



U.S. DEPARTMENT OF
ENERGY

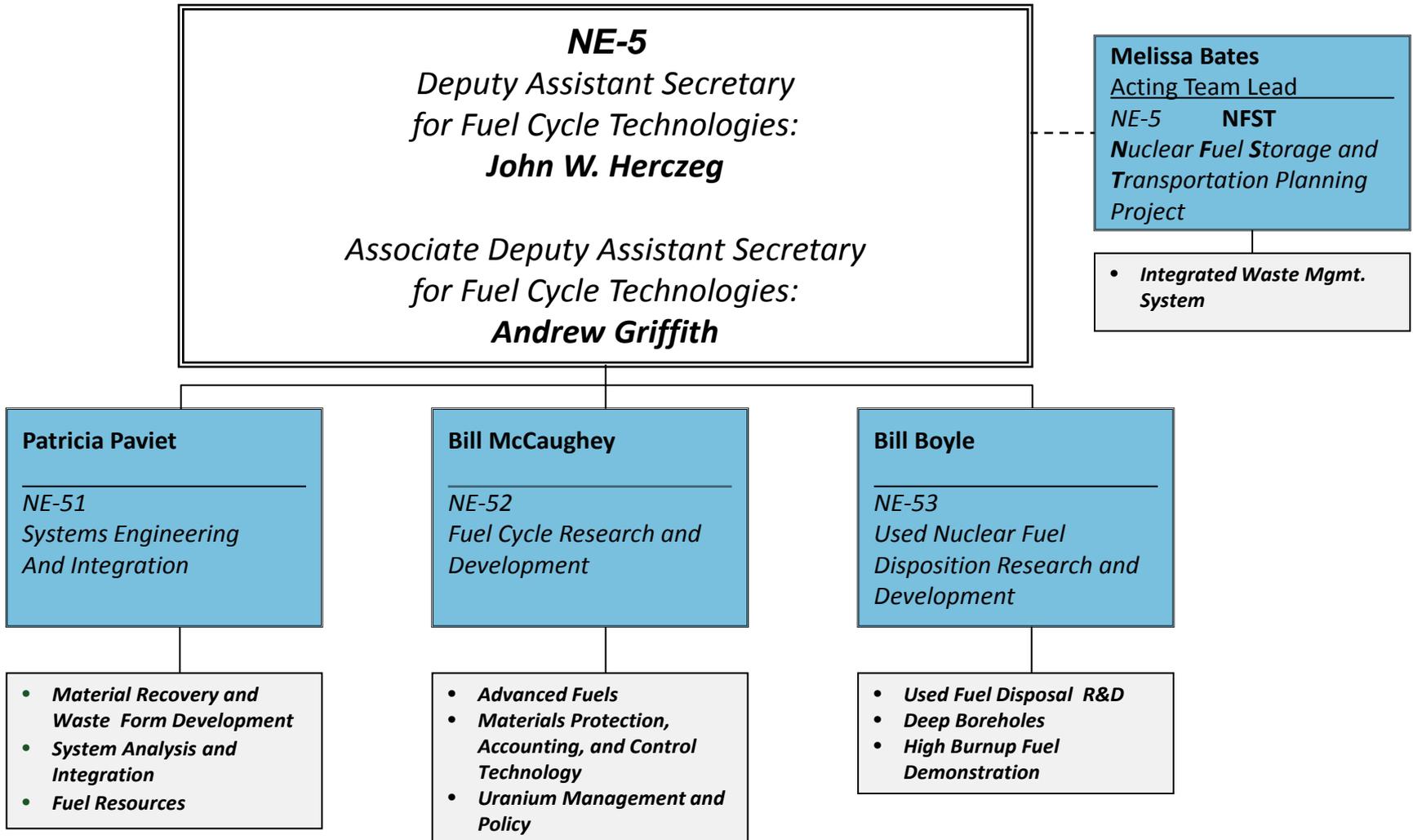
Nuclear Energy

Status of NEAC Fuel Cycle Subcommittee Recommendations

**Subcommittee Chair: Alfred Sattleberger
Recommendations 2012-2014
Report to the
Nuclear Energy Advisory Committee Meeting
December 11, 2015**

