Department of Energy
National Nuclear Security Administration
Washington, DC 20585

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Charge to the Executive Group for the Antineutrino Reactor Monitoring Scoping Study

NNSA's Office of Defense Nuclear Nonproliferation Research and Development (DNN R&D) detection portfolio seeks strategic input to guide future R&D investments. The charge to the **Antineutrino Reactor Monitoring Scoping Study** Executive Group is to facilitate broad engagement with interested communities on the topic of antineutrino-based monitoring of nuclear reactors and associated post-irradiation fuel cycle activities. The particular focus of such engagement should be on the **potential utility** of antineutrino detection technologies and required detection capabilities in the following contexts:

- Near-field: detection systems deployed 10-2000m from a reactor with the knowledge and likely cooperation of the monitored facility
- Far-field: detection systems deployed 2km or further from a reactor, with or without the knowledge and cooperation of the monitored facility

The concept of utility should be explicitly placed in the context of existing or potential policy needs. Furthermore, detailed descriptions of quantities to be measured, considerations for practical implementation, and comparisons to existing techniques should be included. While existing monitoring methods are not directly covered in the workshop, current capabilities should serve as a benchmark for the implementation of the evaluated techniques.

"Antineutrino detection technologies" encompasses detection methods, system implementations, and/or deployment modalities that:

- Are already demonstrated in research or field environments,
- Are under active design and/or construction,
- Can be reasonably foreseen based on plausible technology and engineering projections with a "long-term" horizon

It is requested that the Executive Group develop materials to enable engagement directly with experts in a wide variety of fields and solicit their knowledge and feedback on the use of antineutrino detection technologies in their particular domain of expertise. Communities of interest include:

- International and Domestic Safeguards Agencies and Practitioners
- Reactor vendors and operators (utilities)
- Nuclear Security and Safety NGOs
- Nonproliferation and Nuclear Security Policy SMEs

Following the evolutionary course of the antineutrino applications field to date, engagement with the neutrino physics community and supporting Scientific Funding Agencies will also be of considerable value.

A virtual forum shall be held mid-2020, bringing together interested experts to review the concepts and feedback collected from these communities. A final report should be prepared by

September 30, 2020. The utility report is expected to capture input from all perspectives and provide information to help guide future technology development and implementation efforts.

Sincerely,

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