9th Annual International Forum on the Decommissioning of the Fukushima Daiichi Nuclear Power Station

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OPENING

Thank you, President Yamana-san, for inviting me. I had the privilege of joining you last year to gain a better understanding of ongoing cleanup here in Japan and to visit your remarkable community. I came away impressed by the amount of work achieved in the Fukushima cleanup and by the focus and dedication to supporting the people and community. I welcome the opportunity to be here again to see new progress underway and to update you on our cleanup program in the United States.

It is truly an honor to be a part of the 9th International Forum on the Decommissioning of the Fukushima Daiichi Power Station. This event brings together such a tremendous wealth of knowledge, expertise and experience from nuclear cleanup leaders across the globe.I value the ongoing collaboration among our nations as we solve shared challenges and progress our respective cleanup missions safely and effectively. Collaboration across government and private industry enables us to apply lessons learned, drive innovation and navigate challenges – including decommissioning nuclear facilities. While government and regulatory structures may vary across international borders, the safety culture and science underpinning our work is universal.

EM MISSION OF TODAY

It is a commitment to operational excellence, safety culture and scientific integrity that I carried through my nearly three decades in the commercial nuclear power industry before I joined the US Department of Energy. And, it is a commitment I bring to my role at the Department

of Energy today where I oversee nuclear operations, safeguards and security, and technology development for our cleanup program.

When our environmental cleanup program was established in 1989, it was responsible for the cleanup of 107 defense nuclear sites throughout the United States. The scope of the contamination included:

- more than 340 million liters of liquid radioactive waste
- more than 700,000 metric tons of depleted uranium
- more than 5,000 contaminated facilities
- millions of cubic meters of contaminated soil
- and billions of liters of contaminated groundwater.

Over the years, the challenges have been great, but progress has been steady. The active cleanup area of land has been reduced by 90 percent. With work completed at 92 sites, our program is performing cleanup activities at 14 remaining sites, as well as operating a deep geological disposal facility for our Trans Uranic waste.

The true value of our mission lies not in the number of sites cleaned, the number of buildings demolished and removed, or the volumes of groundwater remediated. The true value of cleanup is the impact on those who live, work and raise their families near EM sites. It is about the benefits that cleanup provides to the broader scientific, energy and security priorities. And, it is about empowering people to ensure they have a voice in the cleanup and in the future of their communities. I know maintaining a high level of engagement and transparency with communities and stakeholders is a priority for you here in Japan, as it is for us in the United States.

As we address the environmental legacy of the past, our cleanup in the United States is enabling energy, driving innovation, and unleashing commercial nuclear power. We are transforming liabilities into assets as we reduce risks, bring down old, contaminated facilities, and build up opportunities for the future.

Perhaps nowhere is this more vividly on display than at our Oak Ridge Site in Tennessee. As we eliminate our nation's inventory of uranium-233 from the Oak Ridge National Laboratory, we are at the same time extracting an isotope of thorium enabling beneficial reuse. This effort is reducing our environmental risks while increasing the world's supply of the rare isotope crucial for a promising form of cancer treatment by 1,500 percent.

Elsewhere at Oak Ridge, we have removed more than 500 structures with a total area of over 1 million square meters. Through deliberate planning and smart sequencing, this Deactivation and Demolition work has enabled the area to develop into a hub for modern nuclear energy technology. Additional land has been set aside for recreation and historic preservation. In fact, a new center is set to open later this month designed to share the site's history with future generations.

In another part of the United States, EM's Portsmouth Site in Ohio is on a similar trajectory. After extensive decontamination and decommissioning work, the first gaseous diffusion plant is already down, and we are on track to begin demolition of the second later this year. This will reduce risks and, ultimately, enable more land to be used by the local community for economic development.

UPDATE ON ACCOMPLISHMENTS

We are on track to realize a set of key accomplishments across our EM sites. Earlier this summer, we completed safe demolition of the last major facility at the West Valley Demonstration Project in New York. This project, completed on time and under budget, removes the most contaminated facility from that site and positions EM for the next phase of cleanup success there.

