As seen in the January 2023 issue of **Nuclear**News

A LOOK BACK AT 2022

By *Nuclear News* staff

Another calendar year has passed. Before heading too far into 2023, let's look back at what happened in 2022 for the American Nuclear Society and the nuclear community. On the following pages, we have compiled what we feel are the top nuclear news stories of the past year.

But first, here are some of ANS's activities for 2022.

Publications

The past year saw a multitude of publications from ANS.

For ANS's **technical journals**, in addition to monthly regular issues, a handful of special issues were published. In *Nuclear Science and Engineering*, the special issues were the fully open access issue on the Versatile Test Reactor, published in November (as a supplement to the regularly scheduled November issue), and the special issue on the Transformational Challenge Reactor Design, published in December.

In *Nuclear Technology*, a special section on the Nuclear, Humanities, and Social Science Nexus appeared in the June issue (as an extension of the September 2021 full special issue with the same title). In addition, selected papers from the 2020 International Topical Meeting on Advances in Thermal Hydraulics (ATH'20) were published in the August issue, and selected papers from the 2021 Nuclear and Emerging Technologies for Space Topical Meeting (NETS 2021) were published in December (as a fully open access supplement to the regularly scheduled monthly issue).

No special issues of *Fusion Science and Technology* appeared in 2022, but already in this first month of 2023, the special issue featuring Young Investigators in Fusion has been published. In addition, *Nuclear Technology* published this month as a fully open access supplement a special issue on the U.S. Department of Energy Microreactor Program. And next month, *Nuclear Science and Engineering* will publish selected papers from the 2021 International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering (M&C 2021).

ANS also published the ***Transactions*** for the Annual Meeting (containing 196 papers) and the Winter Meeting and Technology Expo (339 papers) of 2022.

For topical meeting coverage, the following **proceedings** were published: International Conference on Physics of Reactors (PHYSOR) 2022 (362 papers); Advances in Thermal Hydraulics (ATH) 2022 (82 papers); Nuclear and Emerging Technologies for Space (NETS) 2022 (145 papers); Nuclear Criticality Safety Division Topical Meeting (NCSD) 2022 (88 papers); 14th International Topical Meeting on Nuclear Applications of Accelerators (AccApp'21) (30 papers); 14th International Conference on Radiation Shielding and 21st Topical Meeting of the Radiation Protection and Shielding Division (ICRS 14 and RPSD 2022) (124 papers); TopFuel 2022 Light Water Reactor Fuel Performance Conference (103 papers); and International High-Level Radioactive Waste Management Conference (155 papers).

For **books**, none were published in 2022, but coming this year are *Nuclear Criticality Safety: Evaluations, Calculations, and Experiences*, by Robert D. Busch (a complementary book to Ronald Knief's book *Nuclear Criticality Safety: Theory and Practice*) and *Redemption of Prometheus: Creating a Sustainable Nuclear Enterprise for the 21st Century,* by Raymond J. Juzaitis.

ANS publications are available online at ans.org/pubs.

Meetings

There was an assortment of ANS meetings in 2022:

- In February, the IRPA North American Regional Congress, in St. Louis, Mo.
- In March, the 19th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-19), a virtual meeting.
- In April, the 12th International Conference on Methods and Applications of Radioanalytical Chemistry (MARC XII), in Kailua-Kona, Hawaii, and the 2022 Student Conference, at the University of Illinois–Urbana-Champaign.
- In May, Nuclear and Emerging Technologies for Space (NETS 2022), in Cleveland, Ohio, and the International Conference on Physics of Reactors 2022 (PHYSOR 2022), in Pittsburgh, Pa.
- In June, the ANS Annual Meeting, in Anaheim, Calif.
- In July, Global 2022, in Reims, France.
- In August, the Utility Working Conference and Vendor Technology Expo (UWC 2022), in Marco Island, Fla.
- In September, the 13th International Topical Meeting on Nuclear Reactor Thermal Hydraulics, Operation and Safety (NUTHOS-13), in Taichung, Taiwan, and the 14th International Conference on Radiation Shielding and 21st Topical Meeting of the Radiation Protection and Shielding Division (ICRS 14/RPSD 2022), in Seattle, Wash.
- In October, the TopFuel 2022 Light Water Reactor Fuel Performance Conference, in Raleigh, N.C., and the Virtual Graduate School Fair, held online.
- In November, the ANS Winter Meeting and Technology Expo, in Phoenix, Ariz.

Thirteen ANS meetings are scheduled for 2023. You can find information online about ANS meetings at ans.org/meetings.

Continued

Webinars and position statements

ANS produced 25 webinars on a variety of topics in 2022. You can find on-demand recordings of these webinars (and those of past years) on the ANS website at ans.org/webinars. Online, you also can find information on ANS position statement activity in 2022:

- Updated the supporting background information for Position Statement #41 (*Health Effects of Low-Level Radiation*).
- Revised and updated the supporting background information for Position Statement #77 (*The Nuclear Regulatory Commission*).
- Revised Position Statement #44 (*Nuclear Energy's Role in Climate Change Policy*).
- Revised Position Statement #72 (*The Use of Highly Enriched Uranium for the Production of Medical Isotopes*).
- Revised Position Statement #84 (*Safeguards and Security for Advanced Reactors Using HALEU*).
- Revised Position Statement #35 (*Advanced Reactors*).
- Revised Position Statement #30 (*Domestic Production of Stable and Radioactive Isotopes*).
- Retired Position Statements #21, #29, and #53. These three documents were rolled up into one combined new Position Statement #85 (*Education, Training, and Workforce Development for Nuclear Science, Engineering, and Technology*).
- Retired Position Statements #28 and #73. The information in these documents is now instead reflected in *Beneficial Uses of Radioisotopes*, a brochure ANS has published in conjunction with Source Security Working Group. The brochure can be found in the public policy initiatives page at ans.org/policy/initiatives on the ANS website.

All current and historical position statements are available online. Just visit ans.org/policy/statements.

Standards

For ANS standards, the following were published in 2022:

- ANSI/ANS-2.21-2022, *Criteria for Assessing Atmospheric Effects on the Ultimate Heat Sink* (revision of ANS-2.21-2012 [R2016]).
- ANSI/ANS-8.3-2022, *Criticality Accident Alarm System* (revision of ANS-8.3-1997 [R2017]).
- ANSI/ANS-8.7-2022, *Nuclear Criticality Safety in the Storage of Fissile Materials* (revision of ANS-8.7-1998 [R2017]).
- ANSI/ANS-19.3-2022, *Steady-State Neutronics Methods for Power Reactor Analysis* (revision of ANS-19.3-2011 [R2017]).
- ANSI/ANS-19.3.4-2022, *The Determination of Thermal Energy Deposition Rates in Nuclear Reactors* (revision of ANS-19.3.4-2002 [R2017]).
- ANSI/ANS-30.3-2022, *Light Water Reactor Risk-Informed, Performance-Based Design* (new standard).
- ANSI/ASME/ANS RA-S-1.1-2022, *Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications* (revision of ASME/ANS RA-S-1.1-2008 [R2019]).

ANS standards are available for purchase online at techstreet.com/ans.

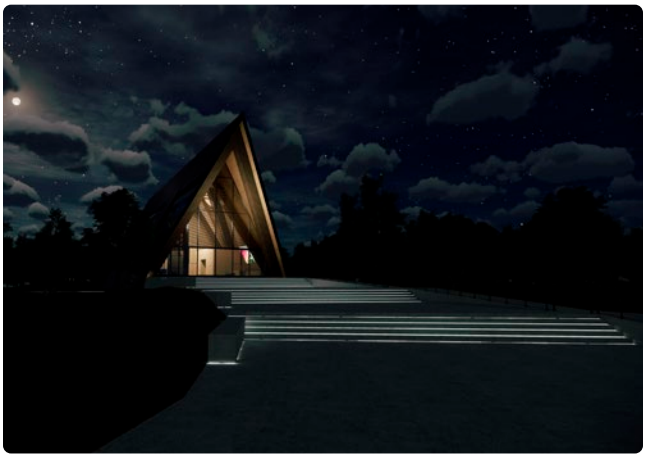
Members

Two well-known ANS members passed away in 2022: Larry Foulke, 85, a past president (2003–2004) who had a four-decade career in nuclear technology and taught nuclear engineering at several institutions—Bettis Reactor Engineering School, Penn State University, and the University of Pittsburgh; and Zack T. Pate, 86, former chief executive officer of the Institute of Nuclear Power Operations (INPO) and founder and former chair of the World Association of Nuclear Operators (WANO).

