Testimony of

Vahid Majidi, PhD
Director
Savannah River National Laboratory

Before the

Subcommittee on Energy
Committee on Science, Space and Technology
House of Representative

— On —

Nuclear Waste Cleanup: Research and Development Opportunities for the Department of Energy's Office of Environmental Management

—

2318 Rayburn House Office Building, Washington, DC 20515 • July 13, 2022, 10:00 a.m.

SRNL is the Department of Energy
Office of Environmental Management's National Laboratory

THIS PAGE INTENTIONALLY BLANK

Good morning, Chairman Bowman, Ranking Member Weber and members of the subcommittee. Thank you for inviting Savannah River National Laboratory to testify before you today, to discuss our mission, and the value of our work to our nation.

Who is Savannah River National Laboratory?

Savannah River National Laboratory (SRNL) is one of the 17, Department of Energy National Laboratories, and the only laboratory stewarded by the Office of Environmental Management. Battelle Savannah River Alliance, LLC (BSRA) is charged with management and operation of SRNL under Contract No. 89303321CEM00080, for the Department of Energy (DOE). With this contract, SRNL will provide risk-informed approaches that achieve sustainable regulatory end-states for environmental and legacy management programs; we will support nuclear deterrence by reducing threats through advances in proliferation detection technologies; and we will develop environmentally responsible science and energy security strategies through advanced engineering of materials and chemistry.

BSRA is, by design, a not-for-profit, limited liability company. Battelle Memorial Institute has partnered with five leading universities; Clemson University, the Georgia Institute of Technology, the University of South Carolina, the University of Georgia, and South Carolina State University, which is the only historically black colleges and universities member of the management and operations board of any national laboratory. Each of the above institutions are non-profit organizations, all dedicated to scientific discovery and technology advances for the purposes of education and societal benefit. Additionally, we have two small business integrated subcontractors; Longenecker and Associates and TechSource, to help us with critical skill gaps.

In another proud moment in our history on May 7, 2004, Secretary of Energy Spencer Abraham formally designated SRNL as a federally funded research and development center (FFRDC) and a "National Laboratory." The FFRDC designation is a recognition of our national obligations shared with only 42 other entities in the United States. As a FFRDC, we are obligated by law (Title 48, Code of Federal Regulations, Part 35, Section 35.017) to operate in the public interest as strategic partners with the Department of Energy to ensure the highest levels of objectivity and technical excellence are applied to research and development conducted on behalf of the government. Therefore, we must provide technical expertise, unbiased advice and help the government make cost effective choices regardless of potential direct benefits, or the lack thereof, for SRNL.

The confluence of a FFRDC National Laboratory operated by a not-for-profit parent company creates a technical and scientific environment where we must focus on making discoveries, inventions, and innovations to do the greatest common good. Our employees come to work every day with pride because their job is to serve our nation.

What does Savannah River National Laboratory do for the DOE Clean-up mission?

Our experience and deep understanding of the challenges associated with the DOE's Office of Environmental Management (EM) and Office of Legacy Management (LM) missions,

is rooted in seven decades of helping solve our nation's most challenging nuclear material production, processing and cleanup issues at the Savannah River Site. Today, our Laboratory provides applied science and engineering innovation for DOE's 15 active cleanup sites and 101 post-closure management sites.

SRNL provides integrated modern and practical solutions to complex environmental cleanup and long-term surveillance and maintenance problems. Our Laboratory's advanced engineering efforts deploy practical science-based tools to address the nation's most challenging problems. In short, "We put science to work!"

SRNL Conducts Fundamental and Applied Research:

SRNL's Laboratory Directed Research and Development (LDRD) Program invests in research that positions the lab to meet DOE's mission needs while developing the future R&D workforce needed to rise to complex technology challenges. One example is the Functionalized Cellular Magmatics R&D project funded in anticipation of future EM's needs, which explored the fundamentals of engineered cellular magmatics – synthetic stone of glass and ceramic -- that replicate natural volcanic materials. These cellular magmatics are a nascent green material, with the potential to help significantly reduce or find valuable uses for municipal wastes. The cellular magmatics project was born from decades of materials science expertise funded by EM in support of nuclear waste immobilization. Currently, this project is benefiting from industrial partnership and additional funding through the Advanced Research Projects Agency-Energy (ARPA-E).

