The Vendor Technology expo fills not only the exhibit space . . .

UTILITY WORKING CONFERENCE

Areas of interest expand as attendance continues to grow

A meeting once devoted exclusively to the immediate concerns of power reactor operation has been broadened to include topics such as social media and Generation IV reactors.

To paraphrase an advertising slogan for a now-defunct line of automobiles: This was not your father's Utility Working Conference (UWC). The meeting established by the ANS Operations and Power Division to address issues of immediate concern to power reactor licensees, and to allow for the sharing of experiences potentially applicable to several plants or systems, included in its 17th annual iteration (held August 8–11) sessions on the uses of social media, succession planning, and Generation IV reactor concepts. As it has been before, the meeting took place at the Amelia Island Plantation, a resort on the Atlantic coast, north of Jacksonville, Fla.

While the official theme of the meeting was "People Achieving Excellence," the undercurrent of the event, like those of the past five years or so, was the perceived growth prospects for the nuclear industry, as evidenced by the growth of the vendor technology expo held in conjunction with the meeting. Until recently, all of the meeting's events took place under one roof, in the resort's conference center. Because more and more exhibitors have clamored to participate, the expo now fills the exhibit space, the foyer outside the space, and the area around the main entrance. More than 70 exhibitors staffed more than 80 booths. Of the 600 preregistered attendees, 147 were utility employees, and so, in effect, there were about two utility people for every exhibiting vendor.

Last year, with the number of attendees grown beyond the conference center's ability to seat everyone in a single room, the opening plenary session was moved to a large, air-conditioned tent about a quarter of a mile's walk along wildlife trails leading from the conference center. This year, four general sessions and an evening social event were held in the tent. The breakout sessions under various special focus areas (such as knowledge management and regulatory relations) were held in the conference center, resulting in a fair amount of traffic on the wildlife trails.

Some degree of thematic change has been under way for about five years. As various organizations began preparing applications for combined construction and operating licenses for new power reactors, topics related to this work began turning up in UWC sessions. Strictly speaking, a utility working conference should be about the work being done by the utilities, and COL applications had certainly become the work of some utilities. It just wasn't the kind of work previously discussed at this meeting—the how-to-improve-motor-operated-valve-performance kind. Several of this year's breakout sessions, however, did delve into the traditional topics of interest to plant personnel. Two of those sessions, on maintenance productivity and preventive maintenance/backlog management, are reported on in greater detail in the Special Section on Nuclear Power Plant Maintenance (see pages 48 and 58 of this issue).

The case for nuclear expansion

At the opening plenary session, Michael

Howard, president and chief executive officer of the Electric Power Research Institute, presented a view of a "full portfolio" for a low-carbon energy future. The projections were developed from EPRI's PRISM/MERGE software. He said that if every option for shifting away from combustion-based electricity were pursued fully, carbon dioxide emissions could be reduced by 41 percent. Nuclear power could provide 28 percent of the nation's electricity in 2050, under the full portfolio.

The full portfolio, Howard said, is the lowest-cost solution to "decarbonize" the economy. Along with boosting low- or no-carbon supplies, aggressive efficiency efforts would be undertaken, with a goal of demand reduction—and preferably not "demand destruction," with the cost of electricity rising so high that the economy and standard of living would decline. Even with the full portfolio, Howard said, the cost of energy in 2050 would be about 80 percent higher than the baseline in 2007. With a "limited portfolio," however, the cost in 2050 would be more than three times what it was in 2007.

In the limited portfolio, about a third of the electricity in 2050 would be generated by natural gas. Wind and biomass each would provide just under a quarter, nuclear would contribute less than one-tenth—a smaller share than either hydroelectricity or solar—and coal-fired generation would end around 2030.

In the full portfolio, nuclear power's 28 percent would be exceeded only by coal, which would be converted entirely to carbon capture and sequestration and would provide nearly half of the generation. Wind would have a slightly smaller share than in the limited portfolio, hydro would remain the same, gas and biomass would each be well below 10 percent, and solar would make no noticeable contribution.

