



Idaho National Laboratory – National University Consortium

Fission Battery Initiative Workshop Series –

7th Series Topic: Domestic & International Nuclear Safeguards & Security

Friday, April 2, 2021

10:00 a.m. – 4:35 p.m. (U.S. Eastern Time)

Moderators:

Gustavo Reyes (Idaho National Laboratory)

Raymond Cao (Ohio State University)

Carol Smidts (Ohio State University)

Cassiano Endres de Oliveira (University of New Mexico)

The aim of the *Fission Battery Initiative*

To define and coordinate research and development of nuclear energy system technologies that can fully achieve battery-like functionality.

Problem Statement

Imagine the ability to produce fission batteries with standardized designs in factories. These fission batteries could be directly installed for applications at any location with limited (and possibly zero) site development. The use of multiple standardized units would provide unprecedented scalability, and able to operate without onsite personnel or operators, providing power reliably and on demand. When they are no longer needed or fully utilized, the fission batteries could be readily removed, replaced, and centrally refurbished or dispositioned. Such nuclear energy system would possess these key attributes: economic, standardized, installed, unattended and reliable.

The objectives of this *Fission Battery Safeguards & Security Workshop* are to:

- Initiate conversations on issues and hurdles related to fission battery safeguards & security (S&S).
- Promote the identification of research and development needs to support fission battery S&S requirements.
- Foster community building and share the current state of understanding on fission batteries among stakeholders.
- Identify the potential stakeholder needs to make fission batteries a reality.

Guest Presenters

Trent Nelson
International Atomic Energy Agency

Frederik Reitsma
Ultra Safe Nuclear Corporation

Shawn Datres
Pacific Northwest National Laboratory

Steven Prescott
Idaho National Laboratory

Alan Evans
Sandia National Laboratory

Vaibhav Yadav
Idaho National Laboratory

Doug Osborn
Sandia National Laboratory

Adam Williams
Sandia National Laboratory

Robert Anderson
Idaho National Laboratory

Indrajit Ray
Colorado State University

Quanyan Zhu
New York University

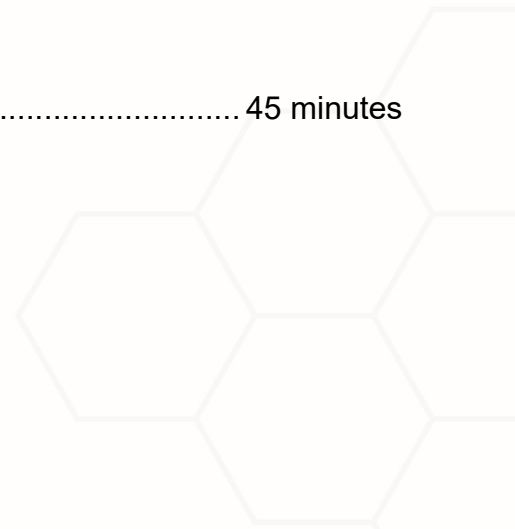
Robert England
Idaho National Laboratory



Session 1: Nuclear Safeguards (Session Chair: Gustavo Reyes, INL)

02 April 2021
All U.S. Eastern Time

- 10:00 Opening Statement and Introduction..... Gustavo Reyes (INL)
- 10:10 International Computer Security Strategy – IAEA Pub Trent Nelson (IAEA)
- 10:20 Safeguards Ideas on Microreactors/FBFrederik Reitsma (USNC)
- 10:30 Pragmatic Security of Unconventional Power Sources .. Shawn Datres (PNNL)
- 11:00 Panel Discussion 1
Moderator: Gustavo Reyes, INL
Panelists: Trent Nelson, IAEA
Frederik Reitsma, USNC
Shawn Datres, PNNL
- 11:30 Break..... 15 Minutes
- 11:45 Target Set Analysis Tools & Needs for FB Steven Prescott (INL)
- 12:00 Physical Protection Systems Strategies for FB Alan Evans (SNL)
- 12:15 Security Economic Analysis on FB..... Pralhad Burli (INL)
- 12:45 Panel Discussion 2
Moderator: Raymond Cao, OSU
Panelists: Steven Prescott, INL
Alan Evans, SNL
Pralhad Burli, INL
- 13:15 Break..... 45 minutes



Session 2: Nuclear Security

(Session Chair: Carol Smidts, OSU)

14:00	Opening Statement and Introduction.....	Carol Smidts (OSU)
14:10	FB's Place in the INS Civilian Nuclear Security Project	Doug Osborn (SNL)
14:20	Additional Physical Security Considerations for FB.....	Adam Williams (SNL)
14:30	Cyber-Informed Engineering – S&S of FB.....	Robert Anderson (INL)
14:40	Panel Discussion 3 <i>Moderator:</i> Cassiano Endres de Oliveira, UNM <i>Panelists:</i> Doug Osborn, SNL Adam Williams, SNL Robert Anderson, INL	
15:10	Break.....	15 Minutes
15:25	Zero Trust Security for Fission Batteries	Indrajit Ray (CSU)
15:35	Cross-Layer Cyber-Physical Security of FB	Quanyan Zhu (NYU) Control Systems
15:45	Experimental Testbeds & Cyber Hardening of FB.....	Robert England (INL)
15:55	Panel Discussion 4 <i>Moderator:</i> Carol Smidts, OSU <i>Panelists:</i> Indrajit Ray, CSU Quanyan Zhu, NYU Robert England, INL	
16:25	Closing Remarks.....	Gustavo Reyes (INL)
16:35	End	