Review of the Continued Analysis of Supplemental Treatment of Low-Activity Waste at the Hanford Nuclear Reservation

October 20-21, 2021
Virtual Meeting

PUBLIC AGENDA
Draft: October 10, 2021

Day 1: Wednesday, October 20, 2021 (All times are US Eastern.)

PUBLIC SESSION

WEBEX connection details for October 20:

Join from the meeting link
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11:00 am – 11:05 am	**Call Open PUBLIC SESSION to Order and Welcome to the Second Meeting** John S. Applegate, Committee Chair, and Charles D. Ferguson, Study Director
11:05 am – 11:20 am	**Introduction, Overview, and Status of FFRDC Team's Work** William (Bill) F. Bates, Deputy Associate Laboratory Director for the Environmental and Legacy Management (ELM) Directorate, Savannah River National Laboratory
11:20 am – 12:05 pm	**Baseline Case and Flywheel Effect for Technetium and Iodine** Michael E. Stone, Savannah River National Laboratory
12:05 pm – 12:45 pm	**Regulatory Considerations** Stephanie Johansen, Pacific Northwest National Laboratory
12:45 pm – 1:15 pm	**Break**
1:15 pm – 2:15 pm	**Decision Framework** David Tate, Ph.D., Institute for Defense Analyses

2:15 pm – 2:45 pm	**Assumptions and GAO Best Practices** Matt Champagney, Parsons
2:45 pm – 3:00 pm	**Break**
3:00 pm – 3:30 pm	**Alternatives Update and Preliminary Assessment** Dan McCabe, Savannah River National Laboratory
3:30 pm – 4:00 pm	**Technical Uncertainties** Matt Asmussen, Pacific Northwest National Laboratory
4:00 pm – 4:45 pm	**Cost Estimating Bases and Description** Gene Ramsey, Savannah River National Laboratory
4:45 pm – 5:00 pm	**Public Comment Period**
5:00 pm	**Adjourn PUBLIC SESSION**

Day 2: Thursday, October 21, 2021 (All times are US Eastern.)

PUBLIC SESSION

WEBEX connection details for October 21:

Join from the meeting link
https://nas-sec.webex.com/nas-sec/j.php?MTID=m37be22b6dce86b66911974a727ff1b9f

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11:00 am – 11:05 am	**Call Open PUBLIC SESSION to Order and Welcome to the Second Meeting** John S. Applegate, Committee Chair, and Charles D. Ferguson, Study Director
11:05 am – 11:45 am	**U.S. Department of Energy's Office of Environmental Management's (DOE-EM's) Initiative to Develop a R&D Roadmap for Accelerating Hanford Tank Waste Cleanup** Ming Zhu, Ph.D., DOE-EM Senior Advisor for Laboratory Policy and DOE-EM Liaison to Network of National Laboratories for Environmental Management and Stewardship (NNLEMS), U.S. Department of Energy

	Connie Herman, Associate Laboratory Director, Environmental and Legacy Management directorate, Savannah River National Laboratory
11:45 am – 12:30 pm	**U.S. Department of Energy's Updates to Maximum Contaminant Levels and Dose Coefficients for Relevant Radionuclides** Carlos Corredor, Senior Health Physicist, Office of Public Radiation Protection, U.S. Department of Energy
12:30 pm – 1:00 pm	**Break**
1:00 pm – 1:20 pm	**Perspective from the Chair of the Hanford Advisory Board** Stephen (Steve) Weigman, Chair, Hanford Advisory Board
1:20 pm – 2:00 pm	**Perspectives from Representatives of the Hanford Communities, Energy Community Alliance, and Tri-City Development Council** David Reeploeg, Executive Director, Hanford Communities Diahann Howard, Executive Director of the Port of Benton Brent Gerry, Mayor, West Richland, WA
2:00 pm – 2:30 pm	**Perspective from Washington State Department of Ecology** Jay Decker, Lead Tank Waste Treatment Engineer, and Suzanne Dahl, Section Manager of Tank Waste Treatment
2:30 pm – 3:00 pm	**Perspective from Oregon Department of Energy** Jeff Burright, Radioactive Waste Remediation Specialist, Oregon Department of Energy
3:00 pm – 3:10 pm	**Break**
3:10 pm – 3:35 pm	**Perspective from the Nez Perce Tribe** Jack H. Bell, Director, Environmental Restoration and Waste Management Program, Nez Perce Tribe
3:35 pm – 4:00 pm	**Perspective from the Confederated Tribes of the Umatilla Indian Reservation** Althea Huesties-Wolf, Hanford Policy Analyst, Confederated Tribes of the Umatilla Indian Reservation
4:00 pm – 4:45 pm	**Wrap Up of FFRDC Team Presentations with Additional Time for Q&A about the Presentations** William (Bill) F. Bates, Team Leader, Savannah River National Laboratory
4:45 pm – 5:00 pm	**Public Comment Period**
5:00 pm	**Adjourn PUBLIC SESSION**

