



Sandia National Laboratories

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Sandia National Laboratories—Support for International Nuclear Safeguards

A strong foundation

Sandia's safeguards focus ensures cradle-to-grave surety of safeguards. The Labs' contributions date back to the late 1970s with the inception of the U.S. Support Program to the International Atomic Energy Agency (IAEA).

Leveraging technical capabilities across applications

Sandia continues to provide robust expertise, from foundational competencies in nuclear technology to knowledge gained from other programs in information assurance, domestic safeguards, nonproliferation, physical protection, arms control, and the nuclear fuel cycle. Safeguards measures can be adapted across a range of mission spaces while taking into consideration such factors as a system's objectives, response time for actual or suspected breaches, and status of ownership – both of the items subject to monitoring and the monitoring system itself.



Core Technical Areas of Sandia's Safeguards work:

Information Management, Security, and Analysis

Sandia National Labs specializes in ensuring that safeguards information can be trusted. Sandia develops secure safeguards systems; develops secure communications; develops advanced tamper indication for equipment; provides data authentication and encryption solutions; and conducts vulnerability assessments. Sandia is evaluating and developing novel approaches in data analytics such as machine learning and blockchains to improve the analysis of safeguards data.

Containment and Surveillance (C/S) Measures

Safeguards rely heavily on the verified assurance that nothing has changed between inspections. Measurements to assay nuclear materials are complicated and time consuming. By providing verifiable evidence for continuity of knowledge, C/S measures offer substantial savings in both cost and time by avoiding the need to remeasure previously-assayed materials. Sandia specializes in the research and development of C/S technologies such as tags, seals, and video surveillance systems.

Unattended and Remote Monitoring

International safeguards make increasing use of automated measurements at facilities. Valuable inspector time is thereby saved for non-routine tasks. Automated equipment must do much more than safeguards measurement, however. Sandia specializes in such vital features as:

- Measures to ensure the integrity of verification equipment (tamper indication, state of health)
- Secure transmission to protect against eavesdropping and other threats
- Wireless communications to facilitate system deployment

Geological Repository Safeguards

Appreciable quantities of nuclear material will remain in spent fuel that is buried in underground repositories. From a safeguards standpoint, repositories pose both a design verification problem and a containment and surveillance problem. Significant challenges remain for technology solutions. Safeguards need to tag and verify the integrity of disposal canisters. A repository needs to be monitored during construction, operation and closure phases. The timescales for repository safeguards could be vastly longer than conventional safeguards scenarios.