAVYS has been responsible for decommissioning and waste management activities.

Ján Valko, chairman and chief executive officer of JAVYS, stressed that since the breakup of Czechoslovakia, the relationship between the nuclear sectors of the two countries has remained strong. "Today we strengthen these bonds further by the new project of building the nuclear power station that will contribute significantly to increase the energy independence of Slovakia and to reduce significantly the deficit of power generation capacities in Slovakia." Martin Roman, chairman and general manager of CEZ, also noted that both countries retain considerable expertise in the nuclear field.

INDIA

NPCIL, Westinghouse plan AP1000 import talks

Following the signing of a memorandum of understanding (MOU) on May 28, Westinghouse Electric Company is to begin discussions with Nuclear Power Corporation of India Ltd. (NPCIL) on the possible deployment of AP1000 plants in India. In addition to continuing its indigenous nuclear program involving pressurized heavy-water reactors, NPCIL is holding talks with

several international vendors about the construction of larger light-water reactors.

The MOU was signed by S. K. Jain, chairman and managing director of NPCIL, and Westinghouse President and Chief Executive Officer Aris S. Candris. In making the announcement, NPCIL said that the MOU is "another milestone in engagement of NPCIL and Westinghouse for preparing the contract and related details of setting up of multiple AP1000 reactors in India."

In a statement, Candris said, "We are confident that our business model, with emphasis on localization and infrastructure development, will benefit NPCIL, Westinghouse, and the people of India and the United States."

Meena Mutyala, Westinghouse vice president and business leader for India, confirmed that Westinghouse would make use of India-based companies and labor. She said that the company is exploring potential opportunities to work with companies such as Larsen & Toubro and others to provide construction-related services, equipment, and modules for AP1000s. "In India, with an already-established infrastructure, we also hope to qualify companies to assist us in constructing or providing equipment for AP1000s elsewhere in the world," she said.

NPCIL is already engaged in discussions with Russia's Atomstroyexport for the construction of additional VVER 1000 reactors at Kudankulam, where two units are in the final stages of construction. The company has also signed MOUs with GE Hitachi Nuclear Energy for the possible construction of advanced boiling water reactors, and with Areva for its EPR reactor.

AUSTRALIA

Nuclear science benefits from new federal budget

While known to be critical of nuclear power, Australia's current Labor government has nevertheless acknowledged the importance of nuclear science and technology by providing the Australian Nuclear Science and Technology Organization (ANSTO) with Aus$62 million (about $49.6 million) in the 2009 federal budget to fund new neutron research instruments at its OPAL reactor facility and to help establish the Center for Accelerator Science.

ANSTO chief executive officer Adi Paterson said that the Aus$37 million (about $29.6 million) for its OPAL research reactor, Australia's largest single research expenditure, would help it reach its potential of being one of the three leading research reactors in the world. "We are currently experiencing a great and increasing demand on some of the nine neutron beam instruments we already have and are building at ANSTO, so the funding for extra instruments will help address this issue," Paterson said. "The additional instruments will also allow Australian scientists to undertake research into areas such as material behavior and biological studies, which are at the leading edge of current international science."

As for the Aus$25 million (about $20 million) being provided to fund the Center for Accelerator Science, Paterson said that this "will enable an upgrade of current ANSTO accelerators at a time when ANSTO is looking to broaden its support for accelerator science. This funding will support ANSTO's aim of working in partnership with other research organizations in a national network of accelerators to maximize the benefits this important infrastructure can offer. . . . Accelerators are key tools for use in nuclear safeguards and forensics, medical physics, materials science, and radiation physics, [thereby] ensuring [that] Australia has top facilities for its scientists."

UNITED KINGDOM

NDA to divest land adjacent to Sellafield

Following the sell-off in April of three potential sites for new nuclear power stations, the U.K. Nuclear Decommissioning

CORYS

www.corys.com

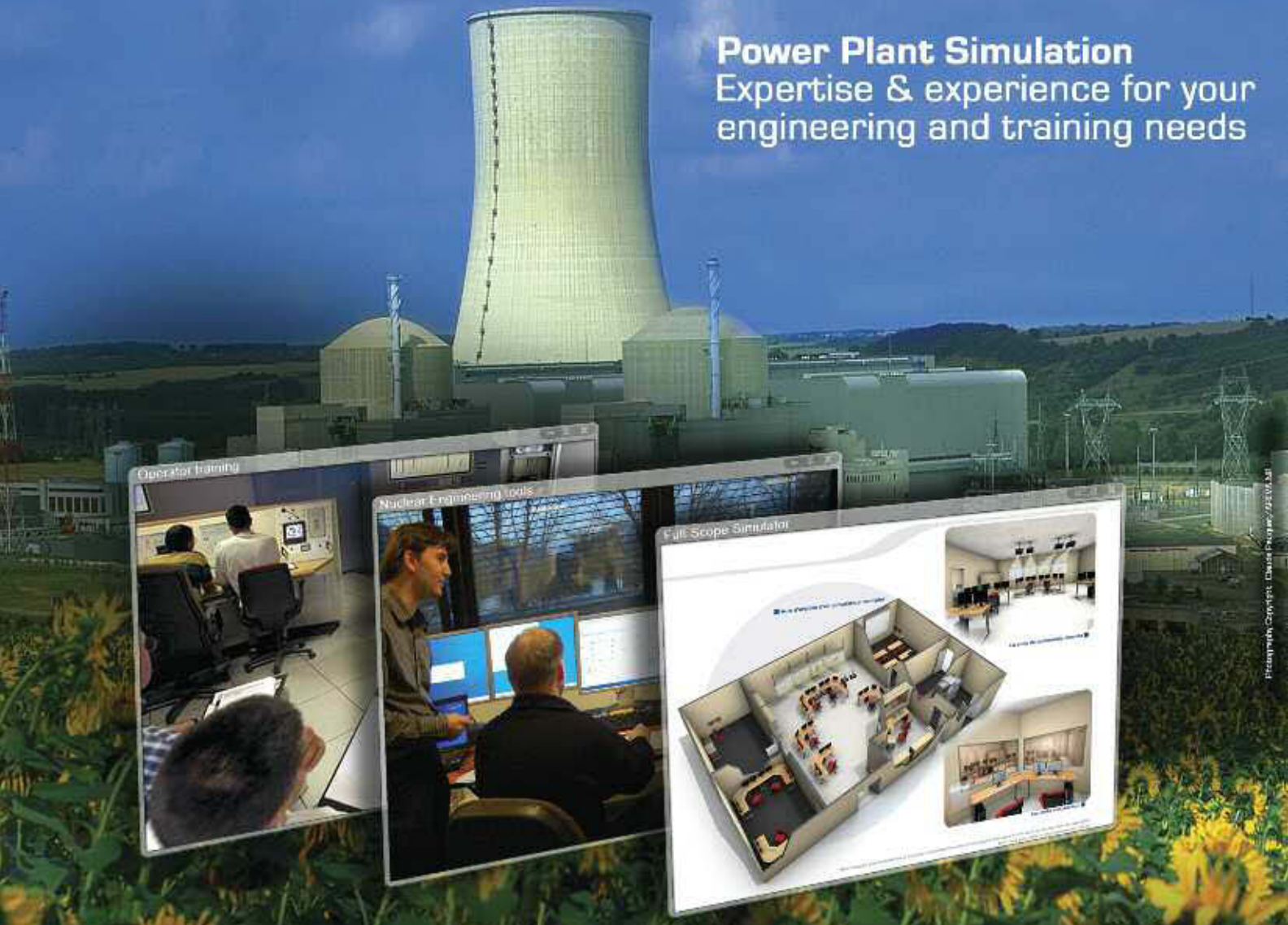
Training
& Engineering
Support
Systems

CTI
Corys Thunder inc.

www.corysthunder.com

Power Plant Simulation

Expertise & experience for your engineering and training needs



Leading edge simulation technology

180 simulators world wide

20 years of experience

Hundreds of experts servicing your needs

T-REX: State of the Art Simulation Environment

CORYS T.E.S.S.
74, rue des Martyrs
38027 GRENOBLE
Cedex 01 - FRANCE

For more information, contact
Pascal Gain at pgain@corys.fr

Corys Thunder Inc.
107 Industrial Drive, Suite E
St. Marys, Georgia 31558
USA

For more information, contact
Jody Ryan at jody.ryan@corysthunder.com

Authority announced that it was starting the process to dispose of 250 hectares (618 acres) of land adjacent to its Sellafield facility in Cumbria. The previous sale by an online auction process of land adjacent to its Bradwell, Oldbury, and Wylfa nuclear power stations raised approximately £387 million (about $630 million), which the NDA will use for its decommissioning mission. The NDA expects to conclude the sale of the Sellafield land this year.

The area now up for sale, like the previous three sites, is included in the list of sites vetted by the government as being "credible" as possible nuclear sites at the early stage of the assessment procedure.

The process is open to interested parties who submit compliant proposals satisfying the conditions set out in the request for expressions of interest, but the NDA reserves the right to exclude parties at any stage who do not offer a reasonable prospect of delivering value. Participants in the process will be given the opportunity to visit the land for sale, evaluate the opportunity, and perform due diligence.

Besides assessing bids on the basis of value for money, the NDA will also consider whether the proposed use could have a detrimental effect on the operations of facilities at its adjoining sites. It also expects that government approval will be a condition.

Sellafield: Land up for sale could be new nuclear sites

IAEA

Spent fuel and radwaste convention working well

Although there is room for improvement in several areas of the implementation of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, the verdict of the contracting parties at the close of the third triennial review meeting was that it is working well. The summary report of the meeting, which was held May 11–20 at the headquarters of the International Atomic Energy Agency in Vienna, Austria, also notes that the discussions at this latest gathering were more constructive than those at the two previous review meetings, with more knowledge sharing taking place.

The most important areas are "continuity and communication," *Nuclear News* was told during a post-meeting interview with review meeting president Kunihisa Soda, a member of Japan's Nuclear Safety Commission, and vice presidents László Koblinger, from the Hungarian Atomic Energy Authority, and Frank Marcinowski, of the U.S. Department of Energy.

"Continuity has to do with transfer of information from the officers of one review meeting to those of the next," Marcinowski said, "and communication is about interaction among the contracting parties during

International Briefs

A PROGRAM TO FIGHT THIRD-WORLD CANCER was launched on May 26 by the World Health Organization (WHO) and the International Atomic Energy Agency. The Joint Program on Cancer Control will provide the framework for the two organizations to work together to create a more coordinated and robust approach to combating cancer in developing countries. This action reflects rising international concern over the growing global cancer burden, with more than 70 percent of all cancer deaths occurring in low- and middle-income countries. According to the announcement of the launch, "If current knowledge were put into practice, at least one-third of cancer cases could be prevented, another third could be detected early, treated, and cured, and suffering could be alleviated through palliative care for patients with advanced cancers."

The IAEA has long provided radiation technology and expertise to developing countries for cancer diagnosis and treatment, notably through its Program of Action for Cancer Therapy (PACT), which was created to integrate diagnostic and treatment-related activities into national cancer control plans. "But radiotherapy alone cannot halt the growing global cancer crisis," said IAEA Director General Mohamed ElBaradei. "The Joint Program with WHO underlines our conviction that only through combined effort and collaboration can we bring hope and relief to those whose lives are threatened by cancer."

AN ENGINEERING CONTRACT FOR PAKISTAN'S CHASMA-3 AND -4 reactors has been awarded to Shanghai Nuclear Engineering Research and Design Institute (SNERDI) by China Zhongyuan Engineering Corporation, China's main international nuclear project contractor. Under the contract, signed in Shanghai on April 28, SNERDI, a subsidiary of the State Nuclear Power Technology Corporation, will provide engineering design and technical services for the two new units. SNERDI was responsible for overall engineering design of the first two Chasma units, the only nuclear power projects exported by China. The company said that it has already started the design work, focusing on the major long-lead components.

RUSSIA'S ROSATOM HAS SET UP A SINGLE ISOTOPE EXPORTER and is prohibiting its subsidiary companies from exporting isotopes independently. "We have drastically changed the rules in the field of trade in isotopes," said Sergei

the gap years between reviews." He said that the latter could be achieved by mechanisms such as an interactive newsletter, some other form of Web-based communication, or additional meetings on issues of special interest.

The secretariat of the joint convention, which is provided by the IAEA, has also been asked to propose specific mechanisms. Gabriela Siraky, scientific secretary of the joint convention, told *NN* that a set of proposals will be presented at a general committee meeting to be called before the end of this year.

The general committee is made up of the president and two vice presidents, along with the chairs of the six country groups at the third review—Andy Hall (United Kingdom), Peter Brennecke (Germany), Doug Metcalfe (Canada), Kaare Ulbak (Denmark), Merle Lust (Estonia), and Jean-Rémi Gouze (France)—who will all remain in office until the fourth review in May 2012. All contracting parties will be kept informed, Siraky said.

Several topics relevant to improving the review process were discussed at the meetings of an open-ended working group set up at the opening plenary session. Besides communication and continuity, the working group discussed the possibility of establishing a meeting or a series of meetings for national policymakers during the years between reviews. The group also considered organizing meetings of contracting parties to discuss particular areas of concern, which could include, according to Marcinowski, disused and "orphan" sealed radioactive sources, legacy wastes (in particular in the former Soviet Union region), and final disposal of high-level radioactive waste.

The working group also discussed the possible adoption of a data presentation tool based on the Net-Enabled Waste Management Database, which was developed by the IAEA to collect and store information about national radioactive waste management activities and waste inventories. A similar tool for the joint convention would focus on the preparation and presentation of the national reports on which the review process is based.

According to the summary report, 45 contracting parties took part in the third review: Argentina, Australia, Austria, Belarus, Belgium, Brazil, Bulgaria, Canada, China, Croatia, the Czech Republic, Denmark, Estonia, Euratom, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Morocco, the Netherlands, Nigeria, Norway, Poland, Romania, Russia, Senegal, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Tajikistan, Ukraine, the United Kingdom, and the United States.

Five of them—China, Nigeria, Tajikistan, Senegal, and South Africa—attended the meeting for the first time. Uruguay did not attend but submitted a national report; Senegal attended the meeting but did not submit a national report; and Kyrgyzstan and Uzbekistan did not attend or submit reports. The OECD Nuclear Energy Agency and the European Bank for Reconstruction and Development were present as observers.

The report says that despite a large diversity of national situations, all parties present shared the view that progress has been made since the second review meeting in May 2006, both in building and maintaining relevant legislative and regulatory frameworks and in implementing them. "The third review was held in a time when several countries are considering launching a national nuclear power program, and it [is] strongly recommend[ed] that the safety of spent fuel and radioactive waste management be taken into account from the very beginning," the report adds.

Notwithstanding the significant progress made since the last review, the report identifies a number of areas where further action is needed by many parties: National policies for the long-term management of high-level waste and spent fuel must be implemented; disposal facilities must be sited, constructed, and operated; disused sealed sources must be inventoried and orphan sources recovered; knowledge management and human resource issues must be addressed; and financial resources must be found to cover liabilities.

The report also highlights progress that has been made. For example, many parties have completed and updated their legislative and regulatory frameworks, although for some, more effort is needed in this area. Some parties are developing or already have radiological clearance systems in place. Many have already developed, or are developing, management strategies based on increasingly comprehensive inventories of spent fuel and waste arising or projected to arise from decommissioning.

Some parties reported progress in the siting, construction, and operation of geological disposal facilities. Regional repositories were mentioned by several countries with small nuclear programs or with limited waste management programs, although no real practical progress has so far been achieved. Some parties included naturally occurring radioactive material, which does

Kiriyenko, head of Rosatom, Russia's federal nuclear regulatory agency, during a press conference on May 26. "Rosatom has analyzed the situation in this market and has seen that Russian companies ensure almost half of the global isotope supplies but sell isotope products at very low prices as raw materials." With the measures now taken, Kiriyenko said, "we have already managed to raise the prices of some items by as much as 10 times, and nothing awful has happened. Our consumers have survived this." He went on to say that Russia should stop exporting "raw isotopes" and start using isotopes "for manufacturing export-oriented high-tech products."

A SHIPMENT OF MOX FUEL ARRIVED IN JAPAN in mid-May, according to a report by the Japan Atomic Industrial Forum. The mixed uranium-plutonium oxide (MOX) cargo left the French port of Cherbourg on March 5 in two purpose-built vessels, the *Pacific Pintail* and the *Pacific Heron,* traveling around the Cape of Good Hope and arriving at the Omaezaki Port on May 18. The shipment included fuel for three power companies—Chubu Electric, Shikoku Electric, and Kyushu Electric. Kyushu's Genkai-3 reactor is expected to be loaded with MOX fuel later this year, marking the first actual use of MOX fuel in the country.

In April, Areva signed a contract with Japan's Electric Power Development Company to supply MOX fuel assemblies for the Ohma nuclear plant, which will be the first advanced boiling water reactor to take a full MOX core, according to Jean-Pierre Gros, executive vice president of Areva's recycling business unit. The fuel will be fabricated at Areva's Melox plant in southern France, using Japanese plutonium recovered at the chemical processing plant in La Hague. Ohma is scheduled to begin operation in 2014.

JAPAN AND ITALY SIGNED A NUCLEAR COOPERATION PACT during the G8 Energy Ministers Meeting in Rome on May 24. The agreement was signed by Japan's Minister of Economy, Trade and Industry Toshihiro Nikai and Italy's Economic Development Minister Claudio Scajola. Under the memorandum, METI will support the development of the infrastructure needed for the reintroduction of nuclear power generation in Italy, whose reactors were shut down following a public referendum banning the use of nuclear power in the country in the wake of the Chernobyl accident. The memorandum sets forth a framework for cooperation in nuclear power development in areas such as information exchange, human resource development, public education, and other activities.

not originate from the nuclear fuel cycle, in their national reports. All parties agreed that decisions on policy and other sensitive issues, such as the siting of disposal and other facilities, should be made with stakeholder involvement.

Many parties, especially those with nuclear power plants, have established funding programs for decommissioning, but the issue of funding for the decommissioning of research reactors remains to be resolved for some. A number reported notable progress in the decommissioning of facilities.

Some progress has been made since the second review in the management of disused sealed sources and orphan sources. Many parties have started to implement tracking systems and national registries. The report says that many parties reported progress in the areas of site remediation and legacy waste management.

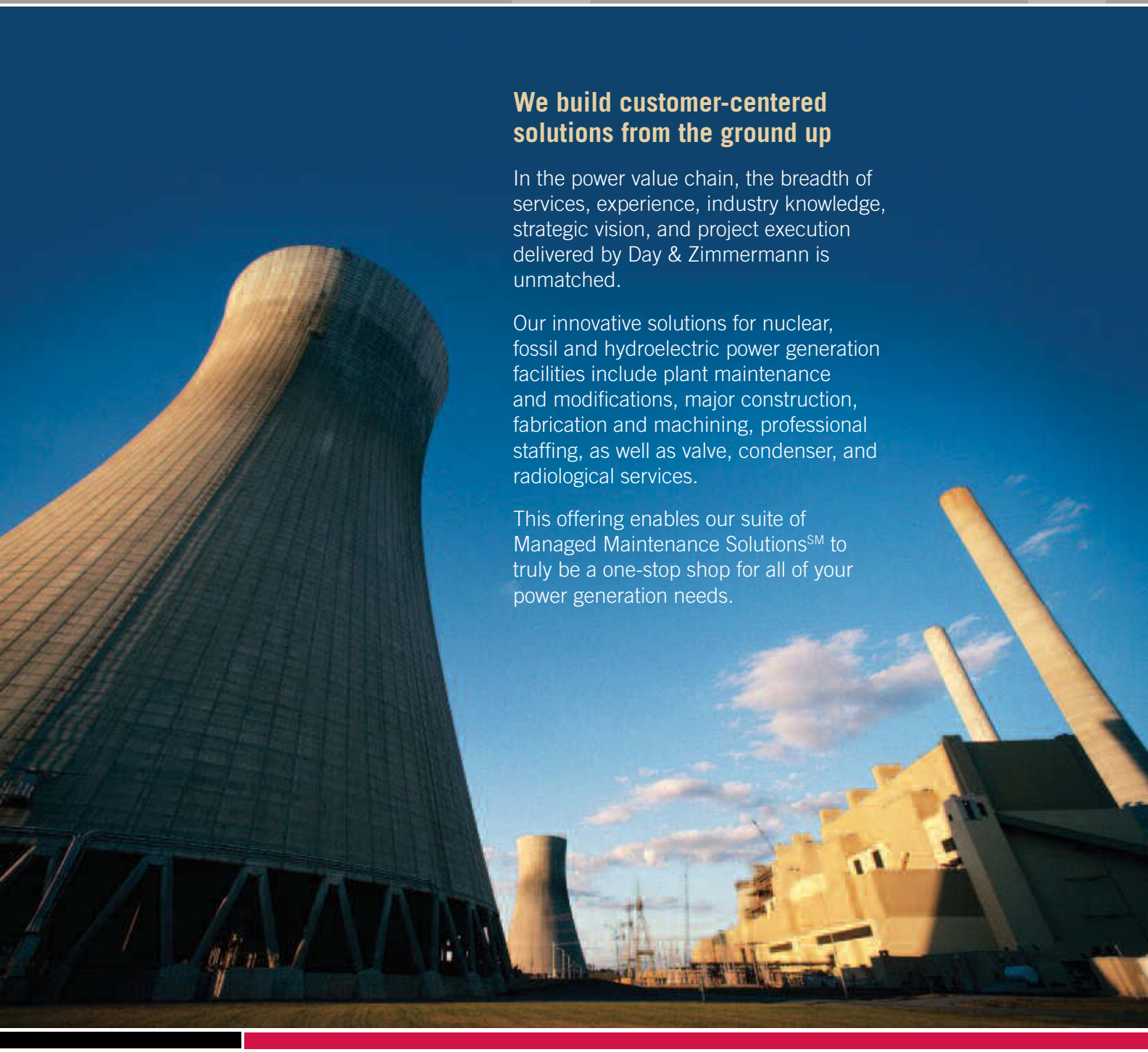
The report notes that the "preservation and transfer of knowledge—and of corporate memory and experience—concerning the safety of spent fuel management and the safety of radioactive waste management through education and training and through recruitment of new staff were recognized as being of crucial importance for both operators and regulatory bodies."

Asked at the interview about the slow growth in the ratification of the joint convention—adopted in 1997 and in force since 2001, but with only 48 contracting parties—Soda said that Portugal has now become the 49th member, meaning effectively that all countries with spent fuel are now parties. But he conceded that the efforts of the IAEA and individual parties to persuade others of the value of the convention for them have so far not borne much fruit. "We are trying hard, but it is slow," Soda said, noting that many small countries are using only sealed sources for medical treatment and feel no incentive to join.

Koblinger said that the issue is how to persuade officials of the smaller nuclear users that the convention is not just a sort of spent fuel club. Perhaps it is time to separate sealed sources from spent fuel and the whole spectrum of wastes of the nuclear fuel cycle, he said. The idea has been mentioned in review discussions. Koblinger also mentioned that the cost of participation in the treaty can be considerable for some countries. No one expects them to submit national reports of 100-plus pages, he said, but report preparation itself can be very expensive.

"But all countries planning national nuclear energy programs should see the joint convention as a chance, an opportunity," he said. "Preparation of the national report alone, apart from exposure to the review discussions, will be extremely useful for them. During report preparation, you have to go through all the areas very systematically."—*Gamini Seneviratne* NN

We look at power plant maintenance from a **different** angle.



We build customer-centered solutions from the ground up

In the power value chain, the breadth of services, experience, industry knowledge, strategic vision, and project execution delivered by Day & Zimmermann is unmatched.

Our innovative solutions for nuclear, fossil and hydroelectric power generation facilities include plant maintenance and modifications, major construction, fabrication and machining, professional staffing, as well as valve, condenser, and radiological services.

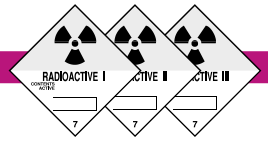
This offering enables our suite of Managed Maintenance Solutions℠ to truly be a one-stop shop for all of your power generation needs.

Day&Zimmermann

We do what we say.®

Safety, Integrity, Diversity, Success

www.dayzim.com



SPENT FUEL/HLW

Chamber: Review of U.S. waste policy needed

The U.S. Chamber of Commerce calls for a permanent solution for spent nuclear fuel and high-level radioactive waste.

A 16-PAGE REPORT issued by the U.S. Chamber of Commerce's Institute for 21st Century Energy calls for the United States to commit to a permanent solution for its spent nuclear fuel and high-level radioactive waste. The report, *Revisiting America's Nuclear Waste Policy,* is available online at <www.energyxxi.org/reports/Nuclear_Waste_Policy.pdf>

At issue is how the United States will deal with its nuclear waste following President Obama's questioning in February of the country's nuclear waste policy of the past three decades. Obama's fiscal year 2010 budget scaled back funding for the Department of Energy's Yucca Mountain program to $196.8 million, only enough for "those costs necessary to answer inquiries from the Nuclear Regulatory Commission, while the administration devises a new strategy toward nuclear waste disposal."

The new strategy does not involve a repository at Yucca Mountain, in Nevada, which is why Energy Secretary Steven Chu said in March that he would form a blue ribbon commission to study and recommend alternative waste strategies. The report noted that it is time to review the nation's waste policy because "many of the facts, conditions, and assumptions that were in place in 1982 when the current policy was crafted are no longer accurate or germane."

The United States currently has 60 000 metric tons (t) of commercial spent fuel that has accumulated in the past 35 years, and 13 000 t of U.S. government–generated spent fuel and defense-related high-level waste. The spent fuel and HLW are stored at 121 locations in 39 states. The nation's current fleet of 104 light-water reactors produces about 2000 t of spent fuel every year. In addition, 20 companies have submitted license applications to the NRC seeking authorization to build and operate 26 new reactors. While the first of these reactors will not come on line before 2016, the expansion in nuclear generating capacity will increase the annual production of spent fuel significantly.

"Yucca Mountain has been demonstrated to be the best solution under current law, but is by no means the only solution for managing America's nuclear waste," said Christopher Guith, the institute's vice president for policy. "If the Obama administration and Congress plan to change course after 30 years of independent scientific review and billions in investment, they have a legal responsibility to the American people and utilities that have paid more than $28 billion in fees and interest to immediately craft a workable long-term solution."

In its report, the Chamber of Commerce declares that the administration and Congress, regardless of the rationale for pursuing a new direction, should establish a durable waste policy that ensures that the federal government will meet its legal obligations while creating the regulatory certainty to foster the expansion of nuclear

Waste Management Briefs

THE NORTHWEST LLW COMPACT CAN'T STOP ENERGYSOLUTIONS from accepting nuclear waste generated outside of the compact's member states, according to a May 15 ruling of the U.S. District Court for the District of Utah. The court's decision will allow EnergySolutions to proceed with its plan to import low-level radioactive waste from Italy's decommissioned nuclear facilities. The LLW will be processed and recycled for use as radiation shielding blocks by other nuclear plants, and some material will be disposed of at EnergySolutions' facility in Clive, Utah. The company had been at odds over the issue with the Northwest Interstate Compact, which has some regulatory authority for LLW disposal activities in Alaska, Hawaii, Montana, Oregon, Utah, Washington, and Wyoming. The compact voted to stop the company from importing the LLW, but in May 2008, EnergySolutions sought clarification from the court. According to an EnergySolutions statement, the ruling means that the court has "agreed with the company's interpretation of the law on this critical issue." Steve Creamer, chief executive officer and chairman of EnergySolutions, said, "We are pleased that this ruling ends any question on this matter." The Clive facility has been disposing of LLW for more than 20 years and of residuals from internationally generated material for about eight years.

SRS'S H CANYON FINISHED PROCESSING old reactor components from the Nevada Test Site, the Department of Energy announced on May 27. The DOE said that the work was an example of facilities at the Savannah River Site working together to stabilize and dispose of surplus nuclear materials from other agency sites. The components came from the Super Kukla Prompt Burst Reactor, which operated at the Nevada Test Site from 1964 to 1978. It produced an intense pulse of neutron and gamma radiation to measure how well nuclear weapon components and materials withstood bombardment. When the reactor was disassembled, parts were sent to the DOE's Oak Ridge facility in Tennessee for consolidation of surplus nuclear materials. Oak Ridge then sent 324 containers for chemical separation to SRS's H Canyon facility, where the last of the Super Kukla material was successfully dissolved in April and downblended into low-enriched uranium, which will be converted for use as fuel by the Tennessee Valley Authority's Browns Ferry reactors.

power in the United States.

The report adds that while Yucca Mountain has been studied, characterized, and found to be the safest and best option for disposing of the country's spent fuel and nuclear waste given the parameters of U.S. law, its opening as a repository is not a prerequisite to building new reactors.

The report also says that although on-site storage of spent fuel is safe and secure, "it should not be relied upon as a fall-back policy because the federal government will not fulfill its legal requirements." The DOE was contractually obligated to begin taking spent fuel from commercial reactor sites in 1998. More than 60 lawsuits have been brought against the DOE for failing to perform its contractual duty to take the spent fuel. The projected liability for the federal government for failing to remove the spent fuel from the commercial reactors is $30 billion.

The report offers the following recommendations:

- Move the management of nuclear waste policy from the DOE to an outside entity, such as a government corporation, with access to the Nuclear Waste Fund, which currently has a balance of $22 billion and collects $750 million annually from nuclear utilities though a nuclear waste fee.
- Begin a process for siting and licensing centralized interim storage locations for spent fuel and nuclear waste, on DOE sites or other sites that have expressed interest in temporarily storing it.
- Close the nuclear fuel cycle to harness the energy in spent fuel, lessen the volume of waste, and reduce security risks, and determine what technologies and timelines should be employed.
- Fully fund the Yucca Mountain license application process.
- Reevaluate the retrievability requirement in the Nuclear Waste Policy Act for waste disposed of in a permanent repository and consider other geologic media and locations with fewer political, regulatory, scientific, or economic obstacles.
- Consider whether utilities should continue paying a nuclear waste fee and consider depositing the fees in a private escrow account.
- In addition to considering centralized interim storage locations for spent fuel, the DOE should look again at spent-fuel recycling and should investigate storing nuclear waste in salt formations because significant experience has been gained from the DOE's operation of the Waste Isolation Pilot Plant in New Mexico.

"As an emissions-free, reliable technology, nuclear energy will continue to play a key role in addressing climate change concerns and meeting demand with affordable and reliable electricity," Guith said. "The time is ripe to revisit our plans for managing the growing volume of used nuclear fuel and to finally commit to a workable plan." NN

DISPOSAL STRATEGIES

Waste management programs use simulation software

Researchers in South Korea and the United States have used software that simulates options for long-term spent nuclear fuel management.

SOUTH KOREA INTENDS to build a centralized storage facility for spent nuclear fuel by 2016. The country's long-term solution, however, is to build a deep geologic repository. Researchers Yongsoo Hwang and Chul-Hyung Kang, of the Korea Atomic Energy Research Institute (KAERI), are working on a project to formalize the country's options for long-term spent fuel management.

Twenty power reactors are currently in operation in South Korea. Another six are under construction, and two more are in the planning phase. By 2030, South Korea expects to have 38 reactors in operation, accounting for about 60 percent of the country's power generation.

The proposed boost in nuclear power will result in a quantity of spent fuel estimated at between 80 000 metric tons of uranium (tU) and 130 000 tU, depending on the scenarios for long-term electricity demand. Hwang, manager of the project to study long-term management options, said that comprehensive planning is the key to a successful nuclear program in South Korea.

To investigate the various options, the Korea Atomic Energy Commission (KAEC)—the top decision-making body for nuclear policy in South Korea—recommended that a national plan for spent fuel management be created. The plan is to include a strong emphasis on public and stakeholder engagement.

"Our government would like to have a short-term management plan to handle the storage problem in Korea," Hwang told *Nuclear News* during a phone interview, "but eventually, when talking about a short-term approach such as spent fuel storage, the public and stakeholders will ask questions about the ultimate solution. We would like to set up some kind of framework, not only for the short-term management, but for determining the final management of the spent fuel in Korea."

KAERI, South Korea's only national nuclear energy laboratory, has been working since 2007 with GoldSim Technology Group, of Issaquah, Wash., on the development of a computer model to simulate various storage and disposal options. The software, referred to as ENVI (Environmentally friendly Nuclear option with Vision and Innovation), is expected to be completed this summer. Hwang and Kang were in the United States earlier this year to check on the progress of the ENVI model when they talked with *NN*.

Hwang

Kang

The software complements a previously developed model that simulates the safety of a number of repository design concepts, including calculations of the long-term safety of potential repositories, since no single site has yet been selected for study, Kang noted.

In addition, Hwang said, the ENVI software has been designed to look at the effects of alternative strategies, such as storing spent fuel in pools for various amounts of time, in centralized storage, or in regional facilities. "For whatever scenario we choose, the software will run out that scenario, calculate all the logistics and all the costs, and then show us the consequences of it," he said.

According to the researchers, ENVI helps address the following questions:

- How do the various storage options (at-reactor storage, centralized away-from-reactor storage, multiple independent spent fuel storage installations, or repository) compare?
- How would the various deployment plans for the introduction of new power plants affect the manner in which the storage facilities would need to be introduced?
- How would recycling or reprocessing affect the proposed storage facility and disposal requirements?
- How does the timing and capacity of a final disposal facility affect the rest of the spent fuel management system?
- What are the implications of using the various storage technologies?
- How would different demands for power generation over the 100 years affect the spent fuel management system?

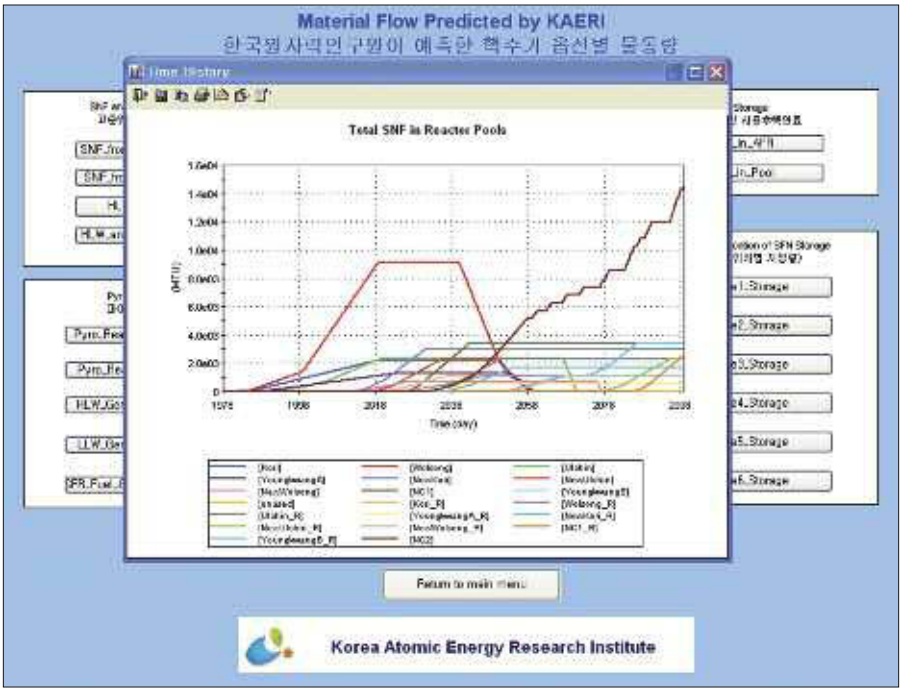
The ENVI model is being developed in GoldSim, a probabilistic simulation software for the dynamic modeling of complex systems, according to Hwang. Models are built hierarchically, and the interactions among various components of the system are illustrated graphically. The models can be constructed to allow stakeholders to experiment directly with the model and ask "what if" questions by evaluating various scenarios. This addresses KAEC's mandate to use an approach that emphasizes public and stakeholder engagement, Hwang said.

The next step in the researchers' work, they said, is to make the ENVI model available to KAEC, which will use it to help set the long-term national strategy for managing Korea's spent nuclear fuel.

Yucca Mountain

The GoldSim product was the core software used by the Department of Energy's currently suspended Yucca Mountain repository project to predict the performance of the site out to 10 000 years and also up to 1 million years. Sandia National Laboratories' Patrick Mattie worked on the project's licensing application as a risk analyst. Sandia was charged with assessing the long-term suitability of high-level radioactive waste storage at Yucca Mountain.

Mattie told *NN* that the United States and South Korea were engaged in "very similar activities" with regard to repository issues, but had approached them from different directions. The United States, he said, was "location-centric," starting with the selection of a geologic repository as the most viable place for long-term waste disposal, and from there identifying about 10 sites before ultimately deciding on Yucca Mountain, in Nevada. By contrast, the South Koreans have adopted a strategy to construct an optimal



The ENVI computer model makes predictions of the amount of spent fuel stored in pools at each South Korean reactor site for a specified management option. (Source: KAERI)

performance assessment model and then find a geologic location that most closely matches it.

