



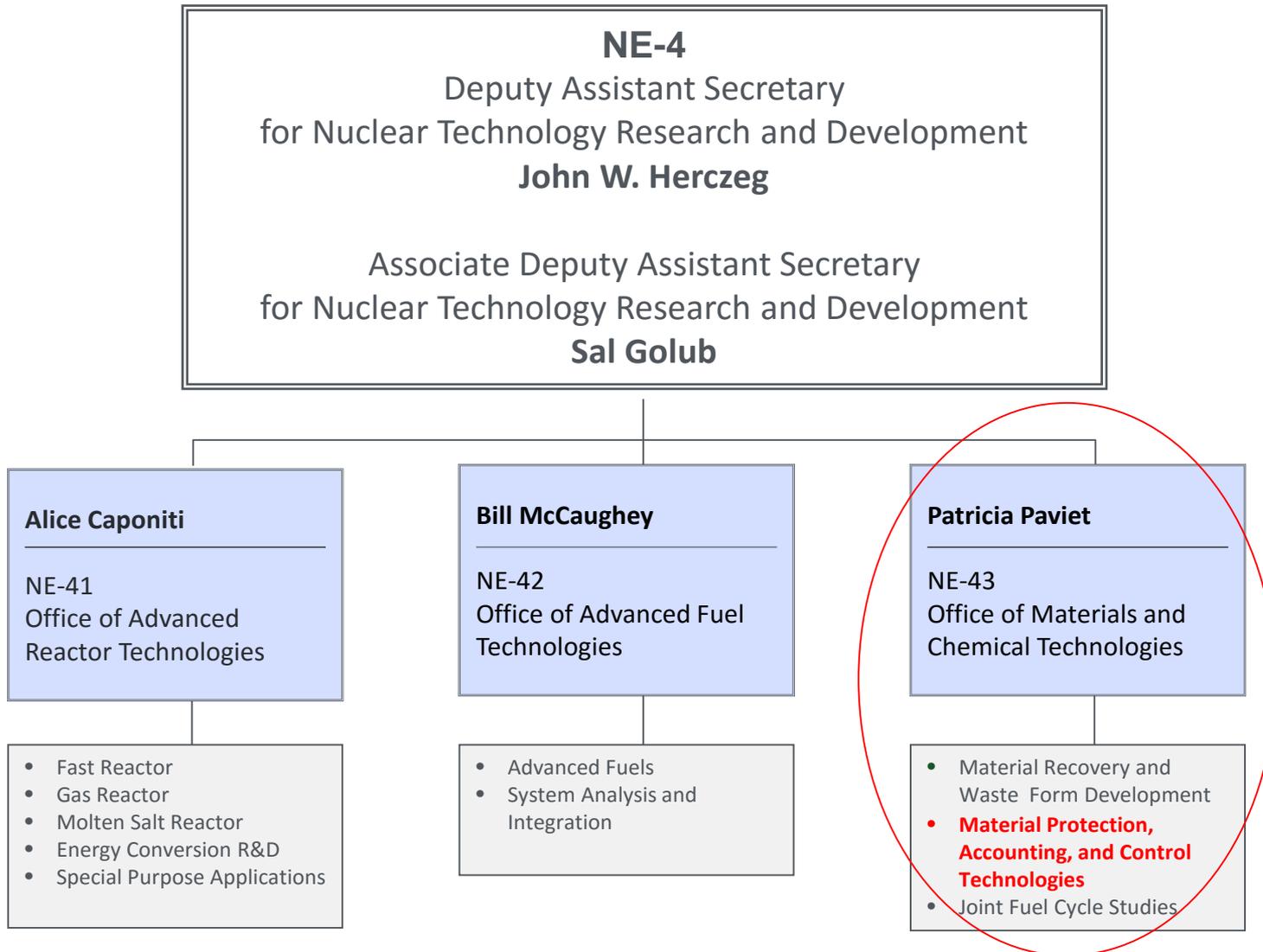
Nuclear Technology Research and Development

Material Protection, Accounting and Control
Technologies (MPACT)

