TESTIMONY
OF
THE HONORABLE SEAN SULLIVAN, CHAIRMAN
DEFENSE NUCLEAR FACILITIES SAFETY BOARD
before the
COMMITTEE ON ARMED SERVICES, SUBCOMMITTEE ON
OVERSIGHT AND INVESTIGATIONS
UNITED STATES HOUSE OF REPRESENTATIVES
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Chairwoman Hartzler, Ranking Member Moulton and distinguished Members of the Subcommittee, on behalf of the Defense Nuclear Facilities Safety Board, thank you for the opportunity to provide this statement for the record on the challenges and actions associated with the aging infrastructure within the Department of Energy's defense nuclear facility complex.

To begin, it may be useful to understand the roles and responsibilities of the Board. The Board is statutorily mandated to provide independent analysis, advice, and recommendations to the Secretary of Energy. Our analysis, advice, and recommendations inform the Secretary, in his role as operator and regulator of the Department of Energy defense nuclear facilities, in providing adequate protection of public health and safety at those facilities. The Atomic Energy Act of 1954, as amended, currently establishes two categories of facilities subject to our jurisdiction, generally described as: (1) those facilities under the Secretary of Energy's control or jurisdiction, operated for national security purposes that produce or utilize special nuclear materials; and (2) nuclear waste storage facilities under the control or jurisdiction of the Secretary of Energy. The facilities in the first of these categories are under the control of the National Nuclear Security Administration and are the subject of today's hearing. Some waste storage facilities in the second category are under NNSA's control, but most fall under the Department of Energy's Office of Environmental Management.

NNSA performs most of its high-risk activities in defense nuclear facilities. I should note, however, that defense nuclear facilities – that is, those that house a significant quantity of special nuclear material – comprise only a fraction of the total number of facilities under NNSA. For example, the campus of the Lawrence Livermore National Laboratory contains over seven hundred buildings, but fewer than 10 are defense nuclear facilities. Thus, we at the Defense Nuclear Facilities Safety Board can speak to the issues of aging infrastructure and deferred maintenance at high-risk defense nuclear facilities, but the total NNSA picture exceeds the scope of our jurisdiction.

For over a decade, the DNFSB has placed strong emphasis on maintenance of safety systems and management of aging infrastructure. In just the last few years, we have conducted on-site reviews of maintenance programs at several NNSA facilities, Board Members have visited sites to evaluate maintenance programs and aging infrastructure, we have held public hearings involving these topics at the Pantex Plant and the Y-12 National Security Complex, we have sent specific reports to NNSA on the maintenance programs at Pantex and the Sandia

National Laboratories, and we have sent a report to the Administrator on the structural integrity of aging production facilities at Y-12. In addition, we receive an annual written report and a briefing from NNSA staff on the safety of aging facilities at Y-12.

From our perspective, aging defense nuclear facilities present several potential safety problems that must be simultaneously managed: systems degrade with time, the risks associated with radiological hold-up within a facility increase with time, waste streams with no defined disposition path may accumulate over time, replacement parts for critical systems become unavailable as manufacturers go out of business or the technology becomes obsolete, and new or evolving missions require existing facilities to be used in ways for which they were not initially designed.

NNSA prioritizes maintenance at high-risk defense nuclear facilities and within facilities, prioritizes safety class and safety significant equipment and components. As a result, while NNSA has a significant maintenance backlog across all of its facilities, the deferred maintenance backlog at defense nuclear facilities is by comparison small. Nevertheless, many of these defense nuclear facilities are past or approaching the end of their design life and present aging challenges that are hard to quantify. Additionally, non-defense nuclear facilities – that is, NNSA facilities that do not contain special nuclear material – generally do have significant maintenance backlogs, and an accident such as a major fire in one of those facilities could pose a risk to a nearby defense nuclear facility.

Notably, aging infrastructure also has a hard-to-quantify, but no less real negative impact on human capital. No matter how much we as a nation invest in critical safety systems, the people who work at these facilities will always be both the first and the last line of defense against any accident. We hear from the management at NNSA sites that aging infrastructure poses challenges affecting recruiting and retention.

For the Board, in its role as an independent executive branch agency advising the Secretary of Energy on safety matters, the sheer number of issues caused by aging infrastructure is a concern. To the extent that a specific failure at a specific place can be anticipated, NNSA has demonstrated that appropriate action can be taken in reasonable time. Yet, the probability of a significant unanticipated failure only increases with time.