"They're going from the top down, and we went from the bottom up," Mattie said. "They actually have a repository model that they've been refining over the years to build confidence in their modeling and their ability to predict future conditions. They're doing a survey of their potential locations in their country that most closely match that optimal repository system."

The Yucca Mountain license application, which was filed in June 2008 with the Nuclear Regulatory Commission, is the end result of years of scientific study that includes site investigation and "process-level modeling" of the important natural and engineered systems, according to Mattie. It also contains an assessment of the site's suitability to comply with the safety standard regulations, which Mattie called the foundation of the license application.

Mattie said that GoldSim software played two roles in developing the Yucca Mountain Project's total-system performance assessment model. The first was to be the framework in which to integrate other models and codes, and the second was to be used as software to model components of the repository system. Tens of thousands of simulations were run to postulate possible outcomes of storing high-level waste at Yucca Mountain. All of the possible outcomes were evaluated, based on a probabilistic analysis, to determine which would be the most likely to happen and to make sure that the likely outcome would meet the regulatory safety standard.

The NRC docketed the application last September, which triggered a three-year deadline (with a possible one-year extension) for the agency to decide whether to grant authorization for the construction of the repository. NN

Powerful Innovation.
Proven Experience.

American Crane can help you navigate through uncharted waters.

Your complete source for specialized Nuclear Material Handling Solutions for current plant needs and **the next generation of nuclear power plants.**

NQA-1 QA Program and Testing

Installation, Site Services and Parts

Single Failure Proof Cranes

In-House Manufacturing

Engineering Solutions

For more information call **1-877-877-6778 x224**

or visit **www.americancrane.com**

A Member of CMAA

MATERIAL HANDLING INDUSTRY OF AMERICA Member Company

ACECO

AMERICAN CRANE

& EQUIPMENT CORPORATION

Your ***Critical Lift*** Experts

NUCLEAR NEWS

NEWSLETTER OF THE AMERICAN NUCLEAR SOCIETY

Volume 52, No. 8 July 2009

SPECIAL SECTION: THE 50TH ANNIVERSARY OF *NUCLEAR NEWS* - 1959–2009

EFFORT TO INFORM MEMBERS COMPLETES 50TH YEAR

In July 1959, members of the American Nuclear Society began finding in their mail a four-page newsletter that looked very much like this page, bearing an alliterative title: *Nuclear News.* The five-year-old society was not a complete novice at publishing: It had launched the journal *Nuclear Science and Engineering* in 1956. It had not, however, produced a publication specifically devoted to the organization's activities, let alone to the coverage of the development and use of nuclear energy and radioactive materials in the wider world. *Nuclear News* immediately took on the first role, and more gradually adopted the second.

SL-1 ACCIDENT COVERAGE PAVES WAY

By its second year, *NN* had gone to a photo-illustrated front cover and began taking paid advertising. Initially there was no credit given for the content or execution of *NN,* although it was produced chiefly by ANS Executive Secretary Octave J. Du Temple, assisted by Ruth Farmakes, who worked on numerous ANS publications during her tenure on the staff. Du Temple's coverage of the January 1961 accident at the Stationary Low-Power Reactor No. 1 (SL-1) at what was then the National Reactor Testing Station (now part of the Idaho National Laboratory) firmly estab lished the news role for the magazine. Coverage of the society's constituencies (professional divisions, local sections, national committees, etc.) remained prominent, along with the inclusion of advance programs for national meetings, but in time a few pages of summarized "Nuclear News of the Month" grew to greater in-depth coverage of a wide range of developments, grouped into sections (for example, Power, Fuel, International, and Industry).

The front covers went to color in the early 1970s, and they usually showed construction taking place on the dozens of power reactors then in progress. For a while there were 15 issues a year, including the annual Buyers Guide and the two preliminary programs for national meetings. While the content of these three issues was different from that of the monthly issues, for a number of years they included the Late News section, written by the editorial staff. News specifically about the society was spun off in 1983 into a separate publication, *ANS News,* was returned to *NN* in 1996, and then spun off again in 1999. The programs for the national meetings are now prepared entirely by the ANS Meetings Department. The Buyers Guide was successful from the start and is still going strong.

TECHNOLOGY ADVANCES BEHIND THE SCENES

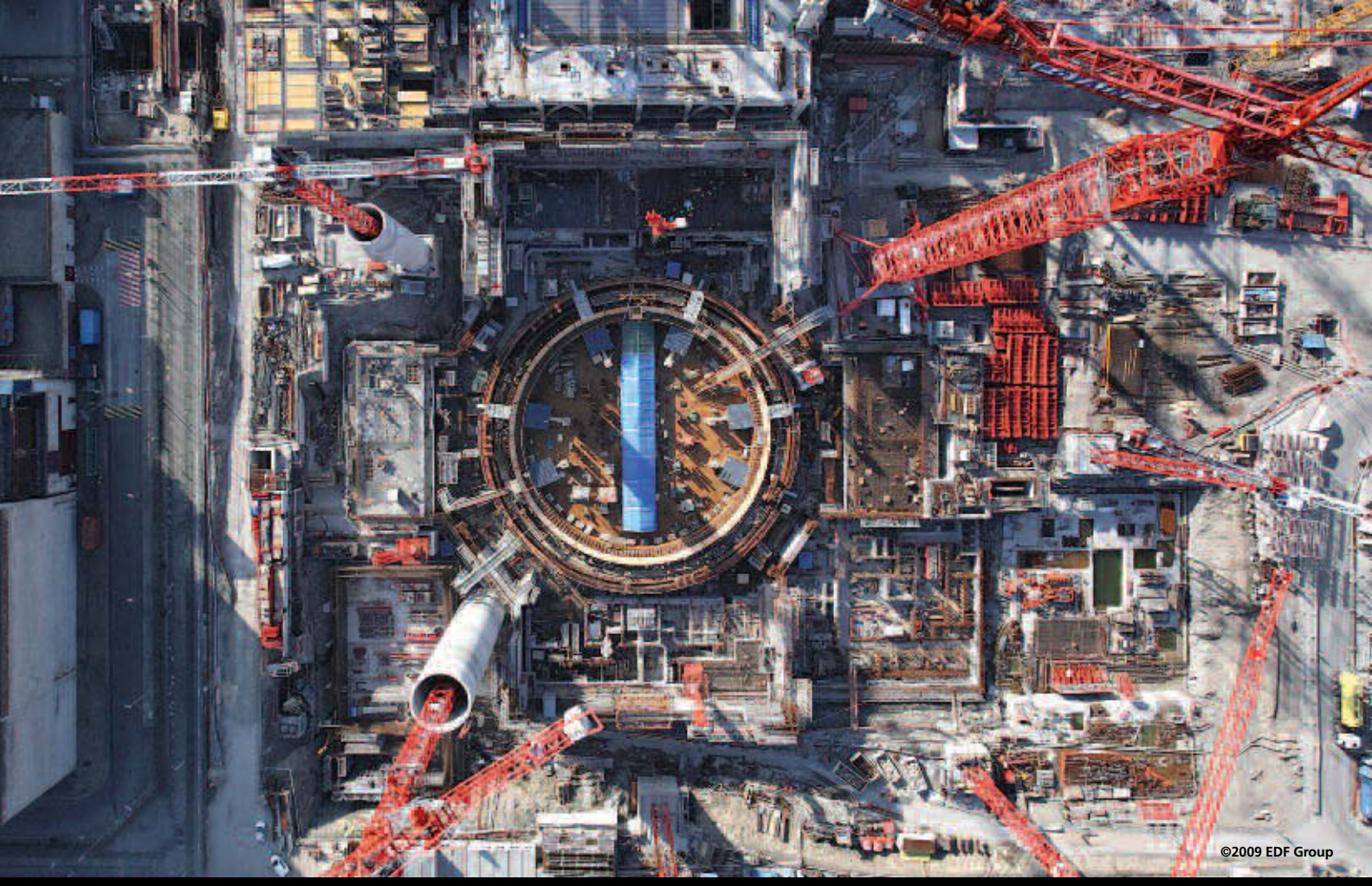
The writing, editing, and production of the magazine have changed enormously in half a century, but because surveys have shown that the readers generally support the content and format of the magazine as they had developed through the 1970s and into the 1980s, the changes have been made mainly to improve the efficiency and reliability of the production process and, when possible, extend the reach of the staff to provide more (and more meaningful) information to the readers. Also, as desktop software has evolved, so have the design elements, the use of graphics and color, and the overall appearance and readability of the magazine. Each step in the process of moving from typewriter-based page setup, through linotype, to the current in-house computerized process has occurred only once it was clear that the next step would be an improvement, enhancing the staff's ability to provide essential news and information on the uses of nuclear energy and radioactive materials.

Similarly, the process of developing the information to be written for the magazine has been streamlined. This editor remembers all too well the days of yore, filled with desperate pleas to distant federal agencies (while running up what were then substantial long-distance phone bills) for immense, arcane documents that would change the course of the entire nuclear industry, which then might arrive weeks later by surface mail, or not at all. Now, just about every such document is available immediately as a free download from the World Wide Web.

Again, however, the end result is intended to be the same, and while the Internet may be the newest tool for the reporter, it has not replaced all of the others. If anything, the many real-time interviews by Senior Editor Rick Michal—by phone and face-to-face—and the coverage of International Atomic Energy Agency meetings provided by correspondent Gamini Seneviratne have increased the quantity of personal-contact journalism in the magazine compared with that of past decades.

Nuclear News continues to be a major benefit for ANS members, both in print and electronically, on the Members section of the ANS Web site. As the magazine's sixth decade begins, its mission remains to report on nuclear science and technology and to provide the essential information—with the details filled in—to ANS members. Following is a look back at the first 50 years; after that, we get back to work on what's happening in mid-2009.

CONTENTS



EDF's Flamanville construction site for a new EPR™ nuclear energy facility (March 2009).

Your Partner for New Nuclear Energy. Today.

For those companies looking at new nuclear, UniStar Nuclear Energy provides economies of scale and scope through coordinated and systematic development of a standardized fleet of AREVA EPR™ new nuclear energy facilities.

To find out more about UniStar, call 410.470.4400 or visit **www.unistarnuclear.com**.

For information on AREVA's U.S. EPR™ technology, visit **www.us.areva.com**

For monthly photo updates of construction progress, send your e-mail address to **info@unistarnuclear.com**.

We congratulate* Nuclear News *on their first 50 years!

EPR™ by AREVA

UniStar® NUCLEAR ENERGY

Building Certainty

50 years of *Nuclear News*: Reflecting on the past, looking to the future

BY BETSY TOMPKINS

Nuclear News has gone through many changes over 50 years, but its mission remains to keep its readers informed about developments in nuclear science and technology.

IN PREPARING TO write this article on the history of *Nuclear News,* I have been observing, through back issues, the evolution of a publication. Perusing the early issues of what started as a four-page newsletter about the activities of the American Nuclear Society, to eventually become the glossy, full-color, electronically produced news magazine of today, has reminded me of the magazine's humble roots and of where it has traveled, through boom times and lean times, to what we anticipate is the eve of a nuclear renaissance in the United States and worldwide.

I have to stop to remind myself that I have been on the staff of the magazine for the majority of its existence, having started here with the title of editorial assistant in 1976. Oh, the changes I've witnessed—in how we are staffed, in how we write, input, and process copy and lay out pages, and in how material is provided to our printer. Technology has certainly made many of our procedures easier.

In putting together this article, I have drawn liberally from two earlier articles on *NN*'s history, one written by Christopher FitzGerald for the 25th anniversary in 1984, and one written by Jon Payne for the 40th anniversary in 1999 (with updates in 2004). These past editors did much of the legwork regarding the early days of the magazine, when it was still a work in progress. I thank them for giving me a head start.

Appearing throughout the pages of this article are remembrances from past editors of *Nuclear News* (and the past international editor). We managed to track down all of the past editors, and during that process, learned that three were deceased. All of the surviving editors except for one were able to contribute, and we were saddened to learn of the recent death of past editor John Graham (see obituary on page 120), who had submitted his contribution in late March.

So begins the journey of a magazine called *Nuclear News.*

In the beginning

As noted above, the first issue of *Nuclear News* was a four-page newsletter. It was initiated by Octave Du Temple—who had become ANS's executive secretary in May 1958—with the goal of keeping the members informed. The typeface was "early typewriter," and the content focused on the activities of ANS, with special emphasis on the society's meetings and publications. There is no record of any name other than

Filling a need

Editor #1 • Octave J. Du Temple, July 1959–March 1961

During my first year as the executive secretary of the American Nuclear Society, I decided that a publication was needed to keep the membership informed about the society's meetings and other activities. At that time, McGraw-Hill was publishing *Nucleonics* and was not giving attention to the activities of ANS, so I started publishing *Nuclear News.* Besides covering society news, the newsletter early on also began reporting on some limited news of the industry.

Then, on January 3, 1961, the accident occurred at the Stationary Low-Power Reactor No. 1 (SL-1) near Idaho Falls, Idaho. I was in the office of Norman Hilberry, the director of Argonne National Laboratory, when we received the news about the accident. He and I were about to go over the financial records of ANS, a task that he and I regularly undertook because he was the chairman of the ANS Finance Committee. He called off our meeting and impressed upon me that this was a serious accident.

I immediately started working with the public relations department at the National Reactor Testing Station, where SL-1 was located. I had a Q clearance (top-secret security clearance specifically related to atomic or nuclear materials) and was part of the team that decided what information was to be released to the public. Ultimately, just about everything was released except for the pictures of the three individuals who were killed in the accident. Ruth Farmakes, the assistant who in those days typed and helped produce each issue of *NN,* and her husband, John, who worked at Argonne, helped to put together the report on SL-1 for the February 1961 issue of *Nuclear News.* We worked on it for about four days and mailed it out to all ANS members (there were about 4000 of them at that time). We beat *Nucleonics* by about 10 days and had a better, more detailed report. This issue made members really take notice of *Nuclear News* as a serious source of industry news.

Along the way, as *Nuclear News* gained importance, several ANS presidents wanted to become its editor. It became clear, however, that the publication could not have a new editor every year and that the editorship was too big a job to add to the job of being president.

This situation also illuminated the problems of my being both the editor of *NN* and the executive secretary of ANS. This led to the appointment of a separate editor, which was a great improvement. John Martens, who held a full-time job at Argonne, became the editor on a part-time basis.

Over the years, *Nuclear News* has become the most important monthly source of information about the nuclear industry for those involved in the industry, and this is because of the wonderful editors and staff who put the magazine together.

An exciting time for nuclear

Editor #3 • Malcolm Ferrier, August 1962–April 1965

I was fortunate to be the *Nuclear News* editor during a particularly lively and productive period in the history of the nuclear industry. The industry was growing fast, with technical advances seeming to occur almost weekly. New projects—power-reactor construction, mainly—were proceeding apace, and nuclear engineering departments were sprouting up at many schools. It was a great time, and I loved every minute of it!

I was the first full-time editor—Octave Du Temple and John Martens fitted in their *NN* duties among their other responsibilities. I had come into the job mainly because of my work at Atomic Energy of Canada Limited's Chalk River Laboratories. My boss there, W. Bennett Lewis, was the 1961–1962 ANS president, and I fell into doing a lot of ANS work, which got me involved in lots of ANS business and eventually the job of *NN* editor. I was fortunate, too, in that Manson Benedict, of the Massachusetts Institute of Technology, was the ANS president (1962–1963) during my tenure as editor. He was a wonderful friend and mentor, and we kept in touch until his death in 2006.

Being the editor of *NN* was not my only job at ANS. I was also the production editor for *Nuclear Science and Engineering, Nuclear Technology* (which ANS started during my tenure), and *Hot Lab Proceedings*, and handled the twice-a-year editing and production of *ANS Transactions.* We also published a series of monographs. Busy days! We made a great deal of money, having to spread it around at a dozen Chicago banks for safety.

I would never have been able to do all of this without our indefatigable production associate, Ruth Farmakes. In those days there were only limited typesetting capabilities available, and Ruth had to type everything for *NN* twice—once to get a feel for the pages and the shape of the magazine, and once again to tidy it all up and justify it (by counting each space, no less!) with her bouncing-ball IBM Executive typewriter, which allowed for justified columns (anyone remember those devices?). Typically I would plunge into each month's heap of press releases and dictate extracts, and Ruth would magically produce the issue. There were longer contributed review articles, too—members of ANS were happy to contribute whenever asked. The production of most of our other publications was handled by commercial houses.

There was no advertising at first, but Dick Quinn came on board in July 1963 to handle that, and the magazine expanded quickly. I was very naive about advertisers: I remember unilaterally changing an ad's copy a couple of times because I thought it too high-blown and fanciful!

There were other nuclear publications, mainly McGraw-Hill's *Nucleonics,* but *NN* took over the top spot as the nuclear industry's magazine. (Having thousands of ANS members to call upon was a huge advantage.)

One special year was 1964, the year of the Third Geneva Conference on the Peaceful Uses of Atomic Energy. Many ANS members helped with the writing of the technical reports of the many sessions, and we were able to give the event comprehensive coverage. I well remember that upon my returning from Geneva, the customs officer in New York was convinced that my very heavy briefcase was stuffed with gold or some such contraband. Paper is exceedingly heavy, and I was carrying scores of papers from the conference!

We also made a start on what is currently a hot topic: Several articles in 1964–1965 covered the importance of nuclear power's not emitting any greenhouse gases (although that term wasn't yet in vogue). We also demonstrated that a coal-fired plant emitted more radioactivity, via thorium, than did any power reactor.

But such a paradise could not last forever. I had long fought a losing battle with the ANS Board of Directors to try to get them to realize that our industry was only partly technical; public acceptance was an equally crucial part of the industry's health and growth. But no money was designated for that aspect, and I left ANS with great regret. I felt that we'd never grow the industry to its full potential in technical isolation.

Nuclear News having been considered for the publication—and that is in contrast to at least 10 possible names having been considered for the society!

It took less than a year for significant changes to occur in the fledgling publication, most notably the broadening of its scope beyond the activities of ANS and an increase in the number of pages, to allow for more in-depth coverage. Items reporting industry news appeared in the April 1960 issue—for example, that the Midwest had received its first nuclear-generated electricity from the Dresden-1 nuclear power plant when it supplied power to Commonwealth Edison's grid. Reflecting the growth of the nuclear industry, which also meant more news to report, *NN* grew as well, and by the end of 1960, the issues were in the neighborhood of 32 pages. It is difficult to pinpoint exactly when the newsletter graduated to magazine status, but the January 1961 issue was the last to carry the word "newsletter" on the cover.

Topical coverage

The exploration of the various possible applications of nuclear technology in the early days of the industry afforded *NN* the opportunity to cover a broad range of topics, including the Rover program, for nuclear rocket propulsion; nuclear ships (the NS *Savannah,* the first cargo-passenger vessel built in the United States, and the icebreaker *Lenin,* in Russia); and Project Plowshare, which involved the development of techniques to use nuclear explosives for excavation, mining, and other peaceful construction purposes.

Along with this array of news coverage were articles about developments in the structure of ANS. For example, an article in the June 14, 1960, issue notes a resolution by the board of directors whereby the divisions of the society would be based on the applications of nuclear science and engineering (Isotopes and Radiation Division, Power Division) or on a segment of nuclear technology (the Hot Laboratory Division), rather than on the technical discipline involved. Members were observing the inventing of ANS in the pages of *Nuclear News.*

It is also notable that even the early issues of *NN* had an international flavor. Reports of books published in Europe appear as early as the January 1960 issue, and the March 1960 issue presented the entire table of contents of the January 1960 issue of the *Soviet Journal of Atomic Energy.*

And there are some topics that seem to have been in the spotlight from the very early days of the industry. The March 1960 issue contained this comment about a talk that had been presented that month by Alvin Weinberg, who was the ANS president at the time and the director of Oak Ridge National Laboratory: "Weinberg also reemphasized to the group the importance and magnitude of the waste disposal problem when we get into a nuclear power economy." There really *is* nothing new under the sun!

The January 3, 1961, accident at the Stationary Low-Power Reactor No. 1 (SL-1), in Idaho Falls, Idaho, presented *Nuclear News* with its first real journalistic test. With Du Temple using his connections to a source at the National Reactor Testing Station (where SL-1 was located) and dictating the text to assistant Ruth Farmakes, the two produced a 14-page illustrated report that was part of the 48-page February 1961 issue. *NN* scooped McGraw-Hill's *Nucleonics* on the story, bringing it well-earned recognition from society members and others in the industry. In fact, the SL-1 report and excellent follow-up articles through the November 1962 issue quieted talk among some board members about discontinuing the magazine because of rising production costs.

As the industry developed and grew through the middle and late 1960s, *Nuclear News* grew and changed, too. Although varied potential uses of nuclear science and technology were still being pursued, nuclear-generated electricity was becoming the major application. The March 1966 issue of *NN* reported that nuclear power plant sales averaged one per week during the first five weeks of 1966—an anomaly, to be sure, but a significant indicator of the shift toward nuclear-generated electricity and a precipitator of other occurrences, including an increase in individuals employed in designing and building nuclear power plants, in utility people in ANS's membership, and in coverage of nuclear power in the magazine, as well as the creation of a focal point for the newly forming antinuclear movement.

Editor #2 • John Martens, April 1961–July 1962
Died April 7, 2006, at age 86

Editor #4 • David Sundberg, May 1965–April 1967
Died June 18, 1999, at age 63

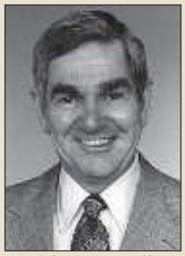
Editor #7 • Christopher FitzGerald, March 1970–September 1972
Died July 11, 2001, at age 74

Along with this growing interest in nuclear power generation as a rapidly expanding commercial enterprise, ANS sought to develop products that would reflect and assist this growth. The first issue of the *Nuclear News* Buyers Guide—with 242 product and service categories and 550 companies—was published in February 1969, and the initial *Radioisotope Directory,* which was bound into the December 1969 issue, was produced. The latter lasted for only two issues, but the Buyers Guide was a huge success and still exists today, having been published every year since its inception. In fact, the 40th edition of the directory was published as the mid-April issue this year, and includes 472 categories and 967 companies. The first issue of the Buyers Guide also contained a two-page spread titled "Facts and Figures about the Nuclear Field" listing nuclear power plants in the United States, along with a one-page table of nuclear employment statistics. The list became a standard feature of the Buyers Guide and eventually evolved into what is today the World List of Nuclear Power Plants.

Another point of note from the 1960s issues of *NN* is the person whose photo appeared most often on the cover: the late Glenn Seaborg. This occurred primarily because of his prominence as an advisor on science policy to three U.S. presidents—Kennedy, Johnson, and Nixon—and because he was a member of the U.S. Atomic Energy Commission during most of that decade, chairing the commission for seven

From Italy to ANS

Editor #5 • John Graham, May 1967–June 1969



I had been working for about five years at a U.S. Navy/NATO antisubmarine warfare laboratory in La Spezia, Italy. I was there with my family, and although we were happy there, my wife and I were anxious to get back to the States so that our five young children could attend school there.

Word got to me through a colleague at the lab that the American Nuclear Society was seeking an editor, and that he had been approached about the job. He was not interested in the job, but I was! By the next day, my resumé was in the mail to ANS.

Arrangements were made via a phone call from the ANS headquarters office for the society's executive director, Octave Du Temple, to meet with me in Naples during one of his trips abroad. The meeting and interview were a success, and I joined the ANS staff in August 1965 as a senior technical editor.

In college, I had edited a magazine that became the "slick" variety, printed in a print shop. We on the editorial staff snitched the idea from a national magazine that the cover should be a different color each month, with the title in clean block letters. And there would be some photographs (*Time* magazine fashion) and a subhead or two. That was all. I carried a similar design to *Nuclear News* when I succeeded David Sundberg as the editor in May 1967.

Another highlight of my tenure at *NN* was bringing Bill Minkler on board, with his humor column, "Backscatter," on the back page. Other firsts under my regime were the pages now called Late News, the staff-written ANS president profile articles, the List of Central Stations (which ultimately expanded into the World List of Nuclear Power Plants), and the Buyers Guide.

I left *NN* in mid-1969 to attend graduate school, but I ended up back at the magazine in 1977 as Washington editor, based in Washington, D.C. The position, however, ultimately was turned into my being the society's Washington representative, which reduced the amount of time I could devote to *NN*.

Today, I look at the magazine and I see me, and some of my early creations that have endured. And while admiring my own contributions, I am constantly amazed at how much I approve of what I see in the magazine today.

Nuclear News *was saddened to learn that John Graham died on June 6 at the age of 88. An obituary appears in the People section of this issue.*

Nuclear News milestones

- July 1959: Publication of first issue of *Nuclear News,* a four-page newsletter
- October 1960: First commercial advertisement
- February 1961: First issue in magazine format
- February 1961: First two-color advertisement
- August 1962: First full-time editor (Malcolm Ferrier)
- January 1963: First four-color editorial illustration
- October 1967: Bill Minkler column becomes a regular feature; it was then labeled "a non-editorial"
- February 1969: First *Buyers Guide* issue published
- July 1969: First staff-written profile of incoming ANS President (Louis H. Roddis, Jr.)
- January 1971: New design, with a section for each news subject—e.g., Power, Isotopes & Radiation, etc.
- February 1971: *Buyers Guide:* First list of U.S. nuclear power plants
- Mid-October 1971: Special issue on Geneva IV, the Fourth United Nations International Conference on Peaceful Uses of Atomic Energy (132 pages)
- September 1972: First separately bound Preliminary Program issue
- September 1973: Plant list is made international, becoming the World List of Nuclear Power Plants
- July 1976: First "On Line with Verna" every-other-month column, by Bernard Verna, about plant operating experience; last column was September 1994
- April 6, 1979: Special Report about accident at TMI-2
- January 1983: *ANS News* is made a separate publication
- October 1983: First "Focus on Finance" every-other-month column, by Linda Caldwell Byus, on electric utility finances; last column was June 1996
- December 1985: First List of Scheduled Outages at U.S. Nuclear Power Plants; last list was July 2001
- June and September 1986: Special reports on the Chernobyl-4 accident
- March 1987: First of the continuing series of "theme issues" (i.e., multiple articles on one topic), with a 45-page special report about waste management
- Fall 1994: Named as most important member benefit in ANS's first professional-quality (and largest) survey of members
- August 1995: First Vendor/Contractor Profile Special Section
- January 1996: *ANS News* moved back inside *Nuclear News*
- January 1996: Program Issues are published by Meetings Department rather than as issues of *Nuclear News*
- January 1999: *ANS News* is again made a separate publication
- March 1999: First annual Reference Issue
- March 2003: First appearance of the Security news section
- October 2006: Education section renamed Education & Training
- January 2008: *NN* becomes available to ANS members in electronic form
- July 2008: "Focus on Finance," again written by Byus, resumes on every-other-month schedule
- November 2008: Education & Training section renamed Education, Training & Workforce

of those years.

One institution of *Nuclear News* was firmly established in October 1967: Bill Minkler's humor column, which appeared on the last page of the magazine. Originally called "a non-editorial," in January 1971 it was renamed Backscatter. At that time, Minkler was a senior engineer at Bettis Atomic Power Laboratory in Pittsburgh, teaching in the Bettis Reactor Engineering School. Blightsburg's most prominent resident has entertained readers for nearly 42 years.

Signs of the times

The late 1960s into the 1970s was a pivotal time in the history of the United States and the world. And while milestones and trends do not always fit neatly within a particular decade, the 1970s certainly brought important changes to the nuclear industry and, consequently, to *Nuclear News.*

As noted earlier, during this time period, the variety of nuclear technology applications that originally were "tested" began to drop away, and more efforts were focused on nuclear power. At the same time, the environmental movement began to coalesce, with the passage in 1969 of the National Environmental Policy Act (NEPA), which had its first court ruling in 1971, employing the Calvert Cliffs nuclear power plant as a test case. In addition, the nuclear power plant business was growing rapidly in the early 1970s, with an acceleration in the reactor ordering that had begun in the 1960s.

In conjunction with this industry growth, *Nuclear News* in 1971 underwent a major redesign. The news sections were organized by subject area—Power, Fuel, Industry, and Education, for example—the basic structure of which remains in place today.

Also, even though there was international coverage, albeit limited, in the very early days of the publication, it was expanded because the industry, too, was expanding globally. Heavy coverage was given to the third and fourth United Nations International Conference on the Peaceful Uses of Atomic Energy, held in 1964 and 1971, respectively, in Geneva, Switzerland. (An entire separate issue was devoted to the 1971 conference.)

In September 1973, *NN*'s list of U.S. commercial nuclear power plants was expanded to international status, becoming the World List of Nuclear Power Plants. This was no small undertaking in those days before the advanced means of communication that are available today. At that time, no list of plants outside the United States even existed. Nor was there a list of utilities and organizations outside the United States that were operating or building nuclear

Busy times remembered

Editor #8 • Jon Payne, October 1972–August 1993

Editing a magazine such as *Nuclear News* can, even under normal circumstances, keep you busy all day long and into the night. There are always more stories to consider or to write, more printing problems to address.

Then, the job can become still busier and more intense, as happens when there is major news in nuclear science and technology. It is probably no surprise that from my 20 years as editor, the times I recall most vividly are those intense periods.

One of the favorable times was the early 1970s, when the nuclear field had the pleasant problem of many orders for nuclear power plants. Each announcement for a new plant described one of three situations: a firm order, a letter of intent, or a plan.

We published news stories about all of those announcements, but we worked at sorting them out for our readers. The orders and the letters of intent were pretty definite and settled, while those "planned" plants could represent anything from contracts to be signed soon to just the beginnings of ideas for new plants. We developed a checklist and asked many questions before we wrote those stories.

This approach also helped with the process of putting together our list of nuclear power plants. There we included the first two categories (orders and letters of intent), but not plans for new plants. This distinction proved useful to our readers.

Another challenge was expanding our list of U.S. plants to include units in all countries. Today, it seems easy to identify the plants and their owners and operators in all countries, but it was not so in the early 1970s. We put many hours and many search methods into creating the World List of Nuclear Power Plants, which made its first appearance in September 1973.

Something going wrong in the nuclear field also created editorial challenges, with the accident at Three Mile Island an example of that. It was difficult keeping our other work in motion as we searched, along with many other people, to find out exactly what had happened. The magazine's six-page special report, dated April 6, 1979, became the most widely distributed material ever produced by the magazine. The first mailing of this special report went to the magazine's regular mailing list—that is, to all ANS members plus the library subscribers. Soon, other nuclear organizations were asking for copies, which they paid to have printed and sent to them. We printed about 250 000 copies of that report.

During my editorship (which ended in August 1993, when I became the publisher of ANS Commercial Publications), the magazine covered several trends. Among these are the impressive success in improving plant reliability and the expanding use of nuclear medicine—with about one of every three people in hospitals receiving the benefits of radioisotope tests, diagnoses, or therapies.

Also, the magazine has chronicled the political approach in the United States to developing a repository for high-level nuclear wastes. The essence of this approach, which I saw as early as the 1970s, is kicking the decision down the road to the next administration. Too often, the guiding political principle—rarely stated openly—has been that research and studies are okay, but decisions on actual facilities must wait, and wait again. Some promise did appear in the 1980s, with laws enacted that should have led to the establishment of a repository. But soon the politicians were again kicking the decision down the road. This approach continues today.

One noteworthy trend has occurred since my time as editor: the improved possibility of new orders for nuclear power plants in the United States.

More personally, I found that the two most rewarding aspects of serving as the editor of *Nuclear News* were working with the publication's talented staff and providing a magazine that I saw as central to the value of membership in the American Nuclear Society. Those two elements continue: The magazine still has a talented staff, and the publication remains important to ANS and its members.

For 50 years, *Nuclear News* has reported on the many contributions of nuclear science and technology to human society. In the magazine's second half-century, there undoubtedly will be times when the staff encounters instances of intense work. Here's hoping that the next such intense time is because of orders for new plants.

From a grumpy old man

European Editor/International Editor
Simon Rippon, May 1976–February 2000

For 50 years, *Nuclear News* has given appreciative readers all they want to know about a fascinating industry, and it was my privilege to have spent most of my professional life as its European Editor/International Editor, based in the United Kingdom.

It all started for me when I was still a student interested in atomic energy. In 1956, I watched on television as Queen Elizabeth II opened Calder Hall, the first industrial-scale nuclear power plant. For some years, Calder Hall produced plutonium for the military, but the plant was soon optimized for the commercial production of electricity and heat. The plant had taken 42 months to design and build, with nothing more than slide rules to perform calculations. It cost tens of millions of pounds in real money and produced a vast amount of electricity. If you ignore the accountants, whose rules are weighted against capital intensity, the electricity produced really was too cheap to meter. In September 2007, the Nuclear Decommissioning Authority—about the last remaining U.K. organization to have "nuclear" in its name—demolished the cooling towers of this remarkable power plant.

In the same 50 years, I have been privileged to write about the growth of a remarkable industry that currently produces about 14 percent of the world's electricity. But how much more might it have been! We could, like France, produce 80 percent of our electricity from nuclear. We could have nuclear electric transport. We could have nuclear ships. We could have nuclear desalination and agro-industrial nuclear complexes. We could have nuclear-powered steel-making.

Instead of all these exciting things, I have spent a great deal of time reporting on and refuting protestors. It has been a challenging and rewarding task, but a sad one, too. There has been disgraceful waste, not the least of which is U.S. President Barack Obama's intent to scrap the $13.5 billion spent on Yucca Mountain in order to placate the not-in-my-backyard attitude of a few people in Nevada.

Now is the time to say that there is no waste problem: We will recycle it as mixed-oxide fuel as the French do, and get 25 to 30 percent more energy from it. Sure, there is still a small residue of fission products. These are vitrified and encased in steel, which makes it safe for the hundred or so years over which it decays to a lower level of radioactivity than the uranium from which it came. Yes, there will be a small bit of plutonium left, but that is still shorter-lived than uranium. How much better that is than the 9 billion tonnes of carbon dioxide waste that we pump into the atmosphere every year!

Nuclear News has been quite progressive. Back in the mid-1980s, I was sending an average of 8000 words a month across the Atlantic electronically, and Chris FitzGerald was even then editing my copy on screen. I recall Jon Payne saying happily that my copy did not have to be retyped, as was the case for anything sent by fax. He did not mention, however, that I am one of the world's worst spellers (it has something to do with dyslexia in my youth, although we did not know about such things then, and I certainly could not spell it). I did manage to write a spell-checking program for my computer that worked quite well for a few years. It was written in machine code and occupied a massive 124 bytes—not kilobytes or megabytes or gigabytes—of memory.

I recall a visit to a powerful French simulator near Lyon. The people there told me that they had just gotten a link to a center in Paris that would accept 1 megabyte per second. Now I grumble if the Internet connection on my computer is achieving only 4.5 megabytes per second, compared with the 8-megabyte speed that is claimed to be possible by the service provider. And so, if we can push a complete reactor design down an optical line at a gigabyte per second today, why on earth do we waste 10 years assessing new reactor designs?

When I retired from *Nuclear News* in 2000, I became a grumpy old man. My main grump was with the U.K. government and the death of the nuclear industry. Now, more than 10 years too late, there are signs of a revival, but it looks as if it will have to be led by the French or Japanese.

I have greatly enjoyed writing about the first 50 years, and surely will not be around for the next 50. But perhaps we can—we must—see the renaissance start off, even if too slowly, on the right path, with *Nuclear News* still there to tell you all about it.

I warmly congratulate *Nuclear News.* And to the politicians who have done so much to hold us back, this grumpy old man says "bah!"

power plants. It was difficult even for the International Atomic Energy Agency to obtain power reactor information from some of its member nations, especially those in the Soviet bloc. Consequently, a major effort that involved writing many letters and making many phone calls, as well as calling in numerous favors, was required to assemble that initial international list.

Because of the large number of nuclear plants being ordered in the 1970s and the literally hundreds of projects requiring frequent changes in the "construction completion" column of the World List, its publication frequency was increased to twice yearly. It appeared in the Buyers Guide issue, to reflect updated data as of the end of the previous year, and in the August or September issue, to reflect updates as of midyear. Starting in 1979, the first of the year's two World Lists was moved from the Buyers Guide to a regular issue of the magazine, generally the February issue.

In May 1976, *Nuclear News* showed further commitment to international coverage of the nuclear scene with the hiring of Simon Rippon as its European editor. He was able to make effective use of a few "stringers"—some of them writers, some of them nuclear industry people—in Europe who were able to help provide expanded international news coverage and content. A couple of those stringers still write stories for the magazine today.

