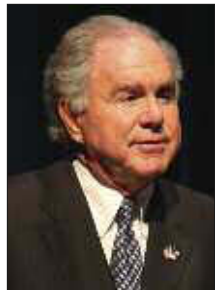


ANS WINTER MEETING

Biggest crowd in 30 years celebrates “Nuclear Progress!”

OPENING THE AMERICAN Nuclear Society’s 2010 Winter Meeting, ANS President Joe Colvin said that it is an exciting time for the nuclear industry and for the society as well, as reflected by the more than 2000 people registered for the meeting, the theme of which



Colvin

was “Nuclear Progress!” Colvin said that these days, progress can be seen in daily newspapers and on television news, not only in the United States but around the world. Looking at progress on the power reactor side, he said, 61 units are currently under construction and another 157 have been ordered. In the United States, four units are in the preliminary phases of construction.

Furthermore, he added, progress is being made not only in the nuclear power field, but also in other areas of nuclear technology, such as those covered in the three embedded topical meetings: fusion technology, isotopes for medicine and industry, and nuclear plant instrumentation, control, and human-machine interface technologies. These topicals, Colvin said, also reflect the meeting’s theme by “showing the breadth of the work we are doing . . . bringing the advantages of what we do to the public at large across the world.”

He then turned the meeting over to the general chair, Alvin Trivelpiece, director emeritus of Oak Ridge National Laboratory, who introduced the mayor of Las Vegas, Oscar Goodman. The mayor’s description of Las Vegas was of a tale of two cities. Besides being the welcoming city of tourism and gaming, he said, it is also a city of 2 million people who are yearning to attain the status of a world-class city. Referring then to the embedded topical on nuclear medicine, he urged delegates to take a trip downtown to see the new facility housing the Lou Ruvo Brain Institute, where research is being conducted into neurodegenerative diseases. Its early success has led to discussions on expanding medical activities in the city, which, Goodman said, could mean the diversification of Las Vegas’s

Meeting session coverage:

- ◆ *The effort for European nuclear energy policy*
- ◆ *Uranium supply and responsible mining*
- ◆ *U.S. policy after Yucca Mountain*
- ◆ *Small modular reactors and energy parks*

economy into “medical tourism.” And so, he said, “we may run into each other again.”

Dave Rossin, an ANS past president (1992–1993), then took to the podium to



Rossin

give a eulogy for another ANS past president, E. Gail de Planque, who died in September. Rossin called her one of the most unforgettable people he has ever known, referring to her intellect, dedication, persistence, and integrity, as well as her rare combination of charm and professionalism. He noted that de Planque’s research on the application of thermoluminescent dosimetry had made her internationally known, and he referred the session attendees to the July 1988 issue of *Nuclear News*, which contains the profile article marking the beginning of her ANS presidency, to note her many accomplishments. During her presidency, Rossin said, ANS’s International Committee gained stature and the society’s international relationships grew stronger. She set the standard for international initiatives for every ANS president to follow, he said. “Yes, she was a challenge to work with, and also a pleasure to work with,” he added.

Returning to the theme of the meeting, Trivelpiece noted that when the “Nuclear Progress” theme was suggested, how that theme should be presented was also considered. One aspect of nuclear progress,

Trivelpiece said, is that it is truly international, engaging many nations that are undertaking many different activities. The decision was made, therefore, that the opening plenary session would be international, and nuclear leaders from several countries were invited to describe the nuclear progress they are achieving.

The Russian perspective

Trivelpiece noted that he met Evgeny P. Velikhov, president of the Russian Research



Velikhov

Center Kurchatov Institute, in 1963 at a nuclear energy conference in Salzburg, and that they have been involved in various activities together ever since. Velikhov’s presentation included highlights of a study that was initiated at the July 2009 summit of Russian President Dmitry Medvedev and U.S. President Barack Obama. The report, *Promoting Safe, Secure, and Peaceful Growth of Nuclear Energy: Next Steps for Russia and the United States*, is a joint project of the Harvard Kennedy School’s Belfer Center and the Kurchatov Institute and is intended to provide recommendations as to how the two countries can achieve common goals.

Meeting the challenges of energy supply, environmental concerns, and security simultaneously will be one of the most difficult problems facing humankind in this cen-

ture, Velikhov said. According to the report, he noted, achieving a common vision will require building a new global framework for managing nuclear energy, including new and strengthened institutions that can effectively accomplish agreed upon safety, security, and nonproliferation goals while respecting the sovereignty and national interests of each country.

Russia and the United States should seek to be world leaders in nuclear safety, he said, establishing a culture and policy of continual improvement and focusing attention on reducing the most significant remaining risks. The two countries should also help other countries do likewise, particularly those preparing to launch nuclear power programs, he added.