Other ANS members who we learned in 2022 had left us include John C. Arbo, 82; Eric S. Beckjord, 93; Wallace B. Behnke Jr., 95; Bernard L. Bloch, 88; John C. Blomgren, 76; Robert M. Brugger, 92; John B. Buchanan, 94; Paul T. Burnett, 88; Noel Corngold, 93; Floyd E. Dunn, 82; Joseph W. Glaser, 71; George B. Humphreys, 93; Milton Klein, 98; Myron B. Kratzer, 97; Leo G. Lesage, 87; Charles C. Limoges 82; Evan E. Lloyd, 77; Bruce M. Lory, 66; Povl L. Olgaard, 93; Gerald M. Padawar, 93; Jeffery R. Parrette, 96; Gerald V. Policastro, 68; Seymour J. Raffety, 90; John P. Roberts, 81; Thomas H. Row, 87; Massimo Salvatores, 80; William S. Stanley, 68; Alfred A. Strasser, 95; Joseph W. Talnagi, 68; Richard G. Taylor, 75; Frederick W. Todt, 94; Richard F. Walker, 97; Robert W. Wiesener, 92; Robert E. Williams, 73; Norman G. Wilson, 89; and Richard E. Wood, 93.

A sincere thank you to *Nuclear News* readers and advertisers—you make it possible for us to publish the world's premier news source for the nuclear community.

Now read on to revisit some of the top news stories from the year just left behind.



An artist's rendition of Oklo's Aurora powerhouse. (Image: Gensler)

License application for Oklo unit denied

The Nuclear Regulatory Commission announced on January 6 that it had denied "without prejudice" Oklo Power's application to build and operate its Aurora microreactor in Idaho. The denial, according to the NRC, was due to the California-based firm's failure to provide sufficient information on several crucial topics regarding the Aurora design, including potential accidents and the classification of safety systems and components. Oklo submitted its combined license application on March 11, 2020, for Aurora—a 1.5-MWe compact fast spectrum microreactor—to be built at Idaho National Laboratory. Agency staff accepted the application for docketing on June 5, 2020, making Aurora the first advanced non–light water reactor to be accepted for review by the NRC. On January 11, Oklo said that despite the setback, "Conversations we have had with NRC management in the last few days have made it clear that the door is open to supplement the application and to resubmit."

Rita Baranwal joins Westinghouse as chief tech officer

Westinghouse Electric Company in January appointed ANS member and Fellow Rita Baranwal chief technology officer to drive next-generation solutions for existing and new markets that align with the company's strategy. Baranwal's appointment marked her return to Westinghouse, where she worked for nearly a decade in leadership positions in the global technology development, fuel engineering, and product engineering groups. Baranwal served as the former assistant secretary for the Office of Nuclear Energy at the Department of Energy from July 2019 to January 2021. Prior to her role, Baranwal directed the Gateway for Accelerated Innovation in Nuclear initiative at Idaho National Laboratory. Before that, she served as director of technology development and application at Westinghouse.

Baranwal

Hunterston B worker in the Charge Hall, November 2021. (Photo: EDF Energy)

Hunterston B plant closes with Unit B2 shutdown

The Hunterston B nuclear power plant ended its nearly 46 years of zero-carbon electricity generation for Scotland in January with the shutdown of Unit B2. The 495-MWe advanced gas-cooled reactor (AGR), which began commercial operation in March 1977, was taken off line on January 7. The station's companion unit, the 490-MWe AGR B1, had been shut down the previous November. Under an agreement with the U.K. government signed on June 23, 2021, EDF Energy, owner and operator of Britain's power reactor fleet, is responsible for defueling all seven of the U.K.'s AGR nuclear stations within the decade. EDF expects the defueling of the AGR facilities to take from three and a half to five years.

Permit issued for Sweden's deep geological repository

The government of Sweden issued a permit to the Swedish Nuclear Fuel and Waste Management Company (SKB) on January 27 to build a deep geological

Continued

January

repository for spent nuclear fuel at Forsmark in the municipality of Östhammar. The government also issued a permit for a spent fuel encapsulation plant in Oskarshamn, where the country's inventory of spent fuel is currently being stored. Prior to final licensing, the country's Land and Environment Court and Swedish Radiation Safety Authority will need to establish conditions for facility operations. SKB said that construction can start only when all licenses are in place, after which time it will take about 10 years to build the repository.

Rendering of the Forsmark geologic repository for spent nuclear fuel in Sweden. (Image: SKB)

February

Exelon split completed; Constellation launched

Constellation, formerly Exelon Generation, owner and operator of the nation's largest nuclear reactor fleet, announced on February 2 the completion of its separation from Exelon Corporation and its launch as a stand-alone, publicly traded company. The previous February, Exelon had announced an effort to separate its utility businesses from its competitive power generation and customer-facing energy businesses.

License transfers for the Exelon fleet were approved by the Nuclear Regulatory Commission in November 2021. Now operating as Constellation units are Braidwood-1 and -2, Byron-1 and -2, Calvert Cliffs-1 and -2, Clinton-1, Dresden-2 and -3, FitzPatrick-1, Ginna-1, LaSalle-1 and -2, Limerick-1 and -2, Nine Mile Point-1 and -2, Peach Bottom-2 and -3, and Quad Cities-1 and -2. Decommissioning reactors covered by the transfer include Dresden-1, Peach Bottom-1, Three Mile Island-1, and Zion-1 and -2.

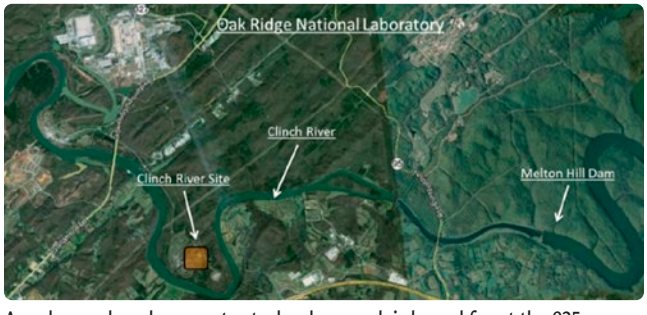
West Virginia lifts ban on nuclear power plants

West Virginia Gov. Jim Justice signed a bill on February 9 that repealed the state's quarter-century-old ban on nuclear power plant construction. The legislation, S.B. 4, passed the West Virginia Senate and House of Delegates in January with no substantial opposition. The measure rescinded article 27A of the West Virginia Code, which prohibited "the construction of any nuclear power plant, nuclear factory, or nuclear electric power generating plant until such time as the proponents of any such facility can adequately demonstrate that a functional and effective national facility, which safely, successfully, and permanently disposes of radioactive wastes, has been developed." 27A also required nuclear facility construction to be economically feasible for West Virginia ratepayers and in compliance with all applicable environmental protection laws, rules, and requirements.

Justice

TVA board approves advanced reactor program; initial focus on Clinch River

The Tennessee Valley Authority's board of directors in February gave the go-ahead for a program that will explore the development and potential deployment of small modular reactors as part of the utility's decarbonization strategy. Gathered at Western Kentucky University on February 10 for a quarterly business meeting (its first in-person meeting since the start of the COVID pandemic), the board unanimously authorized up to $200 million for a "New Nuclear Program." One of the first tasks for the program, TVA said, is a project to develop a Nuclear Regulatory Commission construction permit application and potentially deploy a light water SMR at the Clinch River site near Oak Ridge, Tenn., which currently holds the nation's only NRC early site permit for SMRs.