The On Line with Verna column, authored by Bernard Verna, an independent consultant and publisher of a newsletter called *Nuclear Power Experience,* first appeared in the July 1976 issue of the magazine. In the every-other-month column, Verna covered a variety of topics related to the nuts and bolts of plant operations. Probably his most significant column was on the 1977 Davis-Besse feedwater transient, a precursor of the Three Mile Island-2 accident. That column appeared in the May 1979 issue of *NN,* just in time to be a big part of the magazine's TMI-2 news coverage.

Plenty of news was also coming out of Washington, D.C., in the 1970s, with events that were redirecting nuclear science and technology. The Atomic Energy Commission was split into two parts—the Energy Research and Development Administration (ERDA) and the Nuclear Regulatory Commission—in 1974; President Gerald Ford issued a statement in 1976 that directed agencies of the executive branch to delay the commercialization of reprocessing until uncertainties were resolved; Congress's Joint Committee on Atomic Energy was disbanded in 1977; and President Jimmy Carter announced in 1977 that commercial reprocessing and recycling of plutonium would be deferred indefinitely, and he then vetoed S. 1811, the ERDA Authorization Act of 1978, which prevented the legislative authorization required for the construction of

a breeder reactor and reprocessing facility.

In conjunction with all of this activity in the nation's capital, John Graham, who had been the editor of *NN* from 1967 to 1969 (not the John Graham who was the 1995–1996 ANS president), rejoined the magazine in 1977 as Washington editor.

Ending on a down note

Although far from a positive occurrence at the end of the 1970s, the accident at GPU Nuclear Corporation's Three Mile Island-2 on March 28, 1979, was one of the most notable events covered by the *Nuclear News* staff, and also one that had profound effects on the nuclear industry going forward.

Because of the nature and significance of the accident, it was decided that *NN* would produce a special report to provide a factual accounting of events. Collecting information for that special report was a noteworthy challenge and required that other editorial work be set aside during the first few days following the accident as we, along with thousands of other people, tried to learn exactly what had happened.

The six-page special report that resulted from those several days of concentrated effort turned out to be the most widely distributed material ever produced by *NN*. Dated April 6, 1979, the report's initial press run was the same as that of the regular issues of the magazine—all ANS members (at that time numbering about 13 000) and library subscribers. Within days of the report's distribution, an organization called asking to purchase 10 000 reprints. This was followed by a request for 50 000 copies from another organization. This continued until ultimately, within a few months after the accident, 250 000 copies of the report had been printed.

Nuclear News also provided follow-up articles over the years as various steps in TMI-2 investigations, cleanup, and report issuance were undertaken and completed.

Adapting to the times

The 1979 accident at TMI-2 had a substantial influence on the events that followed. Besides the NRC's calling for numerous equipment backfits and modifications of plant procedures, the Institute of Nuclear Power Operations was formed in late 1979. INPO set high goals for the United States' fleet, placing emphasis on improving plant operations. This set the tone for the 1980s—particularly in the early years of the decade—and affected *NN*'s coverage, too.

In October 1983, Linda Caldwell Byus joined *NN* as a contributing editor with an every-other-month column called Focus on Finance. She provided insights into the financial workings and dealings of the nuclear power industry as it dealt with the new focus on plant operations.

In order to provide more in-depth reporting on plant operations, Gregg Taylor was hired in 1984 to focus solely on those activities. He visited plants around the world, providing a look at nuclear operations worldwide through his writings and photographs.

Also developed during this time was the List of Scheduled Outages at U.S. Nuclear Power Plants, which made its debut in December 1985. This list came together through many hours of work by the editorial staff and, not unimportantly, the good graces of the utilities. Over the years, it proved to be of value to many people, among the more interesting being individuals who moved around the country to work at the outages, or needed the list to learn when outages would be occurring in their part of the country. For example, a St. Louis–based welder called to purchase the list so that he could see when outages were scheduled in his area. A subscription to the twice-yearly list was started in 1992, whereby individuals paid a nominal fee to receive the list at about the same time that it was to appear in the July and December issues, or a higher fee to receive it by mail a month before its appearance in the magazine. It was a very successful product during its lifetime.

April 26, 1986, the date of the disaster at the Chernobyl-4 nuclear station, in Ukraine, presented *Nuclear News* with one of the most challenging reporting situations in the

magazine's history. Ukraine at that time was still part of the Soviet Union, and obtaining factual information about the accident was a difficult process. Once again, as with the TMI-2 report, other editorial work was set aside while efforts were made to ferret out the details. The IAEA became the conduit for information from the Soviet Union to the rest of the world. Ultimately, after many hours spent making phone calls, and relying a great deal on European Editor Simon Rippon to track down and verify the facts, the editorial staff managed to put together another special report that appeared in the June issue of the magazine. Reprints of that report were also widely distributed.

Later that year, *NN* prepared another special report, dated September 11, 1986, based on an August IAEA meeting held in Vienna that was devoted entirely to the Chernobyl accident. That meeting featured the presentation by Soviet officials of what some called "a surprisingly large volume" of information. Rippon attended the conference and provided coverage of the Soviets' revelations, as well as analyses of that information by outside observers. Like the TMI-2 report, this special report was mailed separately to members in addition to their regular monthly issues of the magazine.

Another topic that garnered increased attention during the 1980s was waste management. The magazine's Waste Management section included heavy coverage of the topic, and the first of *NN*'s special sections—consisting of a group of feature articles on a single topic—encompassing 45 pages, appeared in the March 1987 issue.

In a departure from magazine publishing, and to provide another source of revenue for ANS, the *Nuclear News* staff in 1988 developed, gathered data for, and published the first volume of the *World Directory of Nuclear Utility Management.* It has been (mostly) an annual publication ever since, with its 21st edition (in print and on CD-ROM) just recently made available.

And in another move that affected the content of the magazine, *ANS News,* which had been a part of *Nuclear News* from its beginning in 1959, was launched in January 1983 as a separate publication. This change, made with the intent of keeping members better informed about society activities, was nurtured through to its realization by ANS member Roger Tilbrook, who is currently the chair of the ANS Publications Steering Committee.

Entering the steady-state years

The general editorial direction of *Nuclear News* did not change much in the 1990s, although there was somewhat greater coverage of nonpower areas, including nuclear medicine, food irradiation, industrial uses of radioisotopes, and aerospace applications. Special sections also continued to grow in importance after they put down roots in the late 1980s. Among the topics of

Some lean years

Editor #9 • Nancy Zacha, September 1993–November 1995

It certainly wasn't the best of times, nor was it quite the worst of times, but the future looked pretty grim on the nuclear front during the two-plus years I served as *Nuclear News* editor. (I assumed the position, after a decade or more as an associate editor, when longtime editor Jon Payne was promoted to publisher.)

During those years, plants were shutting down early left and right, and you couldn't give a nuclear plant away. Many industry experts were predicting that fully 25 percent of the 100 or so operating nuclear plants would permanently shut down early and enter into decommissioning. The Nuclear Regulatory Commission had issued its rule on license renewal in 1991 (it was amended in 1995), but at that time, only the most optimistic of industry pundits thought that any plant would ever apply for extended operation.

As a result, nuclear plant decommissioning appeared to be the profession of the future: In 1994, the American Nuclear Society formed the Decommissioning, Decontamination, and Reutilization Division and launched *Radwaste Magazine,* which would cover nuclear site cleanup, decommissioning, and waste management activities. With 25 plants expected to be shut down in the next few years, and more added to the total as their licenses ran out, decommissioning work promised to keep nuclear industry professionals busy until retirement. Then the nuclear industry would quietly fade into history, a failed experiment that never reached its potential—this despite the fact that most nuclear plants, especially those built before the days of 20 percent interest and runaway costs, were steadily producing much-needed power and doing it with increased efficiency each year.

With advertising revenues down and general ANS membership falling as well, during those years *Nuclear News* was forced to cut the number of pages it published. Several sections, including Fuel and Isotopes & Radiation, went from appearing monthly to appearing only occasionally. The contents pages reverted to a single page, and even Bill Minkler's "Backscatter" column was limited to two-thirds of a page.

In 1994, the responsibility for publishing *ANS News* was transferred from the Membership Department to *Nuclear News,* and in 1995, the monthly tabloid was reduced to a bimonthly publication schedule, again for budget reasons. A new design, however, and more personalized content increased its readability, and in June 1995 the newsletter won the Silver Award in the Association category from the Newsletter Publishers Conference.

Within a month or two of my taking over the editorship, I lost two longtime editors and thought that I would lose my mind as well. Fortunately, I was able to hire several new editors who brought new excitement and energy to the magazine. One of these editors, Rick Michal, remains on staff to this day as Senior Editor. (Looking back, I think that hiring Rick was the highlight of my tenure as the editor of *Nuclear News.*) And during these years, the magazine moved from an outside typesetter to in-house desktop production. Certain design and printing options, including color reproductions, suddenly became much easier and cheaper and changed the look of the magazine significantly.

This stint at the helm of the magazine was my last at ANS headquarters. I left *Nuclear News* and ANS, not because of the grim state of the industry, but because a change in my personal situation necessitated a relocation to another state. I remained committed to nuclear energy, however, and was thrilled when only a few years later, Jon Payne approached me to return to work for ANS as the editor of *Radwaste Magazine*—these days known as *Radwaste Solutions*—from wherever I happened to be living. I continue to hold this position today.

And isn't it nice to know that all those experts who predicted the early demise of the nuclear industry have been proven wrong, wrong, wrong! Decommissioning work is nearly finished for commercial plants, license extensions and 60-year operating lifetimes have become standard (indeed, there is talk of 80-year, 100-year, and even "perpetual" plants), 17 combined construction and operating license applications for 26 reactors have been submitted, and nuclear power once again is poised to be the energy source of the future.

special sections in the 1990s were waste management, materials management, nuclear training and education, outage management, robotics, and maintenance. In 1992, the September issue contained a section on new reactor designs, and the November issue included an article by Nancy Zacha, who at that time was the director of the ANS Public Communications Department, that told the story of CP-1, the first nuclear reactor, in anticipation of the 50th anniversary of the first controlled chain reaction in December of that year.

Some changes did occur, however, resulting at least in part from the need to tighten the collective ANS belt as the nuclear industry (particularly in the United States) went through a period of little to no growth. ANS staff was downsized, and Senior Editor E. Michael Blake left the magazine's staff in 1993. In 1994, the On Line with Verna column ended. In 1996, the Meetings Department took over the publication of the two program issues for the twice-a-year ANS national meetings. These had previously been published as separate issues of *Nuclear News* and had included some editorial content, as well as advertising, which had dramatically declined. Also that year, *ANS News* was moved back into the magazine for budgetary reasons, and Linda Byus's Focus on Finance column was discontinued.

But there were some positive developments during these years, too. The growing importance of waste management was recognized by ANS with the creation in 1994 of *Radwaste Magazine,* a specialty magazine covering practical approaches and solutions to waste management and environmental restoration issues and problems, available by paid subscription. Nancy Zacha, a former editor of *Nuclear News,* became the editor of the waste publication (renamed *Radwaste Solutions)* in July 1998, and still holds that position today.

By the 1990s, changes in the status of nuclear programs worldwide had slowed considerably, especially in the United States, with the advent of the deregulation—or restructuring—of the electric generating industry. New power reactors were still being built in a number of countries, but not so many that the World List of Nuclear Power Plants had to continue its twice-yearly publication schedule. In 1995, it was returned to annual updating, and it is now the centerpiece of the annual Reference Issue, which was established as a regular feature of the March issue starting in 1999.

Another development at the end of the 1990s was the decision by ANS governance to move *ANS News* back out of *Nuclear News,* in order to better serve the members by providing more coverage of society news. Funding was allocated to bring on a full-time editor to handle the once-again stand-alone bimonthly publication, and in October 1998, Phyllis Ruzicka became its editor. She still oversees its production as editorial director, and is an associate editor for *Nuclear News*. She edits all of the copy for both publications.

The processes used to put together *NN* had been slowly changing over the previous decade, with typewriters and manual paste-up methods replaced in the mid-1980s by word processors, and in 1993 by personal computers. The switch from an outside typesetter to in-house desktop publishing was made with the January 1995 issue, with layouts produced on a Macintosh system. The full-scale electronic publishing operation—that is, no film and all digital—was in place by 2002. The improvements in efficiency, quality of graphics, and design flexibility have vastly improved the attractiveness of the magazine. The prepress work is handled for both *Nuclear News* and *Radwaste Solutions*—as well as for the *World Directory of Nuclear Utility Management* and *ANS News*—by Chris Salvato, who processes all of the copy and graphics and designs the layouts for the pages. For *NN*'s layout, he is guided by the "form breakdown," which shows the positions of all of the ads and editorial material and is prepared for each issue by the production editor, Patti Matas.

Continued

The new millenium

As the new century began, *Nuclear News* saw some changes. International Editor Simon Rippon retired and Dick Kovan, who like Rippon is based in the United Kingdom, stepped into the position, with a vast world of news to cover.

In keeping up with changes in the industry, the Power section of the January 2000 issue included a sidebar headed "Nuclear plant dealings—completed, under way, and in negotiations," a series of bullet points on ownership changes, license renewals, mergers, and utility name changes. This "feature" ran in nine issues in 2000, and also in the January, March, and May 2001 issues. In April 2001, "Status of license renewal applications in the United States" appeared for the first time. It next ran in the August issue, and then every two or three months for the next three years.

The terrorist attacks on September 11, 2001, in the United States affected many aspects of people's lives and various industries, including the nuclear industry, with heightened interest in nuclear facility security. In response to the continued emphasis on security issues, the March 2003 *NN* included a newly created Security news section. Also in response to the times and the restructuring of utilities, the List of Scheduled Outages was halted as utilities came to see the detailed information that they provided for the list as proprietary and grew less willing to allow for its printing in the magazine in advance of plant outages. Its last appearance was in July 2001. To this day, *NN* and the ANS Accounting Department receive calls asking whether the list—a valuable tool to many—is still available.

In early 2004, a familiar face returned to *Nuclear News*: Mike Blake, who had been gone since 1993, returned to once again write for the magazine. As activity picked up in the areas of license renewal and the sales of plants, and talk of new nuclear power plants in the United States increased,

A score of years at *Nuclear News*

Editor #10 • Gregg Taylor, January 1996–July 2004

There is a saying that a journalist has a license to be curious. My 20 years with *Nuclear News* enabled me to visit 70 nuclear power plants in 14 countries. The life experience was immense: I stood inside control rooms, trained in a simulator, explored operating plants of every reactor type, trotted around in anti-Cs during outages, and crawled through sites under construction.

Of the many memories that flood back, several stand out:

■ Looking down the long, long row of *eight* reactors at (then) Ontario Hydro's huge Pickering site.

■ Being lectured by a nuclear plant manager in Scandinavia: "Here, if we have a problem, we hire 20 engineers. In America, you hire 20 lawyers."

■ The morning I was lifted into the Georgia sky on a platform by a crane, high above the two-unit Vogtle plant—then under construction—to take a cover photo with a fisheye lens.

■ Being told by a plant official at the Qinshan-1 nuclear plant, southwest of Shanghai, that he knew nothing about any plans for a second reactor there. At that very same moment, I was hearing booms echoing across the site from an unseen location over a nearby hill. I later learned that those explosions were actually demolition to excavate for the next unit.

■ The time someone phoned in what turned out to be a phony bomb scare for my hotel room in Karachi, Pakistan (even so, the hotel put a guard at my door afterward).

■ Jumping into the cold Baltic Sea with utility managers, between scalding sessions in a sauna, *cum* vodka, the evening before visiting their nuclear plant in Finland.

What impressed me most, though, was the professional intensity of almost all plant staffers I ever talked to, and their joyful interest in sharing ideas with peers across the world. There was, and truly is, an international nuclear safety culture.

I started at *Nuclear News* in 1984 in the newly created position of *NN* Associate Editor—Nuclear Power Plant Operations. With a journalism degree and previous newspaper and technical editing experience, I learned on the job about nuclear technology and how reactors are operated and maintained.

Each article I wrote was also a short course for me on the subject at hand. The Baltimore Gas & Electric executive I interviewed for one of my first articles snorted with impatience when I asked, "What do you mean by 'INPO?'" A few months later, I was in Atlanta doing interviews for an "INPO at five years" feature article.

In the 1980s, speculation at industry meetings centered on when the next U.S. nuclear plants would be ordered. Who could have imagined then that new construction would be confounded for at least a generation by—of all things—electric industry deregulation?

As my 20 years at *NN* progressed, I learned that the magazine's readers are a special breed. They are well educated, cosmopolitan, intensely interested in their profession, and intellectually aggressive. They *care* about the magazine and its contents.

Being the editor-in-chief of *NN*—from January 1996 to July 2004—gave me the privilege of a front-row seat in exploring cutting-edge science and technology worldwide and talking to the fascinating people who led the way.

Through the years, developments in computer technology and the Internet made our job easier and news gathering and print production more efficient. When the Chernobyl accident occurred in late April 1986—in the "old" days, before the Internet—it was a challenge to get our hands on relevant documents in time for the next (June) issue of *NN*. We used all of our international, U.S. government, and industry contacts to pull in the necessary information. We even managed to quickly send out a separate special report about the accident to our readers.

Talking with the "gray heads" of the nuclear industry—the highly talented and charismatic individuals in government, industry, and academia who pioneered the science and technology during the early years—was a privilege and a stirring experience. They had gravitas, gentility, and class, and were true statesmen with vision. Most of them have now passed on, alas, and their example is missed. But we managed in time to induce many of them to write wide-ranging feature articles for *NN*. Those stories preserved historical memory and documented the exciting past of the nuclear heritage for our younger generations of scientists and engineers.

Now just a reader of *NN* these days, I remain impressed by the depth of coverage the staff provides. The magazine has a highly integrated crew of talented professionals, with many years of experience, who track and report significant and useful information. *NN*'s news articles and feature stories disseminate developments, lessons learned, good practices, and new ideas that help to cross-fertilize the excellence of operating nuclear plants worldwide. They also give a view of the technology's promising new future. I am proud to have been a part of that noble mission.

Blake sought a way to impart the ever-changing information to readers. The result was a rotating series of columns—"License renewal and power uprate status report" (which ultimately became "Maximizing the Assets"), "Renaissance Watch," and "Reactor Marketplace." With the falling off of reactor sales among utilities, "Reactor Marketplace" was discontinued in August 2007, but the other two continue in alternate issues.

Certain special sections of the magazine claimed a regular spot on the editorial calendar in the 2000s: the Reference issue, in March; Outage Management, in April; and Plant Maintenance, in October. The editorial staff ventured into some new territory, too, with first-time special sections on Instrumentation and Controls, in December 2006 and 2007; Fuel, in June 2008; and Security and Safeguards, in December 2008 (a Security special section had been included in the December 1989 issue, but that did not encompass safeguards). Senior Editor Rick Michal has conducted many interviews with people knowledgeable in their subject areas for these and the other special sections that have appeared in the magazine.

In 2004, *Nuclear News* covered the 50th anniversary of the American Nuclear Society with a special article in the June issue, and throughout the 2000s, the magazine has run feature articles on the newest reactor designs from the major vendors.

The continuing discussions of a nuclear renaissance and the challenges it presents require that *NN*'s coverage keep up with the times. In October 2006, the name of the Education news section was changed to Education & Training, and then, as more focus was placed on workforce issues, in November 2008 it was changed to Education, Training & Workforce. In July 2008, Linda Byus rejoined the magazine as a contributing columnist, resurrecting her Focus on Finance column from the 1980s and 1990s and once again providing her insights as a financial analyst into current nuclear events.

Another important step for the magazine was its inclusion, starting with the January 2008 issue, in the Members section on the ANS Web site, providing members with earlier access and the ability to search each issue. Library/nonmember subscribers now also have electronic access, as of early 2009.

The staff behind the pages

None of all that has been covered in this article would have been possible, or would continue to be possible, without the people who have contributed their time and efforts to making *Nuclear News* a success. The talents of those people fall in the areas of both advertising and editorial, and the two working together over the years have brought the magazine to where it is today.

Advertising

Advertising has been an integral part of *Nuclear News* from the publication's early years. The October-November 1960 issue (for a few issues, *NN* was published every other month) carried the first commercial advertisement, from Central Research Laboratories. For many years, Central Research held the back cover ad position in every issue, and it still advertises in the magazine today. The first two-color ad appeared in the magazine in February 1961.

Over the years, advertising has helped support the magazine, as well as ANS. In fact, the magazine's advertising revenues from 34 120 total pages of advertising (through July 2009) amount to more than $56.2 million (not adjusted for inflation) over its first 50 years, representing a substantial portion of ANS's total revenues. In the early 1980s—when great expansion in the industry was still expected—advertising contributed about 30 percent of the society's total revenues. Today, *NN*'s contribution is about 18 percent, a relatively large proportion of revenues as compared with other organizations (5–10 percent is much more usual).

The success of the advertising operation did not happen by accident. Under the en-

trepreneurial propensities of Executive Secretary Octave Du Temple, individuals were brought on board to pursue advertising from companies even in the early days, when the industry was very new. Those who have served as advertising sales manager over the years are Richard Quinn (July 1963–April 1967), Richard Harris (November 1967–May 1982), Rosemary Harvey (June 1982–January 1994), Gregg Taylor (February 1994–April 1997, during part of that time—January 1996–April 1997—serving also as the *NN* editor-in-chief), and, currently, Jeff Mosses, who started in ANS's Membership Department in January 1996 and moved into the sales manager position in May 1997.

No small contribution to the advertising effort has been made by a loyal group of advertising representatives who pound the pavement to drum up advertising for *Nuclear News,* as well as for *Radwaste Solutions* magazine. Collectively, they have more than 225 years of service to the society. The accompanying map provides more details on these reps, who are contracted to work for ANS. The first to sign on to become a rep for *Nuclear News* in 1960 was Dave Kingwill, who remained a rep until his death in 1995. The years of service of his sons, Baird (1982) and Jim (1989), overlap with some of their father's service time as a rep, and they continue today to work for ANS's commercial publications. Conversely, the newest member of the sales rep team is Kazuhiko Tanaka (2008), who is based in Japan. The other sales representatives and their start years are Ken Jordan (1965), Lee Fernandez (1972), Doris Weinberg (1973), Bill Powell (1982), Warren DeGraff (1984), and Andrew Baker (1994).

The current *NN* Advertising staff (from left): Bess Weglarz, Jeff Mosses, and Erica McGowan

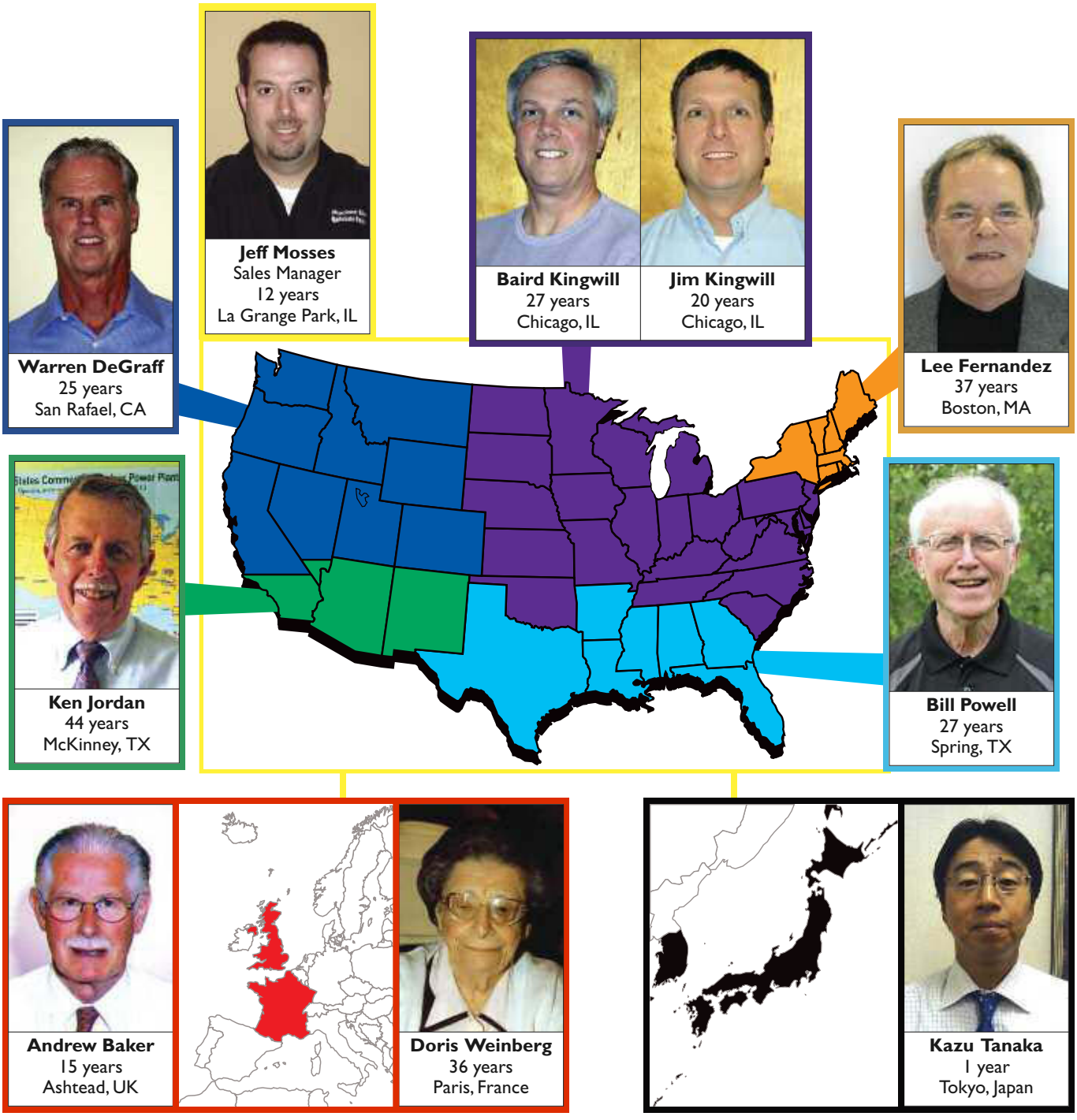
Mosses, who ably leads the overall advertising effort, also has a staff of two at the headquarters office: Erica McGowan, advertising/production assistant manager, has been with the magazine for three years, and Bess Weglarz, circulation assistant, has 21 years of service. It seems appropriate, too, to recognize others who were employed in

the Advertising Department in the past who had long service records and spent a large part of their careers at *Nuclear News,* learning and practicing their commercial art. Those individuals include Rosemary Harvey (29 years), the late Patricia Fairchild (21 years), the late Gloria McCabe (18 years), and Richard Harris (17 years).

Starting with that first advertisement in 1960, more than 1000 companies and organizations have advertised in *Nuclear News*, some running ads regularly, and some now and then. The universe of companies that offer products and services to the nuclear industry has changed over the years, following the phases the industry has gone through, from its beginnings and through major growth, and then to decreasing business, to a leveling off, and to where it is today, with renewed interest in nuclear as a clean, efficient source of energy.

A special feature that has become a staple of the August issue is the Vendor/Contractor Profile Section, which offers advertisers a free page or half-page of space for an advertorial "profile" with the purchase of an equivalent size ad, providing an opportunity to tell about their products and services, capabilities, and accomplishments in detail alongside their advertisement. As a result of this special section, which in 2009 makes its 15th appearance, the August issue has become the largest regular issue of the year (the August 2008 issue included a record—for an August Vendor/Contractor issue—60 ad pages), and gives *NN* the opportunity to thank its advertisers for their continued support.

Continued



The team of advertising representatives for *Nuclear News* (and *Radwaste Solutions*), led by Sales Manager Jeff Mosses, has a total of more than 225 years of service representing the sale of more than 34 120 pages of advertising (and counting) and more than $56 million in revenues over 50 years.

The current *NN* Editorial staff (standing, from left): Phyllis Ruzicka, Mike Blake, Patti Matas, Rick Michal, and Andrea Bianchi. Seated: Betsy Tompkins and Chris Salvato.

An additional function of advertising, besides the obvious one of helping potential customers make purchasing decisions, is to provide readers with an idea of the trends that are occurring in the industry. Also, especially as the magazine has moved toward more extensive use of color in its pages, the advertisements have added tremendously to its visual appeal.

Editorial

Working alongside the Advertising Department—and providing the content that allows for the sale of advertisements—is the editorial staff. Credit is due Octave Du Temple for starting *Nuclear News,* and for the magazine's growth and the improvements it incorporated, both in the early years and later on. Du Temple, who retired as the society's executive director in 1989, was also the first editor of *NN.* He nurtured and stood by the magazine, helping guide it on its course toward excellence, and protected it from well-meant but questionable suggestions that might have hindered its future importance to the society.

The transition of hiring a staff dedicated to the production of the magazine as it grew was inevitable because the work involved was too much for Du Temple to handle on a part-time basis in addition to his other work. In April 1961, John Martens, who was employed at Argonne National Laboratory, was hired as part-time editor, and Du Temple continued to handle the news about ANS activities. The first full-time editor, Malcolm Ferrier, came on board from Atomic Energy of Canada Limited's Chalk River Laboratories in August 1962.

The following 11 people have served as the lead editor of *Nuclear News,* six of them in the magazine's first decade—a high turnover, but perhaps to be expected in the early years of a publication's life: Octave Du Temple (July 1959–March 1961), John Martens (April 1961–July 1962), Malcolm Ferrier (August 1962–April 1965), David Sundberg (May 1965–April 1967), John Graham (May 1967–June 1969), Ted Meinhold (July 1969–February 1970), Chris FitzGerald (March 1970–September 1972), Jon Payne (October 1972–August 1993), Nancy Zacha (September 1993–December 1995), Gregg Taylor (January 1996–July 2004), and Betsy Tompkins (August 2004–present).

Having a staff with strong editorial skills is key to producing a quality publication. It is also beneficial to have at least some of those individuals remain on staff for a number of years to gain an in-depth understanding of the field and to learn good publishing practices, as well as to acquire and pass along their historical knowledge in both of these areas.

NN International Editor Dick Kovan

Several people have had long tenures at *Nuclear News*. Those who have retired after many years of service are Jon Payne (21 years as editor, 11 years as publisher of Commercial Publications), Simon Rippon (24 years), and Gregg Taylor (18 years). Chris FitzGerald, who retired in 1986 and died in 2001, had 15 years of service.

The current *NN* editorial staff boasts an impressive 99 collective years of service (in equivalent full years): Betsy Tompkins, editor and publisher (30 years), E. Michael Blake, senior associate editor (22 years), Rick Michal, senior editor (15 years), Chris Salvato, desktop editor (12 years), Dick Kovan, international editor (9 years), Patricia Matas, production editor (6 years), and Phyllis Ruzicka, associate editor (5 years; she was the editor of *ANS News* from October 1998 to August 2004 prior to moving over to *NN*). The newest full-time member of the editorial staff is Andrea Bianchi, *NN* editorial assistant and editor of *ANS News,* who has about eight months of able service under her belt. Also, Susan Gallier, who was the *NN* production editor from 1997 to 2000, now provides proofreading and other editorial services to the magazine as a contractor.

The stability, longevity, and knowledge of the staff are key to the amount and quality of the work it produces for the magazine. For example, material for the special sections—in 2009, there have already been four, and in addition to this special anniversary section, there will be two more later in the year—would be difficult (if not impossible) to research, assemble, write, and edit with an inexperienced staff.

Other people with close associations to *Nuclear News* who put in substantial time are Nancy Zacha, currently the editor of *Radwaste Solutions,* who worked the equivalent of about 13 full years on *NN,* from 1980 to 1995, and John Graham, who worked a similar number of years during two separate periods of time, in the mid- to late 1960s, and 1977 to 1990.

Looking back, moving forward

Nuclear News has grown over the past five decades from a society newsletter to a full-color magazine, right alongside the nuclear industry's and ANS's growth and development, and many dramatic events have been reported in its pages.

The ways we gather and write the news and produce the magazine certainly have changed and improved, but as we move into the sixth decade of the nuclear industry with a nuclear renaissance within reach, *NN*'s mission remains the same: to report the news and to provide in-depth feature stories to keep our readers informed about the latest developments in nuclear science and technology.

Section continued on page 70

A Leader in the Nuclear Industry for over 50 Years

With a legacy of more than 50 years in nuclear engineering and advanced manufacturing, Babcock & Wilcox Nuclear Operations Group and Nuclear Fuel Services, Inc., continue to provide components of unquestioned reliability to the U.S. Government and to commercial customers.

Likewise, B&W is proud to have twice received the designation of Nuclear Historic Landmark by the American Nuclear Society – B&W's Critical Experiment Laboratory, the first privately licensed nuclear facility, and Nuclear Fuel Services, Inc., providing fuel for some of the nation's first commercial nuclear reactors and fuel for the U.S. Government.

B&W – a leader in the nuclear industry.
We salute the "Nuclear News" publication for 50 years of service.

B&W thebabcock&wilcoxcompany
a McDermott company

Leadership by Example

Leading the Way in Nuclear Power

As a proven leader to the nuclear industry, Shaw's Power Group has offered a broad range of services for more than 60 years. A *Fortune 500* Company, Shaw is ranked No.1 in Power Design by ENR for 2008 and 2009.* Shaw employs 26,000 staff in 150 locations worldwide.

Engineering

As the engineer and constructor for 18 U.S. nuclear plants, Shaw maintains ASME-III (N) certifications and is providing engineering services to more than 50 nuclear power plant operating units—more than half of the U.S. fleet.

Piping, Tank, and Structural Steel Fabrication

As a world leader in pipe fabrication, Shaw supplied piping to 58 of the 104 operating nuclear power units in the U.S., and is certified by ASME to perform all activities required for construction of nuclear plant piping components. Shaw is constructing a state-of-the-art module fabrication facility in Lake Charles, LA to support new nuclear construction.

Plant Completions and Restarts

Building on our extensive experience in plant completions and restarts worldwide, Shaw played a significant role in the successful completion of the Browns Ferry Unit 1 restart project.

Plant Uprates and Upgrades

As a power uprate industry leader, Shaw has performed uprates and studies on more than 50 operating PWRs and BWRs, adding more than 2,250 MW to the U.S. grid.

Maintenance and Modifications

As a leading provider of commercial nuclear power plant maintenance and modifications services in the U.S., Shaw has active contracts covering nearly 36 percent of the operating units and participated in record-setting outages for PWRs and BWRs in the U.S.

Spent Fuel Dry Storage

Shaw designs, licenses, and constructs ISFSIs; performs spent fuel management studies; and provides fuel movement and cask loading and handling services. We performed design, licensing, and project management for the private dry fuel storage facility.

Decontamination and Decommissioning

Shaw has performed D&D services for 15 commercial, research, and U.S. Army nuclear reactors and to numerous government facilities. Shaw completed decommissioning of Maine Yankee and Connecticut Yankee.

New Plant and AP1000™ Reactor Design and Construction

From the detailed design of the National Enrichment Facility in New Mexico, to design and construction of the Mixed Oxide Fuel Fabrication Facility in South Carolina, to engineering support for the Lungmen nuclear power plant in Taiwan, Shaw can perform virtually every aspect of nuclear design/construction projects around the world.

AP1000 Consortium

Shaw is part of the Westinghouse/Shaw AP1000 consortium, which is building the first four AP1000 units in China and has three contracts for plants in the U.S. The consortium has engineering, procurement, and construction contracts for six units, two each in Georgia, South Carolina, and Florida. These are the first contracts awarded to build new commercial nuclear power plants in the U.S. since the 1970s.

The AP1000 technology is based on standard Westinghouse pressurized water reactor technology that has more than 2,500 reactor years of proven and highly successful operation.

Advanced design features

- Passive safety systems
- U.S. design certification
- Short engineering and construction schedule
- Reduced components and commodities
- Modular construction
- Severe accident mitigation features

For more information contact:

Alan Latti
Phone: +1 856.482.3097
Email: alan.latti@shawgrp.com

Tom Nauman
Phone: +1 617.589.1034
Email: tom.nauman@shawgrp.com

** Shaw ranked No.1 in Power Design by Engineering News-Record (ENR), Top 500 Design Firms, 2008 and 2009.*

17M122008D

Shaw®

a world of **Solutions**™

Building Excellence—
Through Commitment to Nuclear

Shaw's integrated nuclear solutions provide clean, reliable, carbon-free energy and economic growth to communities throughout the U.S. and around the world. Shaw's power uprate projects have added over 2,250 MW to the U.S. grid. We provide maintenance and engineering services to more than half of the nuclear plants in the U.S., instilling a safety culture second to none. And, Shaw is executing new AP1000 contracts with our consortium partner Westinghouse Electric Company for six units in the U.S. and four units in China, offering the world's safest and most advanced nuclear plant technology.

