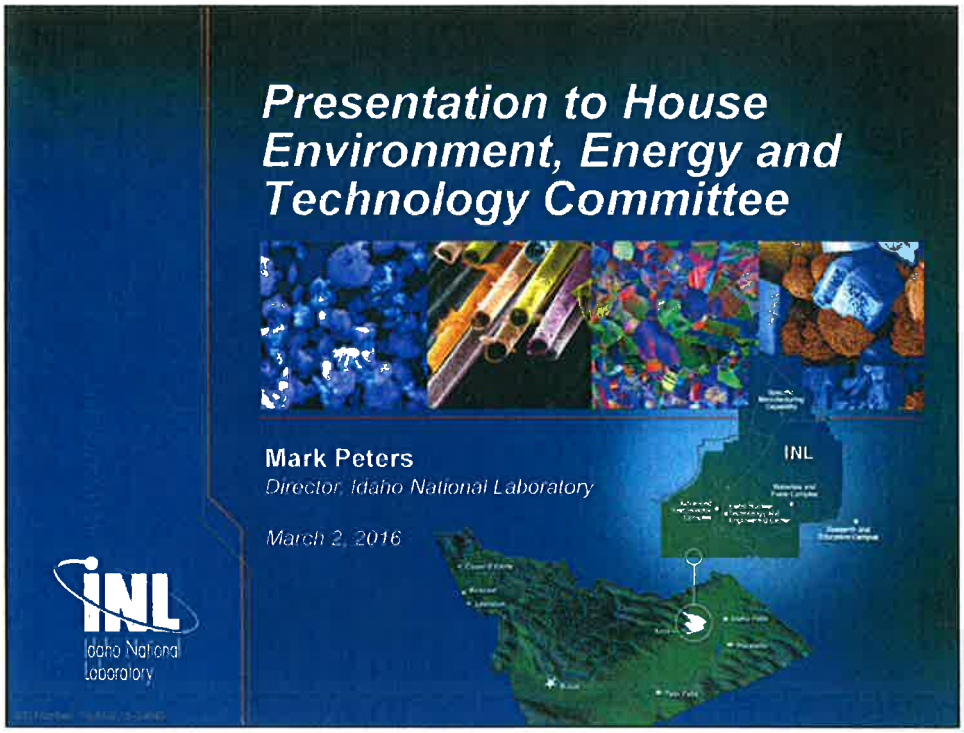
Mark Peters
INL
March 2, 2016
Attachment 1



Mark Peters, INL Laboratory Director

Idaho National Laboratory

INL Small Modular Reactor (SMR) Activities

- **INL works with all vendors to provide fair access to the laboratory benefits**
- **INL works with industry on SMR technology and deployment**
- **INL is supporting DOE in deploying SMRs**

SMR Design Features

- **INL is supporting multiple Light Water Reactor SMR vendors**
  - Small, but not always, <300 MW reactors.
    - Less expensive reactors compared to current LWR reactors
  - Often, but not always, multiple reactors at the same site that can be deployed as power is needed (Modular)
  - Primary cooling system and reactor core in a single simpler nuclear power plant, but not always
- **Integrated Pressurized Water Reactor SMR's are closest to licensing and deployment**
  - Designed to be inherently safer and simple
  - Primary reactor system inside a single factory built containment vessel
  - Higher dependence on passive systems to simplify operation and design

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Idaho National Laboratory

Idaho's Carbon Free Power Project (CFPP)

Land Use Agreement *(2/17/2016)*

- DOE and UAMPS signed an agreement to select, develop and operate a Small Modular Reactor (SMR) nuclear power plant at INL
- Agreement allows an NRC license for a commercial power plant to operate on an approved site
- INL and CFPP operations will be separate. Interface and access are established in the land use agreement
- CFPP will operate under local, state and federal regulations
- DOE water rights are not committed
- INL established an SMR Team to support the CFPP and future SMRs

Siting Status *(March/April 2016)*

- INL is working with CFPP to support an NRC approved site selection process meeting DOE's goals to deploy an SMR
- INL's expert knowledge of successfully operating multiple reactors is key
- Sites throughout Idaho and Utah were initially reviewed. Final candidates are all at INL
- Highest scoring sites were down selected and evaluated on additional data at each round
- Three rounds of down selects resulted in "final four" candidate sites
- Preferred site will be identified soon, then site characterization will begin
- **Operating SMR planned for 2023**

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INL Idaho National Laboratory
Global Security Challenges
Enabling the warfighter, Intelligence Community and first responders
Global security against nuclear and radiological threats
National & Homeland Security
Positioned to address the world's most challenging problems in:
Critical Infrastructure Protection and Resiliency
Nuclear Nonproliferation
Physical Defense Systems
Secure and resilient electric grid
Nuclear nonproliferation safeguards and security
Wireless security and spectrum crunch
Secure industrial control systems across critical infrastructure sectors
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INL Idaho National Laboratory
Energy and Environment Science & Technology:
Excellence – Innovation – Impact
Advanced Transportation
Environmental Sustainability
Clean Energy
Advanced Manufacturing
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Center for Advanced Energy Studies

Collaborative Energy Research

Explore: Energy & Environmental Research
Educate: Energy & Environmental Education
Engage: Apply Knowledge to Industry
Enable: Energy Transitions and Economic Development

