



U.S. DEPARTMENT OF
ENERGY

Nuclear Energy

Status on Settlement Agreement Commitments, and Impact of Nuclear Energy Research and Development

Leadership in Nuclear Energy (LINE) Commission

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Status on Settlement Agreement Commitments: Processing of Liquid Waste

All modifications and corrective actions from the June 2012 event have been completed

- Facility at INTEC began Test Instruction 102, which will bring the facility up to normal operating temperature and pressure

Near term milestones

- Complete contractor readiness assessment and DOE readiness assessments January to February time frame
- Facility will process ~50,000 gallons of simulated waste, expected to begin as early as Feb-March 2014
- This will allow fine tuning of the facility and establish process feed rate for treating the ~900,000 gallons of SBW

Goal: Treat all ~900,000 gallons by December 31, 2014



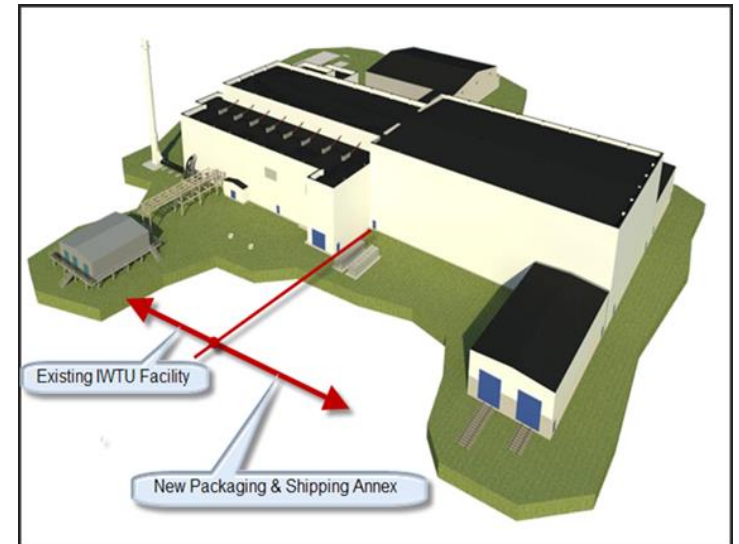
Status on Settlement Agreement Commitments: Calcine Disposition

Commitments to:

- Make calcine road-ready for disposition or storage outside of Idaho by 2035
- Per Site Treatment Plan –
 - 2018 procure contracts
 - 2019 initiate construction
 - 2023 conduct system testing
 - 2024 commence operation



Calcine is currently stored in bin sets at INTEC



Design concept

Status on Settlement Agreement Commitments: Spent Nuclear Fuel Management

Fuel Wet to Dry Storage

- Immediate requirement is to comply with the Settlement Agreement milestone to have all SNF in dry storage by December 31, 2023
 - EBR-II fuel out of wet storage by 2021, to be processed at MFC
 - Navy fuel to NRF by September 2017
 - Evaluating options for future storage of ATR SNF



Spent fuel management in the CPP-666 basin

Fuel Disposition

- Settlement Agreement requirement to ship out of state by 2035
 - Highly dependent on offsite options
 - Will require repackaging of SNF



Dry storage of Three Mile Island fuel debris

Status on Settlement Agreement Commitments: AMWTP & RH TRU

Process and ship legacy TRU by December 31, 2018

- AMWTP contact-handled and remote-handled
 - Shipped ~52,000m³ of ~65,000m³
- Offsite contact-handled TRU waste – LANL – AMWTP must treat and ship out within a year
 - AMWTP has received 3 of 18 LANL shipments

CERCLA ROD

- Buried waste – Exhume 5.69 acres – 55% complete
 - To date, ICP has exhumed 5,864m³
 - Shipped 5,719m³



ARP III exhumation was completed in autumn 2013



RH TRU leaving Idaho for WIPP after treatment in the INTEC FDP Hot Cell



The waste drum supercompactor at AMWTP exerts 4 million pounds of force. This helps reduce the number of shipments and maximizes disposal space in WIPP



Inside the ARP VIII retrieval enclosure before exhumation began in November 2013



From 2005-2013 – INL has Built a Nuclear Energy Research Institution Prepared for the Future

2009 Technical Support Building



2009 Radiation Measurements Laboratory



2009 Test Train Assembly Facility



2010 Radio Analytical Chemistry Laboratory



2016 Operations Support & Cafeteria (planned)



2009 Vehicle Test Station



2009 Radiochemistry Laboratory



2011 Modular Office Building



2012 Irradiated Materials Characterization Laboratory



2012 MFC Dial Room



2008 - Center for Advanced Energy Studies



2008 - National & Homeland Security Laboratory



2008 - Supply Chain Management Offices



2008 - National & Homeland Security Laboratory



2010 - National & Homeland Security Laboratory



2012 - Energy Systems Laboratory



2013 - Research & Education Laboratory (under construction)



NE Facility Development Work

Irradiated Materials Characterization Laboratory (IMCL)

