Office of Nuclear Energy – Mission Pillars

- Advance nuclear power to meet the nation's energy, environmental, and national security needs.
- Resolve technical, cost, safety, security and regulatory issues through research, development and demonstration.
Office of Nuclear Energy Realignment*

- Realignment executed in Oct 2018 moved Advanced Reactor Technologies from NE-4 to NE-5
- Merges advanced reactor technology programs to single organization
- Versatile Test Reactor and fuel development remain in NE-4

*Ink not dry!
Realigned NE-5*

*Ink not dry!

NE-5
Deputy Assistant Secretary for Nuclear Technology & Demonstration
R. Shane Johnson
Mike Worley

NE-51
Office of Nuclear Energy Technologies
Alice Caponiti

NE-52
Office of Advanced Reactor Deployment
Tom O'Connor
Tom Miller

Nuclear Energy Enabling Technologies
Industry and University Support
• Industry funding opportunities
  • Industry FOA & GAIN Vouchers
• Nuclear Energy University Program
• Research Reactor Infrastructure
• Integrated University Program

Light Water Reactor Sustainability
Advanced Reactor Technologies
• Advanced non-LWRs R&D
• Microreactors
• Regulatory Support

Advanced SMR R&D

Gateway for Accelerated Innovation in Nuclear (GAIN)
gain.inl.gov
NEET
Conducts research and development (R&D) and makes strategic investments in research capabilities to develop innovative and crosscutting nuclear energy technologies to resolve U.S. industry nuclear technology development issues

Program Elements

- Crosscutting Technology Development:
  - Advanced Sensors and Instrumentation
  - Advanced Methods for Manufacturing
  - Advanced Cooling Technologies
  - Hybrid Energy Systems
  - Cybersecurity
- Advanced Modeling and Simulation – both NEAMS and Hub
- Nuclear Science User Facilities
- Transformational Challenge Reactor
Advanced Methods for Manufacturing Vision and Goals

Vision

• To improve the methods by which nuclear equipment, components, and plants are manufactured, fabricated, and assembled by utilizing ‘state of the art’ methods

Goal

• To reduce cost and schedule for new nuclear plant construction
• To make fabrication of nuclear power plant (NPP) components faster, less expensive, and more reliable
AMM Projects

- Competitively selected projects via CINR

- AMM initiated in FY 2012
- Open to universities, national laboratories and Industry
- R&D and irradiation/PIE projects funded
- FY2012 – FY 2017: ~$15M
  - In FY 2018 – 38 AMM CINR proposals received
    - 2 CINR projects – awarded - $2M
    - 3 Phase I SBIR projects – awarded $450K
    - 2 Phase II SBIR projects – awarded $2M
- FY 2019: Currently 31 AMM CINR proposals under review
FY 2019 CINR FOA Focus Areas

1. Factory and Field Fabrication Techniques, such as:
   • Welding and joining technologies
   • Modular fabrication and installation

2. Quality Control Techniques and Qualification Methodologies

   Advanced surface plasma nitriding for development of corrosion resistance and accident tolerant fuel cladding – Texas A&M University (10/1/2015 – 9/30/2018)

Past and Current AMM Project Focus Areas

• Factory and Field Fabrication Techniques
  – High speed, high quality welding technologies

• Assembly and Material Innovation to Enhance Modular Building Techniques
  – Advances and innovation in high strength concrete and rebar

• Advances in Manufacturing Processes
  – Cladding and surface modification methods
  – Additive manufacturing

• Improved Concrete Inspection, Acceptance and Construction Methods
  – Improved methods to facilitate the curing of concrete

• Data Configuration Management
  – Imaging techniques for as-built design
  – UAV based 3D surveying
FY 2018 Industry FOA Awards

• **First Round – BWXT**
  Establish an integrated advanced manufacturing and data science driven paradigm for advanced reactor systems
  • Will develop the ability to implement additive materials manufacturing to the fabrication process for nuclear components and sub-components

• **Second Round – HOLTEC**
  Advance and commercialize hybrid laser arc welding for nuclear vessel fabrication
  • Will develop, qualify, demonstrate, and commercialize a metal joining process to solve major manufacturing challenges associated with the fabrication of nuclear components

• **Third Round – EPRI**
  • Establish modular in-chamber electron beam welding capability
  • Will demonstrate the capability to produce large, thick-section components
Questions?