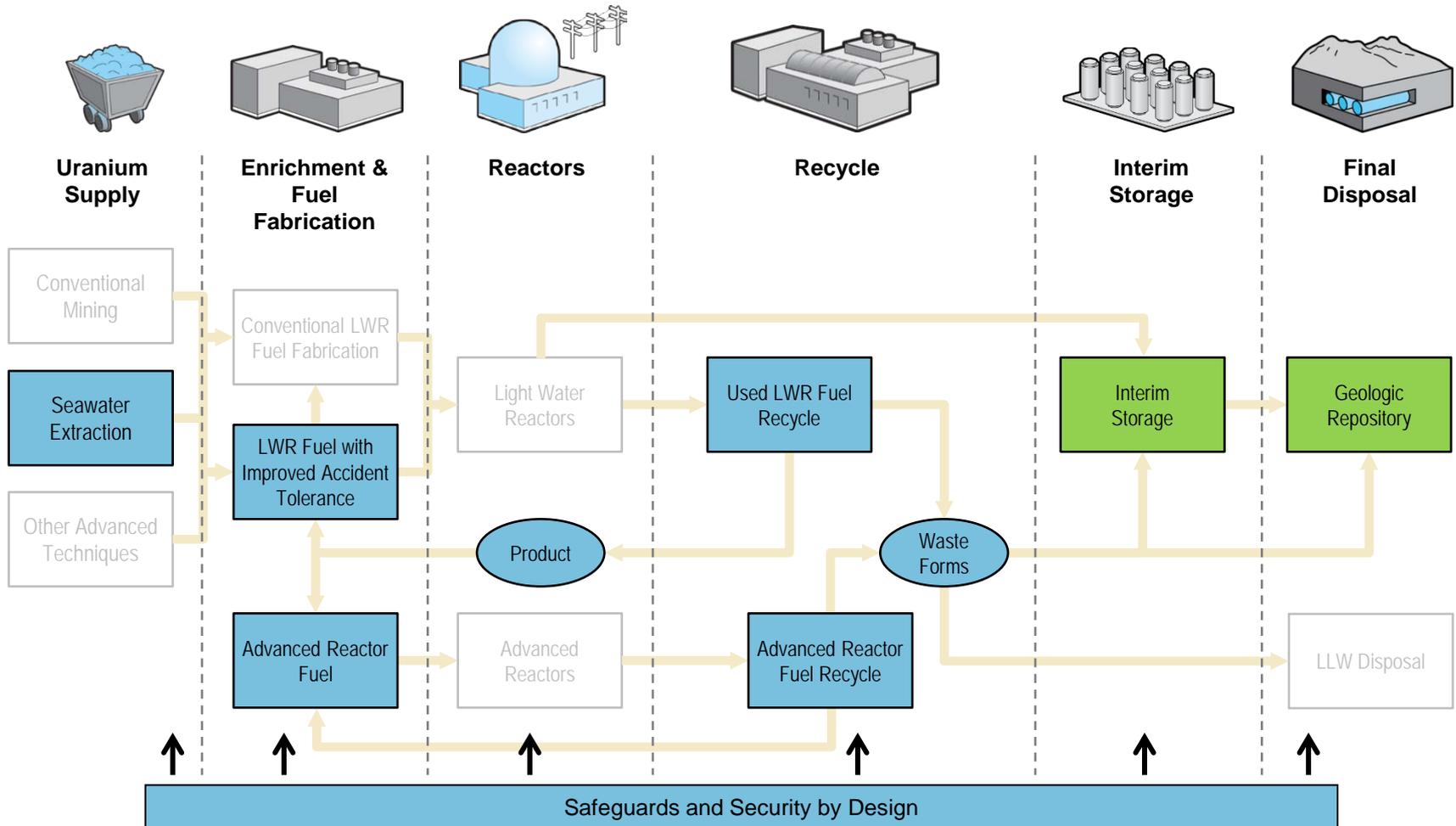
**John W. Herczeg, Deputy Assistant Secretary
Andy Griffith, Associate Deputy Assistant Secretary
Office of Fuel Cycle Technologies
U.S. Department of Energy**

NE-5 Organization Structure





Focus Areas of DOE Fuel Cycle Technologies





Accident Tolerant LWR Fuels and Transient Reactor Test facility

- **NEAC recommendations highlight the work and priorities of the FCRD Advanced Fuel Campaign to develop near-term accident tolerant LWR fuel (ATF) technology and perform research and development of long-term resource enhancement options.**
 - Consistent with Congressional direction:
The current ATF program focuses on fuel and cladding development that can tolerate the severe accident better than the existing zircaloy base LWR fuels in a beyond design basis severe accident- for Gen III & III+.
 - Further: We recognize the work of the LWR Sustainability Program and that the ATF needs to be coordinated, as relevant for both older and future plants.
- **NEAC supports NE's work in proceeding with the restart of TREAT.**
 - NE's work is progressing positively for a successful return to transient testing operations by the scheduled 2018 date. The original plan remains with resumption of operations using the currently installed HEU core and then conversion to a LEU core.