SRNL receives limited funding from the Office of Science (SC) on EM related research. SRNL is participating in a Science Focus Area to understand Hydrobiogeochmistry of Wetlands. The multi-year program, funded by the Office of Biological and Environmental Research, closes at the end of this year. The effort was led by Argonne National Laboratory (ANL) and included collaboration with Clemson University and University of Georgia. Additional FY22 funding was received for a three-year project titled 'Effect of Hydrological Forcing on the Biogeochemical Transformation of Carbon and Greenhouse Gas Emissions in Riparian and Streambed Sediments.' The project is a collaboration with Georgia Tech, ANL, SRNL as well as SC user facilities. SRNL is also a collaborator with the Center for Hierarchical Waste Form Materials. The center is organized as an integrated, multi-disciplinary team to develop the fundamental science from which advanced waste forms for extreme and dynamic conditions can emerge. A simple and practical definition of a hierarchical structure is that it contains a small-scale structural motif within a larger-scale structure or framework. Conceptually, hierarchical structures consist of porous structures, whose cavities are occupied by crystalline or non-crystalline fillers. Example materials include crystalline salt inclusion materials, metal-organic frameworks, porous silica, and hollandite mineral structures with molecular tunnels. The Center's goal is to make the new discoveries and advances needed to design waste forms for radioactive materials with superior stability and performance across extremes in time and environment. These novel waste forms are likely to have transformative impact in reducing the environmental and financial costs of remediation for specific classes of waste with broad applicability in the nuclear field. The team is led by the University of South Carolina with collaborators at Alfred University, Clemson University, University of Florida, Commissariat a

L'Energie Atomique, and University of Michigan. SRNL's recent contribution includes synthesis of single crystals of new Plutonium (Pu)-containing materials.

Other programs funding SRNL's research that benefits EM includes:

SRNL has a strategic focus for reduced energy intensity and environmental impacts within US manufacturing using thermal process intensification by electromagnetic heating (Industrial Decarbonization Efforts). The research leverages an interdisciplinary team of physicists, chemists, and engineers at SRNL with more than $15M in programs funded through Defense Advanced Research Projects Agency (DARPA), Energy Efficiency and Renewable Energy Office (EERE), Advanced Manufacturing Office, Vehicle Technologies Office, and ARPA-E with a focus on upcycling mixed plastic waste, low temperature heavy crude upgrading, low-energy pulp and paper drying, electromagnetic enhanced composite automotive tooling, and efficient ethylene production. A programmatic goal within each project is to enable decarbonization across US manufacturing to support reduced impacts on the environment. The effort is part of the DOE mission to save our planet and the people who live on it and has become a valuable tool as part of the EM program.

SRNL has an award-winning Unmanned Aircraft System (UAS) team that operates 20 rotary and fixed-wing assets. In 2021 the SRNL UAS team conducted more than 350 flights and logged more than 100 flight hours. The team recently received the 2021 U.S. General Services Administration Premiere Federal Aviation Unmanned Aircraft Systems Award and in March of 2022 the team received the 2021 Department of Energy UAS Unit Award, the second consecutive year the team earned the award. Missions included exercises with the U.S. Marines and U.S. Air Force, as well as infrastructure inspections, aerial photography and videography, emergency response exercise support, research and development activities, and other U.S. government support. The UAS capabilities have been used in the inspection of buildings for EM Deactivation & Decommissioning missions and in the application of herbicides to create efficiency while minimizing the potential for personnel exposures in contaminated areas.

SRNL is conducting R&D to improve understanding of airborne release fraction and respirable fraction from postulated free-fall spills in DOE nuclear facilities. The goal of this work is to establish a technically defensible basis for this controlling mechanism, the objectives of this project are to:

(1) Experimentally confirm a critical value for the free-fall spill height in the Ballinger equation.

(2) Provide spill data test cases using water and waste simulants to more closely model conditions anticipated for accident conditions in DOE facilities; and

(3) Quantify the airborne release fraction and respirable fraction from the updated tests using contemporary measurement systems for estimating new, updated estimates for free-fall spill accident analysis applications. The updated estimates will be evaluated for potential incorporation in revisions to DOE-HDBK-3010-94.

EM championed a new project for the SRNL and congress allocated 50 million dollars to establish the Advanced Manufacturing Collaborative (AMC). SRNL will capitalize on this unique opportunity to create an immediate functional platform that integrates discovery science,

manufacturing, modeling, and data analytics to support our mission. AMC will ensure that this significant EM investment will provide next-generation tools and enduring capabilities that benefit EM, National Nuclear Security Administration (NNSA), Science and Energy Security missions while attracting future sponsors through competitively bid projects in energy manufacturing, ARPA-E, and Department of Defense (DoD). This facility is expected to be fully operational in 2024.