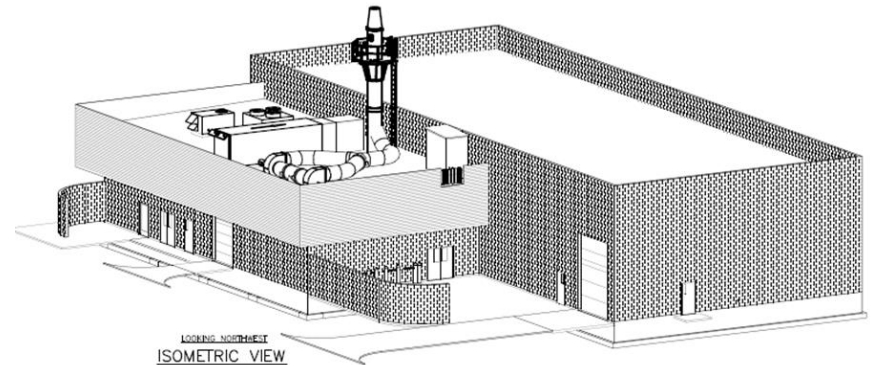
- Built at MFC and equipment being installed
- We're envisioning an Advanced Post Irradiation Examination facility

Resumption of Transient Testing

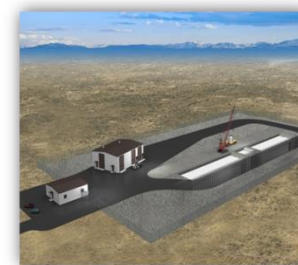
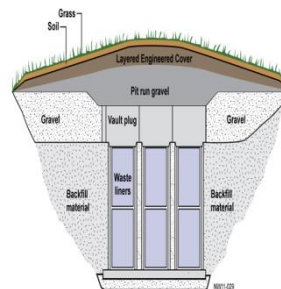
- Public comment period complete on *Draft Environmental Assessment for the Resumption of Transient Testing of Nuclear Fuels and Materials*
- Transient Reactor Test Facility is the preferred alternative
- After evaluation of all comments, a decision will be made whether to prepare an Environmental Impact Statement or issue a Finding of No Significant Impact (FONSI).

RH LLW Disposal effort

- 2011 EA performed and FONSI signed
- Next steps – approval of baseline and construction
- Plan to operate by 2020

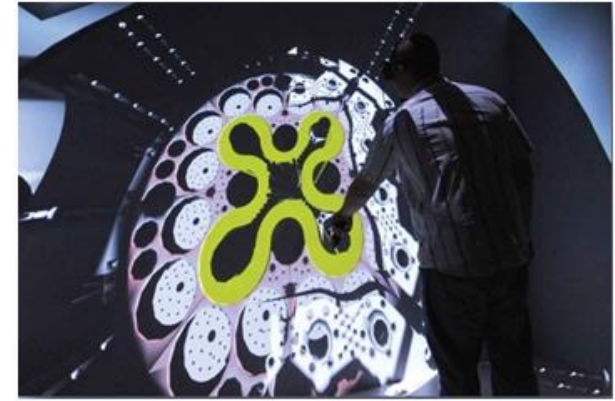


IMCL: 12,000 sq. ft. (8,500 sq. ft. lab wing; 3,500 sq. ft. support wing). Meets vibration, electromagnetic and thermal interference requirements for advanced characterization instruments



Center for Advanced Energy Studies (CAES): An Idaho Success

- **Partnership between the University of Idaho, Idaho State University, Boise State University, and INL**
- **Growing Research Business & Talent**
 - \$4.5 M in new R&D programs in FY13; \$57 M competitively won since 2008
 - 421 students enrolled in nuclear-related degree programs at CAES partner universities
 - CAES Energy Scholars inaugural program: Competitive internships for 10 of Idaho's best and brightest college students
- **Continuing Our Legacy of Research Excellence**
 - ISU researchers successfully grew first single crystal, pure uranium oxide
 - INL and BSU researchers achieved breakthrough in understanding silver fission product migration in advanced nuclear fuels
 - UI / CAES professor Robert Hiromoto selected as Fulbright Scholar (to study in Ukraine)
- **Focus: expand impact in talent pipeline; larger, more sustainable programs rather than projects; and strong industry touch**



Computer Assisted Virtual Environment
at CAES

NE Research into Dry Fuel Storage

- **Main goals of the proposed test are to provide confirmatory data for model improvement, provide input to future SNF dry storage cask design, support license extensions for Independent Spent Fuel Storage Installations, and support transportation licensing for high burnup SNF**
- **Research project led by Electric Power Research Institute (EPRI)**
- **DOE will invest \$15.8 million over five years, with private industry contributing at least 20 percent of the total project cost.**



A spent nuclear fuel dry storage cask at the North Anna Nuclear Generating Station in Virginia

DOE Program to Support SMR Design Certification & Licensing

- In 2012, DOE initiated a 6 year/\$452 M program
- Accelerate commercial SMR development through public/private arrangements
 - Deployment as early as 2022
- Provide financial assistance for design engineering, testing, certification, and licensing of promising SMR technologies with high likelihood of being deployed at domestic sites
- Funding being provided to industry partners through cost sharing
- Exploring additional mechanisms for SMR fleet deployment

The U.S. Government wants to support the safest, most robust SMR designs that minimize the probability of any radioactivity release

Status of SMR Licensing Technical Support Program

B&W mPower America – 1st FOA

- Cooperative Agreement established with team consisting of B&W, Bechtel, and TVA in April 2013
- Initial DOE commitment of \$101 M through March 2014
- Design Certification Application (DCA) submittal to NRC in late 2014; Construction Permit in mid-2015
- mPower is meeting the DOE goals established in the agreement



NuScale Power – 2nd FOA

- Award with NuScale announced on December 12, 2013
- Negotiations on cooperative agreement terms will begin immediately
- DCA submittal planned for late 2015



The program is currently a 6-year \$452 M program – DOE is examining options to optimize the funding split between the industry partners