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Merits and Viability of Different Nuclear Fuel Cycles and Technology Options and the Waste Aspects of Advanced Nuclear Reactors

September 21-22, 2020
Virtual Meeting

PUBLIC AGENDA

Day 1: Monday, September 21, 2020 (All times are ET.)

Connection details for September 21:

Link: https://nas-sec.webex.com/nas-sec/j.php?MTID=m9c39fef78ec791b21a474814a984fb2c
Meeting ID: 199 314 3089
Password: 832EJhk7EDP

Join by phone: +1-415-527-5035 US Toll or +1-929-251-9612 USA Toll 2
Access code: 199 314 3089

Join by video system: Dial 1993143089@nas-sec.webex.com or dial 207.182.190.20 and enter 199 314 3089.

To test audio and video prior to the meeting, go to: https://help.webex.com/en-us/nti2f6w/Webex-Meetings-Join-a-Test-Meeting.

PUBLIC SESSION 1

1:00 pm – 1:10 pm **Call Open PUBLIC SESSION 1 to Order and Welcome**
Janice Dunn Lee, Committee Chair, and Charles Ferguson, Study Director

1:10 pm – 1:30 pm **1.1: Opening Remarks on Behalf of the Department of Energy's Office of Nuclear Energy (DOE-NE) about this Congressionally Mandated Study**
William Boyle, Acting Deputy Assistant Secretary
Office of Spent Fuel and Waste Disposition, U.S. Department of Energy (confirmed)

1:30 pm – 1:45 pm **Q+A and Discussion on Presentation 1.1**

1:45 pm – 2:00 pm **1.2: The Honorable Christopher T. Hanson's Perspectives on the Congressional Mandate**
Christopher T. Hanson, Commissioner
U.S. Nuclear Regulatory Commission, and previously Professional Staff Member, U.S. Senate Appropriations Committee (confirmed)

2:00 pm – 2:15 pm **Q+A and Discussion on Presentation 1.2**

2:15 pm – 2:30 pm **1.3: U.S. House of Representatives' Appropriations Staff Presentation on the Congressional Mandate**
Scott McKee, Professional Staff Member
U.S. House Appropriations Committee, Subcommittee on Energy and Water (confirmed)

2:30 pm – 2:45 pm **Q+A and Discussion on Presentation 1.3**

2:45 pm – 3:00 pm **BREAK**

3:00 pm – 3:20 pm **1.4: Overview of DOE-NE's Fuel Cycle Work**
Andrew Griffith, Deputy Assistant Secretary
Office of Nuclear Fuel Cycle and Supply Chain, U.S. Department of Energy (confirmed)

3:20 pm – 3:35 pm **Q+A and Discussion on Presentation 1.4**

3:35 pm – 3:45 pm **Public Comment Period**

3:45 pm **Adjourn PUBLIC SESSION – Day 1**

Day 2: Tuesday, September 22, 2020 (All times are ET.)

Connection details for September 22 (same as previous connection info):

Link: https://nas-sec.webex.com/nas-sec/j.php?MTID=m9c39fef78ec791b21a474814a984fb2c
Meeting ID: 199 314 3089
Password: 832EJhk7EDP

Join by phone: +1-415-527-5035 US Toll or +1-929-251-9612 USA Toll 2
Access code: 199 314 3089

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To test audio and video prior to the meeting, go to: https://help.webex.com/en-us/nti2f6w/Webex-Meetings-Join-a-Test-Meeting.

PUBLIC SESSION 2

1:00 pm – 1:10 pm **Call Open PUBLIC SESSION 2 to Order and Welcome**
Janice Dunn Lee, Committee Chair, and Charles Ferguson, Study Director

1:10 pm – 1:30 pm **2.1: Overview of DOE-NE's Advanced Reactors Work**
Alice Caponiti, Deputy Assistant Secretary

Office of Reactor Fleet and Advanced Reactor Deployment, U.S. Department of Energy (confirmed)

1:30 pm – 1:45 pm **Q+A and Discussion on Presentation 2.1**

1:45 pm – 2:05 pm **2.2: Overview of DOE-NE's Fuel Cycle Options Evaluation**
Bhupinder P. Singh, Program Manager
Nuclear Fuel Cycle and Supply Chain (NE-4), Office of Nuclear Energy, U.S. Department of Energy (confirmed)