Reading Materials*

* Presentations and videos will be provided in advance on the study's meeting event webpage when available and dependent on copyright permission. If presentations are not posted in advance, every effort will be made to make presentations available on the project website within 2-3 days after the meeting.

From Charles Ferguson, the study director, relevant items include current study information, Congressional mandate text, and background information from the 2017-2020 study, Supplemental Treatment of Low-Activity Waste at the Hanford Nuclear Reservation:

- Link to the current study with statement of task, committee member bios, events contact information, and public comment using the "Provide feedback on this project" feature. Event links will contain presentations when available. Event pages contain videos and presentations.
- Link to relevant text of the Congressional mandate of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021, Public Law 116-283, Section 3125, "CONTINUED ANALYSIS OF APPROACHES FOR SUPPLEMENTAL TREATMENT OF LOW-ACTIVITY WASTE AT HANFORD NUCLEAR RESERVATION"
- Links for previous reviews of FFRDC reports, mandated in Section 3134 of the National Defense Authorization Act for FY2017, are available at:

  Review of the Analysis of Supplemental Treatment Approaches of Low-Activity Waste at the Hanford Nuclear Reservation: Review #1 (2018) The first of four, this report reviews the analysis carried out by the FFRDC. It evaluates the technical quality and completeness of the methods used to conduct the risk, cost benefit, schedule, and regulatory compliance assessments and their implementations; waste conditioning and supplemental treatment approaches considered in the assessments; and other key information and data used in the assessments.

  Review of the Draft Analysis of Supplemental Treatment Approaches of Low-Activity Waste at the Hanford Nuclear Reservation: Review #2 (2018) The second of four, this report reviews the results of the assessments, including the formulation and presentation of conclusions and the characterization and treatment of uncertainties.

  Review of the Final Draft Analysis of Supplemental Treatment Approaches of Low-Activity Waste at the Hanford Nuclear Reservation: Review #3 (2019) The third of four, this report provides an overall assessment of the FFRDC team's final draft report, dated April 5, 2019.

  Final Review of the Study on Supplemental Treatment Approaches of Low-Activity Waste at the Hanford Nuclear Reservation: Review #4 (2020) This review report discusses developments since the publication of Review #3 and provides a summary of public comments on the third committee review report. The authoring committee then shares their views on these comments and whether they change any of the findings or recommendations in the third review report.

