Contribution ID: **365** Type: **Oral**

Applying 3S Lessons: Using Safety Concepts to Develop ”Risk-Informed Safeguards” for Small Modular Reactors

A challenge in integrating security/safety/safeguards (3S) is how to communicate risks given the vastly different technical competencies among subject matter experts in each domain. Similar to conceptual parallels between safety and security (i.e., similar perception of consequences and owner/operator responsibilities), safeguards could benefit by leveraging alternative models to better communicate risk. More specifically, developing clearer descriptions of the potential for incredible high consequence events related to safeguards (including the importance of safeguards-by-design) could help support the responsible development of advanced/small modular reactors.

To this end, this paper introduces an alternate perspective that borrows concepts from nuclear safety to better communicate risks in the safeguards domains. Recently, the safety concept of risk significance (defined as a level of risk exceeding a predetermined threshold) and organizational gradients was used to develop a conceptual “insider risk significance”framework for multi-insider threats. Using key similarities between State-level diversion and subnational theft, this paper conceptualizes a similar “safeguards risk significance” framework for better characterizing safeguards risks for SMR deployment. While still conceptual, a “risk-significant” model could help inform and optimize efforts to improve safeguards efforts aligned with future needs of A/SMR deployment.

SNL is managed and operated by NTESS under DOE NNSA contract DE-NA0003525

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Track Classification: Topical Group C: Safety, Security and Safeguards: Track 10: Safety, Security and Safeguards Interfaces related to SMRs