SRNL Brings DOE National Labs Together Working as a Team:

Savannah River National Laboratory leads the Network of National Laboratories for Environmental Management and Stewardship (NNLEMS). The laboratories network is responsible for coordinating integrated science and technology solutions through broader DOE lab engagement.

FY 2022 NNLEMS Activities include:

- Hanford Supplemental Low-Activity Waste (LAW) Evaluation – National Defense Authorization Act for FY 2021, Section 3125 mandated study to assess treatment and immobilization technologies for Hanford's volume of LAW that exceeds the current production capacity of the Waste Treatment Plant LAW Facility. The review is being performed in coordination with the National Academies of Sciences, Engineering, and Medicine (NAS). The FFRDC team will address the NAS review comments and finalize their study report in early 2023. National Laboratories team include SRNL, Los Alamos National Laboratory (LANL), Sandia National Laboratory (SNL), and Pacific Northwest National Laboratory (PNNL).
- Hanford Tank Waste Acceleration R&D Roadmap – Cleanup of tank waste at the Hanford Site represents the major portion of the EM's environmental liability over the next several decades. The goal of this effort is to inform EM budget request concerning R&D investments to identify technologies and strategies that will help accelerate the Hanford tank waste cleanup mission. The team is currently incorporating review comments on the R&D Roadmap from DOE. National Laboratories team include SRNL, PNNL, LANL, SNL, Idaho National Laboratory (INL) and Oak Ridge National Laboratory (ORNL).
- Characterization of spent Crystalline Silicotitanate Ion Exchange Media Study – Project goal is to understand the contaminants on the media after processing of EM tank waste to assess cost effective options for disposition. The report for this effort is with DOE for final review. National Laboratories team include SRNL, ORNL, PNNL, SNL, and LANL.
- Technical Support to the Energy Technology Engineering Center –EM is responsible for cleanup of soils and groundwater of parts of Site at the Santa Susana Field Laboratory and shares the responsibility with National Aeronautics and Space Administration (NASA) for the cleanup of an adjoining part of the Energy Technology Engineering Center (ETEC). In 2010, DOE entered into an Administrative Order on Consent (AOC) with the California Department of Toxic Substances Control. The 2010 AOC stipulated

that the soils cleanup standard would be based on Look-Up Table (LUT) values. Sampling showed organic, metallic, and other constituents soil concentrations exceeding the LUT values. NNLEMS is providing technical support to DOE in developing novel solutions to the technical challenges of implementing cleanup. National Laboratories team include SRNL, PNNL, and Lawrence Livermore National Laboratory (LLNL).

- Groundwater Remediation Strategy Review for the Los Alamos Site - Groundwater plumes of hexavalent chromium and explosives are two significant challenges facing Los Alamos. This groundwater contamination and the associated subsurface contamination in the vadose zone, are currently at a crucial point -- facing technology-deployment and long-term site management decisions. The subsurface conditions are complex, and the scale of the problem is challenging. As a result, many uncertainties remain, and decisions require careful strategic development and collaboration with regulators and stakeholders to advance environmental cleanup and balance potential risks and benefits. To facilitate the current decision-making and planning processes, EM engaged the NNLEMS to perform an independent groundwater strategy review. The assessment has been completed and recommendations summarized in a technical report, which is currently with DOE for review. National Laboratories team include SRNL, SNL, PNNL, and National Energy Technology Laboratory (NETL).
- LM High Risk Site Collaborations - In FY20, DOE-LM completed an analysis of over 100 LM sites to identify and quantify potential risks. Subsequently, SRNL and DOE-LM assembled National Labs team to address technical concerns at the five highest risk sites (Shiprock, Tuba City, Bluewater, Monument Valley and Fernald). The reviews focused on identification of key issues and development of actionable risk reduction recommendations, which were documented in separate reports issued by LM. The next three sites (Weldon Springs, Amchitka and New Rifles) are currently under review. National Laboratories team include SRNL, PNNL, SNL, LANL, NETL, ANL, Lawrence Berkley National Laboratory (LBNL), and Stanford National Accelerator.
- LM Climate Resilience Evaluation - SRNL developed and reviewed the responses from the National Laboratory network call to evaluate the impacts of global climate change on DOE-Legacy Management activities. LBNL was selected to lead the activity. The task goals include: 1) evaluation of state-of-practice for climate resiliency assessment undertaken by Federal and State Agencies; 2) identifying the breadth of climate drivers and disturbances that potentially impact the regulatory performance of LM sites; 3) subdividing and clustering sites having shared similarities and examine a subset of 'archetypal sites' to examine in detail to determine the specific impacts of climate change/disturbance; and 4) providing recommendations for site modification and long-term strategies broadly applicable to the regional clusters of LM sites. National Laboratories team include SRNL and LBNL.
- Moab Technical Assistance - The Moab site is currently entering an important phase of decision-making to address key subsurface and groundwater contamination needs. To