Presenter Biographies

Matt Asmussen, Pacific Northwest National Laboratory

Dr. Matthew Asmussen is a chemist at Pacific Northwest National Laboratory (PNNL) in the Nuclear Sciences Division of the Energy and Environment Directorate. Dr. Asmussen received his Ph.D. in chemistry from the University of Western Ontario (Canada) and joined PNNL in 2014. Dr. Asmussen's areas of expertise include corrosion science, electrochemistry and

nuclear waste form design and durability. He has published works on a wide range of waste form classes including cementitious, glass, ceramic, metallic and iodine waste forms. In 2018, Dr. Asmussen led a team that was selected as the winner of the Department of Energy Office of River Protection Grand Challenge with the proposal “Cementitious Immobilization of Treated LAW and Ancillary Benefits to Risk Reduction in Cross-site Transfer”. Since 2018 Dr. Asmussen has acted as Principal Investigator of PNNL’s Integrated Disposal Facility (IDF) Performance Assessment (PA) program where he leads a multidisciplinary team focused on solving technical challenges related to glass and grout waste form disposal at the Hanford IDF, providing data and modeling support for the IDF PA and providing technical support for various portions of the Hanford flowsheet. Dr. Asmussen has served as an expert on technical review panels for supplemental low activity waste at Hanford and on cementitious waste forms for the International Atomic Energy Agency.

Jack H. Bell, Director, Environmental Restoration and Waste Management Program, Nez Perce Tribe

I have worked for the Nez Perce Tribe for the past 34 years, except for a 2½ year period where I worked for a natural resource consulting firm. My first 7 years with the Tribe was as a Wildlife Biologist, working mainly on big game management issues and development of a mitigation plans for wildlife. In 1993, I moved into the position of Land Services Director, managing the newly formed Land Services Program. I filled this position for 15 years and during that time I was responsible for managing agricultural leases on over 100,000 acres owned by the Tribe. While in this position I also started the Tribe’s GIS program, the Biocontrol Center for Management of Noxious Weeds, and managed the Nez Perce Horse Registry and breeding program. In 2010 I was rehired by the Tribe as the Natural Resource Damage Assessment (NRDA) Coordinator in the Environmental Restoration and Waste Management Division (ERWM). In June of 2017 I was hired as the ERWM Director. My main responsibilities today are serving as the primary representative for the Tribe on the Hanford Natural Resource Trustee Council (HNRTC), administering cleanup related participation at Hanford, and supervising the Tribe’s Air Quality and Emergency Response Programs. I earned an M.S., 1987, Wildlife Science, University of Idaho, Moscow, Idaho, and a B.S., 1976, Wildlife Management, Humboldt State University, Arcata, California.

William “Bill” F. Bates, Deputy Associate Laboratory Director for the Environmental and Legacy Management (ELM) Directorate, Savannah River National Laboratory

William F. Bates is the Deputy Associate Laboratory Director for the Environmental and Legacy Management (ELM) Directorate at the Savannah River National Laboratory (SRNL). This Directorate focuses on disposition and cleanup of the legacy materials, waste, and facilities across the DOE complex with specific focus in the portfolios of the DOE Environmental Management (EM) and Legacy Management (LM) Offices. Bates has 34 years of nuclear experience, including technical roles in Reactor Technology and Engineering, Manager for Reactor Instrumentation and Controls (I&C), and Engineering Manager of High-Level Waste Systems responsible for all technical aspects of the H Area Tank Farm at SRS. In 2000, he transitioned to Operations Management. His facility management roles have included Deputy Facility Manager for the K Area Material Storage (KAMS) facility, L Area (Spent Fuel Program), and the Receiving Basin for Offsite Fuels (RBOF) and Facility Manager for K Area (KAMS) during the DOE Plutonium Consolidation Campaign. As Facility Manager, he led the deinventory of all unirradiated Highly Enriched Uranium (HEU) ingots and fresh SRS reactor Mk-22 fuel assemblies from K Area, which were part of the NNSA’s Blended Low-Enriched Uranium (BLEU) program feedstock. From 2006 through 2008, he served as the Manager for K Area Business Programs, Project Controls, and Quality Assurance. He returned to Operations Management in late 2008 as the Deputy Director and later Director for Nuclear Materials Storage (K and L Areas). He transitioned to SRNL in 2012 as the Deputy Associate Laboratory

Director for Nuclear Materials Management and transitioned in 2021 to ELM. Bates has participated in several multi-lab teams, including the 2013 Pu Disposition Working Group, the 2015 Pu Disposition "Red Team", DOE Environmental Management's 2019 H-Canyon and Spent Fuel Management Independent Project Team (IPT), the 2020 DOE Nuclear Materials Handling and Infrastructure (NMI) IPT, and led the 2017 NDAA-3134 Hanford Supplemental Low Activity Waste Treatment Analysis FFRDC Team. He is currently the FFRDC Team leader for the 2021 NDAA-3125 followup study to the NDAA-3134 effort.

