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Title: Next Generation Safeguards Initiative

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ABSTRACT

Author – Brian Boyer

Next Generation Safeguards Initiative

Nuclear Engineering Capabilities Review – Los Alamos NM May 18 2011

This poster describes LANL's work in Next Generation Safeguards Initiative (NGSI). It covers work in the following areas:

- **NGSI Human Capital Development**
- **NGSI Enrichment Plant Safeguards**
- **NGSI Concepts and Approaches**
- **NGSI Safeguards Policy**



Next Generation Safeguards Initiative

B. Boyer, N Division, N-4



NGSI Human Capital Development

Student Interns and Summer Seminars/Courses

Penn State Grad Fuel Cycle and SGs Course

Lab Hands-On Experience with Detection Tech

3-D Immersive Virtual Models For Education and Training

R. Miller – INMM Paper Winner – PhD from TAMU – did PhD at LANL – Now Staff

Safeguards Contribution to Handbook of Nuclear Engineering

Former Summer student – R. Leitch – ORNL intern and staff and now Georgetown and NRC Student

EDITED by J. Doyle

NUCLEAR SAFEGUARDS, SECURITY, AND NONPROLIFERATION

NGSI Concepts and Approaches

Oikiluto 3 in 2009

SINCH – Spent Fuel Detector System

Nonproliferation Thorium Fuel Cycle Study

Safeguards by Design – Gen III LWRs

Flow Chart for SBD-RRCA Guidance Development

Spent Fuel Verification Tool Development

Base VVER-440 Model

3-D Virtual Reality Models for Safeguards

Centrifuge Product Station

Process Monitoring Studies

Generation IV Nuclear Energy Systems: Deployable no later than 2030 and offering significant advances in sustainability, safety and reliability, and economics

Material Attractiveness Analysis – SP/KE

FOM	Weapons Utility	Attractiveness	Attractiveness Level
> 2	Preferred	High	-B
1-2	Attractive	Medium	-C
0-1	Impedimental	Low	-D
< 0	Very Impedimental	Very Low	-E

GEN III-IV Reactor Systems Safeguards SGs By Design and Novel Approaches

NGSI Enrichment Plant Safeguards

Presenting Novel Enrichment Safeguards to IAEA

3-D Immersive VR Models for Plant Simulation

Gas Centrifuge Enrichment Plant Mass Balance Concept (Both U and ²³⁵U)

Guide Advanced Enrichment Instrument Development

Tracking UFE Cylinders

Equation:

$$\frac{dm_{CE}}{dt} = \dot{m}_{in} - (\dot{m}_{out} + \dot{m}_{loss}) = 0$$

NGSI Safeguards Policy

Fuel Cycle Analysis for IAEA Suite Level Approach

Participation and Leadership in Shaping U.S. and Int'l Safeguards Policy

Study on IAEA Legal Authorities

Safeguards by Design – LANL Played Key Role in Planning and Executing Meeting

IAEA Safeguards Symposium 2010

Sponsor of Dr. J. Tape as U.S. SAGSI Rep to IAEA

Next Generation Safeguards Safeguards by Design