Both countries also have a special responsibility in securing stockpiles of high-enriched uranium and separated plutonium, Velikhov said, and by working together, they have already made dramatic improvements. They should also work with other leading nuclear states to forge effective global standards for nuclear security, he noted, building on international instruments already in place. He also said that Russia and the United States should lead a sustained global effort to strengthen nuclear safeguards, take additional steps to stop black-market networks, and stem the spread of enrichment and reprocessing.

Velikhov also pointed out that Russia and the United States have a vital national interest in strengthening the International Atomic Energy Agency and in ensuring that it has the authority, resources, personnel, and technology needed to do its job. New institutional arrangements such as Russia's International Uranium Enrichment Center at Angarsk and the IAEA fuel bank can play an important role (see Fuel section, p. 86, for news on these initiatives). The central idea of the Russian initiative, he said, is the creation of a series of international centers,

of its original holders.

Regarding the secure expansion of nuclear technology, Velikhov stressed the advantages of small, factory-built reactors with their high levels of inherent safety and security, strong proliferation resistance, and low operating staff requirements. He said that these might potentially be marketed by an international consortium that could provide "cradle-to-grave" nuclear services, offering fully fueled reactors that would be taken away when their operating lifetimes are over, along with their spent fuel. Producing power stations on a production line is not fantasy, he said, noting that Russia will soon finish an oil platform that is completely built inside a factory environment and will be towed to its position in the Barents Sea. He said that it is bigger than a nuclear power station. "We need only to organize [the design] for nuclear power," he said.

European energy policy

Jean-Pol Poncelet, senior vice president for sustainable development and continuous improvement at Areva, described recent developments in European energy policy. While there is substantial agreement that nuclear energy can significantly contribute to the goal of more sustainable, less carbon-intensive, and secure electricity production, it faces many political hurdles. In the minds of many European Union citizens, he said, nuclear is not a very successful technology. At best, a fair majority would support nuclear energy if the waste issue were "fixed." He noted that although he is not sure what the public really means by this, the back end of the fuel cycle is still



Poncelet

considered by many as a major drawback. He said that one of the biggest antinuclear demonstrations ever seen in Europe was about to take place (on November 9) along the rail track leading to Gorleben, in Germany, where a shipment of vitrified high-level waste was expected to arrive from France. "It is as if we were back in

the late 1970s," he said.

Nuclear power still divides EU member states, Poncelet said. This can be seen in the decision made by EU leaders in March 2007 endorsing a set of binding energy pol-

Nonproliferation policy

A panel discussion, "Current Efforts Toward Sustainable Nonproliferation Policy," was held on Monday afternoon. The panelists were the authors of the articles in the Special Section on Nonproliferation that began on page 55 of the November 2010 issue of *Nuclear News*, and so, because they addressed the topics covered in these articles, we refer the reader to the November issue for details.

icy targets, but avoiding any explicit reference to nuclear power. Aware of the ambiguity of the energy policy that they designed, EU leaders created the European Nuclear Energy Forum (ENEF) to provide an open dialog among industry, the public, policymakers, and other stakeholders on the opportunities and risks of nuclear energy. In the politicians' minds, he said, having a third party addressing nuclear issues under their umbrella could be an effective way of putting nuclear back on the agenda and moving it forward. As a cochair of ENEF, Poncelet laid out some conclusions of an ENEF study on the competitiveness of nuclear power in Europe that was undertaken through an open multistakeholder process.

ENEF, he explained, was created to develop a roadmap for the "responsible use of nuclear energy." To carry out its work, ENEF performed an analysis of baseload electricity generation technologies. The first part of the study highlights the strengths and weaknesses of nuclear as compared with other technologies. It considers the current political, environmental, social, and economic contexts in Europe within which these technologies must perform. The second part, on opportunities and threats, addresses the future of generation technologies under several possible scenarios. Part II of the report is expected in the spring.

The analysis makes use of extensive data on the competitiveness of different technologies in Europe from a variety of sources. It covers not only economic attractiveness, but also the social and environmental dimensions of sustainability. The analysis demonstrates a number of economic advantages of nuclear power, including low fuel costs, the small impact on costs due to fuel price volatility, and others. The report also compares technologies with respect to security of supply, access to resources, global warming, and other externalities such as accidents, waste, human health, employment, and public acceptance. The analysis provided a list of strengths and weaknesses pertinent to the sustainability of the technologies.

Poncelet stressed the importance of this project in providing a new and original way to develop a dialog among multiple stake-

Meeting the challenges of energy supply, environmental concerns, and security simultaneously will be one of the most difficult problems facing humankind in this century.

each under IAEA safeguards (and perhaps with some degree of IAEA control), that would provide services to other countries—without discrimination—but would keep access to sensitive technology in the hands

holders on a controversial issue, and he noted that the report provides a sound analysis to support a broad discussion of nuclear power. Poncelet made the point that in some countries, notably Finland and Sweden, a broad consensus has been created on nuclear issues thanks to a longstanding open and transparent dialog in these countries. "I wish we all are able to be so successful," he said.