Jeff Burright, Radioactive Waste Remediation Specialist, Oregon Department of Energy

Jeff Burright joined the Oregon Department of Energy in 2017. He brings prior experience providing technical decision support for complex Federal nuclear remediation projects around the country, as well as knowledge of radioactive waste management at a national level. At ODOE, Jeff is focused on issues surrounding the high-level radioactive waste tanks at Hanford, the Waste Treatment Plant, and other issues related to long-term risk management, site cleanup, and waste disposal. Prior to joining ODOE, he worked for a management consulting firm based in Eastern Washington that supported collaborative, technical problem solving and risk management for environmental remediation projects, with clients including USDOE, NASA, the US Army, and large private entities. Jeff's work experience also includes research into risk perception and collaboration in multi-stakeholder permitting processes and communication of technical information to public audiences. Originally from Albany, Oregon, Jeff holds a B.A. in English and an M.S. in Marine Resource Management from Oregon State University.

Matt Champagney, Parsons

Mr. Champagney is a project management professional with more than 25 years of experience in federal, municipal, and commercial design and construction spanning the education, healthcare, corrections, retail, and heavy civil markets. He currently serves as technical advisor to Parsons' National Nuclear Security Administration (NNSA) Enterprise Construction Management Services (ECMS) contract, which provides portfolio management, program management, project procurement, risk management, configuration management, planning, design, construction management, project start-up/commissioning, testing, and claims services to the NNSA and other organizations within the Department of Energy. Mr. Champagney is also the ECMS best practice lead for analysis of alternatives (AoA) and has personally led more than a dozen studies for NNSA and DOE-EM including the Plutonium Pit Production Engineering Analysis, the ongoing Hanford Waste Treatment Plant High Level Waste AoA, and the Surplus Plutonium Disposition and Pantex Material Staging Facility AoAs. Mr. Champagney holds a Bachelor of Science in civil engineering from Columbia University.

Carlos Corredor, Senior Health Physicist, Office of Public Radiation Protection, U.S. Department of Energy

Carlos Corredor is a senior health physicist at the Office of Public Radiation Protection at the Department of Energy (DOE) in Washington DC. The Office is under the Associate Under Secretary for Environment, Health, Safety and Security and is responsible for DOE public and environmental radiation protection policy and for assisting the programs in implementing radiation protection requirements within the Department. Serves as the lead project Officer for the update of DOE Standard DOE-STD-1196-2021, *Derived Concentration Technical Standard*, Jul 2021, that supports the implementations of DOE Order 458.1, DOE's main order used for the radiation protection of the public and the environment, from activities that take place around the DOE Complex. Serves as the lead project officer at DOE for the RESRAD Family of codes software developed at Argonne National Labs and has performed several decommissioning projects for the release of real property within the Department of Defense. Carlos has over 32

years of experience in environmental, medical, occupational, and industrial health physics, which derives from working as a U.S. Army Officer in the United States Army, the private industry, and the DOE. Currently serves as an alternate member of DOEs low level Waste (LLW) Federal Review group (LFRG) and served as a health physics subject matter expert in several LFRG reviews of performance assessments and/or Composite analysis at several LLW disposal facilities at different DOE Labs. Carlos Corredor has a master's in science in Nuclear and Radiological Engineering from the University of Tennessee.