accelerate site closure, EM has engaged the National Laboratories for to provide technical expertise in selected critical areas. The ultimate project goal is to submit a scientifically defensible groundwater closure plan that meets all applicable regulatory requirements for approval from the Nuclear Regulatory Commission. Approval of the plan is required no later than January 2025. Natural attenuation, enhanced attenuation and application of supplemental standards are the preferred remedial alternatives. National Laboratories team include SRNL, PNNL, LANL, LLNL, LBNL, and SNL.

SRNL excels in collaborative efforts with other National Laboratories. SRNL is helping eight EM sites to prepare Vulnerability and Resilience Plans in accordance with Executive Order 14008 issued in November 2021. SRNL is helping assess the impact of climate change to critical assets and infrastructure with findings due by October 1, 2022.

SRNL works closely with INL through the EM Office of Technology Development to identify technical information needed to defend safe extended (> 50 years) dry storage of the inventory of aluminum-clad spent nuclear fuel owned and managed by EM at its fuel storage sites. Understanding the hydrogen gas release rates from the water retained in corrosion products (oxyhydroxides) present on the aluminum spent fuel is crucial for mitigating the flammability and/or pressurization threats from excessive hydrogen generation during dry storage. SRNL specific scope includes drying and radiolysis testing to provide the data inputs to estimate long-term storage performance.

Another collaborative project is the NNSA Defense Nuclear Nonproliferation Office-sponsored R&D effort between SRNL and ORNL that seeks to reduce lifecycle costs and schedules and increase safety associated with disposition of surplus Pu. Some of the focus areas of this collaboration include detailed process modeling, and development of automation and robotics for the process. Much of the Pu is owned by EM and the benefits of this collaboration will benefit EM as well as NNSA by expediting the reduction of EM liability and acceleration of the K-area Material Storage facility readiness for deactivation.

SRNL leads the multi-lab Advanced Long-Term Environmental Monitoring Systems (ALTEMIS) project for DOE's remediation efforts. Innovative remediation and monitoring technologies that came from the project include integrated sensor networks and the use of machine learning and artificial intelligence to interpret sensor data. Currently, the system is being deployed in the F-area at the Savannah River Site, which has a series of monitoring wells and injection locations to treat the migrating plume resulting from 50 years of separations processing. In a typical year, hundreds of samples and thousands of parameters are monitored to understand the behavior of the plume and to adjust the remediation approach accordingly. The ALTEMIS approach will optimize the data set related to the controlling variables of the remedial action; thereby minimizing the total number of samples and analytes to be characterized. The artificial intelligence and machine learning aspects will provide early warning for potential changes in behavior to allow early responsive actions to be taken. The approach has the potential to reduce costs of monitoring complex groundwater sites by 90% over the next five decades and is broadly applicable to other EM and LM sites with on-going remedial actions or with long-term monitoring programs.

SRNL Works with Local and National Stakeholders:

Through the recently established SRNL Regulatory Center of Excellence (RCE), our Laboratory is teaming with DOE, academia, our small business partners, and other federal agencies to convey accurate, timely and transparent information to stakeholders about complex site cleanup and closure plans while developing effective solutions to unique regulatory challenges stemming from EM operations. EM sites and missions must deal with a complex combination of technology, government, and community support. The complexity of interactions of government agencies with the public they serve creates the need for unique technical, regulatory and communication approaches. The RCE draws upon the collective expertise of the Savannah River National Laboratory, NNLEMS, Longenecker and Associates and SRNL's University Partners to provide innovative strategies that address mission-critical communication, regulatory compliance, and policy challenges at DOE sites. The RCE's work aligns with DOE's environmental justice and energy equity initiatives by incorporating the socio-economic impacts of remediation into the strategies it develops for DOE sites.