Focusing on U production

Tim Gitzel, president of Canada-based Cameco, focused his presentation on what is being done to ensure the safe, clean, and reliable production of uranium. He said that he does not expect the current surge of activity to stall the way that earlier waves of investment in uranium development did.

In 2009, reactors around the world consumed about 170 million lb of uranium. This is expected to nearly double by 2030.

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Primary supply from mines provided about three-quarters of this demand; the rest, about 40 million lb, came from secondary sources (which include surplus military material, excess company inventories, and recycled products), and as these are exhausted, there will be a need for more primary production.

The mining and processing of uranium ore, Gitzel said, is not an activity that can



Gitzel

be undertaken without substantial financial resources, strong technical knowledge, and a sincere commitment to the principles of sustainable development. Companies wanting to play in this field will need to overcome many challenges, he said, such as aboriginal claims to the land and native title, increased regulatory scrutiny and standards, rising costs of development and production, and strong competition for talent. Cameco, he said, has about 200 open positions that it is trying to fill through advertising around the world.

Before committing to more exploration, producers need to see long-term positive price signals from the market, Gitzel said. He warned of previous instances, however,

when the market gave strong price signals, such as in the 1970s, when there was an atmosphere of euphoria driven by oil shortages created by the oil-producing countries. Technological advancements were also a feature of this time, he said, as techniques such as earth imaging and improved understanding of geological processes aided the discovery of many new reserves, including those found in the Athabasca basin in Northern Canada at Cigar Lake and McArthur River. But in the 1980s, as nuclear construction programs stalled, utilities ended up with large inventories of uranium, he continued. Investment in exploration and new mine development halted, and the uranium industry was put on life support.

The current nuclear renaissance, which began to take root in 2003, led to rapidly rising uranium prices, Gitzel said, and spurred a new wave of investment and exploration.

Between 2003 and 2009, about \$3.4 billion was spent on exploration and deposit delineation of more than 600 uranium projects worldwide. A number of significant discoveries have been made in previously explored areas and new regions, and coun-

tries such as Kazakhstan and Namibia are joining Canada and Australia as the world's leading producers of uranium. This, he said, should give the nuclear industry the confidence it needs to continue to push forward, knowing that a secure supply will be available for many centuries to come. He noted that Cameco has set an ambitious strategy of doubling annual uranium production from 20 million to 40 million lb by 2018. Innovative mining approaches at the McArthur River mine, such as freezing the ore body 2000 feet below the surface, allow access to more of the ore body and, therefore, higher extraction rates. The company, which is also the largest uranium producer in the United States, with *in situ* mining operations in Wyoming and Nebraska, has plans to double production over the next few years.

The big picture

Concluding the session, Marvin Fertel, president and chief executive officer of the Nuclear Energy Institute, stated that the nuclear community has the opportunity and responsibility to benefit mankind and the planet. There are, of course, real issues to deal with, such as safety, security, terrorism, and proliferation, he said, noting that there is more that we can and should do about these issues.

As Fertel has said before, the renaissance in the United States really started around

1990. In this regard, he noted the important role of his predecessor at NEI and the current ANS president, Joe Colvin, in driving the industry to achieve vastly improved plant performance. Today, he said, the United States may get only 20 percent of its electricity from nuclear power, but that amounts to 800 billion kWh, which is more than that produced in total by all countries except for Russia, China, and Japan. Furthermore, the fleet has been operating at a capacity factor of over 90 percent for about 10 years, with the top quartile at about 97 percent. "The program itself is not only large, but it is quite good," Fertel said.

Many other positive results have come from this improved performance, he said. Without it, "we wouldn't be doing license renewal, we wouldn't be doing uprates, and we wouldn't be considering new plants." Good performance also builds public support, he added.

Regarding delays in the licensing of new plants, Fertel stressed that this is a new process that will take time to mature, but he said that he thinks it is working "okay." The industry has made some mistakes, he said, and the Nuclear Regulatory Commission has also stumbled a couple of times. But once a couple of plants get through the process, he said, licensing times could be reduced from four-plus years to two, and construction time by close to a year.

On the renewed challenge of natural gas, then priced at about \$4 per million Btu (British thermal units), Fertel said that the production of shale gas is a "game changer." It is a local resource found in many places,



Fertel

he said, and will likely become cheaper as the industry develops. Gas prices are expected to rise, he said, but probably not enough to make nuclear competitive in the short term, at least until carbon legislation is passed—which may be a long way off. Of course, utilities in regulated states are better able to make long-range plans, which is why he said that he expects the Southeast to remain the largest growth area.

