Overview of Light Water Reactor Sustainability Physical Security Initiative

F. Mitch McCrory
Physical Security Initiative

The LWRS Program initiated a nuclear power plant Physical Security Initiative in August 2018. Physical security of nuclear power plants is an important aspect of maintaining a safe, secure, and reliable nuclear energy fleet. Physical security programs at U.S. nuclear sites started to ramp up to meet changes in their design basis threat (DBT) in the early to mid-1980s. The events of September 11, 2001 saw more changes to the DBT and significant increases of physical security at nuclear power plant sites. As U.S. nuclear power plants modernize their infrastructure and control systems to move past their original operating licenses, an opportunity exists to apply advanced tools, methods, and automation to modernize their physical security programs leveraging their benefits. These benefits include higher fidelity models that should remove some conservatisms in their security models, leverage automation as force multipliers, improve the optimization of their security postures, and risk-informed methods for use in evaluating security changes.

Figure 9. Sensor configurations evaluated by Sandia National Laboratories for the U.S. Government.

This initiative will leverage advances in modeling and simulation, sensor technologies, risk management tools, automation, and other technologic advances to advance the technical bases necessary to modernize and optimize physical security capabilities. This initiative will include efforts in the following areas:

- Conduct research and development on aspects of risk-informed techniques for physical security to account for a dynamic adversary.
- Apply advanced modeling and simulation tools to better inform physical security scenarios.
- Assess benefits from proposed enhancements, novel mitigation strategies, and potential changes to best practices, guides, or regulation.
- Enhance and provide a technical basis for stakeholders to employ new methods, tools, and technologies to achieve physical security.

To ensure that the LWRS Program Physical Security Initiative is focused on stakeholders' outcomes, the program is creating a working group, which is scheduled to meet September 10–11, 2019, at Sandia National Laboratories (SNL) in Albuquerque, New Mexico.

The Physical Security Initiative started its outreach to U.S. nuclear power plant stakeholders in January 2019 with a site visit to a nuclear power plant by LWRS Program-sponsored physical security and reactor system subject matter experts and held a first-of-its-kind industry training on security provided by the U.S. DOE National Laboratories. This training was held in March 2019 at SNL (see Figure 9) and provided a week-long physical security training course that included participants from the Nuclear Energy Institute, the Electric Power Research Institute, staff from operating nuclear utilities, and other DOE National Laboratory security experts. The course included instruction, hands-on examples, and field exercises for physical security technologies, modeling, and DOE security enhancements. This inaugural training was attended by representatives from 14 U.S. utilities. This training course was adapted from an SNL security course that has been provided to other physical security experts for over ten years. The training also introduced the new LWRS Program Physical Security Initiative to many of the stakeholders and was used as an opportunity to obtain feedback from course participants.

Meet the New Materials Research Pathway Lead

I am pleased to announce that Dr. Thomas M. (Tom) Rosseel has agreed to serve as the Materials Research Pathway Lead. He is a Senior Research Staff Member and Senior Program Manager in Oak Ridge National Laboratory's (ORNL's) Materials Science and Technology Division, as well as a member of the Nuclear Structural Materials Group. Tom received his Ph.D. in Physical Analytical Chemistry from the University of Wisconsin, where he used synchrotron radiation to explore the oxidation states of transition metal oxides. He was awarded a Wisconsin Alumni Research Foundation Fellowship for this research. He also received his B.S. in Chemistry at the University of Michigan, where he was twice awarded the Moses Gomberg Undergraduate Chemistry Prize.

Thomas (Tom) M. Rosseel
ORNL

Dr. Rosseel, who has worked at ORNL for more than 30 years, has managed numerous research projects and programs—including serving as the Deputy Materials Research Pathway Lead for concrete, cable, non-destructive evaluation, and Zion Unit 1 harvesting research tasks. He also managed the U.S. Nuclear Regulatory Commission Heavy-Section Steel Irradiation Program. He has performed research in a number of areas including heavy-ion-induced x-ray studies; positron spectroscopy; the effects of radiation on minerals, aggregates, cement, and concrete; and the effects of radiation on (RPV) steels. As a member of the Materials Research Pathway, he led the effort to harvest RPV base and weld metal from the decommissioned Zion Unit 1 nuclear power plant to study the attenuation of radiation-induced embrittlement. Tom also led the formation of the International Committee on Irradiated Concrete, an organization that provides a forum for broad technical interactions on the effects of irradiation on concrete used in nuclear facilities, storage, and disposal sites, and promotes international collaborations to accelerate efforts to understand and model radiation effects on concrete.

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