2:05 pm – 2:15 pm **Q+A and Discussion on Presentation 2.2**

2:15 pm – 2:30 pm **BREAK**

2:30 pm – 3:15 pm **2.3: Overview of the U.S. Nuclear Regulatory Commission's Regulatory Programs on Fuel Cycles and Waste Aspects of Advanced Reactors**
Christopher M. Regan, Deputy Director
Division of Fuel Management, Office of Nuclear Material Safety and Safeguards (confirmed)
James Hammelman, Senior Chemical Process Engineer
Division of Fuel Management, Office of Nuclear Material Safety and Safeguards (confirmed)
Jose R. Cuadrado, Project Manager
Division of Fuel Management, Office of Nuclear Material Safety and Safeguards (confirmed)

3:15 pm – 3:45 pm **Q+A and Discussion on Presentation 2.3**

3:45 pm – 4:00 pm **Public Comment Period**

4:00 pm **Adjourn PUBLIC SESSION – Day 2**

Reading Materials

Nuclear Fuel Cycle Evaluation and Screening Study documents, which can be found here: https://fuelcycleevaluation.inl.gov/SitePages/Home.aspx.

Presenter Biographies

Dr. **William J. Boyle** is the director of the Office of Spent Fuel & Waste Science and Technology (SFWST) in the U.S. Department of Energy's (DOE) Office of Nuclear Energy (NE). The mission of SFWST is to conduct research and technology development to enable storage, transportation, and disposal of used nuclear fuel and wastes generated by existing and future nuclear fuel cycles. He is currently on detail as the Deputy Assistant Secretary for Spent Fuel and Waste Disposition. Before joining NE, Dr. Boyle was the Director of the Regulatory Authority Division (RAD) in the DOE's Office of Civilian Radioactive Waste Management

(OCRWM). The mission of the RAD was to develop and support the License Application (LA), the environmental impact statement, and maintain a certified Licensing Support Network (LSN) that meets NRC regulatory requirements, for the Yucca Mountain Project. Dr. Boyle was a member of a Source Evaluation Board that successfully evaluated 3 proposals that ended with a non-protested award for a multibillion dollar Management and Operating contract. Before joining DOE, Dr. Boyle was a geo-technical engineer for the U.S. Nuclear Regulatory Commission, Division of High-Level Waste. From 1985-1992, Dr. Boyle participated in private sector site characterization and design activities for proposed repositories at Yucca Mountain, Nevada; Hanford, Washington; and Deaf Smith County, Texas. He also has worked on characterization for and analysis of underground excavations in California, Canada, Finland, and Japan. Dr. Boyle also participated in characterization and analysis of large rock sculptures at Mt. Rushmore, South Dakota, and Stone Mountain, Georgia. He holds a Doctorate in civil engineering, University of California, Berkeley; Master's degree in civil engineering, University of California, Berkeley; and Bachelor's degree in geology, University of California, Berkeley.

Alice Caponiti serves as the Deputy Assistant Secretary for Reactor Fleet and Advanced Reactor Deployment in the Office of Nuclear Energy. She leads a diverse portfolio of research, development and demonstration programs focused on the technical and economic sustainability of the existing U.S. fleet of commercial reactors and the development and deployment of innovative advanced reactors, including small modular reactors and microreactors. Ms. Caponiti is managing a new cost-shared program with industry to demonstrate multiple advanced reactor designs that offer improved safety, functionality and affordability, leading to expanded market opportunities for clean energy. Her office also sustains the nuclear talent pipeline through competitive university R&D and infrastructure investment programs. Ms. Caponiti serves on the Generation IV International Forum Policy Group that advises on research and development needed to establish the feasibility and performance capabilities of the next generation nuclear energy systems. Ms. Caponiti previously led efforts to design, build, test, and deliver safe and reliable nuclear power systems for space exploration and national security applications and conduct detailed safety analyses for each mission. She served as the as the technical advisor to the Department of State and a United Nations working group on space nuclear power sources, as well as a risk communications spokesperson for the New Horizons mission to Pluto and the Mars Science Laboratory mission that delivered the Curiosity rover to the surface of Mars. Prior to joining the Office of Nuclear Energy in 2001, Ms. Caponiti worked on a nonproliferation program to reduce stockpiles of excess Russian weapons plutonium. Ms. Caponiti has a bachelor's degree in civil engineering from the University of Maryland and master degrees in nuclear engineering and the Technology and Policy Program from the Massachusetts Institute of Technology.