Advancing key demolitions is also a priority in Nevada where we are on track to complete legacy cleanup over the next five years. Nevada also

continues to be an important low-level radioactive waste disposal capability for our cleanup sites and supports other Department of Energy missions related to national security. That legacy cleanup includes addressing groundwater, a major part of our mission at sites including Nevada, Los Alamos in New Mexico, and many others.

As buildings come down at some of our sites, capabilities are being modernized at others to enable continued cleanup and future missions. EM completed construction and commissioning of a massive modern ventilation system at our nation's only geologic repository for nuclear waste, the Waste Isolation Pilot Plant, known as WIPP in New Mexico. Construction was completed safely and efficiently - one year ahead of schedule with cost savings totaling $10 million. This major upgrade helps ensure WIPP's long-term role in supporting cleanup of transuranic waste at sites across EM.

We are very close to finishing a new facility led by EM's Savannah River National Laboratory in South Carolina. The Advanced Manufacturing Collaborative, opening this week, will serve as an economic driver – creating jobs, spurring innovation and maximizing the reach of industry.

The Savannah River Site is also leading the way when it comes to EM's radioactive tank waste mission with over 41 million liters processed to date. Optimizations are being installed in liquid waste facilities enabling the Savannah River Site to accelerate from treating 22 million liters of tank waste per year to 34 million.These optimizations will allow EM to clean and close waste tanks at an unprecedented rate.

A few key factors contributed to our unparalleled success in addressing radioactive tank waste at Savannah River. First, a highly skilled workforce and effective project management committed to safety and efficiency. Second, continual engagement with state and local leaders to achieve alignment on achievable risk-based goals. And, third innovative technology solutions developed through partnerships with industry, academia and international partners including many of you participating

this week. For example, we were able to adapt an innovative cesium extraction system from the cleanup of the Fukushima-Daiichi plant here in Japan. The adaptation was used to double the production rates in our salt waste treatment at the Savannah River Site through the Tank Closure Cesium Removal system.

HANFORD

While significant progress has been made throughout the EM program, the work that remains includes some of our toughest challenges.

At sites like Hanford, we have achieved so much to date:

- 20 tons of plutonium have been shipped out of the site
- nearly 1,000 facilities have been demolished
- 2,300 tons of spent nuclear fuel has been moved away from the nearby Columbia River
- most of the nuclear reactors have been cocooned with only one more to go
- more than 36 billion gallons of groundwater have been treated
- over 1,000 waste sites have been remediated
- and tank waste treatment is starting on an industrial-scale.

Even so, EM still has decades of work ahead of us at Hanford. In many regards our mission at Hanford is a marathon not a sprint, and must be planned as such, particularly when it comes to things like prioritization, infrastructure and workforce.

At Hanford, and across our sites, EM is tasked with solving the large scale, technically challenging risks and hazardous conditions posed by the world's largest nuclear cleanup effort. These efforts involve thousands of federal and contractor employees, including scientists, engineers, and hazardous waste technicians and others. The role of federal government employees both at in Washington DC and at sites like Hanford require a broad range of skill sets – from engineers to

project managers to safety experts and beyond. Our teams involve experts from a wide variety of backgrounds including academia, the commercial nuclear industry, the Department of Defense and more. Building a strong pool of talent across our EM sites is a priority for our program. Our acting Hanford Site Manager, for example, has over three decades of service with the Department of Energy. That experience includes extensive expertise in safety and health programs, quality assurance, nuclear safety, environmental permitting, and tank farms operations, bringing a wealth of experience to the Hanford leadership team.

At Hanford alone, a workforce numbering roughly 13,000 people is involved in day-to-day cleanup operations. Our Hanford Field Office oversees the work which is executed by six prime contractor partners with assigned scope under the guidance of the Department of Energy. Robust contract management tools are in place to ensure accountability and adherence to safety, quality, cost and schedule expectations. Our work at Hanford includes difficult issues involving decontamination and decommissioning of contaminated facilities, soil and groundwater remediation, treatment and disposal of liquid tank waste and more. It's essential that our employees both at our field sites and at headquarters in Washington, DC have a high standard of technical, safety and management expertise. We help ensure that through program management protocols, federal project manager certification guidelines, and technical qualification programs, as well as a variety of workforce development and training opportunities. We also rely on expertise from the U.S. Defense Nuclear Facilities Safety Board.