Regarding Yucca Mountain, Fertel said that it is not nearly as big a deal for the public as for politicians. He said that he is relatively certain that the licensing process will proceed, unless the government can come up with a better reason than that it just doesn't want it to. Even so, delays will continue. "We just need to go forward in a rational way," Fertel said, and even if the NRC finds that it cannot license the site, much will be learned. He said that he hopes that the president's blue-ribbon commission will help by coming up with a more sus-

tainable program, which could include managed centralized storage, a good look at recycling, and the selection of a repository site.

Fertel does not expect more than four to eight new nuclear plants to be built before 2020, with four units looking good and eight units a bit of a stretch. Whatever happens in the near term, however, nuclear power is going to expand significantly, he declared, adding that the challenge is having the infrastructure ready when we start building more robustly.

After Yucca Mountain

The DOE's 2010 budget zeroed out funding for the high-level waste repository at Yucca Mountain, in Nevada, ending an effort to move the repository project forward. The termination of the project has opened up a reexamination of disposal plans for used fuel in the United States. The "After Yucca Mountain: What Next?" session explored how the reexamination may proceed and what is likely to be the path forward in determining the ultimate method for handling, storing, and disposing of used fuel.

William Murphy, a professor in the Department of Geological and Environmental Sciences at California State University, opened the session with a review of site characterizations and natural analog studies that guide geologic disposal.



Murphy

Murphy said that there were "big surprises" during the site characterization of Yucca Mountain. "Yucca Mountain is not dry. That's a total myth," he said, adding that the water table at the site is about 700 meters (about 2300 feet) below the ground surface, and that the proposed repository's horizon is about halfway between the ground surface and the water table.

"The infiltration rates that were in the minds of the best scientists of the 1980s—and this is no criticism of them—were practically zero," said Murphy, who explained that after a decade of research, the early assumptions were found to be completely wrong, and that the presence of water was at least an order of magnitude greater than expected.

Murphy said that a long list of technical surprises was revealed by studies of Yucca Mountain. Site characterization revealed oxidizing conditions, bicarbonate-rich groundwater, gaseous radionuclide transport, unexpectedly large unsaturated zone water percolation, fast groundwater flow paths in both the unsaturated and saturated zones, and geologically young exposed and buried volcanoes. "None of these are necessarily fatal, but site characterization is an essential pro-

cess in geologic disposal," he said. "It will reveal surprises, and scientists and engineers can deal with them."

The Yucca Mountain studies revealed many insights on technical problems that needed to be addressed, according to Murphy. For example, the studies fundamentally changed the scientific understanding of water flow in unsaturated fractured rock, and experimental and theoretical work related to site characterization advanced the understanding of the thermodynamic properties of uranyl minerals and the trace solubility of neptunyl.

Murphy concluded that despite the surprises that surfaced regarding Yucca Mountain's characteristics, the geologic disposal of high-level nuclear waste will be shown to be practical, and site identification should be guided by geologic, hydrogeologic, and geochemical principles.

John Kotek, staff executive director for the Blue Ribbon Commission on America's Nuclear Future, gave a review of how the commission was created (it was chartered in 2010 by the energy secretary at the direction of the president) and the job with which it is tasked (to study the back end of the nuclear fuel cycle in the United States and to put together a group of experts and others to do that work and develop a plan).



Kotek

Since its creation, the commission has established three subcommittees: one to study the disposal issue, one to look at reactor fuel cycle technology, and the third to investigate transportation and storage. Kotek added that the subcommittees' meetings have been opened up to the public through Webcasting. The commission's Web site is at <<http://brc.gov/>>.

Robert Budnitz, a scientist at the University of California's Lawrence Berkeley National Laboratory who is working on nuclear power safety and security and radioactive waste management, explained that the idea that nuclear waste can be buried underground originated in a 1957 National Academies study. "For about 20 years, through the 1970s, there was a very strong, growing consensus in the technical community that an underground repository would work—that if you developed the right site and did the right engineering, a repository would work for the disposal of waste for a very long time," he said.



Budnitz

Budnitz said, however, that there was no technical basis in the 1970s for that claim. "It was opinion," he said. "It turns out that opinion was borne by the facts, but it wasn't backed up by any at that time. Today, it's no longer opinion. We know we have a site [Yucca Mountain] that has been engineered and analyzed and designed, and [a license application] sent to the Nuclear Regulatory Commission."

Budnitz then stated strongly that while the NRC had no problem issuing a safety evaluation report for the Yucca Mountain Project, the project was terminated by "a political process." Budnitz said that most everyone who had worked on the project's technical reviews was aware of the role that politics played in killing the project. "There is hardly anybody of respect in the technical community that doesn't agree [that the project was terminated for political reasons]," he said.