For a fully integrated provider of Nuclear power solutions, choose excellence. Choose Shaw.

www.shawgrp.com

AP1000 Rendering





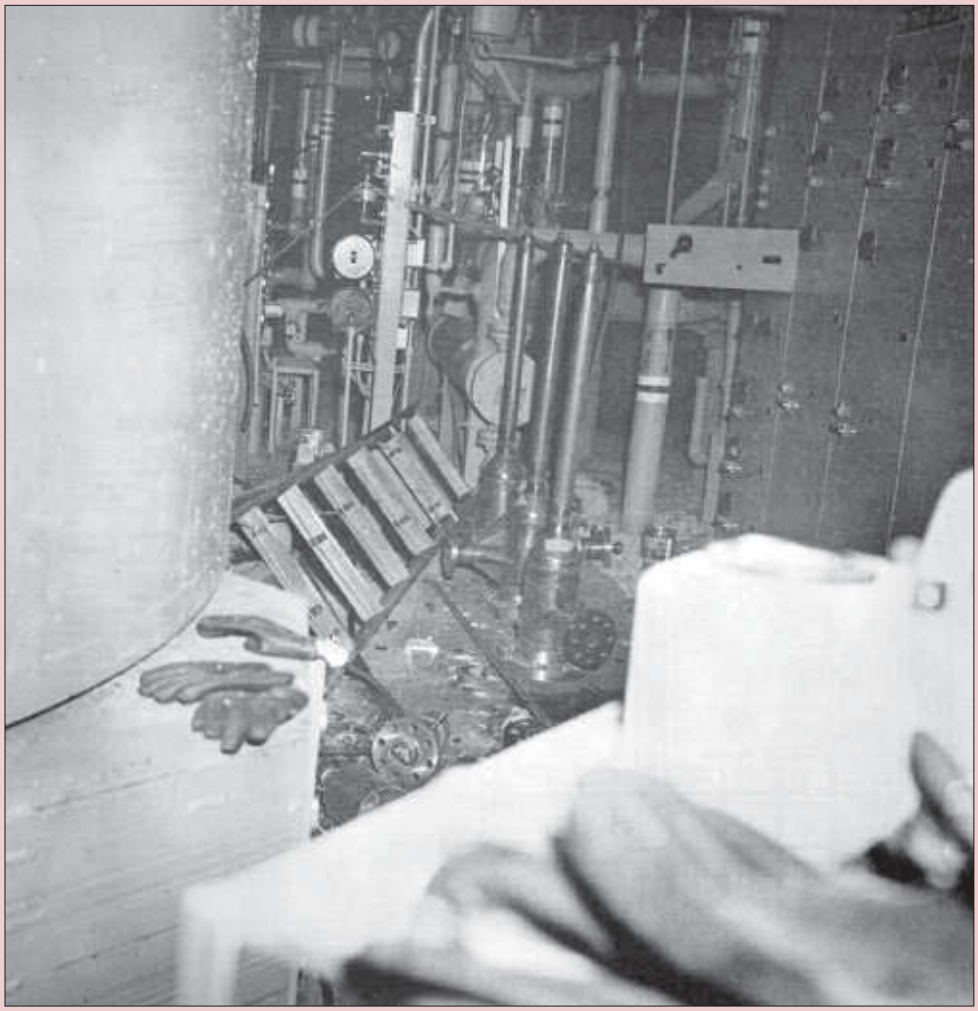

17M122008D

1959–1969

EVEN IN THE February 1961 issue, in which coverage of the accident at the Stationary Low-Power Reactor No. 1 marked the magazine's first in-depth news reporting, the banner headline on page 3 was an exhortation for contributors to the upcoming annual meeting: "Send in papers for Pittsburgh meeting now." With the growth of the civilian nuclear power industry, however, *Nuclear News* soon found a niche reporting on nuclear developments beyond the internal workings of ANS.

SEABORG AND EKLUND

Overseeing the transition of nuclear energy from a chiefly military preserve to a vast civilian enterprise were Glenn T. Seaborg, who chaired the U.S. Atomic Energy Commission from 1961 to 1971, and Sigvard Eklund, who served as director general of the International Atomic Energy Agency from 1961 to 1981.



SL-1

The Stationary Low-Power Reactor No. 1 was operated by the U.S. Army at what was then still a largely military installation of nuclear facilities and is now the Idaho National Laboratory. On January 3, 1961, an inadvertent nuclear excursion, believed to have resulted from the improper withdrawal of a control rod, led to an explosion that killed the three soldiers on duty at the time. In addition to its long report on the event itself, *NN* published the Atomic Energy Commission's interim and final investigation reports in subsequent issues.

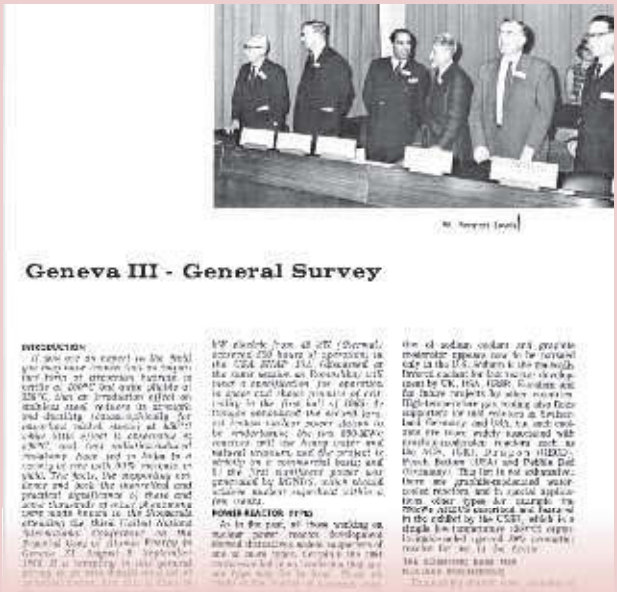
THE SEARCH FOR APPLICATIONS

In the 1960s, the possibilities for nuclear energy and radioactive materials were still being explored. Radioisotope thermoelectric generators have become a staple power source for spacecraft instrument packages, and nuclear continues to provide motive power for Navy submarines, but ventures such as propulsion for aircraft and commercial ocean freighters ran into technical, environmental, or economic obstacles and were not put into wide use. While nuclear propulsion for spacecraft may one day become practical, it would be decades from now before that could happen.


NUCLEAR
NEWS OF THE MONTH

LOS ANGELES DESALTING PLANT TO BE BUILT

Water desalination was also seen as a key application for the emergence of power reactors, leading to ventures such as the one cited in this 1966 news item. The project was canceled, but desalination is still seen today as a prospect for new reactors, such as the ones proposed for southwest Asia.

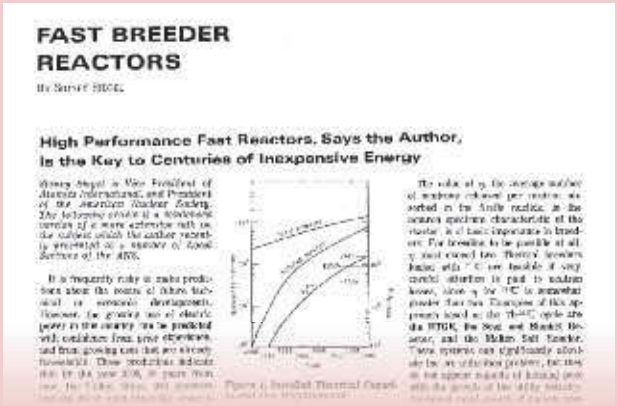

Geneva III - General Survey

GENEVA III

Virtually the entire October 1964 issue of *NN* (the largest issue up to that time, at 124 pages) was devoted to coverage of the Third United Nations International Conference on the Peaceful Uses of Atomic Energy, held in Geneva, Switzerland. The meeting report was made up largely of dispatches from meeting attendees and session participants. In the long term, the Geneva conferences can be seen as having helped the development of civilian nuclear energy use in dozens of countries, but at the time they also helped counteract Cold War tensions related to the nuclear fields. International meetings on nuclear-related matters have since become frequent and commonplace. (*NN* published a similar issue on the fourth Geneva conference in 1971.)

LOOKING AHEAD TO BREEDERS

As thermal-neutron power reactors were being built, the prevailing view was that they were the first wave in a more extensive system of nuclear power that would be joined shortly by fast-neutron reactors, making full use of the energy potential of uranium through the breeding of plutonium from uranium-238. With experimental breeder reactors already in operation, it was believed that the same kind of steady development that had produced commercial thermal reactors would also give rise to commercial breeders. The feature article shown here, from the January 1967 issue, was one of many items published in *NN* in anticipation of the arrival of breeders. While some breeders have been built and operated commercially outside the United States, a number of factors (such as the use of liquid-sodium coolant on long duty cycles and concerns over the widespread use of large quantities of plutonium for fuel) have slowed their deployment. Thermal reactors, however, continued to be used in ever-growing numbers, in part because of the discovery of more abundant uranium resources than had previously been thought to exist.


FAST BREEDER
REACTORS

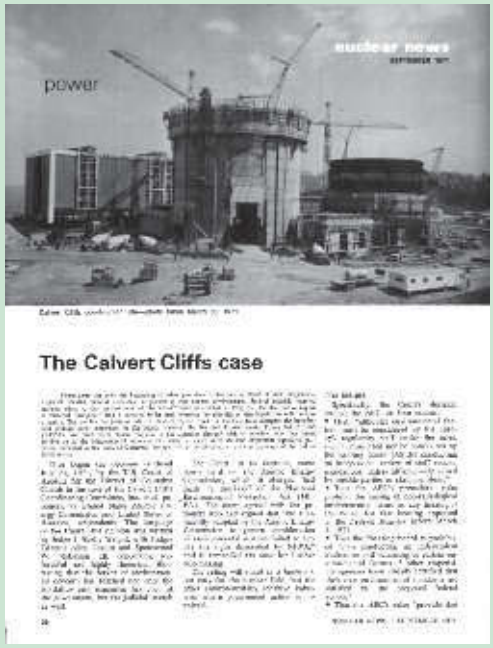
High Performance Fast Reactors, Says the Author, Is the Key to Centuries of Inexpensive Energy

1969–1979

Nuclear News generally followed the development of the nuclear community as a whole, and in the 1970s, nuclear professionals in growing numbers joined the commercial power industry, devoting themselves to the construction and operation of power reactors and the provision of materials and services to support the reactors. There still remained within ANS the laboratory and academic bases that had formed the society, but to an increasing extent, the work at labs and universities was also more related to energy production and the nuclear fuel cycle. Nuclear medicine and industrial applications grew as well, but by the 1970s, many potential applications that had been explored in previous decades were largely abandoned.

NEPA

The National Environmental Policy Act of 1969 required that every major action by a U.S. federal agency be accompanied by an environmental impact statement (EIS). Power reactor licensing counts as a major federal action, and in July 1971, the U.S. Court of Appeals for the District of Columbia Circuit found the Atomic Energy Commission's adoption of NEPA insufficient in the licensing proceeding for the Calvert Cliffs plant in Maryland, which led to far more stringent EIS requirements. With several power reactor projects already in the pipeline, the revision of the EIS process, along with the AEC's roughly contemporaneous decision to require emergency core cooling systems, spurred substantial delays and cost increases for these projects.



The construction boom

In mid-1969, 18 power reactors were in operation in the United States, and 51 in the rest of the world. Ten years later, the numbers were 67 and 143, respectively, and hundreds more reactors were in various stages of construction—many, but by no means all, of which were eventually finished and put into service. *NN* covered the development of nuclear power as a major electricity provider not only in text, but visually as well. The cover of the December 1971 issue (showing the rebar for the Maine Yankee containment dome, before concrete placement) was one of 65 covers in the decade's 120 regular monthly issues to show finished power reactors, construction, or component fabrication. Several other covers were devoted to associated facilities (fuel enrichment and reprocessing plants).

In the late 1970s, however, reactor orders were no longer being placed in the United States at the same rate as in the early 1970s, and cancellations prior to the start of construction were becoming common. The concern was reflected in a February 1978 feature article on whether the lull in orders threatened the new industry's commercial viability. There is a common misconception that the Three Mile Island-2 accident triggered the end of reactor orders in the United States and the wave of cancellations. Although TMI-2 surely amplified the trend, the accident did not create it.

The split

The AEC, initially established to ensure civilian control over nuclear energy activities begun by the U.S. armed forces, found itself in the 1970s both promoting and regulating nuclear energy. The Energy Reorganization Act of 1974 sought to avert a conflict of interest by creating two separate agencies: the Nuclear Regulatory Commission, to regulate nuclear licensees, and the Energy Research and Development Administration (ERDA), to develop nuclear and other advanced energy sources. In 1977, ERDA was combined with other federal agencies to form the cabinet-level Department of Energy, first headed by James Schlesinger (shown here being sworn in), who in 1971 had succeeded Glenn T. Seaborg as chairman of the AEC.

André Giraud

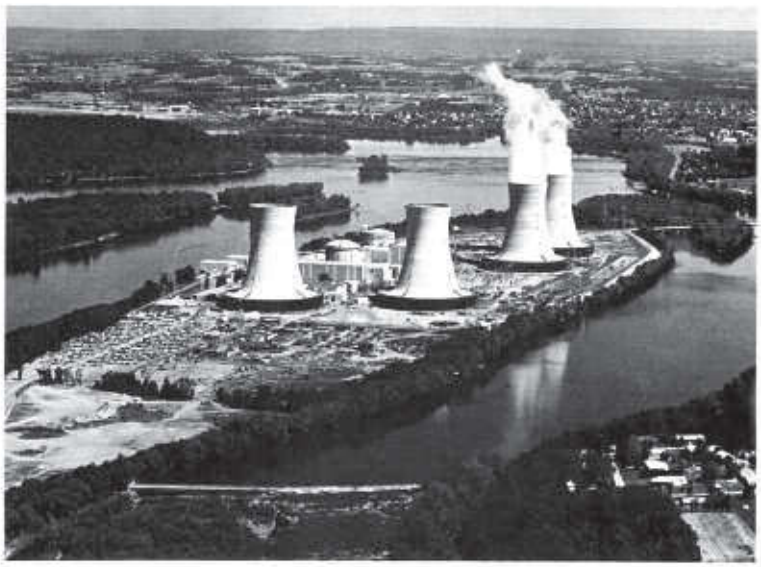
France was an early adopter of nuclear power—and of nuclear weapons—but at the time of the Mideast oil supply crisis in 1973, its share of nuclear-produced electricity was modest. While reactor ordering picked up considerably in countries with large oil-fired electric capacity, France made the largest commitment by far, both to power reactors and to as many aspects of the nuclear fuel cycle as it could develop. André Giraud, who was educated as a petroleum engineer, nonetheless was appointed to head the Commissariat à l'Énergie Atomique in 1970. Over the next two decades, he remained at or near the center of the country's conversion to nuclear power, which was based on standardized evolutions of a single design (a Westinghouse pressurized water reactor) provided by a single reactor vendor (Framatome) to a single customer (Electricité de France), with a centrally planned national power grid. Giraud was appointed France's minister of industry in 1978 and later served as minister of defense.

nuclear news®

Special Report—April 6, 1979

The ordeal at Three Mile Island

A combination of design deficiency, mechanical failure, and human error contributed to the ill-controlled accident that was touched off at about 4 a.m. on Wednesday, March 28, at Unit 2 of the Three Mile Island nuclear power station of Metropolitan Edison Company, a member company of General Public Utilities (GPU). The initial event at the unit, located near Harrisburg, Pa., has been characterized as a loss-of-normal-feedwater turbine trip—with complications. As Norman Rasmussen of M.I.T. explained the following Sunday on ABC's television program "Issues and Answers," the event could not be considered, in the parlance of reactor safety studies, a "major event" ("an event of major consequences" to the public health and safety, he quickly went on to clarify). The TMI-2 "event," however, certainly promises to have major consequences for the utilization of nuclear power in America and elsewhere—this in spite of the fact that the accident was contained and the amounts and forms of radioactivity that did escape from the plant, appeared, by most accounts, to have been of no major consequence.

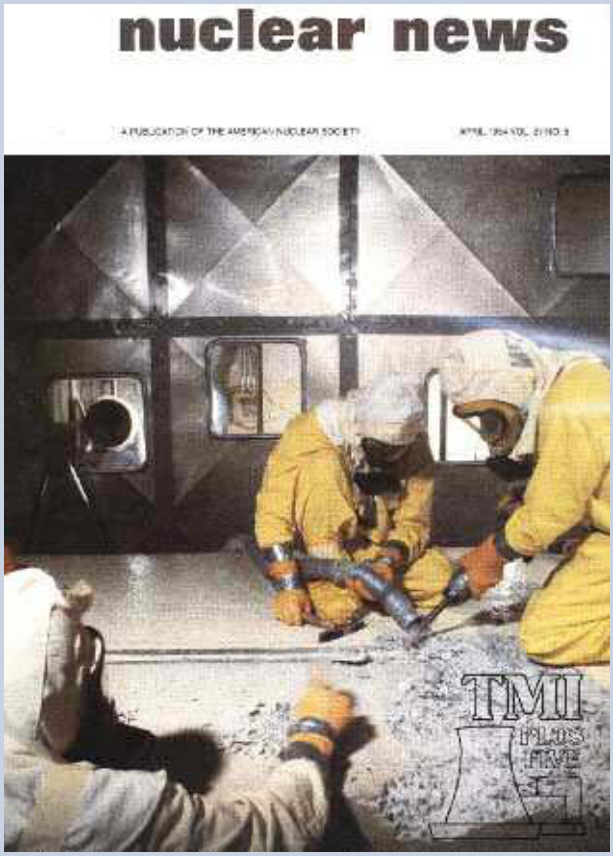


TMI-2 (the event)

On March 28, 1979, a feedwater transient at the Three Mile Island-2 PWR in Pennsylvania was complicated when the pressurizer valve stuck open, depriving the nuclear steam supply system of adequate coolant. The operators' responses to the situation, and the information available to them about the plant's condition, were insufficient, and extensive core damage occurred before the situation was stabilized. The accident prompted a major overhaul of the industry and the NRC, as noted in the summary of the next decade, on page 74, but despite the emission of much more radioactive material (mainly tritium) than would occur in normal operation, the prevailing view among public health professionals is that no discernible adverse health effects resulted from the accident. Shown at left is the special report on the accident that was prepared by the *Nuclear News* staff. Ultimately, 250 000 reprints of the report were distributed.

1979–1989

The accidents at Three Mile Island-2 and Chernobyl-4 shook public confidence in nuclear power worldwide, but the day-to-day operations of the hundreds of power reactors that continued to run smoothly built an experience base that resulted, by the end of the decade, in a widening trend of safe, economical operation at high capacity. Promising results in nuclear fusion led to funding for more powerful devices—which revealed greater complexities and challenges. The United States enacted laws for the disposal of low- and high-level waste, but the development of new disposal sites remained elusive.



TMI-2 (the aftermath)

An extensive, federally assisted cleanup effort at Three Mile Island-2 (depicted here in a "scabbling" operation to remove contaminated concrete) ultimately led to the shipment of the damaged core to the Idaho National Engineering Laboratory and the formation of institutions within the industry to prevent a recurrence—most notably the Institute of Nuclear Power Operations. Nuclear Regulatory Commission practices and regulations were revamped, in some cases requiring retrofitting of reactor projects already in the pipeline, which resulted in further delays and cost increases. After a six-year mandated outage, TMI-1—which had been completely unaffected by the Unit 2 accident—was again allowed to operate, which it has done safely and productively ever since. Another long-term effect came from how bad the accident *wasn't,* lending support to more realistic views of the physical and chemical environment of core-damage accidents and the NRC's acceptance of alternative radioactive source terms for plant operation.

Asia ascendant

South Korea's first power reactor went commercial in 1978. By mid-1989, the eight reactors then in service provided half of the country's electricity. From mid-1979 to mid-1989, Japan added 18 new power reactors, and three of its large industrial firms—Hitachi, Mitsubishi, and Toshiba—progressed from licensees of U.S. reactor designs to largely independent developers and marketers of nuclear equipment and fuel. Also during this time, movement toward a civilian nuclear industry began in China, and contacts were made with established nuclear nations. In a 1980 trip to China by ANS officials, ANS President Harry Lawroski (left) is greeted by Vice Premier Zhang Aiping.

Fusion gets serious

Surprising success in the Soviet Union with the tokamak design for magnetic confinement fusion prompted all other major fusion programs to pursue this approach. New, scaled-up machines essentially got into a race to see which plasma could come the closest to energy break-even. At the same time, inertial confinement, with pellet fuel to be imploded by lasers or heavy ions (in the case of the PBFA-II at Sandia National Laboratories, shown in the accompanying photo), made similar gains. The larger and more capable devices, however, revealed inherent complications that required add-on equipment (such as neutral beam injectors), and despite growing international collaboration, fusion is still years away from demonstrating practicality, and even more years away from contributing as an energy source.


Improving maintenance at CP&L's Brunswick

by Gregg M. Taylor

The search for best practices

Even if construction hadn't wound down and TMI-2 hadn't underscored the importance of plant operation, the entry of so many reactors into commercial service was enough to prompt *NN* to increase its focus on the day-to-day activities involved in producing electricity at nuclear plants. In 1984, *NN* hired Gregg Taylor to develop a new Operations section of the magazine and to report on visits to plant sites in the United States and abroad. The growing experience base also produced data, making it possible by the late 1980s to show that nuclear capacity factors were generally rising—a trend that has continued to this day.


Domestic capacity factors trending upward

Chernobyl-4

The Soviet RBMK reactor design, with its myriad of graphite-moderated pressure tubes and its positive void coefficient, was widely considered to be unlicensable in the United States and Western Europe. Still, until April 1986—when plant personnel, under time pressure to finish a turbine rundown test, intentionally interfered with safety features at the fourth reactor at the Chernobyl site in Ukraine—no RBMK had ever suffered a serious incident. The runaway criticality far exceeded TMI-2 in physical damage, health effects (at least 50 people died, mostly plant workers and firefighters), and the release of radioactive material to the environment. Nuclear programs in the rest of Europe suffered by association to varying degrees. (The most extreme case was in Italy, where eventually all power reactors were closed.) A condition of Lithuania's later entry into the European Union was the closure of both of its RBMKs, and other EU entrants from Eastern Europe had to close Soviet-designed pressurized water reactors early. Russia now sells only PWRs internationally but has not given up plans to finish and operate a long-delayed domestic RBMK.

All levels of waste

Dixy Lee Ray, governor of Washington and former chairwoman of the Atomic Energy Commission, touched off a low-level waste disposal crisis after three of the six LLW sites in the United States closed in the 1970s, leaving the site at Richland, Wash., as a candidate to receive much more LLW than originally expected, and the state of Washington—along with Nevada and South Carolina, homes to the other operating LLW sites—shouldering the country's LLW disposal burden. To draw attention to the situation, in 1979, Ray and the governor of Nevada temporarily closed their sites, and the governor of South Carolina reduced the amount of LLW its site would accept. These actions called attention to the need for LLW disposal to be more equitable nationwide, and in 1980, Congress passed a law for the formation of interstate compacts to develop new LLW disposal sites. As it turned out, no new disposal site was created until 2009, in Texas, although Class A waste is now routinely disposed of at a site in Utah.


legislation

Reagan signs law to make Nevada first site choice

The high-level waste situation has seen even less progress, despite a 1987 decision by the Reagan administration to develop a repository at Yucca Mountain, in Nevada.

1989–1999

The further expansion of nuclear power in the United States and Europe seemed ever more elusive, but the operation of existing reactors continued to improve, and on-site dry cask storage of spent fuel reduced the pressure to dispose of high-level waste. Greater diagnostic precision and developments such as brachytherapy opened new opportunities in nuclear medicine. Disclosures regarding the diversion of civilian uranium enrichment technology threatened to undermine the nonproliferation regime.

The Shoreham plant

possibility of siting a nuclear power station in the demilitarized zone. Sources in the South suggested that this could help to meet some of the electricity shortages in the North, and possibly expedite movement toward eventual reunification.

• In another safeguards development, it was reported on July 5 that South Africa has signed the NPT. The nation's cabinet had given its approval to the NPT on June 29 (see page 91, this issue).

SHOREHAM SUPPORTERS WERE DOWN TO THEIR VERY LAST HOPE on July 22, when they sought for the second time to have the U.S. Supreme Court stay the issuance of a possession-only license (POL) for the 809-MWe boiling water reactor. The hopes of the proponents (the Shoreham–Wading River School District, and Scientists and Engineers for Secure Energy) had risen on July 11, when the Justice Department—acting on behalf of the Department of Energy, and with the tacit support of the Bush Administration in general—asked the U.S. Court of Appeals for the District of Columbia Circuit to order a stay on the POL, which has been authorized by the Nuclear Regulatory Commission. Various Administration officials have come out against the closure of Shoreham, and the plan whereby Long Island Lighting Company would turn the plant over to New York state in return for rate relief and access to other power sources. With this filing to the appellate court, the White House underscored its support of the position held by the Shoreham proponents, that the issuance of any license (even possession-only) must be accompanied by an environmental review, and that this review must include the full-power operation of Shoreham as one of the alternatives. The NRC did not carry out such a review before approving the POL (NN, July 1989, p. 324). While Shoreham remains under the terms of its operating license, Long Island Lighting and New York are

Before their time

The number of operating power reactors in the United States peaked at 111 and then began to slip as the last projects in the pipeline were completed (or canceled) and some operating reactors were closed, long before the end of their license terms. In all, 12 reactors were closed, and as many as nine of them were either still economically viable or could reasonably have been given the opportunity to improve. The strangest case was that of Shoreham, in New York, which was licensed to operate, went critical, and produced electricity, but was closed before commercial operation could begin, in part because of disputes over whether an effective emergency plan could be carried out on Long Island.

NUCLEAR MEDICINE

New techniques, drugs show future promise

As 1989 came to an end, several organizations published announcements on new techniques and radioisotopes that show promise for future applications of nuclear medicine.

• Purdue University announced the development of a new radioactive drug that may make earlier detection of two major vascular diseases more cost-effective. Purdue researcher Mark Green developed Cu(PTSM), a combination of copper-62 and a nonradioactive compound, for use in detecting cerebrovascular and cardiovascular diseases. The drug is designed for use with positron emission tomography (PET), which gives high-quality medical images of internal organs and tissues. The drug has been tested extensively with animal models; human trials are expected to begin in early 1990 at Washington University's School of Medicine in St. Louis.

Green explained that the radioisotopes used in PET imaging decay very rapidly, so it is impractical to transfer the substances to distant locations for medical imaging. For that reason, PET facilities are limited to hospitals and medical centers that have their own cyclotrons. Copper-62, with a half-life of about 10 minutes, is a daughter product of zinc-62. The zinc isotope, however, has a much longer half-life, so there is time to ship the Zn-62 from one location to another to provide the Cu-62. Lower cost radiopharmaceuticals will make PET facilities more affordable for smaller hospitals, Green noted.

• The Fast Flux Test Facility at Hanford has produced a third radioactive isotope during a test run at the facility. This isotope, selenium-75, was requested by researchers in the Urology Department at the University of Washington in Seattle and by the biochemistry laboratory of the National Institute of Health's Heart, Blood and Lung Institute in Bethesda, Md. Selenium-containing molecules are present in enzymes, proteins, and nucleic acids within the body; the use of radioactive isotopes of selenium as a tracer allows researchers to gain understanding in this element's role in the body.

Previous isotopes provided by the FFTF included osmium-191, being utilized by the Children's Hospital of Boston for research involving detailed imaging of soft tissues such as heart and blood vessels, and rhenium-186, being studied by NeoRx Corporation of Seattle as a potential cancer treatment. The FFTF is operated by Westinghouse Hanford Company.

• Stanford University announced a new technological development that allows catheters to be seen clearly on nuclear magnetic resonance (NMR) images. Catheters, tools important in clinical medical applications, are usually made with a radio-opaque substance—generally barium—so that they will be visible on a CT scan or an ultrasound image. However, most common catheters have been extremely difficult to see with NMR imaging. The catheter developed by Daniel Rubin, of the Stanford University

The FFTF test assembly that has produced three beneficial isotopes needed by medical researchers. Craig Knight, of Westinghouse Hanford Company, was the lead fabrication engineer.

Medical imaging and treatment

The advancements in nuclear medicine were not so much to increase power as to improve precision, with developments such as brachytherapy, boron neutron capture therapy, and monoclonal antibodies to improve the delivery of therapeutic radiation to cancerous cells and limit deleterious effects to healthy tissues. With magnetic resonance imaging (MRI) on the way to becoming omnipresent at healthcare facilities, a variety of options derived from research into the behavior of the atomic nucleus were becoming available to health care providers and recipients. Shown is a test assembly that was later installed in the Fast Flux Test Facility to produce medical radioisotopes.

OCONEE LOADED THE 23RD CANISTER in its onsite NUHOMS dry spent-fuel storage facility on November 8, 1993. The photo shows the canister in position for insertion into a horizontal concrete storage module. (For more on Oconee's onsite dry storage facility, as well as on similar facilities at other nuclear power plants, see the special section on Waste Management beginning on page 33.)

Dry storage

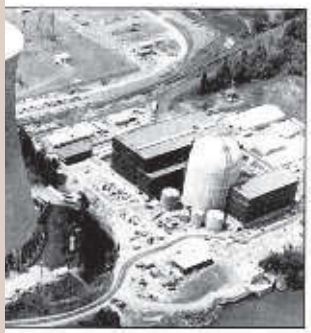
The bad news: You have nowhere to send spent reactor fuel. The good (or at least acceptable) news: Your spent fuel can be stored, safely and within regulations, at your reactor site, perhaps indefinitely. While the matter continued to be challenged (and is still disputed today, for Diablo Canyon, in California), the Nuclear Regulatory Commission concurred with test findings showing that pool-cooled spent fuel could safely be transferred to, and maintained in, dry-storage casks on plant property, in what are referred to as independent spent fuel storage installations. This not only prevented the stalled development of high-level waste disposal from forcing reactors to stop producing electricity, but extended the ability of a reactor to generate spent fuel much farther into the future—eventually persuading reactor licensees of the practicality of license renewal.

Safeguards shaken

The collapse of the Soviet Union in 1991 affected the world in countless ways, but perhaps the most worrisome was the prospect that the nation's nuclear professionals, technology, and materials would become available to rogue states or terrorist organizations. As things worked out, support and funding from the United States and other nations created systems to direct the ex-Soviet assets to worthwhile uses, such as the Megatons to Megawatts program, under which weapons-grade fissionable material is converted to power plant fuel.

The international safeguards regime nonetheless suffered during this time, both from the bellicosity of North Korea (which continues today) and from a clandestine network trafficking in enrichment technology, attributed to Abdul Qadeer Khan, a onetime employee of the Urenco centrifuge enrichment company in Europe. These gaps in the nonproliferation system, and others, have led to two attempts at nuclear weapons programs that are believed to have been curtailed (Iraq and Libya), two that are known to have produced weapons capability (Pakistan and, much earlier, India), a known enrichment capability (Iran), and several rumors about weapons programs elsewhere.

late news in brief



THE CLOSED TROJAN NUCLEAR plant will soon provide college students with an opportunity to gain hands-on experience in environmental compliance, restoration, remediation, and hazardous materials management. Concordia College, in Portland, Ore., will begin using vacant training facilities at the site, including Trojan's chemistry lab, training building, and portions of wetlands and uplands, for a new bachelor's degree program. Trojan, operated by Portland General Electric Company, ceased power generation in late 1992.

NORTH KOREA HAS PULLED OUT OF THE IAEA. A letter declaring North Korea's intention to withdraw from the International Atomic Energy Agency as of June 13 was sent to the U.S. government as the depository of the Statute of the IAEA, and was forwarded to the IAEA on June 16. The North Korean action is a response to a resolution adopted by the IAEA Board of Governors on June 10 that, in addition to condemning the latest incidents of noncompliance with safeguards, also suspended IAEA technical assistance programs in North Korea in all areas except medical assistance. The IAEA has pointed out that the withdrawal of membership does not alter the validity of the safeguards agreement concluded under the Non-Proliferation Treaty. At press time (June 16), the two safeguards inspectors who have been monitoring the unloading of fuel from the North Korean experimental reactor were still at the Yongbyon site.

In talks with former U.S. President Jimmy Carter on June 15, North Korean President Kim Il Sung indicated that he was willing to allow those inspectors to remain at the site. That development prompted a cautiously positive response from the Clinton Administration. At a news conference later that day, interpreted as an attempt to get the North Koreans to make more specific commitments, Bill Clinton stated, "If today's developments mean that North Korea is genuinely and verifiably prepared to freeze its nuclear program while talks go on, and we hope that is the case, then we would be willing to resume high-level talks."

CNSI PLANS TO REDUCE ITS BARNWELL WORKFORCE. Chem-Nuclear Systems, Inc., announced on June 14 that it would eliminate 69 of a total of 161 positions over the following month at its Barnwell, S.C., low-level radioactive waste disposal facility. "This workforce reduction is a direct result of the legislature's failure to authorize the continued acceptance of waste from outside the Southeast Region . . . ," said Allan Stanley, CNSI's vice president for government and public affairs (see story, this issue, page 56). Although a few of the positions being eliminated are held by temporary workers, most are held by full-time employees with years of service. Administrative staff, disposal operations, and the Transportation Division are affected. CNSI will provide outplacement services and counseling to assist employees in finding other jobs; employees will also be eligible for individual severance packages.

RESULTS OF A ONE-YEAR REVIEW OF RBMK SAFETY were reported to a meeting in Brussels on June 10. Rather different interpretations were being presented on the 9000-page report and its 300 recommendations by the Eastern and Western sides of the international consortium that undertook the review, which was funded by the European Union's TACIS (Technical Assistance to the Commonwealth of Independent

1999–2009

WHILE POWER REACTOR deployment slowed in most of the world, China ramped up both the importation of established reactor models and the development of indigenous standard units. Interest picked up more gradually elsewhere, starting with a reactor order in Finland and reactor refurbishments in Canada, then numerous license applications in the United States and pre-licensing activity in the United Kingdom. The fusion community agreed on a site for ITER and started construction and fabrication. The proposed Yucca Mountain repository continued to be delayed, but the actual disposal of some radwaste began at WIPP.

Security

DIRTY BOMBS

RDD report offers steps to reduce threat

The study looked at security risks posed by commercial radioactive materials that might end up in terrorists' hands.

FEW PEOPLE, if any, would die immediately from exposure to ionizing radiation released by a "dirty bomb," according to a report released on January 16 by Monterey Institute's Center for Nonproliferation Studies (CNS). The report, "Commercial Radioactive Sources: Surveying the Security Risks," is available on the Web at cns.miis.edu/pubs/opapers/op11/index.htm.

The study examined the security risks posed by commercial radioactive materials that might end up in the hands of terrorists for use as radiological dispersal devices (RDDs), popularly known as dirty bombs. Until recently, common radioactive materials in medicine, industry, and scientific research have not been considered high security risks. But since the terrorist attacks of September 11, 2001, as the report noted, the al Qaeda group has expressed interest in acquiring the means to "unleash radiological terror," and news reports about this topic have brought questions about the security of commercial radioactive sources.

of the lethal acute doses of ionizing radiation the terrorists would receive in the absence of adequate shielding. Adding shielding would make an RDD heavy and bulky in transportation, dissuading terrorists from employing these types of sources.

Thus, Ferguson said, terrorists would be more attracted to the highly radioactive alpha emitters that present only an internal health hazard and could be handled "safely without heavy shielding" as long as precautions were taken to minimize internal exposure. "It's relatively hard to detect those [alpha emitters]," he said, "so you imagine a terrorist transporting an RDD to some site, [and] radiation detectors might not go off because it's going to be hard to detect the radioactive emissions from those particular radionuclides." For this reason, the report

Private industry and regulatory agencies in industrialized countries (the principal users of high-risk radioactive sources) already have taken steps to secure these commercial radioactive sources that pose the highest security risks (in particular, at reactors that produce commercial radioisotopes; in transit; and at facilities that use the highest risk sources), according to the report. Intensive efforts to improve security over high-risk sources are needed for only a "relatively small" number of sources worldwide, the report said.

Other issues

The study pointed out that another issue of concern is the disposal of high-risk sources outside of regulated channels, thus making

After 9/11

This decade's first concern from the outside world had no adverse influence on nuclear facilities, or on much of anything else: The potential Y2K software hazard was recognized early and was addressed with what appeared to have been an appropriate response. Soon afterward, however, an event with no advance warning occurred: the terrorist attacks of September 11, 2001. The effect on the nuclear field was substantial, ranging from a higher level of concern over the control of nuclear materials to the adoption of measures to reduce the threat level at nuclear facilities, such as the relocation of parking lots to mitigate the possible effects of vehicular bombs. The increased attention was reflected in the creation of the Security section of *NN,* which first appeared in the March 2003 issue. It incorporated what had been the Safeguards section and included more coverage of the nuclear weapons complex than the magazine had previously provided.

As China goes . . .