As I mentioned earlier, aging infrastructure presents several challenges that must be managed simultaneously. Let me give you some specific examples of facility conditions to highlight these challenges.

One challenge is that systems degrade with time. At Pantex, fire system piping that was initially laid underground beginning in the 1970s has been leaking. Since March 1996, the contractors that run the Pantex Plant have experienced 38 corrosion related failures of the high pressure fire loop, on average of 2.1 per year. NNSA has been funding repairs for several years, but they still have a long backlog. In recent years NNSA has also had to repair or replace some above ground fire system components at Pantex, including diesel fire pumps, fire detection elements and water storage tanks. Another example of degraded equipment is the process tanks

and piping in the 9212 Complex at Y-12. The tanks and piping hold chemical solutions containing fissile materials. Because of their advanced age, they are prone to leaks and spills.

Another challenge is the accumulation of waste materials with no defined disposition path. For example, the vault at the Plutonium Facility at the Los Alamos National Laboratory, also known as PF-4, has several hundred containers holding small amounts of special nuclear material for which NNSA has yet to determine an ultimate disposal path. These materials are typically the product of tests performed over several decades that resulted in unique waste compounds. Determining the additional processing needed to meet regulatory requirements for disposal has not been a high national priority. However, by continuing to house these materials, which have no defined programmatic use, the overall risk profile remains higher than it could be.

Still another challenge is the presence of systems that rely on technology that is obsolete. Los Alamos National Security, the contractor at LANL, recently learned that the manufacturer has discontinued production of circuit cards used to process pressure and temperature signals for display in the PF-4 operations center. The controller that contains these circuit cards will have to be replaced in the foreseeable future. As another example, building 332 at the Lawrence Livermore National Laboratory contains a ventilation system installed in the 1960s that uses pneumatic controllers. Building 332 is a part of the Superblock and houses activities important to the management of the nuclear stockpile. Replacement parts for the pneumatically controlled ventilation system are difficult to come by, and new technicians to maintain and calibrate this old technology must be painstakingly trained on the job.

The last management challenge I will mention is the use of aging facilities for new or evolving missions for which the facility was not initially designed. Simply put, new missions placed into existing facilities generally result in suboptimum configurations. An example of where this has occurred is at the LANL PF-4, built in 1978 for research and development is now the nation's only pit production facility following the shutdown of the plant at Rocky Flats in Colorado at the end of the cold war. Another example is at Y-12, where the contractor recently moved a critical radiography capability to Building 9204-2E, a facility constructed in the 1960s. Also at Y-12, the contractor plans to add metal production and purification capabilities to the 1950s-era facility known as the 9215 Complex. The addition of these capabilities at the 9215 Complex is needed in order to cease all operations in the even older, Manhattan Project-era 9212 Complex by the year 2025.

NNSA has provided us with updates on their efforts to address their many challenges. Examples of those efforts, include the capabilities that currently reside in two of NNSA's oldest defense nuclear facilities, the Chemical and Metallurgy Research Facility at LANL and the 9212 Complex at Y-12 will be moved into new or existing facilities. Nevertheless, near term risks in the CMR and 9212 facilities remain because of their advanced age and deficient structures.

Other action has been deferred. The Uranium Processing Facility (also known as UPF) at Y-12 was originally conceived as replacing the capabilities of Building 9204-2E and the 9215 Complex in addition to the 9212 Complex, but cost concerns forced the reduction of UPF scope to encompass only a partial replacement of the 9212 Complex. Meanwhile, Building 9204-2E and the 9215 Complex have known structural performance deficiencies and do not meet modern

structural design requirements. These deficiencies result in an increased potential for structural collapse and release of radiological material following certain seismic events. NNSA plans to operate in these buildings for at least two more decades, and in fact, as previously mentioned, the 9215 Complex will house new capabilities as part of the NNSA plan to end operations in the 9212 Complex.

Other action is still under evaluation. As noted previously, PF-4 at LANL evolved from a research and development facility in 1978 to a plutonium factory today. In 2007, NNSA discovered that the probability of a significant seismic event at Los Alamos was greater than previously anticipated, and since then NNSA has invested considerable resources in strengthening the facility. NNSA and the Board are still evaluating whether the improvements that have been either accomplished or firmly scheduled are sufficient for the long term. Both NNSA and the Board are also evaluating the potential seismic vulnerability of the PF-4 fire suppression system. As an aside, it is worth noting another control that could mitigate the consequences of the design basis seismic event would be an active confinement ventilation system that can be relied upon to protect the public during a design basis earthquake. An active confinement ventilation system is designed to assure continued function during and after an accident, thereby ensuring that radioactive material is captured by filters before it can be released into the environment. The Department of Energy standards did not require an active confinement ventilation system in PF-4 in 1978, but it would be included if it were built new today.