Following up on Budnitz's comments was John Gervers, president of Latir Energy Consultants. Gervers said that the successful siting of a nuclear waste facility depends not only on good science and technical proficiency, but also on public confidence in the safety of the facility and the competence of the managing agency. He noted that scientists and engineers believe that the real challenge of a disposal system is to meet an acceptable standard of safety and the continued capabilities of the site. "They often overlook the concerns of people who live and work near the site and along the transportation routes, and sometimes attribute objections to a lack of knowledge and understanding of complex technical processes," he said.

Gervers said that the responses of citizens and the local and state governments that represent them "are quite rational and require consideration from managers of nuclear waste disposal systems." He pointed out that citizens are not alone in their concerns about radiation risks. "Insurance companies consider the risks of radiation releases to be unacceptable and consistently decline to cover nuclear risks," he said. "The private capital market is also unwilling to make reactor construction loans without federal government guarantees of nuclear investments. Failure to acknowledge community concerns can lead to political resistance and public demonstrations."

To accommodate these concerns, the Nuclear Waste Policy Act of 1987 authorized the creation of units of local government and empowered them to monitor the site process, identify potential impacts, comment on siting activities, and conduct public outreach. "This oversight responsibility has not only contributed to a better understanding of unresolved technical questions, but has also helped assure local citizens that the impacts were being identified and would be mitigated or compensated. The in-

volvement of effective governance in the repository siting process has, in my view, reduced the incidence of public protests at Yucca Mountain,” he said.

Gervers said that there has been continued resistance from more than 70 percent of Nevada’s population and from all leading state officials because of the lack of trust in the DOE’s ability to manage the site in a fair and efficient manner.

Sekazi Mtingwa, a nuclear physicist at the Massachusetts Institute of Technology, discussed a recently completed study he worked on with Johns Hopkins University on used fuel reprocessing, recycling, a geologic repository, and other issues. “First of all, regardless of which fuel cycle is adopted, I think it’s clear that we will need a geological repository,” he said. “The termination of Yucca Mountain necessitates the immediate reestablishment of a scientifically sound and politically viable process for identifying and selecting a suitable site for the long-term disposal of nuclear waste.”

Mtingwa noted that Sweden and Finland have had success in locating repository sites and have enjoyed good community support. “It’s that kind of process that we felt should



Mtingwa

be replicated in the United States,” he said. “But whatever the process, it should be stable, long-term, and able to survive changes in administrations. That is a serious problem, and it has been extremely partisan.”

Although the DOE has withdrawn the Yucca Mountain license application with prejudice, Mohseni explained that NRC Chairman Gregory Jaczko has asked for congressional direction and resources, because “clearly this is a reversible process. This is by no means a situation [that] we can actively close the books on and move away. In fact, our documentation is preserved, as far as the reversibility of the process if we have to resume.”

The NRC, he said, is waiting to see what happens with the Yucca Mountain decision, whether it goes to court or is decided at the congressional level. “Those activities will influence us in terms of where we go,” he said. “Meanwhile, the staff has not remained idle,” he continued. “We have accumulated over 30 years of studying and collaborating in pre-licensing activities with

the national labs, with the Department of Energy. We’ve accumulated a lot of knowledge about licensing geological repositories.”

The characteristics of Yucca Mountain have dominated the knowledge base that the NRC has accumulated over the years, he said. “So for all practical purposes, we are busy making sure that the staff that has worked with us over the past decade does not leave without downloading all the information it has accumulated over the years,” he said.

On the one hand, he said, the possible loss of staff knowledge is a real challenge for the NRC. On the other, employees who worked on the project and wrote the pieces of the safety evaluation report are about to go into retirement, or they have delayed retirement and are disappointed at the project’s current status. “They’re at an age where they’re retiring, and they were excited to see this through,” he said. “They extended their stay for a few more years just to see if this ultimately comes through.”

