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Identifying sabotage risks and adversarial Threats to passive Decay heat removal systems in advanced nuclear reactors

Advanced reactors, including aSMR, GenIV, etc. aim to enhance reliability by incorporating passive safety systems into their plant design. These systems leverage passive methods to provide a high level of reliability for removing decay heat from the reactor core to achieve safe shutdown conditions or other safety functions. Since these systems in some advanced reactor design could provide an ultimate heat sink for the decay power, they serve a critical safety function.

Given these systems reliance on passive methods, they may present novel security risk and unique vulnerabilities to radiological sabotage by insider threats and external adversarial attacks. Historically, evaluation of acts of indirect sabotage focused on primary threats to active system disruption or seizure, while considerations for passive systems (if present), were secondary. Thus, at the current time there is limited existing literature on the threats unique to passive systems.

This paper presents a status and summary of an on-going project tasked with identifying the envelope of possible security threats to passive decay heat removal systems in advanced reactors. The project will determine which threats are most credible and realistic, assess these threats for their potential consequences on reactor safety, and establish recommendations to addressing the identified security concerns. Included in this paper is a narrative of the approach and methodologies to support threat determinations by reactor developers and other stakeholders. Results and findings by the project will be documented separately in a full report once the overall project is completed later this year, and issued to allow broad dissemination of the knowledge gained.

Country OR International Organization

United States

Email address

dlisowski@anl.gov

Confirm that the work is original and has not been published anywhere else

YES

Author: LISOWSKI, Darius (Argonne National Laboratory)

Co-authors: Mr HUNNING, Alex (Oak Ridge National Laboratory); Mr CHWASZ, Christopher (Idaho National Laboratory); Mr GRABASKAS, David (Argonne National Laboratory); Mr OSBORN, Douglas (Sandia National Laboratories); Mr BUCKNOR, Matthew (Argonne National Laboratory); Mr FERRARA, Scott (Idaho National Laboratory)

Presenter: LISOWSKI, Darius (Argonne National Laboratory)

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