During the question-and-answer period, Howard was asked why solar was left out of the full portfolio. He said that in the studies carried out thus far, solar can be a factor only when the price of electricity is high, as it would be in the limited portfolio. He added, however, than in the "2.0" version of the projections that is now being worked out, recent reductions in solar costs are being incorporated, and a small amount of solar electricity will appear in the full portfolio.

The other speaker was Marvin Fertel, president and CEO of the Nuclear Energy Institute. In making the case for more nuclear power, he went beyond Howard both geographically (looking at the entire world, not just the United States) and functionally (seeing nuclear energy being used not just for electricity production but also for desalination, process heat, space exploration, and other applications).

Fertel

The global perspective showed the opportunity for nuclear energy. Fertel noted that 1.6 billion people—roughly one-fourth of the world's population—do not have access to electricity. Not only will those without electricity seek to obtain it, but expected population growth—from 6.4 billion today to 9.2 billion in 2050, with urban centers growing from 3.2 billion to 6.4 billion—will keep demand rising.

Fertel cited the Obama administration's actions in support of the expansion of nuclear energy, including loan guarantees for new power reactors, clean energy tax credits for nuclear component manufacturers, and backing for more liberal nuclear financing under protocols of the Organization for Economic Cooperation and Development. He noted the administration's decision to cancel the high-level waste repository at Yucca Mountain, but stated that the storage of spent fuel at reactor sites is safe and secure, and that issues related to spent fuel should not impede existing plant operation or new plant development.

While maintaining that the long-term fundamentals have not changed for nuclear power, Fertel said that the near-term fundamentals are negative. He said that electricity demand has decreased during the current recession, which began in 2008, and is not expected to return to pre-recession levels until roughly 2012. Also, most regional power markets will be oversupplied for at least five years, and natural gas prices are expected to remain at their current, relatively low, level in the near term. NEI continues to hold to its projection for new reactors that it has maintained for about five years: Fertel said he expects four to eight new reactors to begin commercial operation in the 2016–2018 time frame.

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. . . but also fills the foyer outside the exhibit space . . .

. . . and extends to the building's main entrance.

General sessions

In the general session on social media, Scott Peterson, NEI's vice president for communications, summarized the organization's use of Internet-based media over the past five years. NEI has posted about 125 videos on YouTube, has three Twitter feeds (one of which spread the word about New York City's support for a renewed water use permit for the Indian Point plant), and has a high-traffic blog, "NEI Nuclear Notes." As for companies within the industry, however, Peterson said that the use of social media has thus far been sparse. He also noted that just being involved in these media is not enough to gain public support. British Petroleum is connected to new media in various ways, but this did not prevent vast damage to the company's image in the wake of the Deepwater Horizon oil spill. It's "a lack of credibility" that has hindered BP, regardless of the medium, according to Peterson.

At the session on reactor operation after license renewal, Bill Borchardt, the Nuclear Regulatory Commission's executive director for operations, said that current performance suggests that the prospects for "life after 40" are better now than ever before. Over the industry as a whole, there are no declining trends, performance indicators are better now than they were 10 to 15 years ago, and scrams are relatively scarce. (The all-time low for one year, 65, came in 2005; there has been a modest increase since then, with 75 in 2009.) Nonetheless, he saw issues that will have to be addressed to ensure continued safe, productive operation in a reactor's fifth and sixth decades: buried piping (with 10 leaks reported since 2005), conversion to National Fire Protection Association (NFPA) Standard 805, adherence to amended security regulations (about 40 exemptions have been granted so far), and the aggregate impact of different rulemaking initiatives. In particular, he said, licensees will have to be alert to the aging of cable insulation and to long-term exposure of concrete.


Borchardt

The term "succession planning" usually refers to the grooming of people to move into top executive positions, but at the general session on this topic, the term was used in the context of replacing nuclear workers and professionals at all levels and specialties. The efforts of the Institute of Nuclear Power Operations to bring new people into the industry and help them understand its unique demands was summarized by Ann Winters, INPO's senior project manager for industry leadership development. She said that the Nuclear Uniform Curriculum Program for the training of technicians produced its first results in May, with 14 radiation protection technicians graduating from the program backed by the Tennessee Valley Authority at Chattanooga State Technical Community College, and four instrumentation and controls technicians graduating from the PSEG-backed program at Salem Community College in New Jersey.