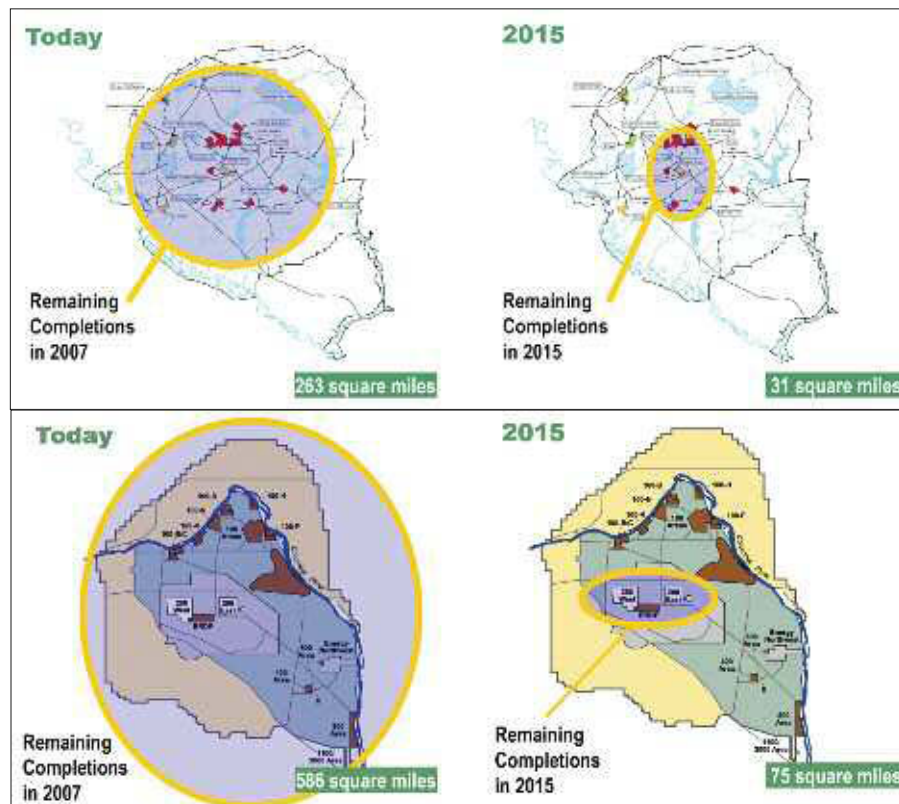
An energy park revival?

The Operations and Power Division’s Nuclear Construction Working Group has been holding sessions at the ANS Winter and Annual Meetings for about five years, long enough for some elements of the event to become familiar—such as a presentation by the NRC on the status of applications under 10 CFR Part 52, and one on polling data on nuclear energy issues, both of which took place at the Las Vegas meeting (and

covered information that was reported in earlier issues of *Nuclear News*). This time, however, there was more attention paid than ever to small modular reactors (SMR), especially the Department of Energy’s developing interest in them. This has overlapped, to some extent, with another DOE interest that has arisen recently (and was described at this session): the concept of energy parks, long dormant but perhaps on the way to being revised to address new missions.

The first presentation was made by John Kelly, deputy assistant secretary for the Office of Nuclear Reactor Technologies in the DOE’s Office of Nuclear Energy. Mainly he provided an update on the DOE’s ongoing programs, including plans for an SMR encouragement effort similar to the Nuclear Power 2010 program that set the stage for the license applications for large light-water reactors that are now being processed by the NRC. He showed dollar amounts in the fiscal year 2011 budget for various projects, even though the fiscal year began without an enacted budget, resulting in the DOE’s operating under a continuing resolution that replicates funding levels from FY 2010.

Kelly covered the Light Water Reactor Sustainability Program, which is intended to develop a scientific basis for the continued operation of the current fleet past the 60 years allowed by a single license renewal, as well as technical and operational improvements that will contribute to the reactors’ long-term economic viability. The program addresses materials aging and



The footprint reduction goals for Savannah River (top) and Hanford

degradation, risk-informed safety margin characterization, advanced instrumentation and controls, advanced fuel development, and economics and efficiency improvements, including alternative cooling methods to mitigate high effluent water temperature and reduce water consumption.

tures, and instead potentially impose requirements developed for conventional light-water reactors. A major sticking point appears to be off-site emergency planning, which was addressed in a Thursday morning session. While there have been joint efforts by SMR advocates on some licensing issues,

The rulemaking process takes years, and it is likely that early SMR applications will have to seek exemptions rather than wait for new regulations to be established.

Kelly's presentation was generally familiar because the sustainability program has been in place for a while. More novel to the audience at this session was the presentation by Benjamin Cross, who is on long-term temporary assignment to the DOE as a senior advisor to the Office of Environmental Management on its Energy Parks Initiative. The initiative is being carried out not by the Nuclear Energy Office, but as part of the effort to clean up locations that are (or were) in the nuclear weapons complex and to make them more useful to the populace in general.

Cross said that the DOE wants to reduce the footprint of contaminated or otherwise unavailable land at the Savannah River Site from 263 mi² in 2007 to 31 mi² in 2015, and at the Hanford Site from 586 mi² to 75 mi² in the same time frame. This process could involve the use of SMR designs that can function as actinide burners to consume some of the "legacy materials" at these sites. During 2010, Savannah River entered into agreements with Hyperion Power and GE Hitachi Nuclear Energy to explore the use of their HPM and PRISM reactors, respectively.