An advanced nuclear reactor technology park is hoped for at the 935-acre Clinch River site. (Image: TVA)

DOE to provide $6 billion in credits to keep existing fleet running

The Department of Energy's Office Nuclear Energy launched a $6 billion program in February aimed at preserving the existing U.S. fleet of nuclear power reactors. Established under the bipartisan Infrastructure Investment and Jobs Act, signed into law by President Biden in November 2021, the Civil Nuclear Credit Program will allow owners and operators of commercial nuclear power reactors at economic risk of shutting down to apply for credits via a sealed bid process.

NuScale solidifies plans for SMR deployment in Poland

At an event held on February 14 at the Chamber of Commerce in Washington, D.C., small modular reactor developer NuScale Power inked an agreement with KGHM Polska Miedz S.A. to initiate deployment of NuScale's SMR technology in Poland. KGHM is a multinational corporation based in Poland that is involved with copper and silver production, employing some 34,000 people around the world. Under the agreement, the companies will take steps toward deploying a NuScale VOYGR power plant in Poland as early as 2029. Such deployment, according to NuScale, would help the Central European nation avoid up to 8 million tons of CO_2 emissions per year.

John Hopkins (left), NuScale Power's president and CEO, and Marcin Chludzinski, president of KGHM's management board, sign the agreement on February 14. (Photo: Business Wire)

Vogtle project hit with new delay, higher cost

Commercial operation dates for the two new reactors under construction at the Vogtle nuclear plant near Waynesboro, Ga., were pushed back yet again in

Fuel being prepared for unloading outside of Vogtle-3 in January. (Photo: Georgia Power)

February, adding to the project's total cost. During a February 17 fourth-quarter earnings call, Southern Company reported that the projected commercial operation dates for both reactors were being extended by three to six months, resulting in a Vogtle-3 start in the fourth quarter of 2022 or first quarter of 2023, followed by a Vogtle-4 debut in the third or fourth quarter of 2023. Investors and analysts on the call were also informed that Southern last year took a $920 million loss on the project—consisting of $480 million for Georgia Power's share of cost and schedule changes and $440 million for incremental costs under the project's co-owners agreement.

NRC: Staff reliance on GEIS for second license renewal is insufficient

In a major change to its subsequent license renewal process, the Nuclear Regulatory Commission in February ruled that reviews of SLR applications must rely on a more extensive environmental analysis than that provided by the agency's Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS). According to the ruling, the GEIS, properly understood, does not cover the SLR period. As a result, the expiration dates of the operating licenses for Florida Power & Light Company's Turkey Point and Constellation Energy's Peach Bottom were pulled back 20 years to the 2030s—the expiration dates of their initial license renewals—despite having been approved for SLR in 2019 and 2020, respectively. Also affected by the decision are units currently under SLR review, as well as those for which SLR letters of intent have been submitted.

Continued

Russia takes Ukraine's Zaporizhzhia plant

On March 4, one week after launching their invasion of Ukraine, Russian forces seized the six-unit Zaporizhzhia nuclear power plant, Europe's largest nuclear power facility and the provider of approximately one-quarter of Ukraine's power generation. The Russian military began shelling the site in the early morning hours of the fourth, resulting in a fire at a location described in a Reuters report as being "outside the station perimeter." According to the International Atomic Energy Agency, the safety systems of the plant's six reactors were not affected by the assault, nor was there any detectable release of radioactive material. Russian troops had entered the nearby town of Energodar on March 3, after breaking through a makeshift barricade—largely consisting of trucks and piles of tires—set up by Energodar residents and Ukrainian regional defense forces.

Energoatom's Zaporizhzhia plant, in southeastern Ukraine. (Photo: Energoatom)

Indiana SMR bill signed into law

Indiana in March joined the growing list of states looking into small modular reactors for future energy production as their coal-fired plants are retired. On March 18, Indiana Gov. Eric Holcomb signed into law S. 271, which allows and incentivizes the construction of SMRs in the state. Introduced on January 10 and sponsored by state Sens. Eric Koch (R., Bedford) and Blake Doriot (R., Goshen), S. 271 passed in the Senate on February 1 in a 39–9 vote and in the House on February 22 by a 70–22 vote.

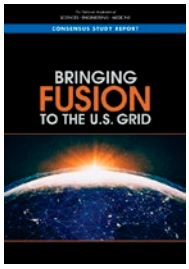
S. 271 requires the Indiana Utility Regulatory Commission, in consultation with the state's Department of Environmental Management, to adopt rules concerning the granting of certificates of public convenience for the construction, purchase, or lease of SMRs—defined as reactors with a rated electric generating capacity of not more than 350 MW. The rules are to be adopted by July 1, 2023.

Unit 2 at the UAE's Barakah nuclear plant. (Photo: ENEC)

Second UAE reactor starts commercial operation

Emirates Nuclear Energy Corporation announced on March 24 that Unit 2 at the Barakah nuclear power plant entered commercial operation. The unit added an additional 1,400 MW of zero-carbon-emission electricity to the United Arab Emirates' national grid, bringing the total amount of electricity produced at Barakah to 2,800 MW. With construction completed in July 2020, Unit 2 achieved initial criticality in August 2021, four months after Barakah's Unit 1 began its commercial life.

White House and DOE launch "bold decadal vision" for fusion energy



The White House Office of Science and Technology Policy and the Department of Energy cohosted a White House Summit on Developing a Bold Decadal Vision for Commercial Fusion Energy on March 17, where energy secretary Jennifer Granholm announced a new agencywide fusion energy initiative and a funding opportunity worth $50 million for magnetic confinement fusion research. A February 2021 National Academies of Sciences, Engineering, and Medicine report, *Bringing Fusion to the U.S. Grid*, is the guiding document for the DOE's fusion energy initiative, and it targets 2035–2040 for an operational 50-MWe fusion pilot plant.

Proposed decommissioning rule released for public comment

The Nuclear Regulatory Commission published its proposed nuclear decommissioning rule for public comments in the March 3 *Federal Register*. Approved by the NRC in November 2021, the proposed rule would incorporate lessons learned from nuclear power plants that have recently transitioned to decontamination and decommissioning and improve the effectiveness and efficiency of the regulatory framework. A draft regulatory analysis conducted by the NRC to determine the expected costs and benefits of the rule found that it would have a net benefit of nearly $18 million to the nuclear industry, the government, and society. The public comment period for the proposed rule ended on August 30, 2022.

Challenges to Texas SNF facility filed in federal court

Several antinuclear groups filed briefs in the U.S. Court of Appeals for the District of Columbia Circuit on March 18, challenging the Nuclear Regulatory Commission's licensing of Interim Storage Partners' (ISP's) consolidated interim storage facility for spent nuclear fuel in Andrews, Texas. The groups, which include Beyond Nuclear, claim that the NRC license, granted in September 2021, violates the Nuclear Waste Policy Act and Administrative Procedure Act by allowing the Department of Energy to take title of commercial spent fuel before a permanent repository is available.

A rendering of ISP's proposed consolidated interim storage facility. (Image: ISP)

That contention, among others, was previously dismissed by an Atomic Safety Licensing Board. The court heard arguments in the case, *Don't Waste Michigan v. U.S. Nuclear Regulatory Commission*, on November 10, 2022.

NRC consolidates LLW rulemaking

The commissioners of the Nuclear Regulatory Commission voted in March to integrate two separate rulemaking activities concerning the disposal of low-level radioactive waste, approving a staff recommendation to issue a "re-proposed" rule that consolidates updates to 10 CFR Part 61, "Low-Level Radioactive Waste Disposal." The commissioners also approved a provision that would allow NRC Agreement States to license the disposal of greater-than-Class C waste streams that are suitable for near-surface disposal, along with a staff recommendation to explore regulatory approaches that would allow for a single regulator for an Agreement State licensee disposing of GTCC waste containing strategic special nuclear material.