. . . so may go the rest of the industrialized world. In mid-1999, China had three power reactors in operation and eight under construction or ordered. In mid-2009, those amounts are 11 and (at least) 26, making China's nuclear power program far and away the world's most expansive in the past 10 years. (Shown are the first two units at Ling Ao, which were completed in 2002.) Already exporting two power reactors to Pakistan, and with its involvement in research and development for the pebble bed modular reactor, China will clearly be a major player in nuclear commerce in the future. Its indigenous reactor design is planned for 22 of its committed new units, and it has arranged for technology transfer for its most recent imports from elsewhere.

ITER gets a home

Transformed from the original INTOR study groups, the International Thermonuclear Experimental Reactor became a going concern as far back as the 1980s, but its stated goal of creating a single tokamak fusion device to overcome the remaining technical obstacles to net energy gain remained remote, even from an institutional standpoint. A prolonged battle over site selection was finally resolved in 2005 with a compromise that put ITER in France, and other key facilities—and perhaps a post-ITER device (DEMO)—in Japan. ITER is now in the early stages of construction and fabrication, with start-up projected for 2018.

Research

FUSION

France named ITER host country, Japan to provide director-general

The agreement for siting the International Thermonuclear Experimental Reactor in Cadarache, France, gives Japan the opportunity to supply the project's director-general and to host a major magnetic fusion support facility.

Success in waste management

With Nevada officials remaining adamantly opposed to the siting of a high-level waste repository at Yucca Mountain, there remains no immediate prospect for final disposal of power reactor spent fuel. During the past decade, however, final disposal of other waste streams has taken place—in what has become a steady routine with little or no public outcry—at the Waste Isolation Pilot Plant (WIPP) in New Mexico. Limited by law to the disposal of defense transuranic waste, and initially allowed only to house waste shipments temporarily, WIPP has now received 58 000 m^3 of waste for final disposal, making possible the cleanup of such long-term contaminated areas as the Rocky Flats site in Colorado.

Late News

HAGWOOD WILL LEAVE THE DOE

THE AP1000 CERTIFICATION RULEMAKING HAS BEGUN,

THE FINAL TRU WASTE SHIPMENT LEFT ROCKY FLATS,

THE NRC PROPOSED A $5.45-MILLION FINE ON DAVIS-BESSE

On the way back?

A curious situation became apparent at the start of the decade: It was seen as unwise to build new reactors, but very good to have existing ones. Utility deregulation made it possible for power reactors to be operated on a "merchant" basis, and not strictly through geographically defined service areas. Between 1998 and 2007, 19 U.S. power reactors were sold, generally by companies seeking to get out of the nuclear business, to other companies who committed themselves as large-scale nuclear operators. The still-improving operational record made nearly all power reactors highly economical, and assets worthy of even more support. The first license renewal was approved by the Nuclear Regulatory Commission in 1998; since that time, no U.S. operating reactor has closed, and the licenses of 54 of the 104 operating reactors have been renewed. Similar stirrings became apparent in other nuclear programs. In Canada, where eight reactors had been idled because expected repair costs were once seen as too high, six have been refurbished and put back into service, and new reactors are now expected to be built, which would more than compensate for the two reactors that are still off line.

The Canadian comeback

With so much of the new baseload capacity in the United States fueled by natural gas, the rising demand for gas boosted its price, affecting its other main use (home heating) and eventually prompting utility executives to try the licensing system in 10 CFR Part 52. The submission of three early site permit requests in 2003, and cost-sharing projects with the Department of Energy in 2004, were overtaken from 2005 on by license applications clearly aimed at new reactor construction. This may amount to a "nuclear renaissance," but no safety-related construction can begin on any U.S. project until a combined construction and operating license is awarded, and that will be no sooner than 2011.

In Europe, the construction of Olkiluoto-3 in Finland—despite delays and cost hikes, and a dispute over who should be held responsible for them—has given rise to new reactor commitments in France and Bulgaria, the resumption of a stalled project in Romania, and an effort to form industrial connections and gain regulatory approvals for new power reactors in the United Kingdom. A nuclear agreement with the United States and the concurrence of the Nuclear Suppliers Group has brought India into play for virtually all nuclear vendors. Several countries with no nuclear power at the present time have invited bids—including countries that have done so before, only to drop their plans. The United Arab Emirates may have the money to introduce nuclear power, but whether this is true of any other country, including the United States, remains to be seen.

Section continued

A. Priori

PRIORI

When *Nuclear News* turns 100 . . .

Maybe my old crowd back at Excited State University (where I still have emeritus status on the faculty and never let anyone forget it) is getting a little lightheaded, what with the renewal of the license for our mothballed research reactor and the swarm of corporate honchos giving job interviews to any undergrad who even thinks about majoring in nuclear engineering. Anyway, I received today by heavily encrypted e-mail what the quantum-entanglement researchers claim to be a transmission that was picked up by their sensors. They think it was a tachyon recoil from some electronic data cloud 50 years in the future, tweaked by whatever it was the researchers were doing. After decoding, they derived the following message:

"At this point in the July 2059 databurst of *Nuclear News,* we'd like to take a few milliseconds to observe the 100th anniversary of this publication. ANS members first received *NN* as a wood pulp derivative, and while your editors are not proud of this fact, we can only echo what is always said by the very few other publications that made a successful transition from clay tablets—sorry, the fact-checking software just informed us that the correct term is *paper*—to pure cyberity: It was all that was available at the time.

"Just think of what you, the ANS member, have received these past 10 decades, first as optically examinable text and graphics, and now as a neural implant: The entire saga of Oyster Creek, finally retired just 10 years ago after two license renewals, with drywell corrosion so extensive that it was deemed economically unfeasible to upgrade the old containment to operate with a traveling-wave core replacement, such as routinely occurs at other old light-water reactors; the development of active hormesis, in which nanoscale genetic engineering makes living tissues thrive on a wide range of ionizing radiation; and the acquisition of all of the world's high-level nuclear waste by Russia, under the famous 'don't ask, don't tell' treaty.

"But enough of dwelling on the past. We are well aware that our attenders are extremely busy, so as ever we will minimize the time that this transmission spends in real-time delta-wave perception before it is relegated to medium-priority memory access. After months of debate, the World Magnetic Fusion Council has announced a consensus in favor of the deuterium/helium-3 fuel cycle, which will require yet another round of upgrades to ITER and DEMO. Confident that this will delay yet again the widespread commercial deployment of tokamaks, India has stepped up its campaign of marketing thorium-cycle reactors, and the thorium to be used in them. A fleet of floating reactors from Russia has arrived in the Indian Ocean, at the last of the icebergs that used to be the Antarctic ice sheet, to begin guiding them toward the locations of their clients on the Arabian peninsula, who bought the 'bergs last year for their water content.

"Among the packets enclosed for your more extensive cogitation is an interview with the chair of the American Petroleum Institute, who remarks on the extensive reach of the modern plastics industry and marvels at the past consumption of petroleum in the era when its distillates were used as transportation fuels, stating, among other things, 'I can't believe how much was thrown away for the sake of internal combustion.'"

I must admit to the possibility that my old colleagues may be having a bit of sport with me. Tachyon recoil indeed! The last time I was in the lab, we couldn't pick up any messages from less than 80 years in the future, and most of them were about sports memorabilia. By the way, if you happen to have a Micah Hoffpauir rookie card, hang onto it.—*A. Priori*

A. Priori is one of a growing number of delusions of NN *Senior Associate Editor E. Michael Blake, who actually doesn't think all that highly of the prospects of Micah Hoffpauir.*

Responsive.

Our Legacy...Your Future.

Clean, reliable and economical nuclear power is the energy source for today and the future. Meeting the challenges to build the next generation of nuclear power plants requires technical know-how, precision execution and exacting quality assurance. ***Burns and Roe*** has the right mix of expertise to meet these challenges and deliver outstanding engineering and construction services on time and on schedule.

800 Kinderkamack Road
Oradell, NJ 07649

Telephone: (201) 986-4055
www.roe.com

BUSINESS DEVELOPMENTS

Bechtel, unions sign pact for Calvert Cliffs-3 work

Bechtel Construction Company on June 1 announced its approval of a project labor agreement with the **AFL-CIO Building and Construction Trades Department,** the **National Construction Alliance II,** and all affiliated international unions for Bechtel's work on UniStar Nuclear Energy's proposed Calvert Cliffs-3 power reactor. UniStar has applied to the Nuclear Regulatory Commission for a combined construction and operating license for Calvert Cliffs-3, which would not be issued until at least 2012.

■ **GE Hitachi Nuclear Energy** announced on May 19 that it has signed a development agreement with **Larsen & Toubro Limited** for a nuclear plant in India based on GE Hitachi's ABWR design. Under the agreement, the two companies will plan for the construction and engineering management resources that would be needed for the project, which has not yet been committed to by India's national power reactor operator, Nuclear Power Corporation of India Limited.

■ **Areva** announced on May 27 that it has signed a cooperation agreement with the Russian company **VNIIAES** on the development of instrumentation and control systems for the first four new VVER reactors to be built in Russia, two each at Leningrad and Novovoronezh. The agreement is similar to one signed in 2008 by the two firms to upgrade I&C at the operating four-reactor Kola plant.

Separately, Areva announced that it has designated 170 North American companies as "Areva certified suppliers."

■ **Curtiss-Wright Flow Control Company,** a division of Curtiss-Wright Corporation, announced on May 18 that it has bought **Northeast Technology Corporation** for $3.5 million in cash. Included in the acquisition is an exclusive worldwide license for Northeast's Snap-In technology.

■ **Thermo Fisher Scientific** announced on May 13 that its Radiation Measurement and Security Instruments business will expand its distribution agreement with **ICx Radiation** to cover all ICx product lines.

■ **Scientech** has announced an agreement under which **Assurance Technical Services** is to become the exclusive provider of harsh environmental qualification testing in support of Scientech's environmental qualification services. The agreement includes a capacity to meet the postulated accident requirements of Generation III+ reactors.

■ **Scandpower AS,** based in Sweden, has opened an office in Richland, Wash., to serve its nuclear utility clients, including Energy Northwest, owner of the Columbia power reactor near Richland. The company stated that it is "constantly looking for more top qualified professionals." More information is available online from <www.scandpower.com>.

■ **Bowtech Products,** a U.K.-based firm supporting the commercial diving industry, has appointed agents in Finland and Sweden. **MeriNorpat** is the Bowtech agent in Finland, and **Swedec AB** fills that role in Sweden.

■ **Proto-Power Corporation** has been acquired by the San Antonio-based company **Zachry.** Proto-Power has been renamed **Zachry Nuclear Engineering** and will join **Zachry Nuclear Construction** to form **Zachry Nuclear.** Zachry Nuclear Engineering will continue to operate from its offices in Groton, Conn., and Chicago, Ill. The value of the acquisition was not disclosed.

NOTE: *Nuclear News* publishes news about nuclear industry contracts—but only about contract *awards.* We generally do *not* publish announcements that the work is under way or announcements that the work has been completed. Send your new contract award announcements to: Industry Editor, *Nuclear News,* 555 N. Kensington Ave., La Grange Park, IL 60526; fax 708/352-6464; e-mail <nucnews@ans.org>.

CONTRACTS

Studsvik gets decon order for Bruce steam generators

Studsvik announced in May that it has received a contract from Canada's Bruce Power for the decontamination and recycling of 32 steam generators. The contract is valued at SKr250 million (about $32 million). The work is to be carried out at Studsvik's facilities in Sweden between 2010 and 2018.

■ **Aurora Flight Sciences** announced in May that it has obtained a Phase II award from the National Aeronautics and Space Administration to develop technology to support autonomous control and protection of space-based nuclear reactor systems. The value of the contract was not disclosed.

■ **DeNuke Contracting Services** announced in early June that it has received a contract, shared with **Spectra Tech,** from the Department of Energy's Environmental Management Consolidated Business Center to support environmental management procurement activities across the DOE complex. DeNuke has also been awarded a "master task ordering agreement" by Los Alamos National Security LLC for environment, safety, health, and quality support at Los Alamos National Laboratory. The value of the contracts was not disclosed.

■ **Westinghouse Electric Company** announced on June 10 that it has received a contract to design, fabricate, and install a new steam dryer at Northern States Power Company–Minnesota's Monticello boiling water reactor near Monticello, Minn. The value of the contract was not disclosed. NN

GEI Consultants

consulting engineers and scientists

Geotechnical
Environmental
Water Resources
Ecological

Nuclear

Great minds working together will overcome the great challenges of our time.

Since 1970, GEI has completed more than 45 projects at 30 nuclear power plant sites across the United States. This legacy continues today. GEI's history of successful performance on nuclear projects is rich in technical excellence, quality, and collaborative team work.

To learn more about GEI's capabilities go to

www.geiconsultants.com

Or call us at 1.888.434.9679

Thomas Sanders: A right-sized future

The 55th president of the American Nuclear Society is promoting small reactors as a way for the United States to get back into the nuclear manufacturing business and compete in the global marketplace.

BY RICK MICHAL

THOMAS SANDERS WANTS the United States to get back to manufacturing nuclear systems—specifically the components for what he calls "right-sized reactors"—for a global market.

Sanders, the 55th president of the American Nuclear Society, is manager of the Global Nuclear Futures Initiative at the Department of Energy's Sandia National Laboratories in New Mexico. The program's objective is to ensure that the global expansion of nuclear power does not result in a corresponding increase in nuclear proliferation.

Sanders is a true believer in landscaping the United States—and the world—with right-sized reactors, which would be rated at 100 to 300 MWe and could be brought on line about two years after the start of construction. The cost of one reactor would be relatively low—$200 million to $300 million—compared with the billions of dollars needed to build large next-generation nuclear plants.

Sanders points out that the United States was once an international leader in providing nuclear goods and services, but not anymore. "The bottom line is that most of our supply industry for manufacturing large nuclear systems is gone," he said. "It's moved offshore so that we are now a net consumer, not an exporter, of nuclear goods and services."

He applauds some foreign nations—France, Japan, Russia, China, and South Korea—for taking action in their own national interest to ensure that critical infrastructures—the nuclear industry, nuclear education, and national laboratories—are healthy, but he worries about these same infrastructures in the United States. "While other nations are investing in and promoting their nuclear enterprise throughout the world, we can't even come to grips with loan guarantees for nuclear projects here at home," he said.

Without loan guarantees, he wonders which utility or conglomerate can take on the first-of-a-kind costs and risks of building a large new reactor. Sanders thinks it will be a foreign government, through a government-owned business entity, that will be the driving force behind the first new build in the United States. A foreign entity—such as Areva, which is owned by the French government—could take an equity position in the project and hold a stake in the American electricity market while sending profits overseas.

To get the United States back in the ballgame, Sanders wants the developing nuclear renaissance to include the United States' having a vested interest in the manufacture of right-sized reactors, which would be much less of a financial risk for buyers than large plants and could be added incrementally, much like gas-powered electricity generating plants are added today. These small reactors could be used for electric power generation and for other purposes, such as processing heat for other industries or for producing hydrogen and potable water.

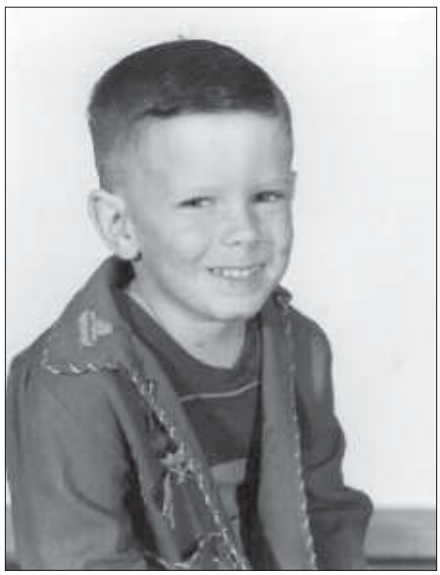
If the United States were to start manufacturing these systems for export, in addition to offering other nations fuel services such as spent fuel "take-back" for recycling and disposal, a two-pronged positive effect would result, he said: The United States would benefit from the revenues that would be generated, and it would also have influence over how other countries deal with nuclear proliferation issues. "If we don't manufacture anything for export, or offer fuel return services such as reprocessing or spent fuel storage, how exactly can we get a country like Iran to stop its uranium enrichment program?" he asked.

How Sanders arrived at these strong positions is due to unplanned circumstances. It is likely, however, that good genes and the United States' involvement in Vietnam during the 1960s steered him along the way.

Early on

Sanders was born in 1946 in the small Texas town of Sinton, population 5000, not far from the Gulf of Mexico. His father, a World War II veteran, split his time between working at an oil refinery and as a crop duster. His mother stayed at home raising Sanders and his siblings. Sanders was a good student, although he showed no particular interest in math and science, and he was active in Cub Scouts and Boy Scouts.

Continued



Sanders the boy, circa 1954

No. 35, Tom Sanders, as a member of the high school football team in 1963

In the 1950s, the American Dream meant owning a home, and about the time Sanders started high school, the Sanders family moved in to a house of their own in Sinton. "My parents are a great example of the post-war movement of young families rising to the middle class," he said.

The new house cost $4000 and had only one bedroom, but it was soon expanded. "In those days, the extended family would get together with saws and hammers and add on rooms," he recalled. "I believe I could still build a house from scratch right now."

The family later moved to an $18 000 brick house in Portland, Texas, on the coast of the Gulf of Mexico.

In high school, Sanders did well in his classes and in sports, but he gave little thought to the future. His father came from a line of farmers, and his mother was from the Texas hill country, where people cut down trees for a living. "We had no intrinsic aspirations for college," Sanders said. "In fact, out of my entire extended family, only a cousin and I went on to get college educations."

After graduating from high school at 17, Sanders took time out for a big adventure. It was 1964 and the Beach Boys were on the music charts, and Sanders had a cousin who lived near the ocean in Ventura, Calif. With $100 and a bus ticket given to him by his father, Sanders went west to catch a few waves. While in Ventura, Sanders took classes at a junior college and realized that he was suited for a career in technology. For the time being, however, life was living near the beach and having fun.

At 18, Sanders bought a car and decided to go back home to Texas, where he divided his time between attending a junior college and working. "Living close to the water during the summer of 1965, I worked on chartered fishing boats, baited hooks, opened beer cans for fishermen, and did some deep-sea fishing on my own," he recalled fondly.

He moved on to labor on the tugboats that supplied offshore oil rigs. "Great paying jobs," he said. "I was paid for 24 hours a day while I was out there, and then I could take off for a week and do whatever, spend my money, have a good time."

That all changed in August 1966, when he was two months shy of his 20th birthday. "This is a story I love to tell to young ANS members and students," he said, "because you never know what's going to happen in your life."

Sanders had saved up to buy a brand new Harley-Davidson motorcycle. After checking out the bike at the dealer, he handed his father some finance papers to cosign. In return, his father handed him an official-looking envelope. "It was from President Lyndon Baines Johnson and it said 'Greetings, Tom Sanders. You are to report for duty one month from today for induction into the armed services of the United States,'" he said.

The Vietnam conflict was under way, and Sanders had already given thought to Uncle Sam's coming for him because many of his friends had enlisted during 1964 and 1965. He knew that the only alternative to military service was to attend college full time, which he wasn't ready for. Instead, he spoke with Navy recruiters. "They looked at my high school record, gave me some tests, and I aced them. I got 137 out of 140 in an aptitude test," he said.

Best man in a wedding in 1967

Sanders's test scores qualified him for the nuclear Navy. "The recruiter said that it was brand new, they were building submarines, and it was a six-year program," Sanders said. "He said that if I didn't know what I wanted to do yet, I should try it out. So I did."

During his six years in the Navy, Sanders learned all there was to know about operating a nuclear reactor. After boot camp, he became an electrician's mate, and from there he went to the Navy's nuclear power school—seven months of 12-hour days. Then it was on to classroom training and hands-on experience on a prototype nuclear power plant. Next came submarine school, and, finally, after more than two years of training, assignment to a nuclear submarine.

"My first submarine, the USS *Kamehameha,* was one of the brand-new Polaris submarines. We did duty out of Hawaii, and the sub sailed out of Guam. I went out to sea for 90 days and then lived on the beach in Hawaii for 90 days. For a 21-year-old, it wasn't bad," he recalled with a grin.

Eventually he transferred to a fast-attack sub named the USS *Shark,* one of the first nuclear-powered vessels.

Although bitten by the nuclear bug, Sanders wanted to try something different after six years in the Navy. He has never regretted his time in the service. He had risen to become qualified to supervise all operations of a Navy reactor. "Submarines are different from commercial power plants," he said. "We would have drills, including reactor scrams with full-scram recovery, every week for training. We did all kinds of drills because we were in a war-ready platform and knew that we would have to be able to continue our mission under any circumstance."

He called the smaller reactors on the subs "phenomenal" because they could go from full stop, to back full, to all-ahead forward as quickly as a young submariner like Sanders could open the throttle. "You're going directly from 10 to 12 percent power to 50 percent, or even 100 percent power, in a matter of seconds," he said. "That's a lot different from what a commercial reactor could do. It's a load-following capability that is rare, and it was exciting to watch how the plant responded."

He marvels at the training he received at the Navy's Nuclear Power School and the prototype plant, and remembers that while sitting at the control area he could see everything that was going on with the nuclear system, whether it was steam moving out of the steam generators, heat added to

Sanders the submariner was awarded the Navy's Good Conduct and Meritorious Unit Medals in 1971.

the reactor, or the mechanisms that give feedback on the reactor's operation. "It was an amazing opportunity," he said. "I would encourage any engineer who is looking for a career start to consider the Navy because it provides a base that can't be duplicated anywhere."

His youngest son, in fact, is a reactor operator on the USS *Hawaii* submarine. (Of his other five children—all sons—two are Rangers in the U.S. Army, one is a lawyer, another is a businessman, and one is a music technician.)

Sanders left the Navy in 1972 as a 25-year-old with a special set of skills. He officially off-boarded from the service on the East Coast of the United States, and as a nuclear-qualified journeyman electrician, he went to work in a shipyard in Virginia. After a year, he headed back to Texas for three reasons: He missed being home, he could become a full-time university student using the GI bill, and he had an urge to see how far he could go in developing a real capability in nuclear engineering.

A nuclear engineer

Sanders enrolled at the University of Texas (UT), where from 1974 to 1985 he earned his bachelor's and master's degrees and a Ph.D. in mechanical engineering with an emphasis on nuclear engineering. He started graduate school in 1977 under Linn Draper, who later became an ANS president (1985–1986) and chief executive officer and president of the American Electric Power Company. During the late 1970s, Draper regularly engaged political activist Ralph Nader by debating him around the country on the virtues of nuclear power, according to Sanders. Wherever Nader was invited to provide his antinuclear rhetoric, Draper was often there to counter him.

A new nuclear engineering professor at UT in 1977 was Dale Klein, who is currently a member (and former chairman) of the Nuclear Regulatory Commission. Sanders recalls that Klein took him and some classmates to a viewing of the movie *The China Syndrome*—a fictional tale about safety cover-ups at a nuclear power plant—about a week before the real-life accident at the Three Mile Island-2 nuclear plant.

While at UT, Sanders also received a senior reactor operator license on the university's TRIGA reactor and did research into gas-cooled fast breeder reactors and fission-fusion hybrid systems. In earning his Ph.D., he performed experiments that had never been done before, such as experimentally validating a theory he had developed for the magnetohydrodynamic flow of a liquid metal in a bed of conducting spheres. Sanders proudly notes that another researcher later named the constant in the empirical relationship after him.

UT is located in the city of Austin, which Sanders describes as politically liberal and which wanted no part of nuclear power after the TMI-2 event. At the time, the municipal utility owned part of the South Texas Project (STP) nuclear power plant, which was under construction. The city offered a referendum with every election to try to abandon the project, but each one failed for financial reasons—electricity from STP would be cheaper than from other sources. Sanders said that during this time, he and his fellow students got involved in debating the antinukes in and around Austin and debunking what he called their pseudo-science scare tactics.

It was during the mid-1970s that Sanders joined UT's ANS student branch and became its president. "We'd go to shopping malls with this big analog display where we'd illustrate the projected growth in the world's population and the growth of energy sources needed," he said. "We were well received by people on the street, generally."

After receiving his Ph.D. in 1985, Sanders interviewed with several national laboratories. He chose Sandia because he was immediately offered a job in program management integrating several technical issues, such as burn-up credit and robotics, on the nuclear waste side of the fuel cycle. He has been with Sandia ever since.

Following his first job at Sandia, he got involved in working on what he calls the five D's—deactivation, decommissioning, decontamination, disposition, and dismantlement—and with developing advanced technologies to perform all of these operations at low cost. "We had technology initiatives

Sanders graduated in May 1985 with a doctorate in mechanical engineering (with a focus on nuclear science and engineering) from the University of Texas.

that ranged from electroslag refining of contaminated stainless steel to the development of very advanced robotic and automated systems that made the D&D processes much safer and more efficient," he said.

Sanders's projects involved the technical challenges associated with the five D's at the DOE's Rocky Flats, Hanford, and Savannah River sites, and the Los Alamos National Laboratory, all of which were part of the government's weapons complex and had facilities and areas contaminated with many types of by-products—from plutonium to fission products.

When Ukraine's Chernobyl accident occurred in 1986, Sanders was among the investigators who invited the Ukrainians to Sandia to find out how the United States could help with the cleanup.

Since the mid-1990s, Sanders has also been instrumental at Sandia in preparing assorted reports on nuclear nonproliferation, including a joint U.S.-Russian analysis in 2002 titled *The Global Nuclear Future: From Atoms for Peace to Atoms for Peace and Prosperity*; the joint action plan from 2003 titled *Nuclear Energy: Power for the 21st Century,* which was signed by the directors of six U.S. national labs; and a concept paper from 2005 titled *Atoms for Peace and Prosperity in the 21st Century.* In addition, in 2004 he developed a partnership initiative of the directors from seven U.S. national labs and nine Russian national labs titled "Toward a Global Nuclear Future: Concerning Sustainable Nuclear Energy for the 21st Century."

He has also authored more than 100 papers and articles for journals, conferences, and magazines that covered many aspects of the nuclear fuel cycle. For ANS, he has served as vice chair and chair of the Special Committee on Nuclear Nonproliferation, and since 2000 he has led congressional seminars on nuclear issues. Sanders was also the assistant general chair of the 2006 ANS Winter Meeting.

Security matters

When the Soviet Union collapsed in 1991, Sandia took on a mission to help Russia, Kazakhstan, Ukraine, and Belarus handle their excess nuclear assets and scientists. The situation, in Sanders's opinion, was a classic national security issue regarding nuclear proliferation, because the United States was getting out of the nuclear power business at the same time that the Soviet weapons complex was still burgeoning and in need of control and cleanup. Few seemed to realize that nuclear power was needed for arms reduction purposes as a bargaining tool and to burn excess high-enriched uranium (HEU) from the former Soviet states.

The Soviet Union's demise also meant that its nuclear supply deal with former Soviet bloc countries had collapsed. Under the deal, the countries received Soviet nuclear goods and services based on the supply-and-return concept—i.e., "you buy our reactor and fuel, we take our fuel back at the end of the in-core fuel cycle." The deal had been a very positive one for proliferation resistance, but now the world was suddenly stuck with unintended consequences. For example, one former Soviet state decided to start immediate research into spent fuel reprocessing to avoid being stranded with nuclear materials and having no place to dispose of them. Reprocessing, of course, can result in the separation of nuclear materials, some of which could be used to make bombs.

Sanders (second from right) and some nuclear specialists on a cold day in Kazakhstan in the early 1990s. The specialists were there to assist with the country's excess material issues.

Sanders was asked to be part of a group of specialists to go to Kazakhstan as part of an initiative to corral excess HEU. It was an emotional time, he admits, because he had been a Cold War warrior—from his Navy days and from his DOE work on security issues—and now there he was, dealing with former adversaries who were suddenly free to interact with the United States. "It wasn't that they had surrendered, it was just that the Iron Curtain had come down," he said.

The early 1990s were not kind to the nuclear industry in the United States, Sanders remembers. Deregulation came to the electricity market, the government's gaseous diffusion plants were privatized, the DOE was split into components, the U.S. nuclear weapons complex was shrinking, and the industry's leading technology research efforts by the government and private industry were solely focused on D&D. "On the one hand, we wanted to promote the transition of excess nuclear materials, people, and technology in the former Soviet Union to peaceful uses. On the other hand, we were at a time in the United States when nuclear technology was not in favor," he said.

By 1997, Sandia management had given Sanders the freedom and the budget to start articulating that nuclear energy was important to national health and security. Driving the message was the reality that the DOE's budget for nuclear energy R&D was near zero and the nation's educational and research infrastructures were rapidly disappearing. Highlighting those facts was then Sen. Pete Domenici, of New Mexico, who in 1997 gave his famous speech at Harvard University in which he said that the abandonment of nuclear technology was unacceptable. Sanders agreed. "We at Sandia, as a national security lab, were aghast," he said. "How were we going to influence the safety, security, and nonproliferation culture around the world if we were 'out of business'?"

That same year, Sandia started the Global Nuclear Futures Initiative program, with Sanders in charge. The program first focused on the management aspects of loose nuclear materials and how to get them under control. It then moved on to help build a bipartisan consensus—consisting of universities, the national research labs, and lawmakers—which was needed to promote reinvestment in nuclear energy research in the United States.

Under Sanders, Sandia teamed with former Sen. Sam Nunn and the Center for Strategic and International Studies (CSIS) on work that ultimately led in 2001 to billionaire Ted Turner's funding of the Nuclear Threat Initiative (NTI). (CSIS is a Washington, D.C.-based foreign policy think tank, and NTI is a non-profit organization whose mission is to strengthen global security by reducing the risk of use and preventing the spread of nuclear, biological,

and chemical weapons.) Today, NTI embraces the supply-and-return concept, and Turner has pledged to invest in the International Atomic Energy Agency's proposed nuclear fuel bank to ensure that countries that forgo enrichment have an alternative source of fuel if needed.

Nuclear infrastructure

People are caught off guard, Sanders said, when they hear him say that within 15 years, Westinghouse reactors, which were once made in the United States, will be coming out of China. Westinghouse is now largely owned by Toshiba, of Japan, and most of their reactor components are made in Japan. But a deal has been struck so that soon the manufacturing jobs will pass from Japan to China.

"When I talk with staffers on Capitol Hill, they're all shocked," Sanders said. "They ask how in the world could we sell Westinghouse to the Japanese? The answer is we didn't. Westinghouse was first sold to the U.K.'s BNFL. Then the British turned around and sold it to Toshiba for a substantial profit."

The same thing has happened with U.S. reactor vendor Combustion Engineering, which was sold to ABB Atom, which was co-owned by the Swiss and Swedish governments. Sanders also notes that General Electric is about 60 percent owned by Hitachi, of Japan, and that Babcock & Wilcox was bought by France's Framatome, which became part of Areva. The bottom line is that these reactor vendors that were once owned by U.S. companies are now largely controlled by foreign governments.

Sanders heartily supports the global expansion of nuclear energy, but he thinks that the United States should be a major part of it. He is convinced that the United States should offer nuclear services using the supply-and-return concept, which the Bush administration was attempting to do through its Global Nuclear Energy Partnership program. GNEP, however, received no funding in the DOE's proposed fiscal year 2010 budget, primarily because the national security benefits of the GNEP vision were lost in the scramble to capitalize on it, according to Sanders.

Sanders notes that President Dwight Eisenhower's Atoms for Peace program in the 1950s was all about managing the spread of nuclear technology around the world through a dominant U.S. industrial enterprise. In 1953, the United States tested the hydrogen bomb and the Soviets were close to doing the same thing. To avert an arms race, Eisenhower recognized that a peaceful U.S. nuclear program in the free world would give the Soviets an incentive to divert their materials, people, and intellect to a similar program behind the Iron Curtain.

Eisenhower also saw an opportunity for expanding the nation's newest strategic infrastructure—nuclear power—which was critical to enabling the growth of the program. The nuclear-powered submarine USS *Nautilus* was launched in 1954, and the government started subsidizing partnerships with American companies Westinghouse and General Electric to become the primary purveyors of technology for the Navy's defense applications. Sanders said that it makes sense now for the United States to follow that same line of thinking—to invest in American companies to become partners for defense and national security purposes—just as France's Areva is partnering with Northrop Grumman Shipbuilding to construct a $363-million facility in Newport News, Va., for manufacturing Areva's nuclear reactor components.

According to Sanders, Eisenhower recognized that if the United States had a robust industrial infrastructure in place, the likely spread of nuclear know-how and technology could be managed through the preeminence of a U.S. nuclear supply industry. Under Eisenhower's plan, the United States dominated the nuclear energy supply base until President Richard Nixon started the process of privatizing it in the early 1970s. Sanders said that Nixon didn't realize that by not expanding U.S. enrichment capability to service growing global needs, he was encouraging other countries to get into the enrichment business. In essence, startup businesses in the United States would be forced to compete with nation states in the export of nuclear goods and services. "It went on from there to what will ultimately result in Westinghouse reactors coming from China's state-owned enterprises within 15 years," he said.

The United States needs to return to Eisenhower's way of thinking, Sanders said. During his term as ANS president, Sanders will push for the United States to get back to manufacturing and supply as a tool for promoting nuclear nonproliferation. "We need to get to a point where people recognize that nuclear energy is good for environmental and energy security, and that having a healthy nuclear supply infrastructure here at home is good for our national security interests and our economic competitiveness," he said.

Sanders also will be looking to assist developing countries in meeting their growing energy needs by providing them with right-sized reactors. In exchange, these countries would agree to forgo uranium enrichment and reprocessing activities. Under the supply-and-return arrangement, these countries would be free from having to dispose of spent fuel in their own repositories. "Given the difficulties associated with developing a repository, I can't think of any nuclear country that would turn down the ability to send all their irradiated material back to their nuclear services supplier," he said.

Sanders feels that the Obama administration, while not embracing GNEP, clearly has an interest in nonproliferation issues, and so the supply-and-return scenario could be an option for consideration. The bottom line, Sanders said, is that there is an opportunity for ANS and its members to inform policymakers of the reality that the United States is falling behind the curve on nuclear issues.

The right size

Sanders said that manufacturing right-sized reactors would allow the United States to penetrate a market that is of limited

Sanders today with his wife, Barbara, and sons (from left) James, John, Andy, Phil, Ryan, and Pat

interest to the big players in the field. Sanders has no particular system in mind for a small reactor because there are about 50 small- to medium-sized designs and concepts in existence today. The large-scale development of these reactors would allow the United States to regain supply capability, he said, and such capability would trickle down to energy security, laboratory innovation, and university enrollments.

Looking at the potential market, the United States has added about 400 000 MW of gas-generated electric power since 1995, most of it coming from 100- to 200-MW systems, or the equivalent of one right-sized reactor. For the offshore market, while about 19 percent of the world's nations could absorb a 1000-MW reactor, the rest of the countries would be better suited—because of electricity grid restraints—for right-sized reactors, Sanders said.

As far as the land space needed, a 100-MW reactor would be as small as 3 meters in diameter and could be placed underground for security reasons, in an area perhaps 10 meters by 10 meters. Small, fast, and thermal reactors have already been demonstrated, he said, and future reactors could be fast, metal-cooled, and low pressure on the primary side so that complex pressure vessels would not be needed. The reactor could also load follow, which larger units don't do because their high capital costs require that they be kept at peak loads at all times. Sanders said that a first landing spot for the right-sized reactors could be the Department of Defense, which could use them for the energy independence of military bases.

The year ahead

Sanders and his wife, Barbara, reside in a home on 40 acres in the Sandia mountains just east of Albuquerque, N.M. He relaxes by working the land, he said. The family moved there in 1992 when Sanders's oldest son was 12 and the youngest was about 4. "We started them at sports activities at 4, and we put them all to work around 8 years old," Sanders said. "I believe that when you raise kids, you keep them so busy that they can't get into trouble. We started building a railroad-tie wall around the back of the house when we first moved there, and we finished it when the last son graduated from high school."

So far so good for the Sanders sons, who are all accomplished and who make their parents proud, he said. Sanders and his wife became first-time grandparents this year when son Ryan and his wife, Samantha, had their first child, Rylee Jane.

Sanders said that the message he will deliver during his term as ANS president fits in with what he is doing for Sandia: promoting national security, particularly the intersection of proliferation prevention and the global growth of nuclear energy. He also plans to work to expand membership globally because foreign nations are eager to obtain nuclear goods, services, and advice.

"I see an opportunity for ANS to do what it did in the earlier days with France, Japan, China, and other countries to develop relationships that promote our values with respect to safety, security, and nonproliferation on a society-to-society basis," he said. He mentioned, for example, that countries such as Malaysia and the United Arab Emirates are developing the basis for an emerging nuclear regulatory environment and are inventing their nuclear infrastructures from scratch.

The prospect of global associations brings Sanders back to the issue of American competitiveness. "A reason we're in the financial doldrums today is that we're so dependent on imports in almost everything that we've lost control of our own ability to influence others through the marketplace," he said.