Other problems continue to raise concern even though they have been addressed. As noted above, corrosion-related failures have occurred in recent years to the site-wide High Pressure Fire Loop at Pantex. Corrosion-related problems have also developed in the fire suppression lines leading into the Device Assembly Facility at the Nevada National Security Site, and to the fire loop supplying the Tritium Extraction Facility at the Savannah River Site. While each of these has been addressed, it is reasonable to wonder what vital, in-ground system might fail next.

Water pipes and fire systems are not the only vital site-wide infrastructure systems needed for nuclear safety, and at NNSA sites, other site-wide infrastructure problems exist. Many site electrical systems are in need of updating or improvement.

To manage a multitude of issues, Y-12 site management in Oak Ridge started several initiatives beginning in 2006. One program is Continued Safe Operations Oversight Team. The CSOOT is composed of experienced Y-12 federal and contractor engineering, operations, and subject matter experts. CSOOT acts in an independent manner to provide an evaluation of enriched uranium operations risk and provides mitigating recommendations directly to senior management. We have maintained a high level of interest in this effort. In 2007, the DNFSB levied a reporting requirement for a formal, annual briefing on this subject. Since then, the DNFSB, NNSA, and the Y-12 contractor have conducted detailed discussions on CSOOT recommendations and aging infrastructure concerns at least annually.

Y-12 also has developed a detailed extended life program for Building 9204-2E and the 9215 Complex, the two facilities that were de-scoped from the UPF project. We found the

documentation of key safety basis-related assumptions, decisions, and scheduled activities to be a positive step. As a living document, the extended life program safety strategy will continue to evolve to provide additional specificity and refinement regarding the planned evolution of the 9215 Complex and Building 9204-2E safety bases. We will continue to monitor this program and identify any gaps between actual conditions and those required by the DOE order on nuclear facility safety. We will independently analyze for gaps in facility structure requirements, nuclear criticality safety requirements, ventilation confinement, and safety basis development strategy.

Lastly, NNSA recently spearheaded efforts to remove material at risk from all three buildings, reducing the inventory of material well below their allowable limits. All of these efforts have begun to significantly reduce risk at Y-12.

Two notes of caution about these programs for managing aging infrastructure. First, to use an automobile analogy, you can invest a lot of money in a 1952 Packard and perhaps make it run as smoothly and as safely as it did in 1952. Nevertheless, it would still be a 1952 Packard, lacking modern safety features such as air bags and reinforced side panels. There are some safety features that can be retro-fitted or risks that can be mitigated. The aging Y-12 facilities, while being better managed, lack some of the safety features that DOE's current standards would require if those facilities were being built new today. Second, Y-12 pioneered the efforts just mentioned out of necessity, as they had many of the oldest operational facilities in the NNSA inventory. Other NNSA sites have adopted some but not all of these practices. All sites will eventually have operating defense nuclear facilities as old as the Y-12 facilities are now.

Another reason to encourage the adoption of these Y-12 aging facility management practices and other best practices at other NNSA sites is that the inherent risks at other sites are likely greater than that at Y-12. The radiological hazards at Y-12 facilities are driven by the presence of uranium, whereas several of the other sites house operations in which the radiological hazard is driven by plutonium. Plutonium presents the potential for significantly greater public consequences if there were to be an accident and managing the risks to the greatest extent feasible is of key importance.

While NNSA remains vigilant in maintenance of its aging infrastructure, the fact remains that many of these facilities are more than 70 years old. Delays in NNSA's efforts to modernize its infrastructure exacerbate safety-related issues and require that ongoing work be performed in degrading nuclear facilities that do not meet modern safety standards. As DOE and NNSA develop new defense nuclear facilities we will continue to work closely with them as they progress with design and construction.

Chairwoman Hartzler, Ranking Member Moulton, thank you again for the opportunity to provide this testimony. We at the Defense Nuclear Facilities Safety Board look forward to working with this Subcommittee. I would be happy to answer any questions you may have.