TRISO-X aims to have commercial fuel plant operating in 2025

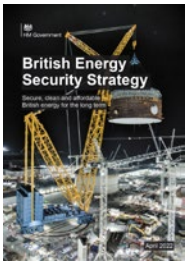
X-energy announced on April 4 that its wholly owned subsidiary, TRISO-X, plans to build the TRISO-X Fuel Fabrication Facility, dubbed TF3, at the Horizon Center Industrial Park in Oak Ridge, Tenn. X-energy has produced kilogram quantities of fuel at its pilot plant at Oak Ridge National Laboratory through a public-private partnership. The commercial plant will use high-assay low-enriched uranium (HALEU) to produce TRISO particles, which are fabricated into fuel forms, including the spherical graphite "pebbles" needed to fuel the company's Xe-100 high-temperature gas reactor. Site preparation and construction were expected to get underway in 2022, with commissioning and start-up scheduled for as early as 2025, according to X-energy.

Artist's rendering of the proposed TRISO-X Fuel Fabrication Facility at the Horizon Center Industrial Park in Oak Ridge, Tenn. (Image: X-energy)

Continued

U.K. energy strategy calls for up to eight new reactors

The U.K. government released a new energy strategy in April aimed at boosting Britain's energy independence, stabilizing its soaring energy prices, and accelerating the deployment of new nuclear, wind, solar, and hydrogen to mitigate climate change. At the same time, the 38-page document, *British Energy Security Strategy*, calls for near-term support for domestic oil and gas, stating, "Net zero is a smooth transition, not an immediate extinction, for oil and gas." (The United Kingdom in 2019 became the first of the world's major economies to embrace a legal obligation to achieve net-zero carbon emissions by 2050.) Following through with this strategy, the government said, could result in low-carbon sources generating up to 95 percent of British electricity by 2030. The ambitious plan could result in the construction of as many as eight reactors in this decade, according to the government.



TVA and OPG form partnership to develop and deploy SMRs

The Tennessee Valley Authority and Ontario Power Generation announced on April 19 the formation of a partnership to develop and deploy advanced nuclear technology as part of their broader efforts to work toward clean energy. According to the agreement, the companies will coordinate their activities in designing, licensing, constructing, and operating small modular reactors.

NuScale signs MOU with Korean companies on SMR deployment in Asia

Small modular reactor developer NuScale Power in April signed a memorandum of understanding with three South Korean companies—Doosan Enerbility Company, GS Energy Corporation, and Samsung C&T Corporation—to explore the deployment of NuScale's VOYGR power plants in Asia. Under the MOU, the

Kiyoun Na, chief executive officer of Doosan Enerbility's nuclear business group; John Hopkins, president and CEO of NuScale Power; Yongsoo Huh, president and CEO of GS Energy; and Byung Soo Lee, executive vice president of Samsung C&T, signed an MOU to collaborate on NuScale SMR deployment in Asia.

Korean companies are to provide NuScale with financial support, in addition to their respective expertise in areas such as component manufacturing, nuclear construction, and power plant operation, according to the April 26 announcement from the Portland, Ore.–based company. Doosan is a nuclear pressure vessel manufacturer, GS Energy a power plant operator, and Samsung a nuclear power plant contractor.

Last of Savannah River's TRU waste arrives at WIPP

The final container of legacy transuranic waste from the Department of Energy's Savannah River Site in South Carolina arrived at the Waste Isolation Pilot Plant in New Mexico for permanent disposal on the afternoon of April 14, the Department of Energy reported. The shipment capped the end of a journey for 239 shipments that began in 2011. In all, trucks that carried the shipments weighed a combined 11,402,000 pounds and travelled more than 347,000 miles to the WIPP site in southeastern New Mexico.

The final legacy TRU waste shipment departs from Savannah River in mid-April, on its way to WIPP. (Photo: DOE)

An artist's rendering of the Hanhikivi plant. (Image: Rosatom)

Contract with Rosatom for Finnish reactor scrapped

Finnish energy company Fennovoima in early May terminated its engineering, procurement, and construction contract with RAOS Project Oy, a subsidiary of Russia's Rosatom, for the delivery of a 1,200-MWe VVER-1200 pressurized water reactor at the Hanhikivi site in Finland's Pyhäjoki municipality. In a May 2 press release, Fennovoima cited "significant and growing delays during the last years," adding that the ongoing war in Ukraine and the international sanctions against Russia as a result had exacerbated project risks, which RAOS had been unable to mitigate. While the release did not speak to the possibility of a replacement partner for the project, Fennovoima board chairman Esa Härmälä provided the following to the press: "I think there will be need for nuclear power also in the future, but that's only my personal opinion."

Huff approved to head Office of Nuclear Energy

Huff

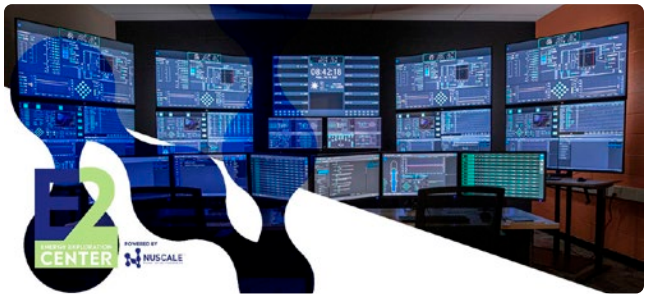
In a bipartisan vote of 80–11, the Senate on May 5 confirmed ANS member Kathryn Huff as the next assistant secretary for the Office of Nuclear Energy (NE) in the Department of Energy. President Biden selected Huff in January 2022 to fill the top spot at NE—a post that had been vacant since Rita Baranwal announced that she was leaving the position on January 8, 2021. Huff came to the DOE in May 2021 to serve as principal deputy assistant secretary for nuclear energy, going on unpaid leave from her position as an associate professor in the Department of Nuclear, Plasma, and Radiological Engineering at the University of Illinois–Urbana-Champaign, where she led the Advanced Reactors and Fuel Cycles Research Group.

Entergy closes Palisades 11 days early

Despite strong support from Michigan Gov. Gretchen Whitmer for extending the operational life of the Palisades nuclear power plant via the Department of Energy's new Civil Nuclear Credit Program, the facility's 777-MWe pressurized water reactor was removed from service on May 20—11 days before its scheduled May 31 retirement date. Plant owner and operator Entergy Corporation said in a news release that control room operators "made the conservative decision to shut down the plant early due to the performance of a control rod drive seal." The Palisades closure ended 577 days of continuous electricity generation, a site- and world-record production run for a plant of its kind, according to Entergy.

NuScale takes next step toward SMR deployment in Romania

Small modular reactor developer NuScale Power announced on May 23 the signing of a memorandum of understanding with Romania's Nuclearelectrica to conduct engineering studies, technical reviews, and licensing and permitting activities at a site in Doicetşti, Romania, selected as the preferred location for the deployment of a NuScale VOYGR power plant. The announcement advances NuScale and Nuclearelectrica's teaming agreement signed in November 2021, under which the companies are taking steps toward deploying a 462-MWe VOYGR-6 facility, which would house six 77-MWe NuScale Power Modules. According to NuScale, Romania has the potential to accommodate the first deployment of SMRs in Europe and become a catalyst for SMRs in the region, as well as a base for supporting operatorship of the technology in other countries.



The first overseas NuScale Energy Exploration (E2) Center is planned for Romania. (Photo: NuScale)

Continued

May

MSU's FRIB: Ready to accelerate discoveries in nuclear physics and applications

Michigan State University's Facility for Rare Isotope Beams (FRIB) officially opened on May 2 with a ribbon-cutting ceremony to celebrate the completion—on time and within budget—of the world's most powerful heavy-ion accelerator and the first accelerator-based Department of Energy Office of Science user facility located on a university campus. The linear accelerator at the heart of FRIB can propel atoms to half the speed of light, resulting in collisions that produce isotopes so rare that until now they have been formed only in stars and stellar explosions. FRIB will give about 1,600 researchers from around the world access to more than 1,000 rare isotopes, many never produced on Earth.