SRNL Works Across the Complex with all EM and LM sites:

Roughly 75% of the funding SRNL's Environmental and Legacy Management Directorate receives is for Savannah River Site-related programs with the remaining funds coming from DOE Headquarters and from across the DOE complex to solve EM's most pressing challenges.

SRNL receives funding from EM's contractors, EM site offices, and the EM Office of Technology Development, as well as commercial entities, to develop and apply science and technology across the EM complex. SRNL provides technologies across the full-range of EM's missions: nuclear material storage, inspection, separation, and disposition; radioactive tank waste processing, immobilization, and disposition; soil and groundwater remediation; facility decontamination, inspection and closure; transuranic and mixed/low level waste stabilization and disposition; and spent nuclear fuel storage, inspection, processing, and disposition. SRNL also maintains cross-cutting capabilities to provide analytical characterization, packaging, and remote automation, while also providing material science and modeling expertise to enable processing in extreme environments.

SRNL's successful technology strategies based on fundamental understanding of the science behind the processes are leveraged for these programs enabling technology transfer in both directions. Some examples of SRNL's work for the Savannah River Site and other DOE sites include:

- Routinely performing baseline testing for the tank waste mission at Savannah River Site (SRS), while also evaluating new technologies to optimize the process to accelerate the closure mission. Most recently, SRNL identified alternative antifoams and reductant to mitigate flammability concerns in chemical processing and melter operations for the Defense Waste Processing Facility. For these programs, SRNL identified alternatives, performed a broad suite of testing from lab scale to engineering scale, evaluated the downstream processing impacts, and worked closely with the site contractor to implement the new materials and flowsheets. The new antifoam was implemented in 2021 and has shown vast

improvement over the previous antifoam, reducing the required additions and processing upsets. The new acid, glycolic acid, will be implement this year with a SRNL scientist participating in the operational transition.

- Research on Real-Time In-Line Monitors (RTIM) for the Hanford Direct Feed Low Activity Waste program as funded by the DOE-Office of River Protection. This program aims to develop and deploy mass balance approaches and real-time characterization technologies to reduce analytical turn-around times and minimize worker exposure while ensuring necessary data quality for low-activity waste glass. SRNL leads this collaborative program between LANL, PNNL, and Consortium for Risk Evaluation with Stakeholder Participation (CRESP). Technologies being evaluated include Raman instruments to measure supernate anions and Laser Induced Breakdown Spectroscopy on slurried samples.
- Through funding by the Hanford Tank Farm contractor, SRNL partners with PNNL and the Vitreous State Laboratory, to evaluate gaps that have safety, environmental, or processing implications in the existing Hanford Tank Waste flowsheets. An example is evaluation of iodine partitioning behavior in the waste processing and immobilization flowsheet.
- At the Oak Ridge Reservation, SRNL in partnership with the EM site office and the UCOR contractor develops monitoring sensors, to better understand the behavior of mercury in facilities destined for decommissioning. Understanding of the controlling variables for mercury behavior in these excess facilities will assist in the decontamination efforts and will minimize worker exposure.
- Since 2018, SRNL has evaluated the challenges associated with dissolution of non-aluminum spent nuclear fuel at SRS. EM recently issued a Record of Decision to process all SRS spent nuclear fuel through the H-Canyon facility for ultimate disposition in the high-level waste system as a glass wasteform. SRNL identified numerous technical challenges associated with many of the non-aluminum fuel items compared to previous spent fuel processing efforts, such as physical size compatibility and fuel reactivity. SRNL is developing a roadmap of the technical challenges and the associated R&D needs to safely address each challenge. SRNL included technical staff from Argonne and Oak Ridge National Laboratories on the team to develop the roadmap and associated technology solutions.
- SRNL transitioned its soil and groundwater remediation technologies from source zone methods to Enhanced Attenuation to Monitored Natural Attenuation. Enhanced attenuation is a plume remediation strategy to achieve groundwater restoration goals by providing a transition between source-zone treatment and Monitored Natural Attenuation (MNA) and/or between MNA and more active methods. These technology advancements have provided a ten-fold reduction in costs of remediation and monitoring.
- Implementation of enhanced attenuation strategies in the SRS F-area Seepage Basins over the last two decades for remediation of radionuclides has resulted in meeting interim Resource Conservation and Recovery Act cleanup goals. Since the implementation of this strategy, secondary sources have been introduced that require improved monitoring. DOE's ALTEMIS project is implementing an innovative sensor-based monitoring system testbed that will improve monitoring

and may significantly reduce costs of monitoring. Advanced AI-Machine Learning techniques are used to evaluate the efficacy of the monitoring system now and two decades into the future.