Suzanne Dahl, Section Manager, Tank Waste Treatment, Washington State Department of Ecology

Jay Decker, Lead Tank Waste Treatment Engineer, Washington State Department of Ecology

Jay Decker is Lead Tank Waste Treatment Engineer for the Washington State Department of Ecology's Nuclear Waste Program. He has thirty-six year of experience in program management, plant operations management, project management, engineering, procurement, and construction. Jay leads Ecology's team in reviewing engineering and construction associated with Ecology dangerous waste permitting for the U.S. Department of Energy's Hanford nuclear waste and vitrification plant and advising Ecology management. Jay is a professional engineer in the state of Washington, and earned a master of science in engineering degree from the University of Texas at Austin.

Brent Gerry, Mayor, West Richland, Washington

Brent Gerry is currently serving his second four-year term as Mayor of West Richland, WA which commenced on January 1, 2018. His first term commenced on January 1, 2014. Mayor Gerry previously served on the West Richland City Council for four years from January 2010 to December 2013. Mayor Gerry is a strong advocate of citizen participation in the City government.

Connie Herman, Associate Laboratory Director, Environmental and Legacy Management Directorate, Savannah River National Laboratory

Connie Herman is the Associate Laboratory Director for the Environmental and Legacy Management directorate at the Savannah River National Laboratory. The organization provides technical strategies and technologies for nuclear material processing, radioactive waste processing and stabilization, soil & ground water remediation, risk assessment, and Deactivation and Decommissioning. The directorate shepherds competencies in materials science and engineering and biological sciences for national security programs and alternative energy applications. Connie has been at the Savannah River Site since 1990 where she has been primarily engaged in the development and deployment of technologies and processes for stabilization of nuclear waste and has been a R&D manager since 2005. Additionally, Connie has worked at other DOE sites where she provided technical leadership to the plutonium disposition program at Lawrence Livermore National Laboratory and directly supported the Office of River Protection at Hanford on technical issue resolution for the Waste Treatment Plant. She is leading the Network of National Laboratories for Environmental Management and Stewardship (NNLEMS) team in the development of the R&D roadmap for the Hanford Tank Waste Mission.

Diahann Howard, Professional Port Manager (PPM®), Executive Director of the Port of Benton, Washington

Diahann Howard was named the Port's executive director December 2019. She has served as the Tri-Cities Research District as its Executive Director 2007-2020, Richland Rotary president (2017-2018) and was named Rotarian of the year (2011-2012). October 2018, she appointed to the U.S. Department of Energy Environmental Management Advisory Board. September 2019, Howard was awarded a Professional Port Manager (PPM®) certification from the American Association of Ports Authorities. Previous to the Port's Executive Directors position, she served as the Port of Benton's director of economic development and governmental affairs. Prior to joining the Port in 2006, she was the economic development manager at the City of Richland. She is on the board of the United Way, Visit Tri-Cities, Eastern Washington University President Advisory Board, as well as various others. During her last fourteen years at the Port her activities have resulted in over $15 million of grant and legislative funding; examples include $5m to support the Wine Science Center at WSU Tri-Cities, $5.4m to complete Delta High School, $2.2m and $1.5m for rail bridge improvements. Ms. Howard is a Tri-Cities native and holds her Bachelor of Science degree in International Affairs from Eastern Washington University. She is the first female to hold the Port of Benton executive director position and the first executive director with Latina heritage among the 75 port districts within Washington State.

Althea Huesties-Wolf, Hanford Policy Analyst, Confederated Tribes of the Umatilla Indian Reservation

Althea Huesties-Wolf is a member of the CTUIR, and the Hanford Policy Analyst for the CTUIR Department of Natural Resources First Foods Policy Program. She has eighteen years of tribal work experience in teaching, outreach, public policy, and environmental work, all of which revolve around her education, a master's in writing; which means she's a bookworm. Althea has been active in her culture since birth, staying in the mountains with her family for huckleberry, wood and elk camps, but it wasn't until age seven that she completed her First Roots ceremony when she became an official gatherer. She's been married to Jeremy Wolf, the current CTUIR Vice-Chair and a high school basketball coach, for 23 years and together they have three kids, a small ranch on the reservation and their own sweathouse.