An aerial view of the Facility for Rare Isotope Beams on the Michigan State University campus in East Lansing, Mich. (Photo: FRIB)

DOD seeks in-space demo of nuclear rocket engine in FY 2026

The Department of Defense wants to deploy spacecraft in cislunar space—the area between Earth and the moon's orbit—with thrust and agility that only nuclear thermal propulsion can provide. The Defense Advanced Research Projects Agency (DARPA) is looking to private industry for the design, development, and testing of a nuclear thermal rocket engine fueled with high-assay low-enriched uranium fuel to heat a liquid hydrogen propellant. DARPA issued a solicitation on May 4 for Phases 2 and 3 of the Demonstration Rocket for Agile Cislunar Operations (DRACO) program, leading to an in-space flight demonstration in fiscal year 2026. Phase 1 awards in April 2021 went to General Atomics for a preliminary design for the reactor and to Blue Origin and Lockheed Martin for a conceptual design of the in-orbit demonstration system.

June

Westinghouse to supply all fuel for Ukraine fleet, plus more AP1000 units

The war in Ukraine notwithstanding, Westinghouse Electric Company in early June stepped up its partnership with Energoatom, Ukraine's state-owned nuclear utility, signing agreements to supply all the nuclear fuel for the country's operating reactor fleet and to collaborate on the construction of nine AP1000 units for Ukraine, rather than the five earlier envisioned. In addition, the two companies affirmed their intention to establish a Westinghouse Engineering Center in Ukraine to support the planned AP1000 projects, as well as Energoatom's operating fleet and future decommissioning program. The fuel is to be supplied out of Westinghouse's fabrication site in Västerås, Sweden, with continued localization of fuel assembly component production in Ukraine.

A group shot of Energoatom and Westinghouse personnel at the Khmelnytskyi nuclear power plant in Ukraine, where the first two AP1000 reactors under a recent agreement will be constructed. (Photo: Westinghouse)

Construction permit issued for first Egyptian unit

The Egyptian Nuclear and Radiological Regulation Authority in June issued the construction permit for the first of four proposed Russian-designed and -supplied reactors at Egypt's El Dabaa site, located on the Arab nation's Mediterranean coast, about 185 miles northwest of Cairo. An application for the permit was submitted by Egypt's Nuclear Power Plants Authority (NPPA)—the public entity charged with operating the

A construction permit was issued for the first of four proposed reactors at Egypt's El Dabaa site, about 185 miles northwest of Cairo. (Image: Wikipedia)

plant—in June 2021. "Today, we etched in gold Egypt joining the ranks of countries building nuclear power plants after over 70 years waiting for this dream to come true," Amged El-Wakeel, board chairman of the NPPA, stated on June 30.

Supreme Court rules against Hanford workers' comp law

The U.S. Supreme Court on June 21 struck down a Washington state workers' compensation law that was designed to make it easier for workers at the Department of Energy's Hanford Site to receive compensation benefits. The court, by unanimous decision, found that the law violates the U.S. Supremacy Clause and discriminates against the federal government and its contractors. Following the Supreme Court's decision, Bob Ferguson, attorney general for the state of Washington, said that the court's ruling does not affect the state's 2022 modification to the law, which made it apply to all workers at all radiological waste sites in the state.

NASEM report: U.S. low-dose radiation research needs DOE/NIH leadership

A report from the National Academies of Sciences, Engineering, and Medicine estimates that $100 million annually will be required for the next 15 years to develop a coordinated research program led by the Department of Energy and the National Institutes of Health to study how low doses of radiation affect disease risk. The report was produced by the Committee on Developing a Long-Term Strategy for Low-Dose Radiation Research in the United States with sponsorship from the DOE and released on June 2. According to the NASEM report's authors, "Research in low-dose and low-dose-rate radiation in the United States is currently limited and fragmented, lacking leadership and an overarching prioritized strategic research agenda." The proposed cross-agency solution would have the DOE leading a portion of the research related to computation and modeling and the NIH leading epidemiological and biological research.

BWXT wins Project Pele contract to supply U.S.'s first microreactor

BWX Technologies, Inc., will deliver the first microreactor in the United States under a contract awarded by the Department of Defense Strategic Capabilities Office (SCO), the company announced June 9. BWXT will have two years to build a transportable microreactor prototype to the SCO's Project Pele specifications and deliver it to Idaho National Laboratory for testing under a cost-type contract valued at about $300 million.

The high-temperature gas-cooled reactor will use high-assay low-enriched uranium TRISO fuel and operate at a power level between 1 and 5 MWe. The microreactor will be transportable in multiple modules that fit 20-foot long, ISO-compliant CONEX shipping containers for movement by road, rail, sea, or air.

Artist's rendering of BWXT's Project Pele transportable reactor modules arriving for setup and operation. (Image: BWXT)

Continued

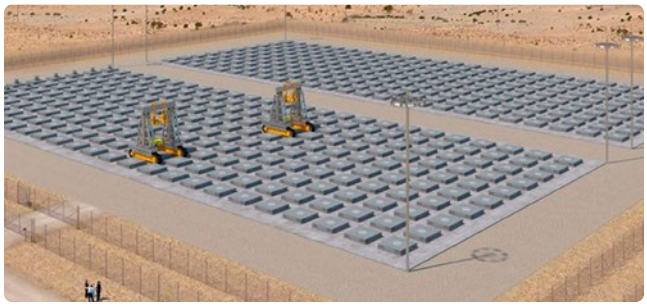
European Parliament backs "green" label for nuclear and gas

In a much-anticipated July 7 vote, EU lawmakers said no to a resolution objecting to the European Commission's proposal to add nuclear energy and natural gas to the list of green technologies covered by the EU taxonomy—the classification system used by the European Union to steer private investment toward environmentally sustainable economic projects. The vote, held during the European Parliament's July 4–7 plenary session, was 328 opposed to the resolution, 278 in favor, and 33 abstaining. An absolute majority—353 members—was required for the resolution to be passed and the nuclear-friendly proposal vetoed. Known as the Complementary Climate Delegated Act (CDA), the commission's controversial proposal allows for the inclusion of nuclear and gas on a transitional basis, under what the EC terms "clear and strict conditions."

U.K. greenlights Sizewell C project

The U.K. government granted a development consent order (DCO) in July for EDF Energy's proposed Sizewell C plant near Leiston in Suffolk, moving the new nuclear build project closer to reality. Nuclear New Build Generation Company, an EDF Energy subsidiary, submitted the DCO application to the government's Planning Inspectorate in May 2020, setting out the range of measures the project would implement to mitigate construction effects and maximize community benefits. The Planning Inspectorate accepted the application in June 2020 and completed its examination in October 2021. Recommendations were made to the secretary of state for business, energy, and industrial strategy in February 2022. The decision to grant the DCO marks the biggest milestone to date in the Sizewell C approval process. According to EDF, it followed four rounds of public consultation that began in 2012 and involved more than 10,000 East Suffolk residents.

A computer-generated rendering of the Sizewell site on the Suffolk coast. Sizewell A and B are to the left and center (respectively) in this image; the section to the right is the Sizewell C area. (Image: EDF Energy)



A rendering of Holtec's proposed HI-STORE CISF in New Mexico. (Image: Holtec)

NRC completes environmental review of Holtec's SNF facility

Based on its environmental review, the staff of the Nuclear Regulatory Commission recommended issuing a license to Holtec International for its proposed HI-STORE consolidated interim storage facility (CISF) for spent nuclear fuel in southeastern New Mexico. The recommendation came in the NRC's final environmental impact statement (EIS) for the facility, which was published in July. The NRC is to make a licensing decision following completion of its safety evaluation report, which is expected in early 2023. "By establishing the HI-STORE CISF, Holtec offers the nation a structurally impregnable, below-ground, disaster-immune, essentially zero-dose-emitting, and visually inconspicuous facility that will have zero impact on the local oil, gas, or potash mining operations or the lives of local farmers and ranchers, while creating well-paying clean energy jobs in the host communities," said Kris Singh, chief executive officer of Holtec.