The bottom line, he said, is that the United States can influence what goes on in the nuclear world only by being a major provider of nuclear goods and services through public and private partnerships, and by making smart choices on the types of nuclear systems that will be built here and offered internationally for export.

"The time is right," he said, "for a new right-sized reactor enterprise." NN

ATC
SUPPLYING INNOVATION

ATC has been called the "Best Kept Secret in the Industry."

And that's no rumor.

ATC's Spectrum Technologies and Southern Testing Services (STS) Divisions deliver best-in-class safety-related and non-safety hardware and services to the utility industry. Our core business is Commercial Grade Dedication (CGD) and Equipment Qualification (EQ) services. These services can be provided to you cost-effectively and quickly. Your plant operates 24/7, and so do we – day or night, we're here when you need us. Our Knoxville, TN and Schenectady, NY locations provide plants with a local presence. Whatever your specific needs, ATC can always figure it out. We hope you'll partner with us, and let us deliver a solution to suit your every need. **www.argoturbo.com**

Spectrum Technologies

Schenectady, NY • 518-382-0056

STS

Southern Testing Services

Knoxville, TN • 865-966-5330

GENERAL ATOMICS
ELECTRONIC SYSTEMS

50+ Years

DEVELOPING INSTRUMENTATION FOR THE NUCLEAR INDUSTRY

INSTRUMENTATION DRAWER

MOVING FILTER PIG MONITOR

WIDE RANGE GAS MONITOR

1958 — 1978 — 2009

NEARLY 40 YEARS PRODUCING RADIATION MONITORS

LIQUID MONITOR

- Area Monitors
- Process Monitors
- Environmental Monitors
- Regulatory Guide 1.97 Post-Accident Monitors
- Single- and Multi-Channel Processors
- Central Computer Systems
- Nuclear Safety Related Monitors

General Atomics Electronic Systems offers comprehensive support throughout the entire plant lifecycle.

- Spare Parts and Repair Services
- Factory and Plant-Site Technical Service Support
- Factory and Plant-Site Training Services
- Semiannual User Group Meetings – Most Widely Recognized in the Industry

In cooperation with our partner RTS Instruments, General Atomics Electronic Systems offers a wide range of radiation detection, monitoring and analysis products with broad applications across the commercial nuclear power, DOE, environmental, research and Homeland Security markets. These products represent significant technological advances, and are designed to satisfy our customers' most demanding performance requirements.

Corporate Office
General Atomics Electronic Systems, Inc.
4949 Greencraig Lane, San Diego CA 92123
TEL: (858) 522-8360 • FAX: (858) 522-8318
Contact: **Victor Camacho**

Represented in Korea by:
Sangjie Commercial Co., Ltd., Sang-Rock Bldg.,
1629-3 Seocho-Dong, Seocho-Ku, Seoul, Korea
TEL: 02-588-3561 • FAX: 02-588-8772
Contact: **Mr. J.K. Shin**

Represented in Taiwan by:
O. Chiao Co., Ltd., 4 F1-2, No. 16, Lane 35, Ji-Hu Rd.,
Nei-Hu District, Taipei City 114, Taiwan
TEL: (886) 2657-0730 • FAX: (886) 8797-3814
Contact: **Ms. Sheila Lee**

Represented in People's Republic of China by:
Beijing BRICEM Science and Technology Co., Ltd.
Jiukeshu 145 Tongzhou Area, Beijing, China
TEL: 010-81530483 • FAX: 010-81530483
Contact: **Li, Shao Hai**

www.ga-esi.com

GRADUATION SURVEYS

ORISE surveys report increases in NE, HP grads

Degrees awarded to nuclear engineering and health physics graduates increased in 2008 from the previous year, ORISE statistics show.

TWO FOUR-PAGE REPORTS released on May 21 by the Oak Ridge Institute for Science and Education (ORISE) show that the number of bachelor's degrees granted in nuclear engineering and health physics continues to rise. ORISE has collected and monitored data on enrollments and degrees in science- and energy-related fields of study for the Department of Energy and other federal agencies since the mid-1970s. Following are summaries of each of the latest reports.

Nuclear engineering

Thirty-one universities in the United States with nuclear engineering programs were surveyed for the report, titled *Nuclear Engineering Enrollments and Degrees Survey, 2008 Data.*

In 2008, 454 bachelor's degrees with majors in nuclear engineering were awarded, the highest number reported in 20 years and a 10 percent increase over 2007's 413 bachelor's degrees in nuclear engineering. While the results marked the fifth consecutive year of increases, the rate of increase in 2008 was the lowest in five years, according to ORISE.

In addition, the number of master's degrees awarded with majors in nuclear engineering—260—increased for the sixth consecutive year and was the highest since 1995. It also was an increase of almost 15 percent over 2007's 227 master's degrees, but was still below the annual numbers from the early 1970s through the mid-1980s.

TABLE I. NUCLEAR ENGINEERING DEGREES, 2000–2008

	Degrees		
Year	**B.S.**	**M.S.**	**Ph.D.**
2008	454	260	127
2007	413	227	89
2006	346	214	70
2005	268	171	74
2004	219	154	75
2003	166	132	78
2002*	195	130	67
2001	120	145	80
2000	159	133	74

*Three programs were discontinued/out-of-scope after 2002 and not included in the 2003 survey. These three programs reported a total of 17 B.S. degrees in 2002.

TABLE II. NUCLEAR ENGINEERING EMPLOYMENT OR OTHER POST-GRADUATION PLANS, 2008

	B.S. degree	**M.S. degree**	**Ph.D. degree**
Continued Study	108	89	10
Academic Employment	2	1	9
Federal Government Employment	29	16	20
DOE Contractor Employment	12	20	21
State and Local Government Employment	0	5	2
Nuclear Utility Employment	70	18	3
Other Nuclear-Related Employment	45	30	10
Other Business Employment	21	5	13
Foreign (non-U.S.) Employment	2	8	11
U.S. Military, active duty	56	10	2
Other Employment	12	11	0
Still Seeking Employment	19	3	1
Unknown/Not reported	78	44	25
Totals	**454**	**260**	**127**

The survey data also show that the number of doctorate degrees awarded in 2008—127—was a 43 percent increase over the 89 awarded in 2007, and 70 percent higher than the 74 awarded in 2000.

"To an extent—and it's somewhat simplistic to say so—the industry is recovering from the effects of the accident at Three Mile Island," said Eric Abelquist, of Oak Ridge Associated Universities, who was quoted in an ORISE statement about the survey results. "Thirty years of safe nuclear power operation in the U.S., the energy crisis, and concerns about CO_2 emissions were required to do it."

Abelquist added that the promise of a nuclear renaissance has helped drive increasing enrollment and graduation rates in nuclear engineering. "Nuclear power is a vital component of our country's energy mix and has found renewed favor," he said. "Construction of nuclear plants requires thousands of workers, and when the plants are built, several hundred persons are needed to operate them."

Undergraduate enrollments in nuclear engineering in 2008—more than 1300 students—were 2 percent lower than in 2007. They were, however, almost triple the number in 2000, but below the numbers reported from the mid-1970s through the early 1990s.

ORISE also said that graduate enrollments have increased each year since 2001, and in 2008 were reported to be more than 1225 students, about 13 percent higher than in 2007.

The ORISE survey data also show the following:

- Employment of 2008 B.S. degree graduates in nuclear utilities (70 grads employed) is, on average, triple the numbers reported since 2000, and has returned to the annual numbers of nuclear engineers hired before 1998.
- Employment of 2008 B.S. graduates in the federal government (29 grads employed) is, on average, triple to quadruple the numbers reported since 2000 and the highest numbers reported in 20 years.

Continued

■ Department of Energy contractors hired 53 nuclear engineering graduates at all degree levels. Of the 53, the M.S. level (20 grads employed) and Ph.D. level (21 grads employed) are the highest reported in nearly a decade.

■ Employment in other nuclear-related businesses shows a doubling for the M.S. level (to 30 grads employed) and an increase for the B.S. level (to 10 grads employed) in 2008 over 2006. (Data were collected for employment in nuclear-related businesses for the first time in 2006.)

■ Post-graduation data show that continued study was, by far, the largest post-degree activity for both bachelor's (108 students) and master's levels (89 students).

For nuclear engineering degrees awarded during the survey period, Rensselaer Polytechnic Institute led the way with 49 bachelor of science graduates. The University of Florida had 26 master's graduates, and Pennsylvania State University and the University of Wisconsin each had 12 Ph.D. graduates.

Health physics

The number of B.S. degrees in health physics granted in 2008 was 73, about 25 percent below the number of B.S. degrees reported in the mid-1990s, but in line with the trend of 70 to 80 degrees granted per year since 2005, according to the ORISE report.

TABLE III. HEALTH PHYSICS DEGREES, 1999–2008

	Degrees		
Year	B.S.	M.S.	Ph.D.
2008	73	108	8
2007	79	91	28
2006	71	90	12
2005	78	77	14
2004	54	64	14
2003	56	73	25
2002	41	76	20
2001	37	71	23
2000	33	79	24
1999	55	115	22

Information was collected from 26 U.S. academic programs that offered health physics degrees. Highlights of the report are as follows:

■ The number of master's degrees in health physics granted in 2008 was 108, 18 percent higher than in 2007 and the highest reported since 1999.

■ The number of doctoral degrees granted (8) was the lowest reported since the survey began more than 40 years ago.

■ Although down 10 percent from 2007, the number of 2008 enrollments in health physics undergraduate programs (about 225 students) was still double the level of enrollments reported in 2000.

■ Graduate enrollments in 2008 (about 425 students) decreased 4 percent from 2007, but the decrease followed five years of increases in graduate student enrollments.

■ The report noted that the recent increase in graduate enrollments means that the number of M.S. degrees should continue to rise by 10 to 20 percent for the next two or three years, and the number of doctoral degrees should continue to rise during the next couple of years.

■ Continued study in the health physics field is the largest post-degree activity for the B.S. level graduates (23 students) and the M.S. level graduates (26 students), and medical facilities continue to be a large employment source for M.S. graduates (21 grads employed).

■ For the first time since the 1990s, B.S. degree recipients found employment in nuclear utilities (8 grads employed) and other nuclear-related businesses (6 grads employed), the report data showed.

For health physics degrees awarded for the survey period, Purdue University was the leader in granting bachelor of science degrees, with 16. The University of Missouri at Columbia had 16 master's graduates, and Idaho State University had the most Ph.D. graduates, with two.

Phillip Patton, chair of the Health Physics Society's (HPS) Academic Education Committee, said that because many of the

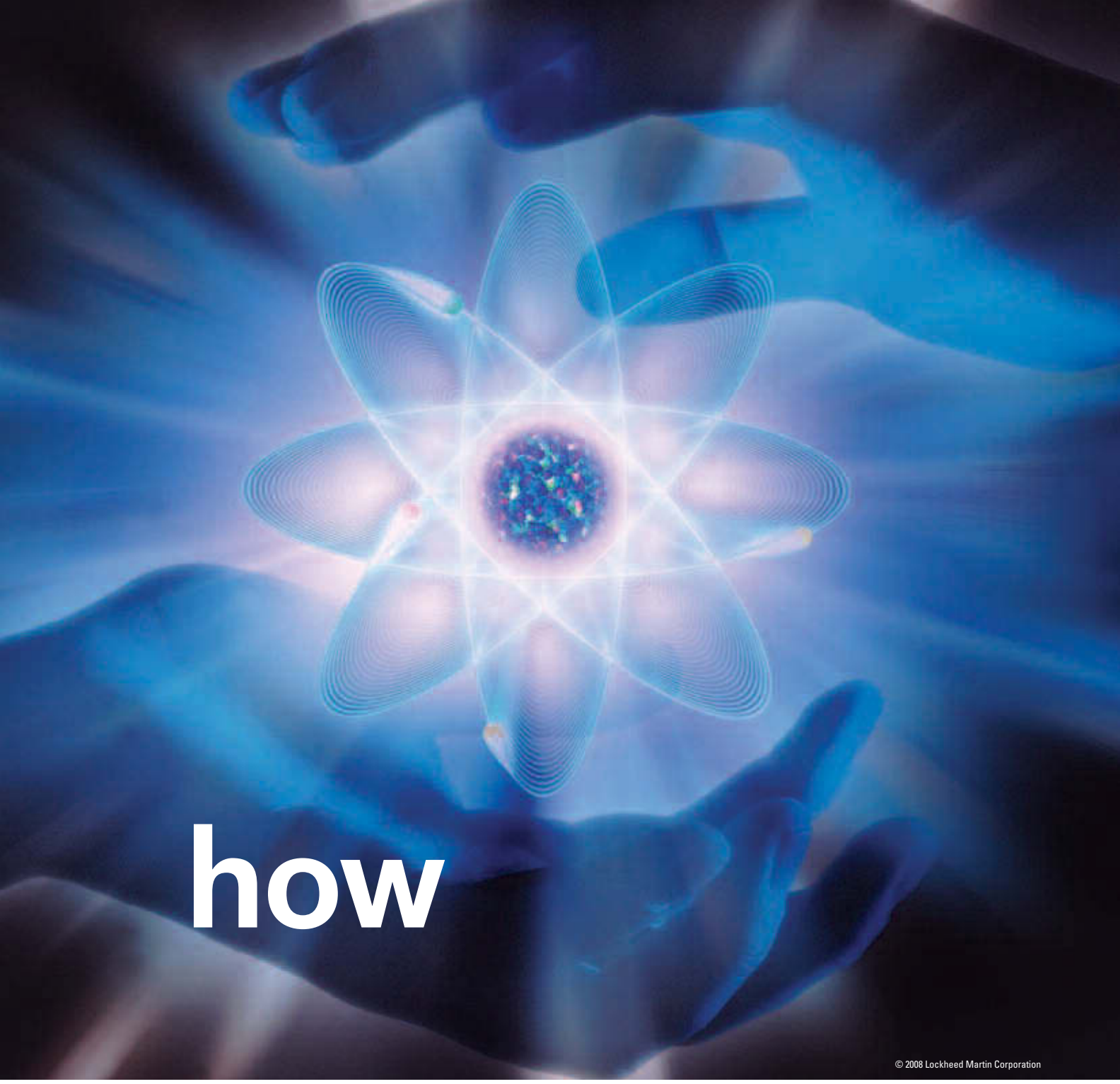
Education, Training & Workforce Briefs

CLEMSON UNIVERSITY IS OFFERING AN ONLINE BSEE PROGRAM through a partnership with the Energy Providers Coalition for Education (EPCE), the two organizations announced on May 28. The Bachelor of Science in Electrical Engineering degree program provides fundamental education in core areas such as circuits, electronics, electromagnetics, controls, power, and communications. The Power Systems specialization of the BSEE degree includes courses in energy conversion, power systems analysis, electric machines, and power electronics and drives. "By partnering with EPCE, we can offer this degree to an industry that is vital to our nation's security and lifestyle and that also has a significant need for new engineers," said Randy Collins, Clemson's associate dean for Undergraduate and International Studies in the College of Engineering and Science. The EPCE coalition includes investor-owned, cooperative, and public power utilities, governmental agencies, associations, local unions, and contractors working together to sponsor industry-created online learning programs to help attract, develop, and retain a skilled and educated workforce. Additional information about the EPCE's programs is available online at <www.epceonline.org>.

THE WINNERS OF WESTINGHOUSE'S N-VISION VIDEO CONTEST, which is designed to encourage young people to think about energy "in the context of worldwide political, economic, and environmental realities," were announced on May 27. Butler Senior High School, in Butler, Pa., won in the high school category, and McKinley Middle School, in Racine, Wis., won in the middle school category. The winning schools each received $3000 to be put toward science department needs, and each student who participated received $100 to put toward school supplies. Twenty-five videos were submitted for the contest. To be eligible, each video had to outline three key advantages of nuclear power and two other forms of energy. The videos could be staged as short plays, commercials, news broadcasts, talk shows, music videos, or documentaries. Westinghouse Electric Company said that the students are encouraged to be creative yet informative.

AREVA IS RECRUITING NEW EMPLOYEES WORLDWIDE, planning to add 12 000 to its workforce in 2009. The company announced on May 14 that it had simultaneously launched recruitment campaigns in six countries or world regions: France, Germany, China, India, North America, and the Middle East. The bulk of the new hires will be engineers and technicians, the company said. In North America alone, Areva plans to hire about 700 new employees, which would represent a 10 percent increase in its current workforce there.

**A NEW $2.4-MILLION TRAINING CENTER IN HOUSTON,** Texas, is the first freestanding building in North America dedicated exclusively to advancing corrosion education, according to a May 1 statement by NACE International. Originally known as the National Association of Corrosion Engineers, NACE International said that the 15 000-ft^2 training center will accommodate more than 3000 students annually as they earn certifications in coatings, cathodic protection, and other professional endeavors related to corrosion identification, prevention, and mitigation.



BETWEEN SAFETY AND RELIABILITY, THERE IS ONE IMPORTANT WORD: HOW.

As a leader in digital instrumentation and control, we're proud of our 50 years of military and nuclear energy experience. Our 70,000 engineers have been, and will continue, to help military and commercial energy customers face down their most difficult challenges. Integrating vital systems is all a question of how. And it is the how that makes all the difference.

lockheedmartin.com/mfc/nuclearsands/

LOCKHEED MARTIN

We never forget who we're working for®

graduates from the health physics programs are going into the field of medical physics rather than health physics, the overall upward trend in enrollments in health physics programs has had less of an impact on any shortage of health physics personnel. "I think the biggest problem currently is that we are behind the curve as far as meeting the needs in health physics and thus companies [and] organizations are mainly seeking experienced personnel," Patton said. "New graduates are not employed and trained at the level I think they could be to meet these shortages. Every position advertised that I see [requests] five, 10, 20 years of experience."

Patton said that he understands why employers in the industry may feel the need to fill the position of a retiring senior employee with someone who has senior-level experience. He added, however, that he believes more on-the-job training should be offered to junior-level health physicists to help them progress to the senior level.

Dick Toohey, director of the Dose Reconstruction Programs at Oak Ridge Associated Universities and president of HPS, said that health physicists are leaving school today with greater potential to reach a senior performance level more quickly than in the past. "Graduates of health physics programs are ready to hit the ground running with nowhere near the amount of catch-up and self-teaching that I and many of my colleagues experienced," he said. "Many of the health physicists of my generation entered the field from a different academic discipline, such as nuclear physics, in my case."

Kevin Nelson, who chaired an HPS task force that studied human capital concerns, said that the number of graduates is not enough to meet demand. "The projected need for radiation protection professionals still overshadows the projected number of graduates, at least in the near-term," he said.

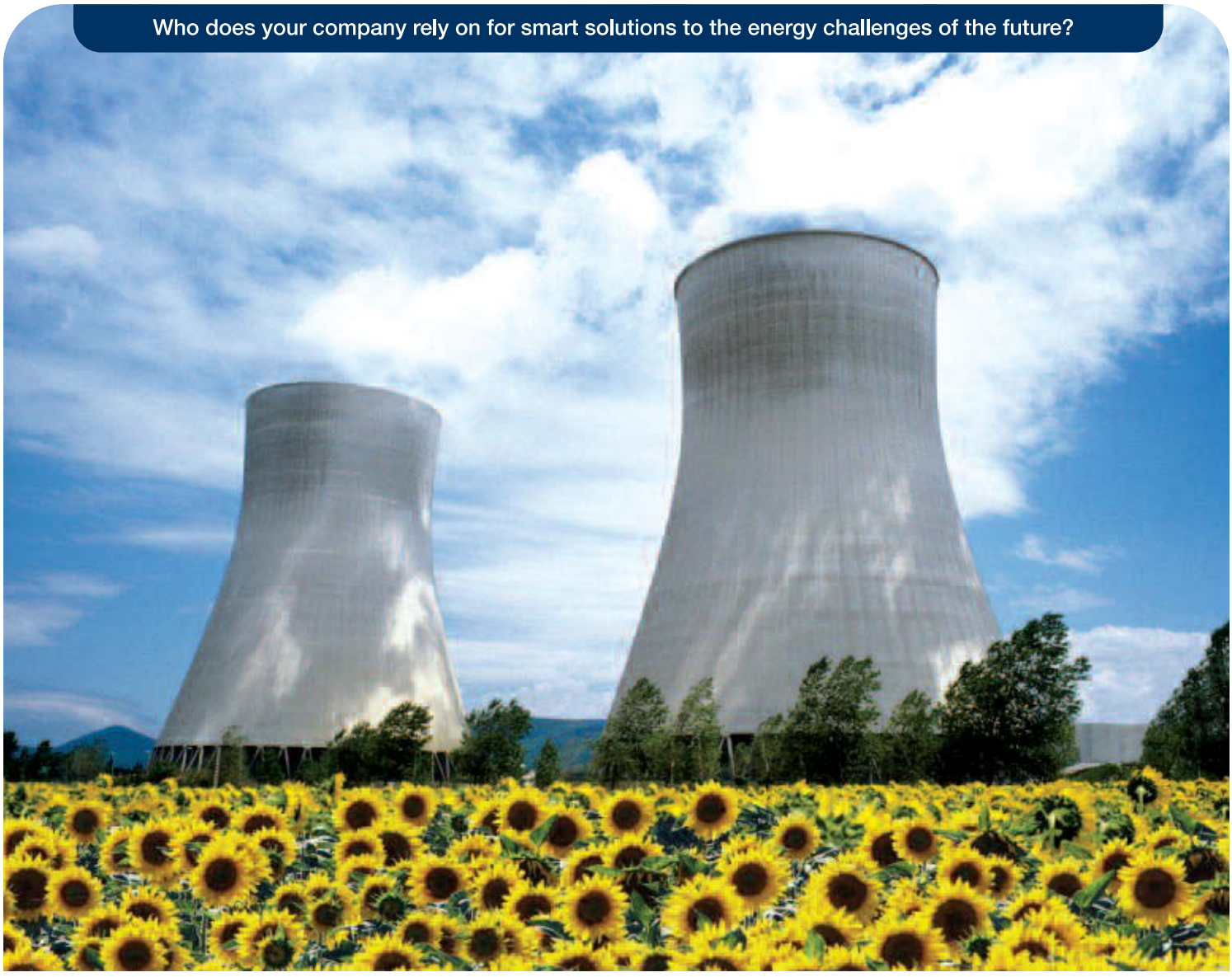
The reports are available online. *Nuclear Engineering Enrollments and Degrees Survey, 2008 Data* is at <orise.orau.gov/sep/files/NE-Brief-64-2008-data.pdf>, and *Health Physics Enrollments and Degrees Survey, 2008 Data* is at <orise.orau.gov/sep/files/HP-Brief-65-2008-data.pdf>. Survey reports from past years are also available on the ORISE Web site.

Section continued

TABLE IV. HEALTH PHYSICS EMPLOYMENT OR OTHER POST-GRADUATION PLANS, 2008

	B.S. degree	M.S. degree	Ph.D. degree
Continued Study	23	26	2
Academic Employment	4	2	3
Federal Government Employment	2	4	0
DOE Contractor Employment	3	5	0
State and Local Government Employment	0	2	0
Medical Facility Employment	0	21	2
Nuclear Utility Employment	8	4	0
Other Nuclear-Related Employment	6	4	0
Other Business Employment	2	8	0
Foreign (non-U.S.) Employment	0	1	0
U.S. Military, active duty	4	4	0
Other Employment	2	1	0
Still Seeking Employment	5	2	0
Unknown/Not reported	14	24	1
Totals	**73**	**108**	**8**

Who does your company rely on for smart solutions to the energy challenges of the future?



SMART SOLUTIONS TO TOUGH CHALLENGES

- → TEST, MEASUREMENT AND DATA ACQUISITION
- → AUTOMATION AND CONTROL SYSTEMS
- → EQUIPMENT QUALIFICATION
- → COMMERCIAL GRADE DEDICATION
- → NUCLEAR-QUALIFIED PRODUCT SUPPLY

NTS Power & Energy: Embracing the Nuclear Renaissance and Powering the Future

National Technical Systems (NTS) is an integrated engineering services company offering a wide range of solutions for the Power & Energy industry. When NTS acquired Acton Environmental Testing in 1985 a commitment to exceptional service was born. Acton's extensive experience serving the needs of the nuclear power industry merged with the vast engineering resources of NTS created a very unique company; one that had the depth of knowledge required to understand the complex requirements of this unique marketplace combined with the adaptive ability to execute quickly and efficiently regardless of the size of the challenge at hand. Today NTS Power & Energy stands ready to provide smart solutions to your toughest challenges. Contact us today to discuss how we can help.

Contact us today to learn more about how NTS can help you solve your toughest engineering challenges. T: 877.211.1751 E: energy@ntscorp.com

www.ntscorp.com/energy/nn

NTS®

ANS Care

www.ans.

ANS Members

Seek and discover new career opportunities.

Résumés

- Post up to five résumés
- The Career Center now supports searchable résumés as attachments in popular file formats

Job Listings

- Browse listings, or search based on keywords, location, position, industry, salary, and more
- Create search agents that will automatically notify you via e-mail when new listings that match your predefined search criteria are posted

To post résumés and search job listings, which are free services provided to all ANS members, please visit: **www.ans.org/members/career**

When you place an employment print ad in *Nuclear News*, your positio

Call 1-800-682-6397 or e-mail advertising

eer Center

org/career

Employers

Find top prospects in your industry.

New Management Interface
- Create and manage your account, purchase services, and use those services instantly

Job Listings
- Improved management system allows more control of, and more options for, the information within your listings

Member Résumés
- Search ANS member résumés and contact prospects via the Career Center

For more information (including costs), to create your Employer account, or to log in, please visit: **www.ans.org/career**

n will automatically be posted in the ANS Career Center free of charge.
@ans.org to reserve your ad space today.

Continued from page 96

AWARD

NRC a top supporter of HBCU programs

The Nuclear Regulatory Commission has been recognized by *US Black Engineer and Information Technology* magazine as one of the top supporters in 2009 of engineering programs at historically black colleges and universities (HBCU) and minority-serving institutions.

USBE&IT magazine's seventh annual survey identified 92 companies and 75 agencies and nonprofit organizations for the top-supporters list. The survey participants were the deans of the accredited HBCU engineering programs and the executive director of the corporate-academic alliance, Advancing Minorities' Interest in Engineering.

The factors considered in evaluating organizations for the top-supporters list included support for infrastructure modernization and enhancement, research, participation on advisory councils, faculty development opportunities, scholarships, student projects, stipends, cooperatives, and career opportunities.

The institutions that participated in the survey included the University of Puerto Rico, the University of Texas at El Paso, the University of Texas–Pan American, Colorado State University at Pueblo, Alabama A&M University, Florida A&M University, Hampton University, Howard University, Jackson State University, Morgan State University, North Carolina A&T State University, Prairie View A&M University, Southern University and A&M College, Tennessee State University, and Tuskegee University.

The list was published in the May/June 2009 issue of *USBE&IT* magazine.

FUNDING GRANT

McMaster U to receive $22M for reactor upgrades

Canada's McMaster University will receive Can$22 million (about $20 million) from the federal and provincial governments to upgrade its 5-MW open-pool research reactor. The funding is part of the Canadian government's Knowledge Infrastructure Program, a Can$2-billion (about $1.8-billion) federal initiative to renew Canada's college and university facilities and systems. The program itself is part of the country's Can$12-billion (about $10.8-billion) economic stimulus package.

The funding announcement was made on May 30 at McMaster University, in Hamilton, Ontario, by Tony Clement, Canada's minister of industry, and Ted McMeekin, minister of government and consumer services.

Correction

On page 51 of the June 2009 issue, an error was made concerning the funding of certain university R&D projects under the Department of Energy's Nuclear Energy University Program. Specifically, some information about two separate projects—one at the University of Idaho and the other at the University of Illinois—was combined into one item. The correct information is as follows:

■ The University of Idaho is to receive about $560 000 for the project "Experimental Study and Computational Simulations of Key Pebble Bed Thermomechanics Issues for Design and Safety."

■ The University of Illinois is to receive about $1.5 million for the project "Understanding Fundamental Material Degradation Processes in High Temperature Aggressive Chemomechanical Environments."

The funding will be used to upgrade the reactor's physical infrastructure to expand Canada's isotope research and production capacity. The McMaster reactor is the only reactor in Canada other than the National Research Universal reactor at Chalk River Laboratories, which is currently shut down (see p. 106), that is capable of producing medical isotopes. The funding will also be used for renovations and upgrades to the university's Nuclear Research Building to accommodate new laboratories, research space, and education for new faculty members, researchers, and graduate students.

The announcement comes as the McMaster reactor celebrates its 50th year of operation. In addition to producing medical isotopes, the reactor tests engine turbine blades for international commercial aircraft, analyzes core samples for the mining sector, and is used for research in a number of fields, including physics, biology, chemistry, engineering, earth sciences, archaeology, and medicine.

McMaster University has a student population of 23 000, and more than 140 000 alumni in 128 countries.

Peter George, McMaster's president, said the proposed funding "is another example of the federal government's continued support for science and technology and the role McMaster plays in the training of the next generation of scientists and engineers in the nuclear power and medicine industries. It will reinforce Canada's position as a leader in nuclear technology."

Clement added that the government's investment in McMaster University will provide a significant short-term economic stimulus to the Hamilton area. "The government of Canada is investing in innovation to create jobs, to help our economy recover quickly, and to improve the quality of life for Canadians," he said.

NUCLEAR EDUCATION

Mississippi program aimed at school-age audiences

The Power Path to Nuclear Energy education program being launched in Mississippi has a goal of steering the state's 7th-12th grade students toward career choices related to nuclear power production.

The program, announced on May 14 by Entergy, is part of the company's Destination Education initiative aimed at supporting Mississippi's public education. "Our nation's energy needs are growing every day, and so are opportunities in our industry," said Mike Kansler, president and chief executive officer of Entergy Nuclear.

In the program, teachers will provide lessons in nuclear science by using workbook games and puzzles and online resources. Entergy will provide training opportunities for teachers and lesson-plan enhancement through guest teachers and company employee volunteers. By creating an early interest in nuclear science, the company said, it hopes that Mississippi students will see the career options available in the nuclear power industry.

The program is being implemented in partnership with the Mississippi Department of Education and the EnergySolutions Foundation, a national organization that is dedicated to the promotion of math, science, and engineering education. The foundation is providing the program's curriculum. About $500 000 in materials for the program will be distributed statewide, and workshops for science teachers will be offered.

"Through Entergy, Mississippi has long been a leader in the nuclear power industry, so it is fitting that Mississippi should also lead the way in educating students about nuclear science," said Gov. Haley Barbour.

The program is the newest component of the Mississippi Department of Education's On the Bus initiative, which encourages corporations and other private entities to help to improve public education in Mississippi.

Entergy is the second-largest producer of nuclear power in the United States. Entergy Nuclear is headquartered in Jackson, Miss. NN

quality & safety,
the fruit of

experience

beyond the tube,
by Valtimet

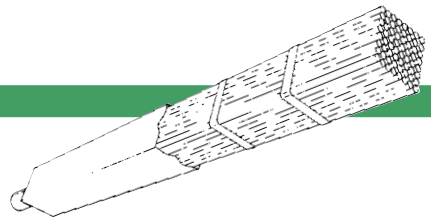
Photography & design for Valtimet by Stephan Caso

33 years of expertise in nuclear
world leader in energy-related markets
premium titanium & stainless welded tubes
exclusive services, on site controls and assistance

Vallourec Group

USA : +1 423 587 1888 (Morristown)
USA : +1 732 469 1861 (Brunswick)
China : +86 1065 1556 82
France : +33 1 49 09 39 81
South Korea : +82 32 556 4424

www.valtimet.com



URANIUM RECOVERY

NRC publishes final generic EIS for ISR mining

The NRC has issued a final generic EIS on ISR uranium recovery operations and announced a new approach to environmental reviews.

The Nuclear Regulatory Commission on June 4 published its final generic environmental impact statement (EIS) for *in situ* leach uranium recovery (ISR) operations in the western United States. The agency also announced a change in its approach to environmental reviews of new ISR facilities, whereby supplemental EISs would be issued instead of environmental assessments (EA), as currently required.

The NRC expects to receive about 17 license applications for ISR mining facilities through 2010, including new facilities, expansions, and restarts.

The NRC said that under the National Environmental Policy Act, an EIS is the most thorough review of the potential impacts of a proposed licensing action on the environment because it involves extensive opportunities for public participation, with a draft report issued for public comment before a final report is prepared. But the new generic EIS responds to public concerns that the NRC's review of generic impacts common to all uranium recovery actions would overlook unique characteristics of each individual site, according to NRC Chairman Gregory Jaczko. "Citizens may have confidence in the certainty of our regulatory decisions, because our reviews will be as comprehensive and transparent as possible, with maximum opportunity for the public to participate in the process," Jaczko said.

The agency said that the generic EIS would improve the efficiency of the environmental reviews of the applications by serving as a starting point for site-specific environmental reviews. Most licensing reviews are expected to be completed within two years, subject to available resources.

The generic EIS categorizes as "small," "moderate," or "large" the various impacts of ISR operations on land use, transportation, surface water and groundwater, geology and soils, threatened and endangered species, historical and cultural resources, public health and safety, ecology, and air quality. It also examines the socioeconomic impacts and waste management issues of ISR facilities. The NRC said that many of these impacts "are expressed as a range, because the precise impacts can only be determined during the site-specific reviews of each application."

The draft generic EIS was published in July 2008, and the NRC staff held several public meetings in South Dakota, Nebraska, Wyoming, and New Mexico to discuss the development of the report and to accept public comment on the draft generic EIS.

The final "Generic Environmental Impact Statement on In-Situ Leach Uranium Milling Facilities," NUREG-1910, is available online at <www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1910/>.

The NRC also said that it would continue to prepare EAs for applications to expand or renew the licenses of existing uranium recovery operations. An EA typically is not issued for public comment, but the agency said that one could be issued for comment if a particular application has high public interest. A "finding of no significant impact" would end the environmental review, but the NRC staff would begin work

Fuel Briefs

A SEVEN-YEAR LITIGATION BATTLE BETWEEN USEC AND AREVA ended on May 18 when the two companies announced that they had agreed to settle several pending appeals and administrative proceedings concerning French uranium enrichment services in the United States and USEC's dumping allegations, which Areva has always denied. The parties to the settlement are USEC Inc. and its subsidiary, United States Enrichment Corporation, and Eurodif S.A. and its affiliates, Areva NC and Areva NC Inc. The settlement ends all procedures undertaken since 2001 as part of the antidumping order that was introduced by the U.S. Department of Commerce in 2002 and was aimed at French imports of low-enriched uranium. In addition, under the settlement, USEC will supply Areva with enrichment services in 2009 and 2010. The agreement also allows Areva to reclaim about $80 million from the $213.5 million it paid in customs duties, and all ongoing administrative and legal procedures on the matter will be dropped. USEC is expected to realize about $70 million from estimated duties deposited by Eurodif S.A. or its affiliates. The antidumping order will remain in force until its next reappraisal by the Commerce Department in 2012.

on a supplemental EIS for the site if significant impacts were identified during the EA.

CAMECO CORPORATION

UF_6 production to resume at Port Hope

The production of uranium hexafluoride (UF_6) at Cameco Corporation's Port Hope conversion facility is expected to resume in the third quarter of this year following a December 2008 suspension, the company announced on May 19. Production was suspended when Cameco could not obtain hydrofluoric acid (HF), which is a primary feed material for UF_6 production, from its sole supplier. Cameco said it has signed a new contract with the supplier, the terms of which are "mutually beneficial to both parties," Cameco said.

UF_6 is exported to international customers to be enriched for use in light-water reactors.

Deliveries of HF were expected to resume within a month of the May 19 announcement. Cameco said that it would continue to negotiate with other suppliers to broaden and diversify its supply base, and that agreements with one or more additional suppliers were likely to be signed in the near future.

As a result of Port Hope's production restart, Cameco said that it was recalling 25 employees who were temporarily laid off when the suspension began; recall notices were issued within a week of Cameco's announcement. The company said that it would provide an update regarding changes to its 2009 fuel services production estimate.

While production at Port Hope was suspended, Cameco met its delivery commitments to its customers through the use of its UF_6 inventory and a contracted supply from Springfields Fuels Limited, which is operated by the United Kingdom's Nuclear Decommissioning Authority. Cameco said that it had also arranged, in cooperation with its customers, for voluntary deferrals of UF_6 deliveries and had made limited purchases of UF_6 conversion services.

In July 2007, a separate event caused a suspension of activities when uranium and evidence of other production-associated chemicals were discovered in the soil beneath the Port Hope facility. The plant was restarted in the third quarter of 2008 after the company implemented extensive groundwater control measures and made repairs and improvements to the facility to prevent uranium and other production-related chemicals from spreading further and to ensure that there are no underground leaks in the future. The plant operated for about a month before it was shut down again because of the HF supply issue.