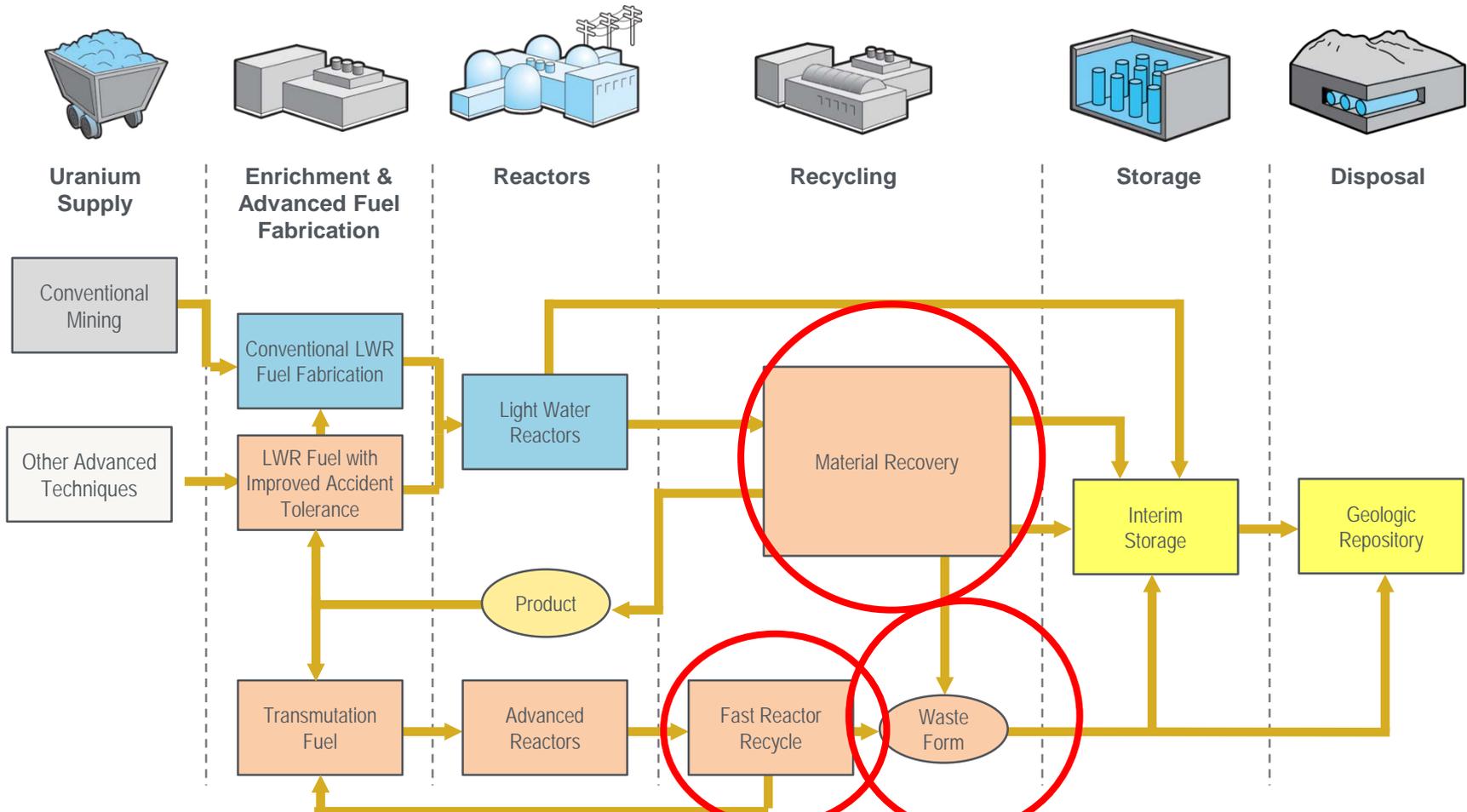
Michael Reim, MPACT Program Manager

NEUP Webinar
9 August 2018

NE-4 Organization Structure



Nuclear Technology Research & Development



←-----Safeguards and Security By Design-----→

Optimize through Systems Analysis, Engineering, and Integration

MPACT Campaign

- **Mission:** Develop innovative technologies and analysis tools to enable *next generation nuclear materials management* for existing and future U.S. nuclear fuel cycles, to manage and minimize proliferation and terrorism risk.
- **Near-term Objectives:**
 - Develop and demonstrate advanced material control and accounting technologies that would, if implemented, fill important gaps
 - Develop, demonstrate and apply MPACT analysis tools to assess effectiveness and efficiency and guide R&D and support advanced integration capabilities
 - Perform technical assessments in support of advanced fuel cycle concepts and approaches
 - Develop guidelines for safeguards and security by design and apply to new facility concepts

MPACT Long Term Objectives

Explore and incorporate *coordinated* safeguards and security by design concepts for nuclear energy systems

- Demonstrate and implement next generation nuclear materials management technologies and approaches, including advanced integration methods
 - Echem, H-Canyon, bilateral engagements, new fuel cycle facilities and demonstrations
- Support NRC rulemaking through engagement and data generation
- Support through international engagement mechanisms to assist the nuclear energy enterprise and demonstrate U.S. Leadership
- **Address safeguards and security issues associated with technology development in other Office of Nuclear Energy campaigns**

FC-3: Advanced Data Integration for Domestic Nuclear Safeguards

Interest in **Molten Salt Reactor (MSR)** research has increased over the past 10 years. The potential safety benefits and cost savings of a comparatively simple design with respect to current commercial power reactors shows promise. However, significant research is required to establish and assess nuclear material accountancy (NMA) for liquid fueled MSRs.

Online processing to remove fission products poses potential NMA challenges in a homogenous fuel/coolant system to confirm that uranium and plutonium are not diverted in the processing. Modeling efforts to quantify whether such diversions can be detected by investigating reactor response to the change of isotopic composition would benefit NMA assessments.

Proposals are sought to develop initial NMA models for simple homogenous liquid fuel MSR design with online fission product removal. University proposals should:

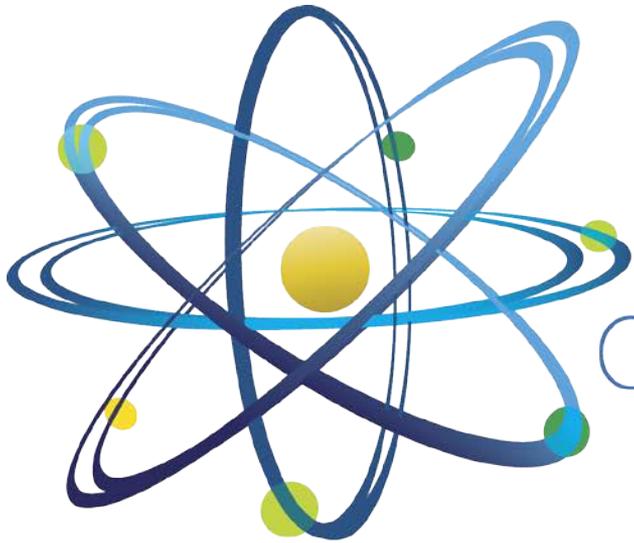
- Utilize models to quantify observable reactor performance to isotopic composition
- Work with U.S. National Laboratory collaborators to identify potential NMA challenges

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Questions?



Clean. **Reliable. Nuclear.**

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