NEAC Recommendations: coordination with the LWR Sustainability program; R&D approach including fuel, NSS, and BOP improvements to enhance accident tolerance; prioritize activities and develop contingency plans in the event of reduced resources; and perform reactor system response analyses.



Material Protection Accounting and Control Technologies (MPACT)

- **NEAC recommendations are an integral part of the MPACT's mission to manage and minimize proliferation and terrorism risk, and to develop innovative technologies and analysis tools to enable *next generation nuclear materials management* for existing and future U.S. nuclear fuel cycles.**

We are:

- Engaging with the NRC directly on research and development including new work on dose consequences of cask sabotage and aging phenomena. NRC representatives are invited to participate in every MPACT working group meeting.
- Integrating the long-term objectives of the MPACT program into a "Virtual Test Bed" which will serve as a tool for comparing fuel cycle-wide safeguards needs with capabilities. This tool will serve to integrate the individual parts of nuclear material accountancy and can be refined as new instrumentation is developed.

NEAC Recommendations: increase interactions with the Nuclear Regulatory Commission in fuel storage consequence analysis; and perform some long-term planning to develop discreet objectives across various research areas.

Fuel Cycle Options Study

- **NEAC recommendations since the issuance of the Fuel Cycle Options Evaluation and Screening Report in October 2014 focus on the simplification of metrics supporting proliferation risk and material security. NEAC understands the rationale behind this simplification and supports modifying the executive summary to include the associated limitations that are discussed in the body of the report.**
 - We plan to take into consideration the NEAC's recommendations for any future revisions to the report.
 - We have addressed all of the NEAC's recommendations prior to the issuance of the Fuel Cycle Options Evaluation and Screening Report in October 2014.

NEAC Recommendations: simplification of metrics supporting proliferation risk and material security.

Deep Borehole Disposal Concept

- **NEAC recommendations about the deep borehole field test align well with our goal to provide a sound technical basis for multiple viable disposal options in the U.S., and to develop the science and engineering tools needed to support disposal concept implementation.**

We are:

- employing a disciplined approach to data gathering and have considered the Data Quality Objective (DQO) process.
- conducting the field test to evaluate the viability of the deep borehole concept.
- preparing more detailed cost and schedule estimates as part of the acquisition process for the field test.
- initiating performance assessments including scenario analysis which would become integral to the licensing of any future borehole disposal site.
- coordinating with other DOE offices and leveraging their expertise as part of the SubSurface cross-cut initiative. The FORGE R&D site will be unavailable in the given timeframe of the test schedule of the field test.

NEAC Recommendations: data gathering; mission rationale; cost and schedule estimates reassessment; comprehensive scenario analyses; and leveraging expertise



Nuclear Fuel Storage & Transportation Planning Project (NFST)

- **NEAC recommendations are consistent with the NFST mission to lay the groundwork for implementing interim storage and associated transportation per the Administration's *Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste (Administration's Strategy)*, and to develop a foundation for a new nuclear waste management organization.**

We are in the process of the pursuing the following actions:

- Developing a tool titled the UNF-Storage, Transportation, & Disposal Analysis Resource and Data System (UNF-ST&DARDS), to characterize and track the entire commercial spent fuel inventory at the assembly level. UNF-ST&DARDS is being developed such that it could be used as the basis for storage and transportation evaluations. This tool will be capable of slicing data in multiple ways to provide information for the design of a pilot interim storage facility as well as the prioritization of R&D activities related to fuel receipt and storage.
- Developing a new standardized transportation, aging, and disposal (STAD) canister system as an option that could provide for an integrated approach to address storage, transportation and disposal related issues in the waste management system.

NEAC Recommendations: completion of study on the entire spent fuel inventory in a way that maintains flexible data; development of a standardized canister design for spent nuclear fuel.

Nuclear Fuel Storage & Transportation Planning Project (NFST) – Cont'd

We are in the process of the pursuing the following actions (cont'd):

- Carefully and systematically evaluating the features and requirements of a generic pilot interim storage facility (ISF) and the larger generic ISF.
- Evaluating the pilot ISF design concepts per the Administration's Strategy.
- Developing an Execution Strategy Analysis (ESA) capability and tool to evaluate alternative execution strategies for future deployment of a consolidated ISF using a consent-based siting process per the Administration's Strategy.
- Evaluating the lessons learned from the consent-based siting programs in multiple countries to determine the elements that DOE believes would support the success of our program as we prepare for the development and implementation of a consent-based siting process.

NEAC Recommendations: improved clarity of objectives and mission; learning from past experience; improving communications and establishing expectations.