Cameco's headquarters is in Saskatoon, Saskatchewan, Canada, and the Port Hope facility is in Ontario, Canada. NN

urenco

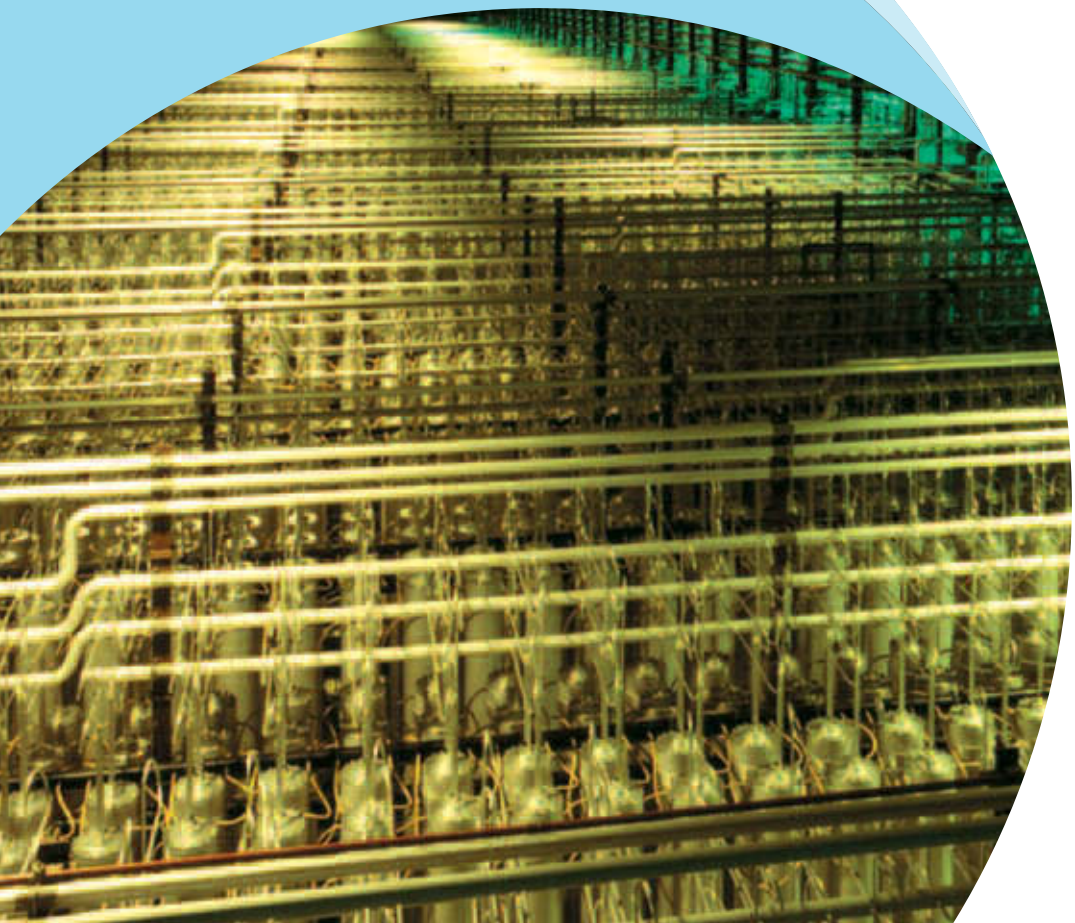
enriching the future

confidence in our future

Our uranium enrichment technology is a revolutionary force in the nuclear fuel cycle. As the cleanest and most energy-efficient technology, it provides a sustainable energy supply for nuclear power which helps ensure security of supply and affordability. In so doing, it ensures nuclear energy is a viable option as part of a balanced energy mix.

As an independent energy and technology group with global leadership in centrifuge technology, Urenco is ideally placed to give a reliable and flexible source of support to the nuclear industry.

www.urenco.com



NUCLEAR MEDICINE

Canadian reactor outage drops world isotope supply

A heavy-water leak at the NRU reactor will stall production until at least late August.

A SHORTAGE OF MEDICAL isotopes is expected to worsen following the news from Atomic Energy of Canada Limited (AECL) at the end of May that the National Research Universal (NRU) isotope production reactor at its Chalk River Laboratories will remain shut down for at least three months.

The NRU reactor, which provides a large share of the world's medical isotopes, was shut down following the discovery of a small leak of heavy water on May 15. AECL soon identified the source of the leak and estimated that the reactor could be repaired and restarted in about a month. In a status report issued by AECL on May 27, however, Bill Pilkington, senior vice president and chief nuclear officer of AECL, said, "Sophisticated diagnostic procedures are required to determine the exact nature and extent of the repairs before returning the NRU reactor safely to service." He said that he expected the reactor to be out of service for at least three months.

On June 2, AECL began removing fuel rods from the reactor, a process that was expected to take three to four weeks to complete. By that time, the company should be able to assess the problem and devise a repair procedure to return the reactor to production.

The leak was discovered during routine monitoring of the reactor after it was shut down following a regional loss of electrical power on May 14. According to AECL, the water was leaking at a rate of 5 kg per hour. A small release of tritium as a result of evaporation was also detected. While the level of activity did not pose a threat to the public or to workers, it was high enough to require AECL to notify the regulator and other stakeholders.

Long-term supply solutions

As the news came out that the NRU reactor would be down for at least three months,

the government announced that it was setting up an expert panel to review proposals from the private and public sectors for new sources of key medical isotopes.

"While we continue to work domestically and internationally to address the current shortage resulting from the outage of the NRU, we are also seeking expert advice with regard to medium- and long-term solutions," said Lisa Raitt, minister of natural resources.

The identification of new ways to secure the supply of medical isotopes, said Raitt, is part of a previously announced strategy to address vulnerabilities in the isotope supply system. Organizations have already put forward concepts for producing a key medical isotope, molybdenum-99/technetium-99m, for the Canadian market. To address the growing concerns, the government is now formally requesting proposals and is appointing an expert panel to identify the most promising solutions. The panel will provide its assessment in the fall.

Other measures taken by the government include the creation by Raitt's department, along with AECL and Health Canada, of a "Protocol for Notification and Information Sharing Concerning Shortages of Medical Isotopes." The government has also invested in isotope production–related studies at McMaster University and helped fund a workshop on accelerator-based photo fission as a possible source of medical isotopes.

In the meantime, the isotope supply problem is an international issue that requires a concerted international approach. "I continue to lead productive discussions with my counterparts in other isotope-producing countries that have some ability to assist with this supply issue," Raitt said. "These countries all have different constraints and capacity that we are working through, but we will continue using all resources available to us to manage this shortfall."

In the meantime, all authorities, along with the health care community, are being encouraged to plan measures such as modifying patient scheduling to optimize the use of available medical isotopes.

REGULATION

New Jersey applies for agreement state status

Despite the economic downturn and the budgetary problems facing state governments, there has been a clear trend recently toward more states seeking agreement state status with the Nuclear Regulatory Commission. The NRC announced on May 26 that it is now considering a request from New Jersey, which if approved would make it the 37th state to assume part of the NRC's regulatory authority over certain radioactive materials.

As an agreement state, New Jersey would take on the responsibility for licensing, rulemaking, inspection, and enforcement activities for radioactive by-products of the production and use of special nuclear material (plutonium and enriched uranium), naturally occurring or accelerator-produced radioactive material (NARM), source material (uranium and thorium), special nuclear material in quantities too small to form a critical mass, and land disposal of source, by-product, and special nuclear material received from another entity. The NRC would retain authority over nuclear power plants, federal agencies using certain nuclear materials, the evaluation and approval of sealed radioactive sources, and the regulation of uranium mill tailings.

If the agreement is approved, about 500 licenses would be transferred to New Jersey's jurisdiction. The state already oversees about 500 NARM licensees, about 300 of which also hold NRC licenses. Under agreement state authority, holders of both NRC and New Jersey licenses would have the licenses combined into a single state license. New Jersey would then have authority over about 700 licensees. Even if the state collects user fees from licensees, it would still probably spend more to be an agreement state than it would if the NRC maintained full authority. NN

Westerman Nuclear

World Class

NQA-1 and ISO 9001/2000

10 CFR 50 APPENDIX B

ASME SECTION III & VIII

Nuclear Subassemblies
Reactor Components
Material Certifications

Radwaste Containers
Pressure Vessels
Heat Exchangers

800-338-8265

www.westermancompanies.com

NA N N3 N PT NS P U UM R

Westerman Companies

Westerman Nuclear LLC is a wholly owned subsidiary of the Westerman Companies

Dedicated to QUALITY PRODUCTS and SERVICE since 1909

RADIOTHERAPY

New technologies found to need more testing

A meeting at IAEA headquarters pointed up concerns over the sufficiency of testing of the most recent radiation imaging and therapy approaches.

CONCERN OVER THE commercial promotion of advanced cancer treatment technologies before they have been properly tested and approved by the medical profession was the focus of the International Conference on Advances in Radiation Oncology, held April 27–29 in Vienna, Austria. The meeting, which was organized by the International Atomic Energy Agency, was attended by some 400 cancer therapy specialists from 81 countries, 19 of which were characterized as high-income states, and 62 as low- and middle-income states, and a number of major national and international organizations.

A background note issued before the meeting—which was cosponsored by the American Association of Physicists in Medicine, the American Brachytherapy Society, the American Society for Therapeutic Radiology and Oncology, the European Society for Therapeutic Radiology and Oncology, and the International Commission on Radiation Units and Measurements—said that recent technological achievements "in the clinical, physical, and biological aspects of radiation oncology represent important steps in providing tools for effective and safe cancer treatment." The note added, however, that technological innovations "are often accepted at face value without a thorough analysis of benefits versus pitfalls" and that "the motivations of medical centers to implement some forms of imaging and treatment delivery are usually a combination of industry advertisement, enthusiasm for novel technologies, and competitive challenge."

There was also concern that innovative treatment strategies have become standard without the scientific evidence to support their superiority to previously existing approaches. "Low- and middle-income countries with limited public health resources should assess carefully whether the implementation of advanced technologies will fulfill national priorities in terms of cancer prevention and control," the note said.

IMRT issues

One of the most discussed new technologies was intensity modulated radiation therapy (IMRT), which can deliver an increased radiation dose to a target tumor with a variable beam that can also be shaped to resemble the target.

The technique "gives physicians and physicists much more flexibility in determining how to deposit the dose within the tissues of the patient," Lawrence Marks, an internationally acclaimed specialist from the University of North Carolina, told *Nuclear News*. "For some disease sites there is indication that IMRT can deliver radiation to the tumor more precisely and improve the outcome for patients.

"Even in the United States or in European countries . . . it has been relatively hard to prove that IMRT is making a dramatic improvement in patient care."

"When you deliver radiation to the tumor, there is always collateral dose that goes to healthy tissue. IMRT gives us more flexibility in determining how to deposit extra dose to the cancer site and not into the normal tissues. But as to whether IMRT should be employed in a widespread manner throughout radiotherapy clinics, I think the answer is clearly 'no,' because in this context we were talking about a lot of countries that barely have the facilities to treat patients on the machines they have.

"The advantage that you get from IMRT is, for most situations, relatively modest. Most of us agree that the benefits gained were very large when we moved from two-dimensional to three-dimensional treatment planning," based on computerized tomography (CT) which, Marks explained, shows what the anatomy is like inside the patient. "But now there are centers in the world that . . . want to leapfrog 3-D planning and go right to IMRT," Marks said, adding that while IMRT also involves 3-D imaging, it "is much more complicated, much more prone to error, and much more labor intensive. I don't think that's the most appropriate thing for many countries to do.

"Certainly for major university centers in countries with adequate resources to study these things, it is a very interesting, a very exciting technology that can help a lot of patients. But even in the U.S. or in European countries . . . it has been relatively hard to prove that IMRT is making a dramatic improvement in patient care. Certainly there are some tumors for which IMRT does provide benefit [even though] the benefit does not appear to be huge. But then, the cost to do it is high.

"For countries where the resources are limited," Marks said, "it seems better to spend the money on health systems, including basic radiation therapy services—simulators, radiation treatment planning devices, blocks to shape the radiation field. Such simple things will bring much more [benefit] than applying IMRT across the board." Even with rudimentary radiography, he said, a lot of patients with various cancers were cured by radiation in the 1960s, 1970s, and 1980s, before the widespread adoption of CT scanning.

Furthermore, there has been no randomized trial of IMRT to study and compare its

positive and negative aspects, Marks said, although there is evidence from studies of breast cancer treatment that side effects on the patient's skin are reduced, both in the short term and long term after radiation.

Marks also stressed that there are high costs associated with the use of IMRT, as it involves a considerable amount of time from physicians, health physicists, and dosimetry specialists to ensure a high level of quality assurance and to deliver the IMRT. This is all on top of the expensive equipment and software. "So for a country with limited resources where you want to treat as many patients as you can . . . IMRT may extend the treatment time for some patients and make it more difficult for the treatment center to take care of all the patients in the way it would want to," Marks said.

Rapporteurs' summary

Geoffrey Ibbott, a professor of radiation physics at the University of Texas M. D. Anderson Cancer Center, summed up the proceedings of three very intense days. He said that the conference participants agreed that "the key point about radiotherapy is that it is a very cost-effective cancer treatment."

Cancer incidence and treatment, however, vary tremendously with the economic status of the country concerned, he said. In developing countries, cancers are often at an advanced stage when they are first diagnosed, and the treatment is often only palliative, although this is changing and more positive results are now being seen. "In contrast," he said, "in developed countries, early detection and awareness are common, and prevention programs much more common. More often treatments are curative."

Many developing countries, Ibbott said, have no facilities at all, and in those that do, the ratio of treatment machines to population is very low. In some countries there is the perception that radiation therapy is only for palliation and is a last-ditch treatment. As a result, people who have the economic means frequently go elsewhere for their treatment. This has motivated some treatment centers to introduce advanced technologies in an effort to retain those patients.

Developing countries clearly have an interest in introducing these new technologies, Ibbott said, but there is often a question as to whether sufficient resources exist to provide and maintain them, "or evidence that these technologies will be beneficial in their intended uses."

There is certainly the potential for adopting new technologies such as IMRT without a full appreciation of the risks, Ibbott said. Some countries need to gain more experience with conventional 3-D therapy and 3-D treatment planning before initiating any more advanced technologies, he added.

Speaking in global terms, Ibbott said that some groups of patients would no doubt benefit from these advanced technologies, and when such technologies are introduced, attention should be given to providing them to these groups.

In the area of radiation biology, a couple of issues came out very clearly, Ibbott said. One is that hyperfractionation (administering smaller doses of radiation more often than standard radiation therapy so that the full treatment course can be given with fewer side effects) and accelerated fractionation (administering larger fractions over a reduced period) "are not proving as promising as was expected and as was hoped."

The second is that hypofractionation (administering larger doses less often than in conventional therapy), in contrast, is demonstrating its value as a resource-efficient approach to cancer treatment. In one case, for example, hypofractionation is being used on Saturdays, when it will not interfere with treatments during the week, to offer treatment to entirely new groups of patients. There was also evidence in both prostate and breast cancer sites that hypofractionation may be very useful, particularly in developing countries.

Ibbott stressed that the implementation of advanced technologies without a full appreciation of the deficiencies could be dangerous. This is particularly true in techniques such as IMRT, where the results achieved could be worse than with conventional treatments if the technology is not well understood and if the quality assurance is not adequate. Ibbott called for studies "to prove the value of IMRT and other advanced technologies before they are introduced into widespread use, particularly in the developing world."—*Gamini Seneviratne*

REACTOR DESIGN

Project to assess reliability of passive safety systems

Ten research institutes and organizations from Argentina, France, India, Italy, Russia, and the United States have launched a coordinated research project (CRP) titled "Development of Methodologies for the Assessment of Passive Safety System Performance in Advanced Reactors." The initial research coordination meeting (RCM), held March 31–April 3, was attended by representatives from all project member countries, with Japan and Sweden (who may join later) attending as observers.

Vladimir Kuznetsov, the International Atomic Energy Agency's scientific secretary for the project, told *Nuclear News,* "The assessment of passive safety systems, using risk-informed approaches, is important not only for advanced nuclear power plants of the future but also for existing reactors that have passive safety systems. Sometimes a simple modification—changing the diameter of a pipeline, increasing the water level in the tank, changing the position of the heat exchangers—can make the passive system of an operating plant more reliable. For new plants, it helps design better, more reliable passive safety systems."

Because small and medium-sized reactors (SMR) make extensive use of passive safety systems, risk-informed approaches may be particularly important for them, Kuznetsov said. "When you quantify SMR safety on this basis, you may be able to demonstrate that one reactor has a smaller emergency planning zone requirement than another of the same capacity. It would thus have a stronger claim to be sited closer to the users. One of our earlier CRPs, on small reactors without on-site refueling, worked out that an SMR in Italy deemed to need a 10-mile emergency planning zone could be demonstrated to need only 3–5 kilometers."

Up until about the mid-1990s, Kuznetsov said, it was generally assumed that passive safety systems are inherently reliable. "It has since been shown that not all are. Questions are now being asked whether passive systems even in operating reactors are reliable. The stringency of regulator requirements has been increasing as safety assessment methods, codes, and approaches evolved. Operators and designers are now being asked by the regulators to 'prove' the reliability of passive safety systems in quantitative terms.

"If the system is active, then it is based on active components that are tested, and people have experience in their operation. Based on this experience, there are numbers that characterize failures, and these numbers can be put into event trees [used in the probabilistic assessment of an active safety system] and you can come up with a figure, a numerical value, for reliability. Whatever this figure might be, it is quantifiable," Kuznetsov explained.

But passive safety systems, he said, are essentially processes. There may be some active "trigger" components, such as check valves, that may have reliability numbers for failures, but for processes such as natural convection, there are usually no data on failures. "This makes it extremely difficult to quantify how reliable the passive system is [when] risk-informed regulations are being applied. In most countries, safety assessments are still deterministic."

The risk-informed approach is already accepted in, for example, Argentinean regulations. Some other countries, notably the United States and South Korea, are developing risk-informed approaches, and the IAEA is considering other options, Kuznetsov said. This approach, he added, makes it possible to discriminate between reactor types and sizes in terms of the real hazard, which includes both probability and consequence.

To deal with hazards in a risk-informed way, the reliability of a system, active or passive, must be quantified. Kuznetsov said that for passive systems, a number that characterizes their potential failure would actually indicate the overall probability of a particular group of accidents. The CRP will be looking at ways to quantify these passive physical processes, such as natural convection, which, he said, are a combination of many factors.

Up until about the mid-1990s, it was generally assumed that passive safety systems are inherently reliable. It has since been shown that not all are.

Kuznetsov further explained that phenomena such as buoyancy and density, friction and resistance, factors relating to flow, sedimentation on walls that could affect friction, and thermal stratification in a large pool causing different water temperatures at different levels are all prone to deviations that could disrupt the process of natural convection. As a result, the heat actually removed by a passive system could be much less than what is required. This may cause a failure that could lead to a release of radioactive products. The CRP, he said, will collectively study such features.

Reliability methodologies

During meetings prior to the RCM, project members identified several methods for the quantification of the reliability of passive safety systems developed by various research centers. One of the better-known methodologies is called Reliability Methods for Passive Safety Functions. Originally proposed in Italy, it was developed by France's Commissariat à l'Énergie Atomique within a European Union research program.

This methodology assumes, for instance, that if there is some physical process, then the parameters of this process, such as temperature and pressure, will have some probability density distribution. One of the aims of the CRP is to develop a framework that could be used as the basis for setting up an internationally accessible database of this distribution for different parameters involved in passive safety systems. Given these distributions, Kuznetsov explained, event tree analyses could identify how the passive system works and the possible sources of performance failure. There are already some databases around the world, he said, but they need to be brought together.

Kuznetsov said that a group at the Bhabha Atomic Research Center (BARC) in India is developing an independent methodology called APSRA (Assessment of Passive System ReliAbility), that is somewhat different. BARC uses a test loop to define failures of certain active components in the system that could result in a deviation from parameters. This is a simpler and perhaps more straightforward approach. It may be less accurate, but the incorporation of tests is important if such methods are applied to new reactors for which there is insufficient testing. "If the available codes are not validated on a sufficient test base, the incorporation of tests into a methodology for reliability assessment of passive safety systems becomes a necessity," he said.

The BARC group is also likely to conduct trial applications of the European methodology with the goal of finding options to merge or to incorporate provisions for certain tests in that approach, essentially to cross-fertilize the two, Kuznetsov said.

What is also important for the CRP, he added, is to work out how best to present and explain the results to regulators. Because the methodologies are rather complicated and explanations can be tedious and time-consuming, CRP members feel that an attractive presentation structure might be helpful.

The CRP has several other test facilities available for experiments. One is a very simple natural convection loop, available through Italy's University of Pisa, which has a frame that can be rotated along the horizontal axis. Though simple, it is an interesting loop, he said, because it can be used to simulate regimes that are unstable, ensuring that many test runs that give positive [successful] results, as well as those in which the system fails, can be performed.

"The immediate plus point for testing," Kuznetsov said, "is that if you calculate and compare the number of actual failures with the number of failures predicted by various methodologies, you have a kind of direct validation of the methodology. Participants expressed some doubts that this would work out," he added, "but decided to try to develop a program of tests along these lines."

Kuznetsov stressed, however, that the most important activity of the CRP is to "develop requirements for a method of reliability assessment of passive systems. We discussed this thoroughly during a special brainstorming session and formulated a skeletal structure of requirements," he said.

The final report of the RCM, along with presentations and other documents, is available from Kuznetsov at <v.v.kuznetsov@iaea.org>.—*Gamini Seneviratne* NN

Standards

ACTIONS

New standard published, other actions

The following standard has been published and is available for purchase:

■ ANSI/ANS-19.10–2009, *Methods for Determining Neutron Fluence in BWR and PWR Pressure Vessel and Reactor Internals* (new standard).

This standard provides a procedure for the evaluation of the best-estimate fast (E>1.0 MeV) neutron fluence in the annular region between the core and the inside surface of the vessel, through the pressure vessel and the reactor cavity, between the top and bottom of the active fuel given the neutron source in the core. This evaluation employs both fast neutron flux computations and measurement data from in-vessel and cavity dosimetry, as appropriate. The standard applies to both U.S.-designed pressurized water reactors and boiling water reactors.

Comments requested

Comments are requested on the following standard by August 11, 2009:

■ ANSI/ANS-8.17–2004, *Criticality Safety Criteria for the Handling, Storage, and Transportation of LWR Fuel Outside Reactors* (reaffirmation of current standard).

This standard provides nuclear criticality safety criteria for the handling, storage, and transportation of light-water reactor fuel rods and units outside reactor cores.

PINS

Under the Project Initiation Notification System (PINS), the following standards are being initiated:

■ ANS-2.25–20xx, *Surveys of Ecology Needed to License Nuclear Facilities* (supersedes withdrawn standard ANSI/ANS-2.25–1982 [R1989; W1999]).

This standard discusses the process for the completion of ecological, terrestrial, and aquatic reviews of the environment for potential nuclear facilities. Facilities include uranium enrichment facilities, fuel fabrication facilities, power and research reactors, interim storage facilities, reprocessing facilities, low- and high-level waste disposal facilities, and other Department of Energy–owned/operated facilities. Site planners must collect information to predict and assess real and potential environmental impacts, and to site and design reactor and nonreactor nuclear facilities that avoid or reduce adverse effects of these potential impacts. Users of this standard will be guided through each stage of a survey with its corresponding requirements, the relationship of the ecologist and other specialists in a major project, sources of information, and the governing laws and regulations.

■ ANS-3.1–20xx, *Selection, Qualification, and Training of Personnel for Nuclear Power Plants* (revision of ANSI/ANS-3.1–1993 [R1999]).

This standard provides criteria for the selection, qualification, and training of personnel for nuclear power plants. The qualifications of personnel in the operating organizations appropriate to safe and efficient operation of a nuclear power plant are addressed in terms of the minimum education, experience, and training requirements. Requirements of this standard may be applied to test, mobile, and research reactors and reactors not subject to U.S. Nuclear Regulatory Commission licensing, at the users' discretion.

■ ANS-51.10–20xx, *Auxiliary Feedwater System for Pressurized Water Reactors* (revision of ANSI/ANS-51.10–1991 [R2008]).

This standard specifies updated design requirements for the auxiliary feedwater system, including system functions, performance requirements, and system description.

Erratum issued

A typographical error was identified in ANSI/ANS-8.1–1998 (R2007), *Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors.* An erratum has been issued and is publicly available in the standards section of the online ANS Store at <www.ans.org/standards/errata/>.

All published and draft standards can be ordered from ANS through Standards Administrator Pat Schroeder (<pschroeder@ans.org>) or Sue Cook (<scook@ans.org>). Comments on draft standards can be sent to Schroeder at ANS, with a copy of comments also sent to the Board of Standards Review at the American National Standards Institute. NN

2009 ANS UTILITY WORKING CONFERENCE & VENDOR TECHNOLOGY EXPO

BACK TO THE FUTURE

AUGUST 2-5 • AMELIA ISLAND PLANTATION • AMELIA ISLAND, FLORIDA

Explore the fundamentals of nuclear power operations – review our past successes, our current challenges, and our vision for the future. Learn how these fundamentals lead to strong performance and support industry growth via new nuclear plant construction and operation. And voyage into the future to explore how new nuclear generation will meet future energy needs and protect our environment. Join us as we travel

BACK TO THE FUTURE.

- **INNOVATIVE SPEAKERS**
- **INSPIRING TOPICS**
- **CREATIVE NETWORKING**
- *Vendor-hosted* **GOLF TOURNAMENT**
- **AMAZING LOCATION**

AMERICAN NUCLEAR SOCIETY

TAKE ADVANTAGE OF DISCOUNTED RATES – PRE-REGISTER TODAY AT WWW.ANS.ORG

People

EDWARD D. HALPIN has been elected president and chief executive officer of STP Nuclear Operating Company, effective upon the retirement of JAMES J. SHEPPARD, ANS member since 1988, in December. Halpin, STP's executive vice president and chief nuclear officer, has held numerous leadership roles since joining the company in 1988.

Halpin

W. GARY GATES, ANS member since 1994 and president and chief executive officer of the Omaha Public Power District, has been elected chairman of the Nuclear Energy Institute's board of directors. WILLIAM D. JOHNSON, ANS member since 2008 and chairman, president, and CEO of Progress Energy, was elected vice chairman.

Gates

Elected to NEI's executive committee were ARIS CANDRIS, president and CEO of Westinghouse Electric Company; DAVID CHRISTIAN, ANS member since 2002 and CEO of Dominion Generation; JOHN FULLER, president and CEO of GE Hitachi Nuclear Energy; JOHN FUTCHER, president of Bechtel Power Corporation; and JOHN YOUNG, president and CEO of Energy Future Holdings Corporation.

Reelected to the executive committee were LEWIS HAY, chairman and CEO of FPL Group, and JOHN KEENAN, senior vice president and chief operating officer of Pacific Gas and Electric Company.

Elected to the NEI board of directors were MARK H. AYERS, president of the Building and Construction Trades Department, AFL-CIO; FREDERICK W. BUCKMAN, president of Shaw Power Group; JOHN FULLER; JOHN FUTCHER; EDWIN D. HILL, international president of the International Brotherhood of Electrical Workers; GANPAT MANI, president and CEO of ConverDyn; MICHAEL W. RENCHECK, ANS member since 2000 and president and CEO of Areva NP; and KIYOSHI YAMAUCHI, ANS member since 2006 and president and CEO of Mitsubishi Nuclear Energy Systems.

Reelected to the board were WILLIAM HITE, general president of United Association; LOUIS PARDI, president and CEO for power at the Washington Division of URS; RONALD PITTS, senior vice president for nuclear at Fluor Enterprises; KRIS SINGH, ANS member since 1979 and president and CEO of Holtec International; and JOHN WELCH, president and CEO of USEC Inc.

DON FENTON has been named head of the Department of Mechanical and Nuclear Engineering at Kansas State University. Fenton joined the engineering faculty in 1986 as an associate professor and became a full professor in 1992. He replaces MO HOSNI, who will continue as a professor in the department.

LUCIA VOTANO has been named director of the Istituto Nazionale di Fisica Nucleare's National Laboratory in Gran Sasso, Italy, the world's largest underground laboratory for astroparticle physics. Votano, the first woman director of an INFN national laboratory, joined the INFN laboratory in Frascati in 1976. She will replace EUGENIO COCCIA at the end of his final term in September.

PAUL SULLIVAN has been named vice president of USEC Inc.'s American Centrifuge. Sullivan will oversee all aspects of research and development for the American Centrifuge technology and the construction of the American Centrifuge Plant in Piketon, Ohio. Previously vice president of operations and chief engineer at USEC's Paducah plant, he will remain in the latter position. Sullivan replaces RUSSELL STARKEY, ANS member since 1983, who is retiring after 12 years with USEC.

DONALD DERANGER and JAMES GOWANS have been elected to Cameco Corporation's board of directors. Deranger is president of Points Athabasca Contracting Ltd. and advisor to the Athabasca Basin Development Corporation. Gowans is president and chief executive officer of DeBeers Canada, as well as chair of the Mining Association of Canada and president of the Canadian Institute of Mining, Metallurgy, and Petroleum. Deranger and Gowans replace retiring board members HARRY COOK and JOHN AUSTON.

Polcyn

JOHN POLCYN, ANS member since 1994, has been named vice president and chief nuclear officer of Invensys Process Systems' global nuclear business. He most recently was senior vice president of commercial nuclear operations at CH2M Hill.

Continued on page 120

Continued from page 18

As a result of Duke's 2006 merger with Cinergy, the parent company of Cincinnati Gas and Electric Company, southern Ohio is now a Duke service area. In its traditional service area, Duke has applied for combined construction and operating licenses for twin Westinghouse AP1000 reactors at the Lee site near Gaffney, S.C. Areva has experience in the region through DOE contract work, and although Areva's U.S. EPR was mentioned as a possible reactor choice, the alliance has stated that it has not made a decision on a reactor model. USEC had operated the Portsmouth enrichment plant, and SODI is an organization devoted to economic development in the region. At this stage, the project is aiming only at gaining DOE support. The next step might be an application to the Nuclear Regulatory Commission for an early site permit, but a Duke spokesperson told *Nuclear News* that there has been no formal notification to the NRC of a proposed submission schedule, and that operation of any power reactors at the site would begin after 2020.

The ITER construction site

▶ **D-T FUSION IN ITER WILL BE DELAYED BY THREE YEARS** from the original target date, according to a revised schedule approved by the ITER Council during a June 17–18 meeting in Japan. The schedule calls for the International Thermonuclear Experimental Reactor to be completed in time for first plasma to be produced in late 2018, three years later than anticipated in the original schedule set in 2005. The official date for the start of experiments fusing deuterium and tritium is now 2026. The ITER Council approved a "phased approach" to the scheduling and execution of experiments. The phased approach is reportedly intended to limit costs on the project, which is in the early stages of construction at a site in Cadarache, France. The first procurement agreements are said to require more resources than originally anticipated. The phased approach not only confirms the stretched-out schedule but may limit the scope of some of the work to be done in experiments. ITER is intended to resolve the remaining technical issues in the production of net energy gain from magnetic confinement fusion. It is now expected to be followed by the Japan-sited DEMO, which is intended to work out how fusion could become a fully practical, dependable energy source.

CONTRACTS TO COMPLETE SLOVAKIA'S MOCHOVCE-3 AND -4 were signed on June 11 in Bratislava by the utility Slovenské elektrárne and the project's main suppliers. The completion of the two nuclear islands will be undertaken by a consortium led by Škoda JS, part of the Russian engineering group OMZ, that includes Russia's Atomstroyexport and Slovak companies. Contracts for the engineering, construction, and project management of the conventional island were signed with Enel Ingegneria e Innovazione. Attending the signing ceremony were Robert Fico, Slovakia's prime minister; Paolo Ruzzini, chairman and chief executive officer of Slovenské elektrárne; and representatives from Areva-Siemens, the supplier of the instrumentation and control systems, and Škoda Power, the supplier of the steam turbines.

Slovenské elektrárne, 66 percent of which is owned by the Italian energy group Enel, and 22 percent by the Slovak state, expects to complete the two reactors by 2012 and 2013. The project will involve an investment of €2.7 billion (about $3.8 billion), which is to be financed by the company's cash flow, aided by the shareholders' decision not to distribute any dividends until the plant's completion. Site work for the two units was formally inaugurated last November. Once all are up and running, the four Mochovce units will supply about 45 percent of the domestic power demand.

Construction of the original Mochovce units, all Soviet-era VVER 440 pressurized water reactors, began in the 1980s but was suspended in 1993. While work on the first two units resumed in 1995, the government would not help finance the completion of Units 3 and 4, which were then mothballed. With assistance from Western companies, the safety systems of the first two units, finally commissioned in 1998 and 2000, had been significantly upgraded and the I&C systems replaced to reach safety levels comparable with Western European standards.

DETAILS OF THE REPUBLICANS' ENERGY BILL were made available on June 10 (see page 29, this issue), and while there are several measures intended to streamline the licensing process for new reactors, the stated goal of 100 new power reactors has no formal force. Section 401(b) of the bill reads as follows: "It is the policy goal of the United States to license 100 new nuclear reactors, or the megawatt equivalent, by 2030, if there are a sufficient number of applicants." There is no clarification of "megawatt equivalent," although this could be interpreted to mean roughly the capacity of 100 1000-MWe reactors. To qualify for the licensing "fast track" outlined in the bill, an applicant would have to use a Nuclear Regulatory Commission–approved reactor design and a site with at least one operating reactor, show broad local public support and "a substantial record of safe operations," submit a complete license application, and demonstrate financial commitment to the project. On the fast track, an environmental review would be completed in one year, but the bill is less specific

regarding the safety review, saying that it would be expedited to "that amount of time which is necessary" to issue a license "without sacrificing any aspect of public health or safety." The NRC would also be required "to seek to reduce by one-half" the design certification review period, to develop technology-neutral licensing guidelines, and to tell Congress what extra resources would be needed to carry out the bill's provisions. National laboratories and education programs would also support the goal of expedited licensing, and the mandatory licensing hearings under 10 CFR Part 52 would be eliminated. The bill would also encourage more domestic uranium production, uphold Yucca Mountain, in Nevada, as the site of a national high-level waste repository, and make Nuclear Waste Fund money available for spent fuel recycling through the private sector, as well as for the development of NRC licensing procedures for recycling.

A RADWASTE SUMMER SCHOOL will be held August 3–10 at the University of California at Berkeley, with a focus on radioactive waste disposal and social-scientific literacy. Hosted by UC Berkeley's Nuclear Engineering Department and the University of Tokyo's GoNERI Program, the school will provide Ph.D.-level graduate students and early career nuclear engineers with advanced studies in integrated social sciences and engineering to help prepare them for the key challenges of the geologic disposal issue. The topics to be covered include the scientific basis for geologic disposal, performance assessment, knowledge management, proliferation resistance and physical protection, ethics, economics, risk perception, and public communication. The school will include a tour of the Department of Energy's Waste Isolation Pilot Plant (shown above) in New Mexico. Additional information is available online at <goneri.nuc.berkeley.edu>. For more information about the GoNERI program, see *NN,* Feb. 2009, p. 39.

WORLEYPARSONS WON CONTRACTS IN EGYPT AND ARMENIA in June. The Australian engineering consulting firm was signed on June 18 by the Egyptian Nuclear Power Plants Authority to a 10-year contract valued at 900 million Egyptian pounds (about $160 million). The next day, the company announced that Armenia's Ministry of Energy and Natural Resources had awarded the company a consulting contract for a new power reactor project.

According to WorleyParsons, its work in Egypt will involve site and technology selection studies, project design, construction management, commissioning, and plant startup. The company will carry out its activities through its office in Sofia, Bulgaria, supported by its office in Cairo. Hassan Yunis, minister of electricity and energy, said that the first stage of the project will involve updating previous site studies, assessing the ability of sites to meet international standards, and preparing a safety report for presentation to the regulatory body. This phase will also include preparing strategies for evaluating available technologies, ensuring a long-term supply of nuclear fuel, and raising the percentage of local contributions—in terms of financing and construction—to the project. The second stage will involve services needed during the construction of the plant, such as project management and supervision, and the evaluation and revision of designs submitted by contractors.

The contract signed with Armenia's Ministry of Energy and Natural Resources will be implemented in four phases. The first two, to begin this year and valued at $500 000, include developing a feasibility study for the project and managing the tender process for choosing strategic investors. During the next two phases, which could be worth as much as $430 million, the company will organize and manage the tender process for engineering, procurement, and construction contractors and will provide consulting services during the design, construction, and startup of the project once the contractor is selected and financing is obtained.

