



# Exploring Practical Roles for **Neutrinos** in **Nuclear Energy and Security**

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**Current IAEA safeguards:** For the vast majority of reactors under current IAEA safeguards, the safeguards community is satisfied with the existing toolset and does not see a specific role for neutrinos.

**Advanced reactors:** Advanced reactors present novel safeguards challenges which represent possible use cases for neutrino monitoring.

**Future nuclear deals:** There is interest in the policy community in neutrino detection as a possible element of future nuclear deals involving cooperative reactor monitoring or verifying the absence of reactor operations.

**Reactor operations:** Utility of neutrino detectors as a component of instrumentation and control systems at existing reactors would be limited.

**Non-cooperative reactor monitoring or discovery:** Implementation constraints related to required detector size, dwell time, distance, and backgrounds preclude consideration of neutrino detectors for non-cooperative reactor monitoring or discovery.

**Spent nuclear fuel:** Non-destructive assay of dry casks is a capability need which could potentially be met by neutrino technology, whereas long-term geological repositories are unlikely to present a use case.