Stephanie Johansen, Pacific Northwest National Laboratory

Stephanie Johansen is an Advisor for the Earth Systems Science Division at Pacific Northwest National Laboratory (PNNL). Ms. Johansen has over twenty years of experience solving complex environmental challenges for the U.S. Department of Energy and U.S. Department of Defense in nuclear waste cleanup and chemical weapons demilitarization. She has extensive experience developing permitting and compliance strategies related to the Resource Conservation and Recovery Act of 1976 (RCRA). She has regulatory experience with a broad range of units, including tank systems, miscellaneous treatment units, land disposal units, container storage, surface impoundments, incinerators, containment buildings, and surface impoundments. Ms. Johansen has collaborated with sponsors to develop regulatory strategies and negotiated acceptance by regulatory agencies. Ms. Johansen also has expertise utilizing analytical data to support regulatory decision-making. She has an M.S. in Chemistry from the University of Washington.

Dan McCabe, Savannah River National Laboratory

Daniel McCabe is a fellow scientist at the Savannah River National Laboratory, where he has worked for over 30 years. His research has focused on characterization, separations, and treatment of hazardous and radioactive wastes. He earned a B.S. in chemistry from Loras

College, in Dubuque, Iowa, and a M.S. and Ph.D. in chemistry from the University of New Mexico, in Albuquerque. He was also a post-doctoral fellow at the University of Michigan. He has many years of experience in tank waste separations, including developing technologies for removing technetium, cesium, and strontium. He has been extensively involved in tank waste treatment process development for both the Savannah River Site and the Hanford site and provided support for the initial DOE response to the Fukushima Daiichi Nuclear Power Plant accident.

Gene Ramsey, Savannah River National Laboratory

William Ramsey has been actively working in research, engineering, and management within the nuclear materials and glass industries since the late 1980's. He has developed numerous foamed glass/ceramic products in commercial use for abrasion, hydroponic agriculture, and filtration. Within the nuclear materials complex, he has recently managed Strategic Planning and Waste Feed Delivery planning in support of the Hanford site. Earlier, he held several roles in process flowsheet development and support for actinide and high-level waste vitrification.

Dr. Ramsey works in project management and as a Technical Advisor for the Savannah River National Laboratory. This includes supporting the long-term Tank Farm and operating canyon flowsheets as well as maintaining a consulting role in glass/ceramic foam intellectual product development. He holds degrees in Ceramic Engineering from the University of Missouri-Rolla and Clemson University.

David Reeploeg, Vice President for Federal Programs of the Tri-City Development Council (TRIDEC) and Executive Director of Hanford Communities

David Reeploeg serves as Vice President for Federal Programs of the Tri-City Development Council (TRIDEC) and Executive Director of Hanford Communities. Before assuming these duties, David spent over 12 years working for members of the Washington state congressional delegation, primarily in the offices of U.S. Senators Maria Cantwell and Patty Murray. David is a native of the Tri-Cities, WA, and is a graduate of Hanford High School and the University of Washington.

Michael E. Stone, Savannah River National Laboratory

Mr. Michael Stone has over 30 years of experience in support of Savannah River Site missions, beginning as a summer intern in 1989. He worked as a system and shift technical engineer during production of Pu-238 for the Cassini mission to Saturn before transferring to the Savannah River National Laboratory. His work at SRNL initially focused on treatment and immobilization of high-level waste at the Savannah River Site (SRS) including support of sludge and salt batch qualification processes, evaluation of chemical pretreatment and melter throughput improvements for the Defense Waste Processing Facility, and evaluation of changes to the overall SRS waste treatment processes to incorporate revisions to the salt waste processes. In 2013, Mr. Stone's focus shifted from support of processes at SRS to supporting waste treatment efforts across the DOE complex. He has been embedded with the WRPS Integrated Flowsheet team as well as supporting work various DOE Office of River Protection programs. While the primary focus of work since 2013 has been Hanford related, tasks have been supported for Oak Ridge and Idaho sites. In 2020, Mr. Stone began supporting DOE headquarters tasks as well as continuing his work at the Hanford site. Mr. Stone is currently serving as Executive Director of the Network of National Laboratories for

Environmental Management and Stewardship (NNLEMS). Mr. Stone has a Bachelor of Science degree from Clemson University in chemical engineering.