Jose Cuadrado is a Project Manager in the Storage and Transportation Licensing Branch in the Division of Fuel Management in the Office of Nuclear Material Safety and Safeguards. In this role, Mr. Cuadrado conducts reviews of applications for spent fuel storage facility licenses, dry storage cask certificates, and transportation package certificates. Mr. Cuadrado is currently the Project Manager for the safety and security review of Holtec International's proposed HI-STORE Consolidated Interim Storage Facility in Lea County, New Mexico. Prior to his current role, Mr. Cuadrado worked in NRC's Division of High-Level Waste Repository Safety, where he performed reviews of the license application for the proposed geologic repository at Yucca Mountain, Nevada, and led the implementation of stakeholder outreach and communications associated with the repository program. Mr. Cuadrado has worked at the NRC for over 18 years. Mr. Cuadrado holds a B.S. degree in Chemical Engineering from the University of Puerto Rico, and an MBA from the University of Maryland, College Park.

Andrew Griffith was appointed in September 2019 as the Deputy Assistant Secretary for Nuclear Fuel Cycle and Supply Chain for the Department of Energy's (DOE) Office of Nuclear Energy. In this position, Mr. Griffith leads DOE's research and development on advanced nuclear fuel cycle technologies that have the potential to improve resource utilization and energy generation, reduce waste generation, and limit proliferation risk. In this role, Mr. Griffith also leads the DOE effort to work with industry to facilitate the improvement of the existing uranium fuel supply chain and develop the supply chain for the new fuel concepts powering the advanced nuclear reactors of tomorrow. Prior to this, Mr. Griffith served in various leadership roles in the Office of Nuclear Energy, supporting the full range of nuclear energy waste management, facility operations, and technology research missions (2003-present). He previously served in the Office of Environmental Management, primarily focusing on the management of DOE's spent nuclear fuel and high-level waste (1990-2003). Before joining DOE, Mr. Griffith served in the U.S. nuclear submarine force and continued serving in the Naval Reserve after joining DOE. He retired from the Naval Reserve as a Captain in 2009. Mr. Griffith holds a Bachelor of Science in Naval Architecture from the U.S. Naval Academy and a Master of Science in Technology Management from the University of Maryland, University College.

James Hammelman is a Senior Chemical Process Engineer in NRC's Office of Nuclear Material Safety and Safeguards, Division of Fuel Management. He has worked in the nuclear material processing/fuel cycle area since 1970. Mr. Hammelman has filled many roles including process engineer supporting plant operations, process development engineer, safety analyst, and environmental impact analyst. He has worked at many nuclear material processing facilities and nuclear waste processing facilities, both those owned by DOE and those owned by private industry. Mr. Hammelman was a project manager for a private company that provided technical support services to the NRC for its fuel cycle licensing activities. He has been a Senior Chemical Process Engineer at NRC for 10 years. At the NRC, Mr. Hammelman has supported the licensing of fuel cycle facilities, the licensing of medical isotope processing facilities, and the planning for licensing of advanced reactor fuel cycle facilities. He has been engaged in NMSS' preparation for advanced reactor fuel cycle licensing for the past 4 years. Mr. Hammelman has provided technical direction to national laboratory contractors that compiled and documented information on the hazards associated with metal fuel fabrication and molten salt reactor fuel processing. He has both a B.S. from Oregon State University and an M.S. in chemical engineering from the University of Washington.