With such a large scope and a wide range of mission areas, managing the site with a team mentality is also essential. This integrated approach to management is important when it comes to setting priorities across the site. We aim to set those priorities across the site, and in fact across the entire EM enterprise, in a way that is:

- protective of workers, public health and the environment
- reflects risk-based decisions rooted in sound science
- adheres to legal and regulatory requirements and

- retains skill sets through smart sequencing that enables workers to shift from one project to the next whenever possible.

Over the past 36 years of cleanup, we have learned a great deal about what waste we have, the actual risks it poses and how to treat it. We know so much more, and we have better technology in place to get the job done at Hanford and across all of our sites. Consider this, when the EM program was created in 1989 digital cameras were just becoming commercially available. Today, we use robots and drones equipped with cameras to look inside of radioactive waste storage tanks.

Much of our cleanup is guided by program planning and regulatory agreements. It's important to ensure those elements reflect the latest science and technology developments. In some mission areas, like liquid tank waste, our approaches have pivoted as we have leveraged technological advancements and lessons learned along the way. Even as we approach what will be a truly transformational moment for Hanford, we are continuing to look at opportunities to better address the full scope of our tank waste mission. One example is the recently completed Test Bed Initiative. The Direct Feed Low Activity Waste system, when fully operational, will solidify a portion of Hanford's low activity waste in glass. In parallel to that effort, we have advanced the Test Bed Initiative as a way to demonstrate another treatment and disposal option for Hanford's low activity tank waste that could compliment the DFLAW system. This effort used an in-tank system to treat 2,000 gallons of waste that was then shipped to commercial facilities where it has been successfully grouted and permanently disposed. Grout is much like concrete. It's a promising approach that has the potential to accelerate and help us more fully address the full scope of the Hanford tank waste mission without sacrificing safety or effectiveness.

We also developed a Research and Development Roadmap, or path forward, to help identify advanced technologies and approaches and better inform our work to accelerate the tank waste mission. The R&D Roadmap leverages the expertise of the Department of Energy's National Laboratories as we look at developing technologies to improve efficiency, reduce costs and accelerate the schedule for the Hanford tank

waste mission. Thirteen R&D projects involving seven National Laboratories and a multitude of industry and university partners have been launched as part of the Roadmap. These projects range from tank integrity monitoring to stabilization of low activity waste. Working in partnership with the Hanford Site contractors, the project teams have already produced 30 technical reports, published 21 peer-reviewed journal articles, and received 5 patents in the U.S. Building on this success, EM has also completed a Technology Development roadmap for deactivation and decommissioning,

CLOSING

Not only at Hanford, but across EM, we continue looking at how scientific advancements can provide opportunities to meet cleanup commitments safely, sooner, and more efficiently. We have a responsibility to evaluate options that could save decades from our current schedules, reduce project risks and save valuable public resources — without sacrificing safety or effectiveness.

Our goal is a fully integrated science and technology program that leverages the capabilities of our national laboratories, academia, and private industry – as well as our international partners in a mutually beneficial manner. A team from the Department of Energy's Los Alamos National Laboratory is about one year into a research project centered around real time neutron detection, analysis and simulation. The effort is designed to aid in fuel debris removal here in Japan, and has the potential to yield benefits in the areas of safety and efficiency.

I know there is much we can learn from each other, and I look forward to speaking with many of you throughout the week about our shared challenges and opportunities. I am excited to see the progress made this year in the Fukushima cleanup and to help identify future areas of collaboration in the years to come. Again, I am honored to have the

opportunity to participate in the International Forum on the Decommissioning of the Fukushima Daiichi Power Station.

Thank you for your gracious hospitality. Arigatou gozaimasu