To accelerate the EM and LM missions, our laboratory provides processing, remediation and closure approaches with a rigorous data-driven foundation. We identify bottlenecks to enable complex-wide decision making; we identify high-impact technologies to optimize processing while minimizing waste production in the disposition of nuclear materials; we help focus clean strategies on contaminants of concern, using passive technologies to reduce costs in long-term maintenance and monitoring; we pioneer innovations to reduce long-term monitoring costs through the integration of scientific advances in sensor networks and by providing high-fidelity assessments of remedial actions in varying environmental conditions.

Consistent with both the Government Accountability Office and National Academies reports, SRNL has been working with other national laboratories to help EM develop an integrated technology development framework. The objective of the program is to provide a good balance of early concept research and development with ready to deploy technologies spanning the range of incremental improvements to transformational changes for the EM mission. SRNL has successfully demonstrated the leveraging of ideas and science that can occur when DOE offices work closely together, and we will continue to provide that value to the government as a FFRDC. With NNLEMS, we are well on our way to identifying the key technology gaps for nuclear material processing, tank waste processing, and soil and groundwater remediation to provide an integrated portfolio for EM.

SRNL Works Across the DOE Program Offices:

The NNSA Defense Nuclear Nonproliferation Office is leading an effort to convert the domestic high performance research reactors from Highly Enriched Uranium fuel to Low Enriched Uranium (LEU) fuel. SRNL is a part of the effort to develop technologies and alternatives for safe treatment and disposition of the LEU spent nuclear fuel from these reactors based on differences in the LEU fuel designs from current designs. This effort is not yet mature but has potential benefit across multiple programs including EM who currently is receiving spent nuclear fuel from several of these domestic research reactors (Massachusetts Institute of Technology, University of Missouri, High Flux Isotope Reactor at Oak Ridge, and National Institute of Standards and Technology).

The Mark-18A program is an example of how SRNL's core competency not only furthers the EM and LM missions, but also supports the NNSA. The Mark-18A program, funded by NNSA, was established to recover rare radioactive isotopes. These isotopes are by-products of the long, high-flux irradiation of "Mark-18A targets,"-- the metal cylinders that were irradiated in nuclear reactors operated at the Savannah River Site in the 1960s and 1970s. The recovered isotopes are valuable for use in in nuclear forensics and high precision measurement.

SRNL designed the equipment flowsheet to process Mark-18A bundles inside SRNL shielded cells. These six-foot by six-foot cells provide the shielding and confinement necessary

to work with radioactive materials. NNSA and the Office of Science benefit from valuable isotopes extracted during this project.

Processing Mark-18A targets will be a roughly decade-long mission providing a relatively long-term opportunity to train the next generation of nuclear scientists and engineers. EM benefits from this program with the dispositioning of 65 target assemblies that would otherwise require processing in the H-Canyon facility where they would have been converted to waste, extending the life cycle of the tank waste mission.

SRNL Develops the Next Generation of Scientists:

As we solve the problems of today, we look too, at our future. We recognize that our nation has a critical need to develop the next generation of scientists and engineers who will ensure our national safety and security. University partnerships are critical to our success and to environmental management mission accomplishment. No single organization possesses the resources and expertise to solve DOE's complex and challenging mission needs. SRNL leverages its strong partnerships with partner universities and engages with them as critical partners in the development of future workforce.