The Honorable **Christopher T. Hanson** was sworn in as a Commissioner of the U.S. Nuclear Regulatory Commission on June 8, 2020, and is filling the remainder of a five-year term ending on June 30, 2024. Hanson has more than two decades of government and private-sector experience in the fields of nuclear energy. Prior to joining the NRC, he served as a Staff Member on the Senate Appropriations Committee, where he oversaw civilian and national security nuclear programs. Before working in the Senate, Hanson served as a Senior Advisor in the Department of Energy's Office of Nuclear Energy. He also served in the Office of the Chief Financial Officer, where he oversaw nuclear and environmental cleanup programs, and managed the Department's relationship with Congressional Appropriations Committees. Prior to joining the Department, he served as a consultant at Booz Allen Hamilton where he led multiple engagements for government and industry in the energy sector. Hanson earned master's degrees from Yale Divinity School and Yale School of Forestry and Environmental Studies, where he focused on ethics and natural resource economics. He earned a Bachelor of Arts degree in Religious Studies from Valparaiso University in Valparaiso, Indiana.

Scott McKee focuses on energy and science accounts at the House Appropriations Subcommittee on Energy and Water. Previously, he worked at the Senate Committee on Energy and Natural Resources, the Bipartisan Policy Center, the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, and the Energy Information Administration at the Department of Energy. Scott has a B.S. and M.S. in Chemical and Biomolecular Engineering from the Georgia Institute of Technology.

Christopher Regan is the Deputy Director for the Division of Fuel Management in the Office of Nuclear Material Safety and Safeguards (NMSS) at the U.S. Nuclear Regulatory Commission. In this role, he is responsible for the safety and security licensing and oversight programs for fuel fabrication facilities, spent fuel storage and transportation, and for radioactive materials transportation packaging. Mr. Regan has over 29 years of experience working as a regulator in the nuclear energy industry, including assignments early in his career as an inspector working at the San Onofre Nuclear Generating Station and as a technical reviewer and project manager for the first commercial operating reactor license renewals. He has subsequently held diverse leadership positions at the NRC that included responsibilities for the Reactor Oversight Process and decommissioning funding assurance and international activities in the Office of Nuclear Reactor Regulation, and the construction inspection and oversight program out of the NRC's Region II office. Mr. Regan was selected into the Senior Executive Service in 2017, and between 2017 and 2019 served in Executive positions as the Deputy Director of the Division of Engineering, in the Office of Regulatory Research and the Deputy Director of the Division of Spent Fuel Management in NMSS. Mr. Regan received an M.S. in Engineering Management and a B.S. in Mechanical Engineering from the University of Maryland.

Mr. **Bhupinder P. Singh** serves as the Program Manager for Systems Analysis and Integration. He is leading a multi-laboratory team of experts to apply the principles of systems engineering to help NE-4 focus its resources on those fuel cycle research and development (R&D) activities which are most important to the future of nuclear energy in the United States. Mr. Singh has over thirty years of program management, project management, and engineering experience in federal government and U.S. nuclear industry. He joined the Department of Energy in April 2002, and has worked as a Program Manager for several key programs within the Office of Nuclear Energy including the Versatile Test Reactor, Fast Reactor R&D as part of the Advanced Fuel Cycle Initiative and Global Nuclear Energy Partnership, Nuclear Power 2010, and Nuclear Energy Plant Optimization. He served as the vice-chair of the Sodium Fast Reactor System Steering Committee under the Generation IV International Forum. He also developed the QA approach currently being used for fuel cycle R&D activities in NE-4. Prior to joining DOE, Mr. Singh worked in commercial nuclear industry in many aspects of commercial nuclear power plants including design and analysis of high-energy piping systems and associated pipe rupture restraints, developing specifications and procuring plant mechanical equipment; providing on-site engineering support for construction and testing, troubleshooting fuel pool leakage problems at an operating power plant, assisting the Nuclear Regulatory Commission in the reconstitution of the licensing basis for a commercial nuclear plant, investigating root causes for break-down of the quality assurance program at a power plant and developing recommendations for corrective actions. Mr. Singh holds a Master of Science degree in Mechanical Engineering from the University of Maryland, a Bachelor of Science degree in Aerospace Engineering from the Indian Institute of Technology, Kanpur, and has been licensed as a Professional Engineer (Civil) in the State of New Jersey since 1982.