David M. Tate, Ph.D., Senior Defense Analyst, Systems and Analyses Center, Institute for Defense Analyses

David Tate joined the IDA SAC research staff in 2000. In his 20+ years with IDA, he has worked on a wide variety of national security issues, including: Analysis of Alternatives for multiple DoD and DHS acquisition programs, decision models for defense acquisition portfolio planning, affordability analysis of acquisition portfolios, drivers of development schedule and schedule growth, cost and schedule risk in major Department of Energy projects, test and evaluation methodologies for AI and autonomy, and national security software industrial base capacity and risks. Dr. Tate has led acquisition cost, schedule, and risk reviews of multiple high-profile national security programs, and has contributed to numerous Analyses of Alternatives and congressionally-mandated program reviews across multiple agencies. He has authored or co-authored dozens of technical reports in the areas of decision analysis, portfolio selection, acquisition of autonomous systems, cost and schedule risk analysis, and software-intensive systems. Prior to coming to IDA, Dr. Tate was Senior Operations Research Analyst for Telecommunications at Decision-Science Applications, Inc. Before that, he was an Assistant Professor of Industrial Engineering at the University of Pittsburgh. Dr. Tate holds bachelor's degrees in Philosophy and Mathematical Sciences from the Johns Hopkins University, and M.S. and Ph.D. degrees in Operations Research from Cornell University. He is an alumnus of the MIT Seminar XXI national security studies program and the Harvard executive course Leading in Artificial Intelligence.

Stephen Wiegman, Chairman, Hanford Advisory Board

Mr. Stephen Wiegman is a retired Civil Engineer. His career includes 40 years in the regulatory compliant development of electric power systems, defense nuclear production facility decommissioning and nuclear/mixed waste management. He is currently chairman of the Hanford Advisory Board. The Board provides policy level public perspective to the Department of Energy, Washington Department of Ecology and the Environmental Protection Agency on matters related to the cleanup of the Hanford site in Eastern Washington.

Ming Zhu, Ph.D., PE, PMP, Senior Advisor for Laboratory Policy, U.S. Department of Energy Office of Environmental Management

Dr. Zhu advises the U.S. Department of Energy Office of Environmental Management (EM) leadership on national laboratory policy, including stewardship of the Savannah River National Laboratory and the Network of National Laboratories for Environmental Management and Stewardship (NNLEMS). Previously, he served as the EM Integrated Performance & Risk Assessment Lead chairing the Interagency Steering Committee on Performance and Risk Assessment Community of Practice; Senior Site Program Manager/Site Liaison for Richland Operations of the Hanford Site; the founding Program Manager for the Advanced Scientific Computing for Environmental Management (ASCEM) initiative; and Co-Chair of the Low-Level Waste Disposal Facility Federal Review Group (LFRG). Since 2010, he has advised the International Atomic Energy Agency (IAEA) on risk-informed decision analyses with stakeholder engagement, including leading Working Group 1 of the MODARIA II Program. He also served as the Acting EM Budget Director, and Senior Advisor to the Director of Homeland Security Advanced Research Projects Agency within the Department of Homeland Security. Prior to his federal service, he directed technical work of National Laboratories and engineering firms on the Yucca Mountain Project. Dr. Zhu holds a Ph.D. in mineral engineering from the University of California at Berkeley, a Tek. Lic. in Chemical engineering from the Royal Institute of

Technology in Stockholm, Sweden, and a B. Eng. in environmental engineering from Tsinghua University in Beijing, China. He is a registered civil engineer with the State of California, and an elected fellow of the American Society of Civil Engineers.

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