$3 billion WIPP M&O contract awarded to Bechtel affiliate

The Department of Energy's Office of Environmental Management announced on July 11 that it had awarded a 10-year, $3 billion management and operating contract for the Waste Isolation Pilot Plant (WIPP) to Reston, Va.–based Tularosa Basin Range Services, a single-purpose entity under the umbrella of Bechtel National. The new contract replaced the WIPP M&O contract held by Nuclear Waste Partnership, which expired on September 30, 2022. The office said that it received five proposals in response to a contract solicitation issued in June 2021, and TBRS was selected after its proposal was determined to be the best value to the government. Located near Carlsbad, N.M., WIPP is the DOE's geologic repository for defense-generated transuranic waste.

NRC returns to full strength with Caputo, Crowell confirmations


Caputo


Crowell

The Senate confirmed by voice vote Annie Caputo and Bradley R. Crowell to seats on the Nuclear Regulatory Commission on August 2, returning the agency to its full, five-member complement. Caputo's term expires in June 2026, Crowell's in June 2027. Nominated by President Biden in May to serve on the commission, Caputo and Crowell appeared before the Senate Environment and Public Works (EPW) Committee on June 8 to field questions. On July 27, the EPW Committee unanimously approved both and sent their nominations to the Senate floor.

NRC okays fuel loading at new Vogtle unit

The Nuclear Regulatory Commission on August 3 authorized Vogtle plant operator Southern Nuclear to load fuel and begin operation at Unit 3—the first reactor to reach this point in the agency's combined license process. (Prior to 1989, reactors were licensed under a two-step process, requiring both a construction permit and an operating license.) The authorization came via an NRC letter to Southern Nuclear verifying that all 398 inspections, tests, analyses, and acceptance criteria (ITAACs) for Vogtle-3 have been met—a prerequisite for fuel loading to commence. The company on July 29 submitted its notification of ITAAC completion. With the authorization, Vogtle-3 moved out of the NRC's construction reactor oversight program and into its operating reactor oversight process.


Unit 3 at the Vogtle site in July 2022. (Photo: Georgia Power)

EDF Energy's Hinkley Point B nuclear power station, in Somerset, England. (Photo: EDF Energy)

U.K.'s Hinkley Point B retired

By all accounts the most productive nuclear power plant in British history, Somerset's Hinkley Point B station closed for good on August 1, with the shutdown of its B1 unit, a 485-MWe advanced gas-cooled reactor. (The plant's B2 unit, a 480-MWe AGR, was shuttered in early July.) The station employed around 500 staff and 250 contractors and contributed approximately £40 million (about $48.7 million) per year to the Somerset economy, according to EDF Energy, owner and operator of the United Kingdom's power reactor fleet. First synchronized to the U.K. power grid in February 1976, Hinkley Point B has since generated 311 terawatt-hours of electricity, EDF estimates—enough to meet the needs of every home in the United Kingdom for almost three years or every home in the southwest of England for 33 years.

X-energy, Dow to collaborate on SMR deployment

Small modular reactor developer X-energy and materials science giant Dow announced on August 9 the signing of a letter of intent aimed at deploying X-energy's Xe-100 reactor technology at one of Dow's U.S. Gulf Coast facilities. The companies expect the SMR plant, which would provide power and process heat to the Dow facility, to be operational by approximately 2030. According to the announcement, Dow is the first manufacturer to declare its intention to develop SMR technology options and intends to take a minority equity stake in X-energy. News of the collaboration broke at the American Nuclear Society's Utility Working Conference and Vendor Technology Expo, held in August at Marco Island, Fla.

Continued

August

Congress passes climate bill with tax credits and more for nuclear

After hours of debate alternating between Democratic praise for the Inflation Reduction Act (IRA) and Republican denunciation of it, the House of Representatives late on August 12 passed the sweeping energy, tax, and health care package in a straight party-line vote, 220–207. Its passage represented a significant win for President Biden, who signed the bill on August 16. The boldly named measure included $369 billion in energy security and climate spending, with nuclear energy among the beneficiaries. The legislation managed to squeak through the Senate on August 7, 51–50, again strictly along party lines, with Vice President Kamala Harris providing the tie breaker.

California lawmakers see the light, vote to extend Diablo Canyon operation

Bowing at last to the unflagging efforts of nuclear advocates over the past few years—as well as to more recent pressure from a former Diablo opponent, Gov. Gavin Newsom—the California legislature late on August 31 approved S.B. 846, a measure providing the option of extending operations at the Diablo Canyon nuclear power plant for five years beyond its scheduled 2025 closure date. The bill passed easily through both legislative chambers: 67–3 in the General Assembly and 31–1 in the Senate. Coauthored by state Sen. Bill Dodd (D., Napa) and Assemblymember Jordan Cunningham

The Diablo Canyon nuclear power plant. (Photo: Wikimedia/Doc Searls)

(R., San Luis Obispo), the legislation included a $1.4 billion forgivable loan to Pacific Gas & Electric, Diablo Canyon's owner and operator. The loan was made contingent, however, on the plant being eligible for the Department of Energy's $6 billion Civil Nuclear Credit Program. (For the decision on Diablo Canyon's CNC eligibility, see page 68.)

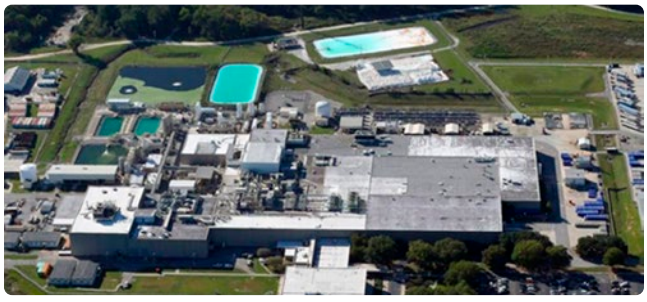
CHIPS and Science Act boosts nuclear energy R&D

President Joe Biden signed the CHIPS and Science Act of 2022 into law on August 9, after the $280 billion "economic competitiveness package" was passed in a 243–187 vote on July 28 in the House of Representatives. In addition to subsidies and tax credits for the semiconductor industry, the CHIPS and Science Act authorized appropriations for a wide variety of scientific research and development, including nuclear energy R&D and support for advanced reactor deployments.

September

Westinghouse fuel plant okayed for four more decades of operation

The Nuclear Regulatory Commission announced on September 12 that it had issued a renewed license for Westinghouse Electric Company's Columbia Fuel Fabrication Facility (CFFF), authorizing operations at the plant for another 40 years—through September 12, 2062. Located in Hopkins, S.C., the CFFF manufactures fuel rods for use in commercial nuclear reactors. According to Westinghouse, 10 percent of the nation's electricity comes from the fuel manufactured at the facility. The CFFF's license, first issued in 1969 by the Atomic Energy Commission, was last renewed by the NRC in 2007. This past July, the NRC issued its final environmental impact statement (EIS) for the proposed renewal, recommending a 40-year extension



An aerial view of Westinghouse's Columbia Fuel Fabrication Facility in Hopkins, S.C. (Photo: Westinghouse)

of operations. Like the NRC's draft EIS released in August 2021, the final EIS concluded that 40 additional years for the CFFF would result in "small" impacts on all resources, except for groundwater and waste generation during decommissioning, which would have "small to moderate" impacts.