THE DOE WILL AWARD NEARLY $9 MILLION FOR NUCLEAR R&D efforts at U.S. universities, the agency announced on June 16. Under the Nuclear Energy University Program (NEUP), the Department of Energy will provide $2.9 million for 70 scholarships of $5000 each and 16 fellowships of $150 000 each to U.S. nuclear science and engineering students. In addition, the DOE will offer over $6 million in infrastructure grants to 29 U.S. universities and colleges in 23 states. The grants will range between about $100 000 and $300 000. All funding is expected to be distributed by September 30. "We need to ensure that the next generation of nuclear scientists and engineers have the training they need to research, design, build, operate, and maintain U.S. nuclear power plants," said Energy Secretary Steven Chu. More information about NEUP, including a list of students selected for scholarships and fellowships and a list of selected universities, is available online at <www.nuclear.energy.gov>. This is the DOE's second NEUP award announcement. On May 1, the agency said that it was providing $44 million for 71 "cutting edge" nuclear energy research and development projects (*NN,* June 2009, p. 51).

THE NRC POWER REACTOR FEE IS $4 625 000 for fiscal year 2009, which ends on September 30. The Nuclear Regulatory Commission on June 10 announced the final fee schedule for its licensees, in the form of amendments to 10 CFR Parts 170 and 171. By law, the NRC must recover 90 percent of its budget through licensee fees (less some funding from the Nuclear Waste Fund and revenue from other activities, including those related to homeland security). For FY 2009, the recovered amount will be about $870 600 000. The hourly rate for NRC personnel has been raised from $238 to $257. Although the power reactor annual fee is higher now than it has ever been, it is not the highest charged by the agency; that distinction goes to the fee for a high-enriched uranium fuel facility, at $4 691 000. The other fees are as follows: low-enriched uranium fuel facility, $1 649 000; uranium hexafluoride conversion facility, $969 000; spent fuel storage/reactor decommissioning, $122 000; test or research reactor, $87 600; conventional uranium mill, $31 200; broad-scope medical materials user (Category 7B), $36 300; radiographer, $22 700; well logger, $9700; industrial gauge user (Category 1C), $2700. NN

For the fastest information on the products, services, jobs or companies you have seen advertised in this issue, simply refer to the convenient "Direct Answer" contact information following this index. Advertiser information is also posted on the ANS Web site at **www.ans.org/advertising**.

Nuclear News

July 2009

See Direct Answer Contact Information on next page →

Nuclear News Direct Answer

Nuclear News
Advertising Sales Reps
Regional Offices

United States

Boston, MA
Lee Fernandez
Phone: 617-722-8333
Fax: 617-722-8334

Chicago, IL
Barry & Jim Kingwill
Phone: 847-537-9196
Fax: 847-537-6519

McKinney, TX
Ken Jordan
Phone: 972-540-2122
Fax: 972-540-2127

San Rafael, CA
Warren DeGraff
Phone: 415-721-0644
Fax: 415-721-0665

Houston, TX
Bill Powell
Phone: 281-376-2368
Fax: 281-251-8555

Non-U.S.

Canada
Lee Fernandez
Phone: 617-722-8333
Fax: 617-722-8334

U.K. and Europe
Andrew Baker
Phone: 44-1372-278411
Fax: 44-1372-278412

Europe
Doris Weinberg
Phone: 33 1 39 64 14 50
Fax: 33 1 39 64 14 50

Japan and Korea
Kazuhiko Tanaka
Phone: 81.3.3584.6420
Fax: 81.3.3505.5628

Sales Manager

Chicago, IL
Jeff Mosses
Phone: 708-579-8225
Fax: 708-352-6464
e-mail: jmosses@ans.org

Advertiser Contact Information

ABS Consulting
Tom Roche
Tel: 714-734-4242
Fax: 714-734-4272
info@absconsulting.com
www.absconsulting.com

Aerofin Corporation
Brian C. Elliott
Tel: 434-528-6210
Fax: 434-528-6281
belliott@aerofin.com
www.aerofin.com

American Crane & Equipment Corporation
Tel: 610-385-6061/
877- 877-6778 x224
Fax: 610-385-3191
sales@americancrane.com
www.americancrane.com

American Nuclear Insurers
Richard D. Jones
Tel: 860-682-1333
Fax: 860-659-0002
rjones@nuclearinsurance.com
www.nuclearinsurance.com

Aquilex WSI Nuclear Services
Chris Futrick
Tel: 678-728-9377
Fax: 770-209-0639
cfutrick@wsi.aquilex.com
www.weldingservices.com

AREVA NP
Donna Gaddy-Bowen
Tel: 434-832-3702
Fax: 434-832-3840
donna.gaddybowen@areva.com
www.areva.com

G.D. Barri & Associates, Inc.
Georgia Barri
Tel: 623-773-0410
Fax: 623-773-2924
georgia.barri@gdbarri.com
www.gdbarri.com

BCP Engineers & Consultants
Crystal Ramey
Tel: 504-361-4236 x320
Fax: 504-362-8601
cdr@bcpengineers.com
www.bcpengineers.com

Bechtel Nuclear Power
Alan Fiorente
Tel: 301-228-8364
afiorente@bechtel.com
www.bechtel.com

Burns & McDonnell
Jordan Dennis
Tel: 816-333-9400 x5172
jdennis@burnsmcd.com
www.burnsmcd.com/careers

Burns and Roe
Bill Gattoni
Tel: 201-986-4250
Fax: 201-986-4210
bgattoni@roe.com
www.roe.com

B&W Company
David Kaskie
Tel: 800-BABCOCK
djkaskie@babcock.com
www.babcock.com

Cameco Fuel Manufacturing Inc.
Doug Burton
Tel: 905-885-4537 x3300
Fax: 905-372-3748
doug_burton@cameco.com
www.cameco.com

CANBERRA
Tel: 800-243-3955
Fax: 203-235-1347
customersupport@canberra.com
www.canberra.com

Chemchek Instruments, Inc.
Barbara Miller-Collins
Tel: 509-943-5000
Fax: 509-946-3368
sales@chemchek.com
www.chemchek.com

Corys Thunder, Inc.
Jody Ryan
Tel: 912-729-1502
Fax: 912-729-1620
jody.ryan@corysthunder.com
www.corysthunder.com

CTR Technical Services, Inc.
Charles Rombough
Tel: 719-685-3805
ctr@ctr-tech.com
www.ctr-tech.com

Day & Zimmermann Power Services
David A. Bronczyk
Tel: 215-299-4924
Fax: 215-299-8395
david.bronczyk@dayzim.com
www.dayzim.com

DIVESCO, Inc.
Casey Westbrook
Tel: 601-932-1934
Fax: 601-932-5698
casey@divesco.com
www.divesco.com

Enterprise Informatics
Carole Lombard
Tel: 858-625-3000
info@enterpriseinformatics.com
www.ebfornuclear.com

Fluor Corporation
Brian Schmidt
Tel: 864-517-1653
brian.schmidt@fluor.com
www.fluor.com

GEI Consultants, Inc.
Robert Lambe, Ph.D., P.G.
Tel: 781-721-4142
Fax: 781-721-4073
rlambe@geiconsultants.com
www.geiconsultants.com

General Atomics Electronic Systems, Inc.
Phil Newman
Tel: 858-522-8352
Fax: 858-522-8318
phil.newman@ga-esi.com
www.ga-esi.com

Global Edge Institute
Tokyo Institute of Technology
Kanako Yagame
Tel: 81-3-5734-7627
Fax: 81-3-5734-3499
ge-apply@jim.titech.ac.jp
www.global-edge.titech.ac.jp

Herguth Laboratories, Inc.
Linda Perry
Tel: 800-645-5227
Fax: 707-554-0109
lperry@herguth.com
www.herguth.com

Hukari Technical Services, Inc.
Ken Hukari
Tel: 303-384-9079
ken@hukari.com
www.hukari.com

Hurst Technologies Corp.
Timothy Hurst
Tel: 979-849-5068
Fax: 979-849-6663
contact@hursttech.com
www.hursttech.com

ICEM'09/DECOM'09
Tel: 520-571-6047
Fax: 520-445-8011
info@icemconf.com
www.icemconf.com

ILD, Inc.
Jack Little
Tel: 225-769-2780
Fax: 225-769-2751
jack@ildpower.com
www.ildpower.com

Kinectrics
Cheryl Tasker-Shaw
Tel: 416-207-6000 x5970
cheryl.tasker-shaw@kinectrics.com
www.kinectrics.com

Lockheed Martin
John Pericci
Tel: 570-803-2623
Fax: 570-803-2204
john.pericci@lmco.com
www.lockheedmartin.com/mfc/nuclearsands

Ludlum Measurements, Inc.
Mick Truitt
Tel: 800-622-0828
Fax: 325-235-4672
mtruitt@ludlums.com
www.ludlums.com

Major Tool & Machine, Inc.
Joel Manship
Tel: 317-917-2619
Fax: 317-634-9420
sales@majortool.com
www.majortool.com

Mitsubishi Nuclear Energy Systems
Kengo Tatsukawa
Tel: 703-908-8043
Fax: 202-775-3988
kengo_tatsukawa@mnes-us.com
www.mnes-us.com

Morris Material Handling, Inc.
Julie Verhaalen
Tel: 414-764-8451
Fax: 414-764-8548
jverhaalen@morriscranes.com
www.morriscranes.com

Netzsch Instruments Inc.
Bob Fidler
Tel: 781-272-5353
Fax: 781-272-5225
bob.fidler@netzsch.com
www.e-thermal.com

Nexus Technical Services Corporation
Donald F. Mershon
Tel: 630-627-2277 x14
Fax: 630-627-2278
don.mershon@nexus-tech.com
www.nexus-tech.com

Northrop Grumman
Robert Malanik
Tel: 410-552-2635
robert.malanik@ngc.com
www.northropgrumman.com

NPTS, Inc.
Rebecca B. Broman
Tel: 716-876-8066
Fax: 716-876-8004
rbroman@eiteam.com
www.npts.net

Nuclear Logistics, Inc.
Craig S. Irish
Tel: 978-250-1684
Fax: 978-250-0245
cirish@nuclearlogistics.com
www.nuclearlogistics.com

Performance Improvement International
Kathy David
Tel: 760-722-0202
Fax: 760-722-0123
kdavid@piionline.com
www.piionline.com

Petersen Inc.
Rob Despain
Tel: 801-732-2027/ 801-721-0000
Fax: 801-732-2098
sales@peterseninc.com or
robd@peterseninc.com
www.peterseninc.com

PHOTONIS
Raquel Ortega
Tel: + 33 555 86 38 06
Fax: + 33 555 86 37 73
r.ortega@fr.photonis.com
www.photonis.com

RCS Corporation
Karen Garcia
Tel: 803-641-0100 x229
Fax: 803-641-7037
kgarcia@rcscorporation.com
www.rcscorporation.com

Rockwell Collins Rollmet
Michael J. Dosdourian
Tel: 949-221-5329
Fax: 949-221-5310
mjdosdou@rockwellcollins.com
www.rockwellcollins.com/rollmet

R.O.V. Technologies, Inc.
Jill Zachary/Jack Judge
Tel: 802-254-9353
Fax: 802-254-9354
mail@rovtech.com
www.rovtech.com

S.A. Robotics
Scott Adams
Tel: 970-663-1431 x144
info@sarobotics.com
www.sarobotics.com

The Shaw Group
Alan Latti
Tel: 856-482-3000
Fax: 856-482-4175
alan.latti@shawgrp.com
www.shawgrp.com

SOR Inc.
Michael Buckley
Tel: 913-888-2630
Fax: 913-888-8150
mbuckley@sorinc.com
www.sorinc.com

STP Nuclear Operating Company
Fax: 361-972-4753
employment@stpegs.com
www.stpegs.com

System One
Mark Fenske
Tel: 877-505-7971
Fax: 412-995-1901
inquiry@systemoneservices.com
www.systemoneservices.com

Tranter
Jody Stonecipher
Tel: 940-264-1034
Fax: 940-723-1131
jstone@tranter.com
www.tranter.com

Trentec
John Clark
Tel: 513-528-7900
Fax: 513-528-4537
trentec@curtisswright.com
www.trentec.com

Tri Tool Inc.
Tel: 916-288-6100
Fax: 916-288-6160
customerservice@tritool.com
www.tritool.com

TriVis, Inc.
Bernie Preisz
Tel: 205-621-0106
Fax: 205-621-1108
bernie_preisz@trivisinc.com
www.trivisinc.com

UniStar Nuclear Energy
Mary Klett
Tel: 410-470-4400
Fax: 410-470-5607
info@unistarnuclear.com
www.unistarnuclear.com

Urenco Enrichment Company Ltd.
Mark Elliott
Tel: + 44 (0) 1628486941
Fax: + 44 (0) 1628475867
enquiries@urenco.com
www.urenco.com

UT Nuclear Engineering
Lydia Salmon-Wright
Tel: 865-974-2525
Fax: 865-974-0668
utne@utk.edu
www.engr.utk.edu/nuclear

Valtimet Inc.
Wendy McGowan
Tel: 423-587-1888
Fax: 423-585-4215
us.contact@valtimet.com
www.valtimet.com

ValvTechnologies
Bill Henwood
Tel: 610-361-0431
Fax: 610-361-0432
sales@valv.com
www.valv.com

Waste Control Specialists LLC
Candance Greenwood
Tel: 888-789-2783
Fax: 575-394-3427
cgreenwood@wcstexas.com
www.wcstexas.com

WEC Welding and Machining LLC
Steve Mondrowski
Tel: 800-345-6108
Fax: 847-362-6441
mondrosa@westinghouse.com
www.wecwam.com

Westerman Nuclear
Matthew Dodds/Jim Christian
Tel: 740-569-4143/ 740-438-1013
Fax: 740-569-4111
mdodds@westermancompanies.com
jchristian@westermancompanies.com
www.westermancompanies.com

Westinghouse Electric Company LLC
Karen Fischetti
Tel: 412-374-3373
fisch1ks@westinghouse.com
www.westinghousenuclear.com

Wilh. Schulz GmbH
Stefan Zwickardt
Tel: + 49 2151 51 70
Fax: + 49 2151 517 101
mail@wschulz.com
www.wschulz.com

Zachry Nuclear Engineering, Inc.
Lisa Apicelli
Tel: 860-405-3054
Fax: 860-446-8292
apicellil@zhi.com
www.zhi.com

Continued from page 114


Voegtle

PHIL VOEGTLE has been named to the new position of director of architectural and engineering technical services at Merrick & Company. Voegtle has 11 years of experience with the firm, which specializes in engineering and architectural design, facility and equipment design-build, procurement, construction management, and geospatial services.

KIYOSHI YAMAUCHI, ANS member since 2006, has been named president and chief executive officer of Mitsubishi Nuclear Energy Systems. Yamauchi, who also serves as executive officer and deputy general manager of Mitsubishi Heavy Industries' Nuclear Energy Systems Headquarters, will head MNES's new Projects Management Division, which was established to coordinate the construction of new nuclear power plants in the United States. Yamauchi succeeds outgoing MNES President and CEO HIROSHI INOUE, who has been named president of Mitsubishi Nuclear Fuel Company.


Noonan

KIRK NOONAN, ANS member since 2005, has been named director of strategic development for nuclear at WorleyParsons. Noonan, most recently director of nuclear business development at MPR Associates and previously vice president of Constellation Nuclear Services, has nearly 30 years of experience in the nuclear industry.

Kudos

To TIM STRICKLAND, member of the Nuclear Materials Control and Accountability Group at USEC's Paducah Gaseous Diffusion Plant, who has received the first Lifetime Achievement Award from the Nuclear Materials Management and Safeguards System, a joint endeavor of the U.S. Department of Energy and the Nuclear Regulatory Commission. Strickland, who was recognized for his contributions to his department's years of sustained high performance and to the NMMSS system processes, is the first inductee into the newly formed NMMSS Hall of Fame. The award presentation took place in Denver, Colo., on May 20.


Strickland

Obituaries

RAMON L. ASHLEY, 80, ANS Fellow and member since 1957; received a bachelor's degree in physics from Tufts University in 1949; served as a research associate in health physics at Brookhaven National Laboratory; spent nearly 20 years at North American Aviation, where he served as a senior research engineer and research specialist; held various senior positions, including executive assistant to the vice president, during his 16 years at Bechtel Power Corporation; worked as a nuclear consultant with Management Analysis Company before becoming an independent nuclear consultant; briefly returned to Bechtel and also worked for BNFL Inc.; continued consulting after his retirement in 2001; died April 23.

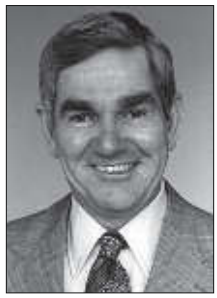

Ashley

ROBERT G. COCHRAN SR., 89, ANS Fellow and charter member; earned a bachelor's degree in physics and a master's degree in nuclear physics from Indiana University in 1948 and 1950, respectively, and a doctorate in nuclear physics from Pennsylvania State University in 1957; spent four years in the U.S. Navy; worked at Oak Ridge National Laboratory; served as associate professor of nuclear engineering and director of the research reactor at Pennsylvania State University; created the Department of Nuclear Engineering at Texas A&M University in 1959, where he spent 22 years as head of the department and helped build a research reactor; served as a consultant for several industrial, educational, and governmental organizations; co-wrote *The Nuclear Fuel Cycle: Analysis and Management;* retired in 1983; died May 2 in Bryan, Texas.


Cochran

HERBERT N. FINKELMAN, 60, ANS member since 1972; earned a bachelor's degree in nuclear engineering from Rensselaer Polytechnic Institute in 1970; worked at General Electric Company before holding various positions at Nuclear Installation Services Company and Nuclear Management Services; completed overseas assignments in Taiwan and the West Indies with Nuclear Power Services and Becon Construction Company; worked for HNF Construction Consulting before spending 10 years at Bechtel; died May 12.

JOHN H. GRAHAM, 88, ANS member since 1973; received a bachelor's degree in naval science from the University of North Carolina in 1946 and a master's degree in intellectual history from the University of Florida in 1970; served in the U.S. Navy for 12 years; was head of the Information Section at the North Atlantic Treaty Organization's Antisubmarine Warfare Research Center in La Spezia, Italy; joined the ANS staff in 1965, where he served as manager of publications and editor of *Nuclear News* until 1969; became generations editor of *Electrical World* magazine at McGraw-Hill Publications; returned to ANS in 1977 to serve as Washington editor of *Nuclear News* and as ANS Washington representative until his retirement in 1990; died June 6.


Graham

RAYMOND E. ISAACSON, 81, ANS member since 1961; received a bachelor's degree in chemical engineering from the University of Washington in 1951; held various positions at General Electric Company, Atlantic Richfield Hanford Company, and Rockwell Hanford Operations; served as a state legislator for the 8th District of Washington for 9 years and as commissioner of Benton County, Wash., for 10 years; retired in 1986; died May 4 in Kennewick, Wash.

THOMAS GILL MILLER, 80, ANS member since 1999; received a bachelor's degree in physics from Berry College in 1950, a master's degree in physics from Emory University in 1951, and a doctorate in nuclear physics from North Carolina State University in 1965; worked for Westinghouse Electric Corporation before spending more than 20 years at the U.S. Army Missile Command at the Redstone Arsenal, where he served as supervisor of the Radiation Physics Laboratory; worked for General Research Corporation prior to founding Tensor Technology; died April 6, 2008.

EUGENE A. PLASSMANN, 87, ANS member since 1978; earned a bachelor's degree in physics, math, and chemistry from Hastings College in 1949, and a master's degree and doctorate in experimental physics from Indiana University in 1954; served in the U.S. military during World War II; worked at Los Alamos National Laboratory for 35 years, mostly in the Critical Assembly–Weapons Neutronics Group; died April 3 in Los Alamos, N.M.

RICHARD B. SHUMAKER, 85, ANS member since 1973; earned a bachelor's degree in mechanical engineering from Purdue University in 1945; worked for General Motors Corporation and Atomic Power Development Associates before spending 26 years at Cleveland Electric Illuminating Company, serving at various nuclear power plants, including Perry and Davis Besse; was head of electric utilities for Logansport Municipal Utilities prior to working for the Physical Plant at Indiana University; retired in 1990; died May 24.

JAMES R. "BOB" TOMONTO, 77, ANS Fellow and member since 1960; earned a bachelor's degree in physics from Villanova University in 1954 and a master's degree in physics from Rensselaer Polytechnic Institute in 1959; served in the U.S. Navy for three years; worked at Alco Products Inc. briefly before serving in various positions at Knolls Atomic Power Laboratory; held senior positions at United Nuclear Corporation and Gulf United Nuclear Fuels Corporation; worked for Florida Power & Light Company for nearly 15 years, serving as manager of nuclear analysis and senior consultant; retired in 1989; died May 7.


Tomonto

AKIHIKO "AKI" YOKOSAWA, 81; graduated from Tohoku University in Sendai, Japan, and earned a doctorate in physics from Ohio State University; joined the faculty of Illinois State University in 1954; worked as a high-energy nuclear physicist at Argonne National Laboratory from 1959 until his retirement in 2001; died May 25 in Naperville, Ill.

HERBERT F. YORK, 87; received bachelor's and master's degrees in physics from the University of Rochester in 1942 and a doctorate from the University of California at Berkeley in 1949; joined the University of California Radiation Laboratory at Berkeley before joining the Manhattan Project; served as director of Lawrence Livermore Laboratory for six years; was an advisor to six U.S. presidents and was appointed by President Dwight D. Eisenhower as the first director of Defense Research and Engineering in 1958; in 1961, became founding chancellor of the University of California at San Diego, where he also served as professor and chair of the Physics Department; served as chief negotiator for the 1979–1981 Comprehensive Test Ban negotiations in Geneva, Switzerland; founded the UC Institute on Global Conflict and Cooperation in 1983; wrote several books, including *The Race to Oblivion* and *Arms and the Physicist;* died May 19 in San Diego, Calif. NN

Equipment & Services

For your convenience, the phone number of a contact and the Web address for each company are listed.

Gamma-ray spectrometer

The ORTEC business unit of AMETEK Advanced Measurement Technology (a division of AMETEK, Inc.) has introduced its transSPEC DX-100 hand-held gamma-ray spectrometer. It has a high-purity germanium detector with a relative efficiency of greater than 40 percent and features enhanced display, communications, data storage, and analysis capabilities. The spectrometer enables the user to perform quantitative gamma spectroscopy assays in the field and is suitable for a variety of *in situ* applications. It can be operated through wireless communications and its data can be stored on a removable Secure Digital Input/Output card. Applications include nuclear materials hold-up, nuclear safeguards inspection, emergency response, and reactor maintenance.

ORTEC Products Group • 800/251-9750 • www.ortec-online.com

Hazardous area camera head

R. Brooks Associates, Inc. has added the portable, lightweight ICH-4 integrated camera head to its line of specialty video cameras for remote monitoring of hazardous areas. The ICH-4's 360-degree pan and tilt capabilities, along with its extended zoom capabilities, enable complete area monitoring of high-radiation, toxic, or otherwise hazardous areas from a distance, minimizing danger to personnel. It can easily maneuver between remote monitoring locations and can be adapted to any mounting situation. The camera can operate in 32 °F to 122 °F (0 °C to 50 °C) and features a 70-watt efficient LED array package designed to last the life of the camera. The ICH-4 is compatible with all Brooks legacy cameras and six different industry protocols, including Pelco and Vicon.

R. Brooks Associates • 800/836-0285 • www.rbrooks.com

Reactor program

R.O.V. Technologies, Inc. has introduced its Boiling Water Reactor and Pressurized Water Reactor Outage Equipment and Services Program. All equipment and services offered in this program are presented in menu format—online or in print—which enables the user to choose only the services required. Menu items include the required equipment and trained technicians to perform the work at the client's plant. This program helps utilities accomplish both outage critical path time reduction and ALARA goal compliance. Outage service menu items for both BWRs and PWRs include reactor disassembly and reassembly surveillance systems, spent fuel pool inventory and under-rack cleaning, and turbine/balance-of-plant piping closeout inspections. Other BWR menu items include core alteration surveillance systems, inspection of main steam and feedwater piping internals and reactor head, and cavity/drywell/torus inspections and cleaning. Other PWR menu items include reactor head lift surveillance, inspection and cleaning of both reactor vessels and cavities, four-sided fuel

inspection camera systems, and refueling core verification.
R.O.V. Technologies, Inc. • 802/254-9353 • www.rovtech.com

Drive system

Morris Material Handling has introduced its compact Smartorque Adjustable Frequency Control, an energy-saving and self-regulating drive system for overhead material handling equipment. Its AC drive technology and self-monitoring systems mitigate the chances of accidents while lifting, transporting, and spotting loads. Programmable software features include adjustable acceleration and deceleration, which allow for the fine-tuning of crane performance for specific plant operations. A built-in diagnostics system displays faults for quick troubleshooting, minimized downtime, and safe multi-hoist load handling. The system is suitable for most overhead lifting equipment applications, including modernizing aging cranes, updating cranes to suit changing environments, and retrofitting existing AC- and DC-powered cranes.

Morris Material Handling • 800/933-3001 • www.morriscranes.com

Pressure flow meter

Spirax Sarco, Inc. has made available its Gilflo Models B and ILVA variable pressure flow meters for accurate measurement of most industrial fluids, gases, and both saturated and superheated steam. The Gilflo B flow meter is a differential pressure flow meter, and the Gilflo ILVA is a spring-loaded variable-area, variable-differential, pressure-type flow meter. Both offer a 100:1 turndown with an accuracy of ±1 percent of rate and repeatability better than 0.25 percent of rate. The units also offer easy installation, with wafer designs, and require six pipe diameters upstream and three downstream.

Spirax Sarco, Inc. • 803/714-2000 • www.spiraxsarco.com

Video probe

GE Sensing & Inspection Technologies has released its XL Vu VideoProbe, a portable unit designed for basic inspection in hard-to-access areas. Features include its intuitive, easy-to-use controls and servo motor All-Way Probe articulation. It includes standard AC corded or upgraded battery-powered options, a custom shipping and storage case, a 1-GB internal flash memory, a USB 2.0 port, VGA video out, and full tip optic interchangeability with secure double threads. The XL Vu has applications in many industries, including oil and gas, power, automotive, security, and aerospace.

GE Sensing & Inspection Technologies • 866/243-2638 • www.gesensinginspection.com

Backscatter

MINKLER

Fifty years of nuclear journalism, and other stuff

As you've no doubt noticed from this issue's cover, *Nuclear News* is 50 years old.

Fifty years is a long time. Or not, depending on your perspective. When I was a young graduate student in 1959, 1909 seemed ages ago. But now, in 2009, 1959 seems like yesterday. Almost.

In terms of technological progress, 50 years *is* a long time. In 1909 we had Model T Fords. By 1959 we had yacht-sized cars with giant tail fins. In 1959 we also got the Barbie doll. In 2009 we have microprocessor-controlled robotic dogs, including one with a built-in cyberflea.

Elsewhere in this issue the editors have put together a 50-year history of *Nuclear News.* I know it'll be exciting and well-written, as befits one of America's great magazines. But here on the back page, I want to tell you some history that the editors aren't going to mention because it may be apocryphal.

Nuclear News has always been included with ANS membership. Members don't have to buy a separate subscription. But the founding fathers and mothers decided early on to generate a wider audience—and some revenue—by selling *NN* on newsstands.

In the early years when nuclear power was new, the issues of *NN* were slim and the magazine was not well known. It was sold in supermarket checkout lines alongside the *National Enquirer,* the *National Examiner,* the *Star,* and Juicy Fruit gum. In Canada, *NN* appeared next to the *Hush Free Press,* Necco Wafers, and Caramilk bars.

To get folks to choose *NN* over the other journals, we printed provocative photos and headlines like theirs. If the *National Enquirer*'s headline screamed "Woman Gives Birth to Two-headed Giraffe," with an accompanying photo that folks were supposed to believe was real, *NN*'s banner would shout "Neutron Sex Scandal at Local Power Plant," with a blurry photo of some bare fuel rods bathing in coolant.

The article would explain that neutrons are supposed to mate with uranium-235 nuclei. That's nature's plan to make the reactor work. But, it said, engineers at our local power plant discovered some neutrons mating on the side with zirconium, hafnium, and boron nuclei, thus violating the neutronics moral code. For shame!

In fine print at the end, the article explained that extracurricular dalliances are actually normal and necessary for reactor operation. Neutrons have no moral code, no conscience. They are opportunists who just mate with whatever's in their path. Reactor designers count on that.

But most readers didn't get that far. The important thing was that the headline and photo made our magazine fly off the shelves, and *NN* regularly outsold its sensation-mongering competitors.

As the nuclear industry matured and the *NN* issues got thicker, with more advertising and more news to report, the magazine grew in dignity and readership and moved from the checkout line to the regular magazine shelves, sharing space with *Popular Mechanics, Road & Track, Vogue,* and *Mad.*

Our beautiful, clear cover photos of nuclear plants, components, and dignitaries vied successfully with *Road & Track*'s latest from Porsche, *Vogue*'s haute-priced haute couture, and *Mad*'s grinning Alfred E. Neuman.

Our next move was into those bastions of intelligence and erudition, the book store coffee shops, with tables and arm chairs for reading quietly or discussing Proust while eating oversized pastries with a fork and drinking overpriced coffee while looking literary and learned.

Now *NN* can be found in the most intellectual of coffee shops next to the *Atlantic Monthly, Science,* the *New Republic,* and the *Journal of Molecular Paleontology.* Folks can purchase an issue of *Nuclear News* and read about nuclear engineering and politics in library-type quiet while sipping $6 iced cappuccinos.

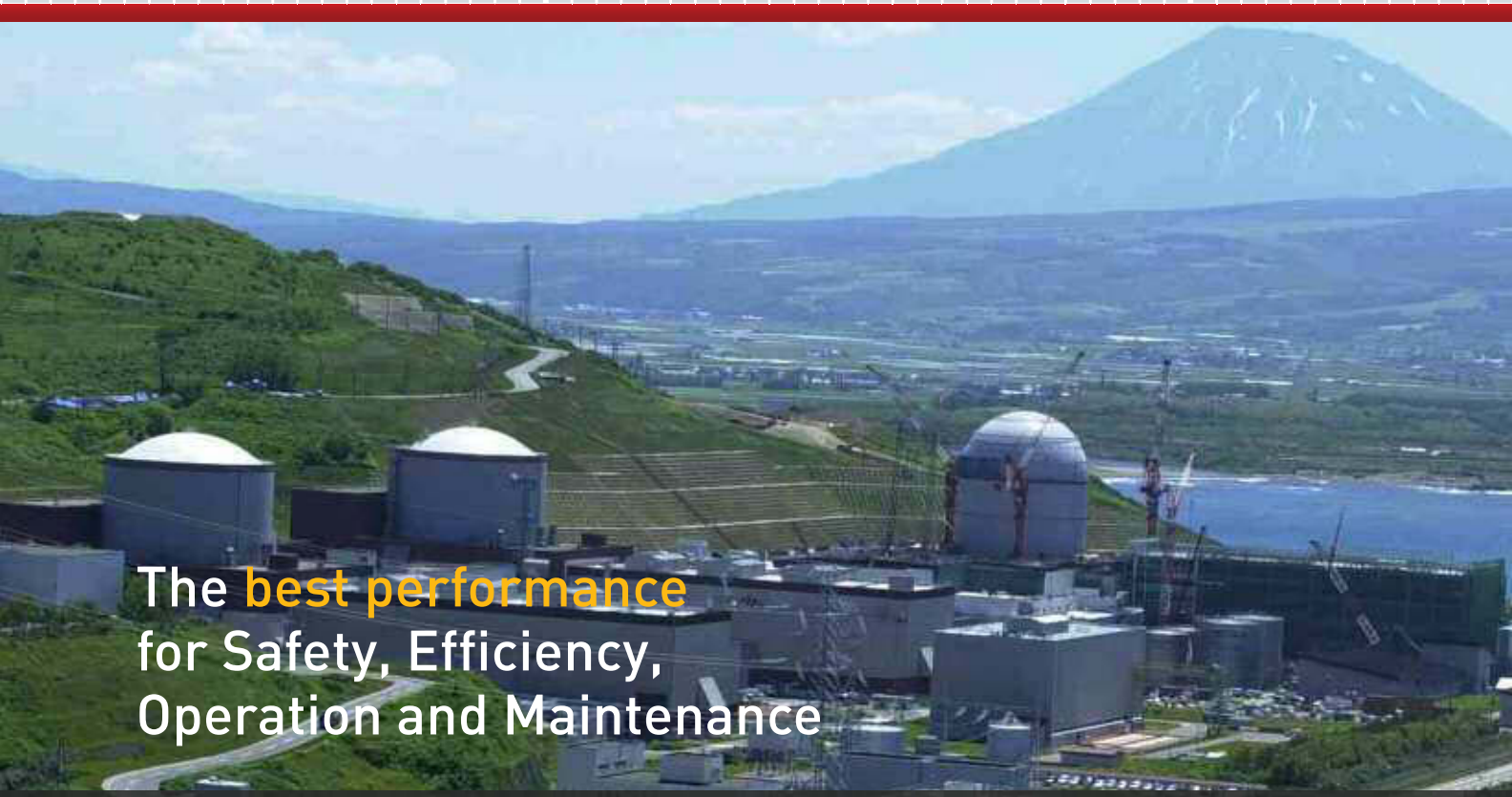
The thing is, you probably won't actually find *NN* on the magazine rack, because the publication sells out the moment it hits the stands. People line up around the block for it, and police have to break up fights.

The best way to get your copy is to join the American Nuclear Society and receive it with your membership dues, in the time-honored tradition of 50 years, the last 40 of which I've been privileged to write this column.

Happy 50th, *Nuclear News.* And here's a toast of Old Rottslager to 50 more.—*Bill Minkler*

MNES
Mitsubishi Nuclear Energy Systems

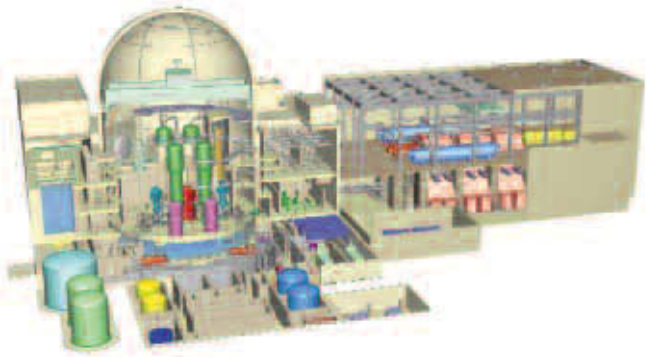
YOUR ENERGY. OUR EXPERIENCE.



The best performance for Safety, Efficiency, Operation and Maintenance

The final phase of testing has begun at the Tomari-3 nuclear plant built by Mitsubishi Heavy Industries, Ltd., for the Hokkaido Electric Power Company near Sapporo, Japan. The plant is the first to use Mitsubishi's state-of-the-art full digital instrumentation and control system. Tomari-3 is also the first newly-built plant to use Mitsubishi's new-generation turbine generators with 54-inch blades to boost the efficiency of the turbine system. Mitsubishi started construction of the Tomari-3 unit in November 2003, and testing of the completed 912-megawatt plant began in January 2009. Commercial operation is scheduled to begin in December 2009. Tomari-3 is the 24th nuclear power plant built by Mitsubishi in Japan.

The U.S. Advanced Pressurized Water Reactor (US-APWR)



- At 1,700 MW, the highest output in the industry
- Capital costs per megawatt lowest of all reactors
- Thermal efficiency rated at 39%
- Small footprint reduces cost of steel & concrete
- Modular construction reduces on-site labor costs

MITSUBISHI NUCLEAR ENERGY SYSTEMS, INC.
MITSUBISHI HEAVY INDUSTRIES, LTD.
Mitsubishi Corporation

www.MNES-US.com (202) 775-3933

Centrifugal Chillers

The Only Purpose Built Safety Related Chillers for the Nuclear Power Industry

Trentec has over 20 years of nuclear power experience designing and manufacturing application-specific solutions for plants worldwide. Our high performance, energy saving and low operating cost safety-related solutions are manufactured under ASME Section III, Section VIII and 10 CFR 50 Appendix B Quality Assurance programs. Trentec's HVAC partner, LS Mtron, has delivered more than 50 safety-qualified chillers worldwide with an installed base of greater than 10,000 systems.

Features include:

- Rugged, Reliable Nuclear Design
- Value Matched to Your Requirements
- Service and Spare Parts, 24/7
- Safety-Related Control System
- Wide Standard Range of Capacity (200 Ton to 4000 Ton)
- R-134a Refrigerant
- Refrigerant Cooled Oil Cooler
- Advanced PID Controls
- Network Capable, Integrated Control System with Diagnostic and Remote Monitoring
- Designed to Match Current Footprint, Volumetric and Inlet/Outlet Locations

CURTISS WRIGHT Flow Control Company

Trentec

Trentec, a business unit of Curtiss-Wright Flow Control Company
4600 East Tech Drive, Cincinnati, OH 45245
513.528.7900 · www.trentec.com