Cross said that the DOE intends to reduce another footprint—in this case carbon—although not every proposal throughout the complex is necessarily nuclear. For the Nevada Test Site, solar power is being considered. Legislation has passed the House and was being considered in the Senate to authorize \$20 million for the program, allowing for some projects to be started, Cross said.

SMR emergency planning

As interest in small modular reactors grows, especially among potential customers, the reactors' designers must increasingly come to grips with the ways in which current power reactor regulations do not, in the designers' view, credit the designs' fea-

including one under the auspices of ANS, emergency planning has spurred the development of white papers by the Nuclear Energy Institute (NEI) and by individual designers and potential customers.

Thomas Hicks, of Idaho National Laboratory, said that the lab submitted a white paper to the NRC in October on emergency planning for the Next Generation Nuclear Plant (NGNP) project, which would be a Generation IV very-high-temperature gas-cooled reactor. (Under the current schedule, the DOE would apply for a COL in 2013 and operation would begin in 2021.) Hicks said that the paper asserts that the NGNP core cannot melt and that there is no scenario in which there could be a large early release of radionuclides, and so the emergency planning zone (EPZ) should be sized to reflect this.

Walter Lee, the Tennessee Valley Authority's fleet nuclear preparedness manager, provided the perspective of a potential SMR customer. The agency is exploring the construction of as many as six Babcock & Wilcox mPower modules at the Clinch River site in Tennessee. Lee said that TVA will use the NEI white paper, which he said is similar to the one for the NGNP, although it does not address EPZ size, which, Lee said, is too site-specific. Among the issues to be worked out, in his view, is the effect that modules could have on an EPZ. If an EPZ is defined for a plant with x modules, he said, and the plant then adds y more modules, does the EPZ have to be revised?

Patricia Milligan, senior technical advisor for nuclear security incident response at the NRC, said that the agency is in the process of revising NUREG-0654, the agency's criteria for the preparation and evaluation of radiological emergency response plans, and that this will not be slowed down in order to accommodate SMRs. The rulemaking process takes years, she said, adding that it is more likely that early SMR applications will have to seek exemptions rather than wait for new regulations to be established.

During the question-and-answer session, Milligan said that the NRC is working on an SMR policy paper, which has been scheduled for issuance in fiscal year 2012, although she added that she hopes it will ar-

rive sooner. The NEI white paper, she said, will provide input to the policy paper. She also suggested that anyone who is involved in SMR work should begin to participate in state and local emergency management conferences, and not just for radiological emergencies. It had been noted by Milligan and others earlier that localities that need to meet nuclear emergency plans generally want to use the equipment and facilities for other local emergencies, taking an "all hazards" approach.

Digital age communications

The rise of social media—including Twitter, Facebook, LinkedIn, and blogs such as the ANS Nuclear Cafe (<www.ansnuclearcafe.com>)—is making a positive impact on the nuclear energy industry.

One company, Areva, holds monthly teleconference sessions for nuclear bloggers who call in to take part in discussions about the company's nuclear activities. During the session "Focus on Communications: Credibility in a Digital Age," Jarret Adams, Areva's media relations director, said that communicating with these new social-media messengers has become an accepted practice. "For any company now, of any size, it's not a question of whether you should be involved in social media, but how you do it," he said.

Adams recalled a time about a decade ago when a lot of companies wondered whether putting up a Web site would increase sales. "It seems ridiculous now to consider that question," Adams commented, "but today, a company without a Web site just doesn't exist."

And so it is with the new social media, Adams reasoned. As the nuclear industry has worked to generate public support, social media is "probably one of the best returns on your investment in terms of communication," he said.

Areva has entered the realm of social media in a big way. In addition to its Web site, the company has a blog site, is on Facebook, sends out Tweets, and uses LinkedIn



Adams

to recruit new employees. While Areva recognizes the role and responsibility of traditional media, "at the end of the day, there are more places out there, and there are more opportunities for companies and organizations to communicate their messages to a wider audience than ever before," he said.

Adams explained that Areva has a policy of treating bloggers the same as it does traditional journalists. Unlike some traditional journalists, however, who may be assigned by an editor to cover a story that has

a nuclear angle but who have no personal knowledge of the technology, “bloggers actually do understand our field,” he said. “They understand nuclear technology. It’s not a one-day story. They don’t come into it not knowing the first thing about nuclear power. They don’t believe that nuclear power plants are going to explode.”

Adams said that opponents of nuclear power are getting their messages out using social media as an ally, which makes it seem like nuclear advocates are outnumbered. That is a false image, he said, because the results of surveys reveal that many Americans actually favor nuclear energy. It is time, Adams said, for nuclear advocates to start using social media to get their own messages out. “It’s something in which everybody needs to become involved,” he said.