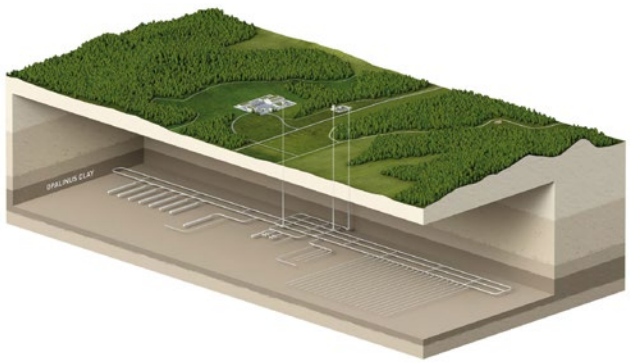
Graphic rendition of the Aurora microreactor. (Image: Oklo Inc.)

Oklo reapproaches NRC with microreactor licensing plan

Some eight months after the Nuclear Regulatory Commission denied Oklo Inc.'s license application to build and operate its Aurora microreactor in Idaho (see page 31), the company returned to the regulatory fray. On September 21, Oklo announced that it had submitted to the NRC a licensing project plan (LPP) outlining its proposed engagement to support future Aurora licensing activities. According to the announcement, the LPP presented prelicensing interactions to help Oklo and the agency achieve an efficient and effective review process, including items necessary for advanced fission designs.

Switzerland zeroes in on deep geological repository site

Nagra, Switzerland's national cooperative for the disposal of radioactive waste, announced in September that it has selected Nördlich Lägern in northern Switzerland near the German border as the site for a deep geological repository for radioactive waste. According to Nagra, extensive investigations concluded that Nördlich Lägern is the most suitable area for a geologic repository with the best overall safety reserves. Nagra also plans to build a spent fuel encapsulation plant at the Zwilag interim storage facility in nearby Würenlingen, which has been in operation for years. Nagra will now prepare general license applications for the repository, aiming for submittal to Switzerland's Federal Council in 2024.



An illustration of Switzerland's proposed deep geological repository. (Image: Nagra)

DOE advances consent-based siting with funding opportunity

The Department of Energy's Office of Nuclear Energy took another step in developing its consent-based siting process for storing spent nuclear fuel, announcing in September that it is making $16 million available to communities interested in learning more about "consent-based siting, management of spent nuclear fuel, and interim storage facility siting considerations." The funding opportunity follows the DOE's 2021 restart of its consent-based process. "With this funding, we are facilitating constructive, community-based discussions around the consensual solutions for storing spent nuclear fuel in order to harness the true power of clean nuclear energy," said secretary of energy Jennifer Granholm.

DOE opens application process for clean hydrogen hubs

The Department of Energy opened the application process for its $7 billion program to create regional clean hydrogen hubs (H2Hubs) across the United States on September 22. The DOE announced its intention to fund the program on June 6, the same day that Westinghouse Electric and Bloom Energy announced plans to develop the electrolysis technology that nuclear power plants can use to produce clean hydrogen from water. The DOE H2Hubs program was funded by the Bipartisan Infrastructure Law and supports the H2@Scale Initiative to create networks of hydrogen producers, consumers, and local infrastructure. At least one of the planned hydrogen hubs will use nuclear power to generate the hydrogen.

Continued

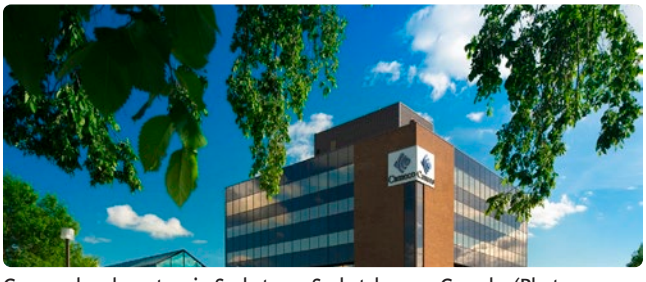
Virginia governor touts nuclear in launch of new state energy plan

Speaking in early October at the launch ceremony for Virginia's 2022 Energy Plan, Gov. Glenn Youngkin called for an all-of-the-above approach, stressing the need for "an achievable and dynamic energy plan that provides for abundant, reliable, affordable, and clean energy." He also left no doubt as to where nuclear power fits into that plan. "We have to be all in [for] nuclear energy in Virginia," Youngkin declared, addressing an audience of lawmakers, hard-hatted workers, and business executives at a power transformer manufacturing facility in Lynchburg. "When it comes to reliability, affordability, when it comes to clean power, when it comes to the abundant nature of growing power demand, absolutely nothing beats nuclear energy. It is the baseload of all baseloads. And Virginia is uniquely positioned to lead." In addition, the governor said that his state plans to "launch a commercial small modular reactor that will be serving customers with baseload power demand in southwest Virginia within the next 10 years."

Youngkin

Westinghouse changes hands again as Cameco buys into $7.9 billion deal

Five years after bankruptcy, Pennsylvania-based Westinghouse is being sold again, this time with a 49 percent share going to Cameco Corp., the front-end uranium mining, milling, and conversion company headquartered in Saskatchewan, Canada. Cameco and Brookfield Business Partners, based in Toronto, Ontario, announced the deal on October 11. Once the deal closes as expected, in the second half of 2023, Brookfield Renewable Partners and other Brookfield institutional partners will own a 51 percent interest in a consortium with Cameco. Brookfield Renewable would add its 17 percent interest in Westinghouse to a portfolio of about 124,000 MW of hydroelectric, wind, solar, and storage facilities—24,000 MW installed and 100,000 MW under development—in North America, South America, Europe, and Asia. The total enterprise value for Westinghouse is $7.875 billion. Existing debt of about $3.4 billion will be assumed by the purchasers, with the estimated $4.5 billion equity cost being met by investments of about $2.3 billion from Brookfield Renewable and its institutional partners, and of about $2.2 billion from Cameco.



Cameco headquarters in Saskatoon, Saskatchewan, Canada. (Photo: Cameco)

The Neckarwestheim nuclear power plant in Germany. (Photo: EnBW)

Germany to keep last nuclear plants running through winter

Via an October 17 letter, German chancellor Olaf Scholz informed economy and energy minister Robert Habeck, environment minister Steffi Lemke, and finance minister Christian Lindner of his decision to keep Germany's three remaining operating nuclear power plants running "beyond 31 December 2022 until 15 April 2023 at the latest." The order ended months of argument between Scholz's two coalition partners—the stridently antinuclear Greens and the center-right Free Democrats (FDP)—regarding the plants' continued operation. (Habeck and Lemke are Green Party members, while Lindner is with the FDP.) Prior to September, those plants—Isar, Neckarwestheim, and Emsland—were scheduled for retirement by the end of 2022, in keeping with Germany's nuclear energy phaseout policy. In late September, however, in something of a compromise between the Greens and the FDP, the German government forged an agreement with the operators of Isar and Neckarwestheim to keep those two plants in operational reserve this coming winter should they be needed for energy security. RWE's Emsland was to remain slated for closure by December 31.

Westinghouse to build Poland's first nuclear reactors; KHNP gets separate deal

Poland chose Westinghouse Electric Company on October 28 to supply the reactors for its initial nuclear power plant, as the Central European nation seeks to lessen its dependence on domestic coal and Russian imports for its energy supply. Polish prime minister Mateusz Morawiecki announced the decision on Twitter, confirming earlier reports that Westinghouse's AP1000 technology was the government's likely choice. Competing with the American firm for the job were Électricité de France and Korea Hydro & Nuclear Power. In October 2021, EDF submitted an offer to build four to six EPRs in Poland, while KHNP offered in April 2022 to construct six APR1400 units. KHNP got its own deal, however, just days later when it signed a letter of intent with Polish companies ZE PAK and PGE to "jointly prepare a plan for the construction of a nuclear power plant based on Korea's APR1400 technology."

Seventh Hanford reactor gets cocooned

The Department of Energy's Office of Environmental Management completed construction of Hanford's K East Reactor cocoon in October, ahead of schedule and under budget. Cocooning of K East—enclosing it in a protective steel structure while the reactor's radioactivity naturally decays—was one of the office's key construction priorities for 2022. K East, which operated from 1955 to 1971, is the seventh of nine former plutonium production reactors to be cocooned at the Hanford Site near Richland, Wash. The nearby K West Reactor will be the eighth. The ninth, the B Reactor, has been preserved as the world's first full-scale plutonium production reactor and is part of the Manhattan Project National Historical Park.