Since 2014, SRNL has supported EM in its management of the office of environmental managements' Minority Serving Institutions Partnership Program (MSIPP). SRNL facilitates involvement of five other national laboratories by providing internship funding, support to historically black colleges and universities and minority serving institutions through the competitive research award process and most recently, providing funding for postdoctoral research and graduate fellows. Furthermore, competitive research projects funded under MSIPP allows for the selection of research projects that meet EM's needs. SRNL researchers began a collaboration with the University of New Mexico via an MSIPP-funded project aimed at developing novel methods to separate technetium from off-gas condensate produced during waste disposition. This program offers minority UNM students the opportunity to gain training in and exposure to EM missions while helping develop a talent pipeline for DOE labs. EM recently announced Northwest Indian College of Bellingham, Washington, will be awarded a grant of up to $5 million to train future scientists and engineers through EM's expanded MSIPP. In all, EM is investing $56 million in MSIPP through competitive research awards, internships, shared interest research partnerships, a post-doctoral research program, a graduate fellowship program, technology, curriculum and professional development and the Savannah River Environmental Sciences Field Station. EM's MSIPP celebrated a milestone on June 13, 2022 when the first MSIPP Postdoctoral Research fellow started work at SRNL. To date, two candidates accepted EM's MSIPP postdoctoral positions at SRNL. Under the EM's MSIPP, SRNL is collaborating with a minority serving institution to develop green and cost-effective remediation of organic contaminants in subsurface environments. Specifically, the focus of this work is to employ biochar modification processes to enhance adsorption performance of target pollutants, such as trichloroethylene (TCE), tetrachloroethylene (PCE) and, potentially, tributylphosphine (TBP) and tributylphosphine oxide (TBPO) in groundwater. While we put science to work, we are also working to build the science, technology, engineering, and mathematics workforce of the future.

SRNL Works Across the Globe:

Beyond our shores, SRNL has long-standing collaborations with the United Kingdom, Canada, France, and Japan in the areas of environmental management and non-proliferation. SRNL operates as the lead laboratory and is the conduit to NNLEMS technical review and advice on water treatment technologies, groundwater management, and waste disposition strategies for the Japan government in the cleanup of Fukushima Daiichi. The existing Strategic Partnership Program with Tokyo Electric Power Company (TEPCO) has recently been extended and the third TEPCO engineer assignee will report to SRNL in July 2022 to enable the development of focused solutions to emergent issues.

SRNL is also collaborating with the Japanese Atomic Energy Agency under the DOE and Japan's Education, Culture, Sports, Science and Technology Ministry Statement of Intent for U.S. support in reducing plutonium inventories in Japan. The purpose of the collaboration is to inform the decision-making process for elimination of Monju nuclear fuel inventory, with the focus on advancing the science and technology for the disposition of such materials.

Conclusion:

SRNL's enduring vison for the future, is to deliver societally impactful discovery science and advanced engineering initiatives; be the leading champion for our environment and our planet; be a cornerstone for our national security; advocate for advanced Science, Technology, Engineering, and Math education of our future workforce and engage with our community to support our youngest citizens and enable a better future for all.

Mr. Chairman, SRNL's expertise, experience, innovative spirit and our relentless pursuit of excellence combine to uniquely position the lab to help DOE accelerate cleanup activities, realizing a reduction in liabilities and costs by shortening the time necessary to complete cleanup operations.

Dr. Vahid Majidi

Director, Savannah River National Laboratory
President, Battelle Savanna River Alliance

EDUCATION

Wayne State University, PhD, Chemistry
Eastern Michigan University, Bachelor of Science, Chemistry

EXPERIENCE

Vahid Majidi is responsible for the management, operation, and strategic direction of Savannah River National Laboratory (SRNL). Employing approximately 1,000 technical and support staff, SRNL conducts research and development for diverse federal agencies, providing practical, cost-effective solutions for the nation's environmental, nuclear security, energy and manufacturing challenges. As the U.S. Department of Energy's (DOE) Environmental Management Laboratory, SRNL provides strategic scientific and technological direction and program support for the nation's legacy waste clean-up program.

Dr. Majidi is a former member of the senior executive service with direct reporting responsibilities to the U.S. Secretary of Defense, U.S. Director of National Intelligence and the Director of the Federal Bureau of Investigation. He has more than 30 years of experience in the areas of chemistry, measurement science and technology, national and homeland security, science and technology policy, and nuclear nonproliferation.

Dr. Majidi previously served as the Deputy Assistant Secretary of Defense for Nuclear Matters, responsible for nuclear weapon surety and the acquisition and modernization of the nuclear weapons stockpile. From 2006-2012, Dr. Majidi served as Assistant Director for the Federal Bureau of Investigation's Weapons of Mass Destruction (WMD) Directorate, responsible for coordinating and managing its equities, activities, and investigations involving WMD. In 2003, he was appointed Chief Science Advisor to the Department of Justice (DOJ) and was detailed to DOJ from Los Alamos National Laboratory (LANL), where he coordinated science and technology policy among DOJ component agencies and with state and local law enforcement entities. Dr. Majidi also served as the Chemistry Division Leader at LANL and was a tenured associate professor of chemistry at the University of Kentucky.