Daniel Ingersoll, senior program manager for technology programs at Oak Ridge National Laboratory, spoke on Generation IV reactors and the long-range prospect for nuclear power in general. He listed, among other things, the research and development needs for facilities envisioned well into the future: for small reactors—sensors and instrumentation, diagnostics/prognostics, control systems, long-lived fuels and materials, and enhanced security and safeguards; for reactors that would augment the fuel cycle—driver and transmutation fuels, advanced materials, high-efficiency compact heat exchangers and supercritical carbon dioxide power conversion, and high-fidelity design and safety analysis simulation tools; for fuel recycle—advanced electrochemical and aqueous reprocessing methods, transmutation fuel and target fabrication, high-burnup fuel, and advanced safeguards technology and methods.

Breakout sessions

The Regulatory Relations track included a panel discussion on the leakage of tritiated water and degradation of buried piping. Bob Hardies, a senior-level advisor for materials engineering in the NRC's Division of Component Integrity, said that at the prompting of Chairman Gregory Jaczko, the NRC staff has studied the issue and has concluded that there is no immediate safety concern. It was noted that most pipe degradation observed thus far has been pitting, which is not seen as a structural flaw.

Nonetheless, the panel moderator—Jack Grobe, deputy director for engineering and corporate support in the NRC's Office of Nuclear Reactor Regulation—stated that anything potentially leading to the leakage of radioactive material into groundwater is a hot-button issue for the public, evoking a response different from other potential mishaps at a nuclear plant. He went so far as to call the situation arising from tritium leaks, even when they are completely contained on plant property, a "public confidence crisis."

Bo Clark, program manager for plant support engineering and balance-of-plant corrosion at EPRI, discussed his work in 2006 that showed that cathodic protection can prevent buried-pipe degradation. Cathodic protection techniques, in effect, block cor-

rosion by drawing off the electric current arising from the corrosion environment to a metal anode more electrically active than the substance of the buried pipe or tank.

Because tritium is an isotope of hydrogen, it can travel wherever water can, but although it may be the radioisotope most likely to migrate through a leak, it is not the only one. It was noted during the discussion that carbon-14 could also be a cause for concern, and that its half-life is much longer than tritium's (5730 years and 12.3 years, respectively). NEI has asked EPRI to look into ways to mitigate C-14 leakage.

Grobe also moderated a panel on fire protection regulatory guidance. Donnie Harrison, chief of the probabilistic risk assessment licensing branch of the NRC's Division of Risk Assessment, said that Regulatory Guide 1.205, which is intended to help a licensee make the transition to the use of NFPA 805, has been revised, based on experience with the license amendment applications for Progress Energy's Harris (approved by the NRC in July) and Duke Energy's Oconee (expected to be approved around the end of this year). The original version, Harrison said, did not clearly show applicants what was expected of them.

Joe Donahue, Progress Energy's vice president for nuclear oversight, talked about his experience leading the utility's effort for the Harris amendment. He said that Progress will change the rest of its fleet to the risk-informed NFPA 805 as well, but he noted that anyone can comply fully with the original, prescriptive regulations in 10 CFR Part 50 Appendix R if the plant's layout allows for the proper separation of cable trays. As it happens, NFPA 805 allows Progress to retain much of its installed fire barrier material—approved at one time, but later found by the NRC not to meet its advertised capability—by installing additional equipment to provide sufficient overall fire protection.

Alex Klein, chief of the fire protection branch in the NRC's Division of Risk Assessment, said that the agency is ready for an expected rush of NFPA 805 license amendments, certainly by early next year and perhaps before the Oconee amendments are issued. Also, Entergy may submit an amendment for Palisades in December. In some cases there may be some urgency, and both NRC and industry representatives made the point that some plants are technically out of compliance with any fire protection regulation. The NRC, however, is extending enforcement discretion until the Oconee amendments are approved, as long as the licensee has compensatory measures, such as fire watches, in place. This will allow licensees to observe whether the amendment process works before committing to NFPA 805 or full Appendix R compliance.—*E. Michael Blake* NN