A protective steel cocoon was built over the former K East Reactor building at the DOE's Hanford Site. (Photo: DOE)

DOE awards $38 million to advance spent fuel recycling

The Department of Energy announced on October 21 that it will provide $38 million in funding for a dozen projects aimed at developing technologies to advance spent nuclear fuel reprocessing, reduce the volume of high-level waste requiring permanent disposal, and provide domestic advanced reactor fuel stocks. Funded through the Converting UNF Radioisotopes Into Energy (CURIE) Program within the DOE's Advanced Research Projects Agency–Energy (ARPA-E), the projects are being led by universities, private companies, and national laboratories. "Recycling nuclear waste for clean energy generation can significantly reduce the amount of spent fuel at nuclear sites and increase economic stability for the communities leading this important work," said secretary of energy Jennifer Granholm.

DOE plans offtake contracts to stock a HALEU bank "as soon as possible"

The Department of Energy's plan for meeting the urgent need for high-assay low-enriched uranium (HALEU) to fuel advanced reactor deployments advanced when the DOE held an Industry Day on October 14. Attendees were asked how soon they could deliver 25 metric tons per year of HALEU enriched in the United States from newly mined uranium. Offtake contracts for six or more years of HALEU production at that rate could be used to stock a DOE-owned HALEU bank to "support [HALEU] availability for civilian domestic research, development, demonstration, and commercial use." The Energy Act of 2020 authorized a HALEU Availability Program to build a sustainable commercial enrichment infrastructure, and the Inflation Reduction Act of 2022 provided an initial $700 million for HALEU availability. Of that $700 million, about $500 million will be available for offtake agreements.

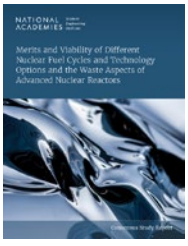
Continued

U.K. government backs Sizewell C with close to £700 million

The British government announced on November 29 an investment of £679 million (about $828 million) in the proposed Sizewell C nuclear plant in Suffolk, England, confirming chancellor of the exchequer Jeremy Hunt's remarks on the project in his November 17 statement. The investment makes the government a 50 percent shareholder with EDF in Sizewell C and allows for China General Nuclear Power Corporation's exit from the project. (CGN remains, however, a partner with EDF in Britain's Hinkley Point C new nuclear build project, currently underway in Somerset.) The funding also represents the first direct government investment in a new nuclear power project since Sizewell B—the last nuclear power station to be built in the United Kingdom. (Approved for construction in 1987, Sizewell B entered commercial operation in 1995.)

Two reports agree: Diverse advanced reactor fuel cycles can succeed

Advanced reactors and small modular reactors with strikingly different coolants and sizes offer an array of different benefits, but when it comes to fuel cycle issues, including spent fuel and waste, they have a lot in common with conventional light water reactors. Two reports released in mid-November—a National Academies of Sciences, Engineering, and Medicine (NASEM) consensus committee report two years in the making and a Department of Energy study released by Argonne National Laboratory—addressed the timely topic of advanced reactor fuel cycle issues. While the NASEM committee ventured to define research and infrastructure needs to support the entire nuclear power fuel cycle, inclusive of new technologies, for decades to come, the DOE report compared the front- and back-end fuel cycle metrics of three reactor designs (from NuScale Power, TerraPower, and X-energy) that have been selected for DOE cost-share–funded demonstrations within this decade.



Tarik Choho, Westinghouse nuclear fuel president (left, foreground), and Simon-Erik Ollus, executive vice president of Fortum Generation, shake hands after signing the VVER-440 fuel contract, surrounded by Fortum and Westinghouse team members. (Photo: Westinghouse)

Westinghouse, Fortum strike fuel deal for Loviisa

Westinghouse Electric Company and Finnish energy company Fortum jointly announced in November the signing of a long-term partnership to develop, license, and supply VVER-440 fuel to Finland's two-unit Loviisa nuclear power plant. The new fuel type, according to Fortum, is based on the British Nuclear Fuel Limited/Westinghouse fuel supplied to Loviisa from 2001 to 2007 and used in parallel with the fuel supplied by Russia's TVEL in the early 2000s. (From 1999 to 2006, Westinghouse was part of the now-defunct BNFL.) The fuel agreement with TVEL, Fortum said, is valid until the end of the units' current operating licenses in 2027 and 2030.

Bids in for new unit at Dukovany

A Westinghouse-Bechtel team, France's EDF, and Korea Hydro & Nuclear Power have all submitted their initial bids for securing the contract to build a fifth reactor at the Czech Republic's Dukovany plant, Czech utility ČEZ announced on November 30. Dukovany, one of the Czech Republic's two nuclear power facilities—the other being the two-unit Temelin plant—houses four Russian VVER-440/V213 pressurized water reactors, all of which entered commercial operation from 1985 to 1987. In March 2020, ČEZ filed an application with the country's State Office for Nuclear Safety to construct up to two new reactors at the site, each with a generating capacity of up to 1,200 MWe. Final bids are to be submitted by the end of September 2023 and the winning bidder announced in 2024, according to the announcement. ČEZ hopes to have the new unit in operation by 2036.

Westinghouse's Kirsty Armer and Studsvik's Mikael Karlsson sign a technology license agreement to develop a metals recycling and treatment facility at the Westinghouse Springfields site in Lancashire, U.K. (Photo: Westinghouse)

Westinghouse, Studsvik to expand capabilities at Springfields site

Westinghouse Electric Company on December 1 announced the signing of a long-term technology license agreement with Swedish engineering services firm Studsvik to develop a metals recycling and treatment facility at Westinghouse's Springfields site. Located near Preston, Lancashire, in northwestern England, Springfields is the United Kingdom's only site for nuclear fuel manufacturing, supplying all its advanced gas-cooled reactor fuel. According to Westinghouse, Springfields fuel is responsible for about 32 percent of Britain's low-carbon electricity generation. In addition, the site exports other nuclear fuel products to customers around the globe. In its announcement, Westinghouse stated that the new project, dubbed the Springfields Melter for Advanced Recycling and Treatment (SMART) facility, will feature a metal melter as the core technology to clean, treat, and recycle contaminated metals and large components.

Ontario's SMR plans for Darlington advance

The Ontario government announced in early December the start of site preparation at the Darlington nuclear power plant for Canada's first grid-scale small modular reactor: GE Hitachi Nuclear Energy's BWRX-300. Darlington's owner and operator, Ontario Power Generation, awarded Niagara-based E.S. Fox a contract in March 2022 valued at C$32 million (about $23.5 million) for early site preparation and support infrastructure, including water supply, electrical power, information technology, and road services. OPG expects the work to generate some 100 jobs. "With global businesses looking to expand in jurisdictions with clean and cost-effective electricity, small modular reactors will help compete for and attract more game-changing investments in Ontario's economy," said Ontario premier Doug Ford at the December 2 ceremony marking commencement of the work.

Centrifuge casings arrive at the Piketon, Ohio, plant. (Photo: Centrus Energy)

Centrus signs contract to complete HALEU demo in 2023

Centrus Energy confirmed on December 1 that its wholly owned subsidiary American Centrifuge Operating had signed a contract with the Department of Energy that was first announced on November 10 to complete and operate a demo-scale high-assay low-enriched uranium (HALEU) gaseous centrifuge cascade in Piketon, Ohio. The base contract is valued at about $150 million over two phases through 2024: Phase One includes a cost-shared investment of $60 million, split 50-50 between Centrus and the DOE, to bring the cascade online and demonstrate production of 20 kilograms of 19.75 percent HALEU by the end of 2023. Under Phase Two, production would continue for a full year at an annual rate of 900 kilograms, on a cost-plus-incentive-fee basis valued at about $90 million.