Dan Yurman, the session organizer and a nuclear blogger on his Web site, Idaho Samizdat (<<http://djsrv.blogspot.com/>>), said that the use of social media represents a huge opportunity for nuclear energy to tell a story. “The new social media paradigm, the constant connection to mobile devices—not desktops, but laptops—[means that] these will dominate the next decade of social media,” he said.

Yurman recited some statistics: There are 500 million users on Facebook and 145 million



Yurman

blogs. The three categories that draw the most readers to blogs are politics, technology, and entertainment. But, as Yurman joked, “as a nuclear blogger, I should tell you that I have not yet found a way to mix the words ‘nuclear energy’ and ‘Lindsay Lohan’ in the same article.”

Yurman said that bloggers write about issues from sources they trust, and not just because the sources send out press releases, as was common during the days of traditional media when public relations firms would blanket media outlets with news about their clients. Social media, which is an interactive environment, offers the ability to comment quickly and initiate dialogue, and readers expect to be able to give feedback. “If you are the party who has a media site out there, if you’re not listening, you may not understand why your message failed to persuade, because you will not have any feedback,” he said.

Yurman explained that social media can deliver exposure for a message, and that the return on investment can be calculated. He gave as an example a giant paint company that wants to reach interior decorators and puts up a Web site or blog site for that purpose. Using analytics offered by social media services, the company can track the

number of hits it gets on the site and compare it to its increase in paint sales—the return on investment.

Nuclear energy is a different story, of course. “You’re tracking an entirely different thing,” he said. “It’s an intangible qualification.” Among the top nuclear blogs in the United States, the Atomic Insights site (<www.atomicinsights.blogspot.com/>), run by blogger Rod Adams, currently attracts more than 200 000 readers a year. Yurman’s blog site gets half that number.

There is a path to follow for success for the nuclear industry in social media, according to Yurman. The first step is to pay attention to what the reader is saying, what the critics are saying, and what competitors are saying. Second, produce content and populate social media channels. “Put a video on YouTube, and Tweet about it,

and link it to a blog, and put something about it up on your Web site or Facebook to drive traffic to it,” he said. The third is to make sure that you can be contacted by the readers. “Authenticity and transparency. Answer inquiries. Put contact information on your blog. Put it directly on the main page so that people can find an e-mail address or phone number at which to contact you,” he said. “One of the things that drives me crazy is blogs that are anonymous.”

Tom Fields, Web content manager for the DOE’s Idaho National Laboratory, established INL’s Facebook site (<www.facebook.com/IdahoNationalLaboratory>). Fields noted that Facebook users around the world spend 700 billion minutes per month



Fields

on Facebook, “so there is a huge audience out there.”

Facebook has been translated into more than 70 different languages, and 70 percent of all users are outside of the United States. “So if you’re doing international marketing, it’s the perfect vehicle,” he said. INL’s Facebook entry, which has about 2800 “fans,” has tabs to click on to reach information on the lab’s research and jobs available. There is also basic information available on the lab, and another tab opens up to videos on research projects. Yet another tab contains photos of the lab, the work being conducted there, and the scenic areas near the lab.

The goal for INL’s Facebook page, ac-

ording to Fields, is to get the message out that INL is “the energy research center, especially with regard to nuclear.” The site, however, is not exclusively about nuclear power. It includes a lot of information about hybrid batteries, wind power, and other energy research.

Laura Hermann, vice president of Potomac Communications, observed that public affairs offices of major companies are struggling to figure out how to operate in the new media environment. “The mass media, mass communications, is no longer re-

Social media, which is an interactive environment, offers the ability to comment quickly and initiate dialogue, and readers expect to be able to give feedback.

ally an effective tool,” she said.

What had been public relations/advertising/marketing teams—those departments that had always operated in their own little silos—are now having to think more creatively. “That old-fashioned ‘send/receive’ model isn’t working anymore,” Hermann said.

The social media outlets have brought “the mainstream media to its knees in terms of how it needs to operate,” she said. “The media environment has converged, and so the traditional role of a corporate communicator and working with media has changed radically.”

In the past, she said, a corporate communicator would develop relationships with a handful of reporters, and that was all that was needed for a company to get its message out. “Now we’re looking at a media environment where not only is there an increasing number of freelancers that are stringing a host of different publications, but you have journalists who are really working to build their own brand,” she said. “They are no longer representing an individual news outlet, but they are representing themselves.”

One name she mentioned was well-known energy writer Matt Wald of the *New York Times*, who is also featured on the Green Blog that the *Times* maintains. Another reporter, she said, used to do environmental coverage for *Time* magazine, but he has left the print industry altogether and now writes only for a blog site. “So, you see, the traditional relationships that really made the difference for the corporate communicators are gone,” she said.—E. Michael Blake, Dick Kovan, and Rick Michal