Core Capabilities

- Energy Systems Design and Analyses
- Nuclear Science and Engineering
- Materials Science and Engineering
- Environmental and Resource Sustainability
- Carbon Engineering
- Geological Systems and Applications
- Policy

CAES by the Numbers

In the past 5 years:

$105.1 M	Research and development funding and equipment acquired
3325	Number of students supported by CAES-related projects
814	Number of publications, presentations, and proceeds CAES researchers produced

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The Idaho National Laboratory Site

We Maintain:

- 890 square miles
- 111 miles of electrical transmission and distribution lines
- 579 buildings
- 177 miles of paved roads
- 14 miles of railroad lines
- 3 reactors
- 2 spent fuel pools
- Mass transit system
- Security
- Museum
- Educational and research partnerships – CAES

3,771 Employees
FY-2015 Business Volume
$917M

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INL by the Numbers

- **10 Year** anniversary of INL
- **14 States** have a National Lab *(there are 17)*
- **5th Largest** employer in Idaho
- **$917M** business volume
- **$130M** to Idaho subcontractors and small businesses
- **$88.6K INL Annual Salary** (vs. $38K Idaho vs. $51.4K National)
- **506 new** INL employees
- **9,500 visitors** to EBR-I *(8,000 in 2014)*
- **350 interns** up from *170 from last year*
- **$622.5K** community giving
- **175 Events** hosted by INL

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Contribution to Idaho's Gross State Product

- **INL is Idaho's 5th largest private employer and 10th largest when compared to all public and private businesses.**
- **The Lab adds nearly $1.6 billion to the state's total output and almost 9,300 to employment in Idaho – an 8% increase over FY14**

- INL brought money into Idaho and generated additional value added output of nearly **$942 million**
- More than **$667 million of economic output** was generated through INL suppliers and employee household spending
- BEA subcontracted more than **$130 million to Idaho subcontractors**
- INL economic impacts resulted in an estimated **$58 million in state and local tax revenues**
- Average base salary of an INL employee is **$88,635 annually**
- Taxes generated by INL operations account for **1.6% of total state** and local tax revenue

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Idaho National Laboratory
Where We are Going 2015-2020 – INL Business Volume Forecast
Primary Business Growth Areas: Advancing Nuclear Energy, Enabling Clean Energy Deployment and Securing & Modernizing Critical Infrastructure
$1,600
$1,400
$1,200
$1,000
$800
$600
$400
$200
$0
$917
$1,002
$1,093
$1,192
$1,300
$1,339
FY15
FY16
FY17
FY18
FY19
FY20
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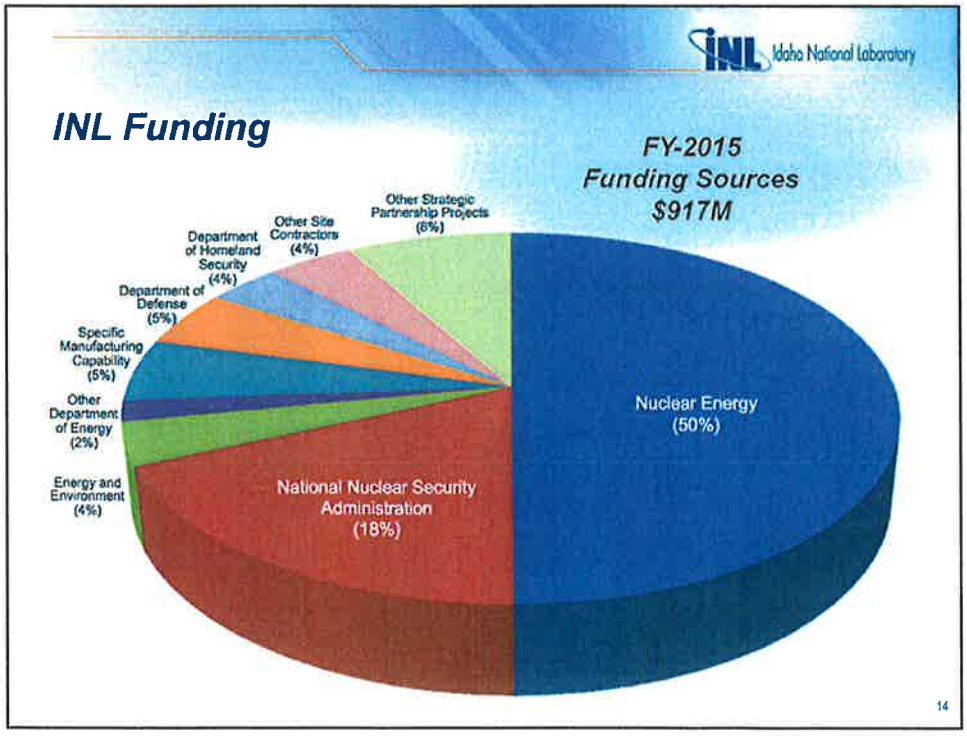
Idaho National Laboratory
INL Funding
FY-2015
Funding Sources
$917M
Other Strategic Partnership Projects (6%)
Other Site Contractors (4%)
Department of Homeland Security (4%)
Department of Defense (5%)
Specific Manufacturing Capability (5%)
Other Department of Energy (2%)
Energy and Environment (4%)
National Nuclear Security Administration (18%)
Nuclear Energy (50%)
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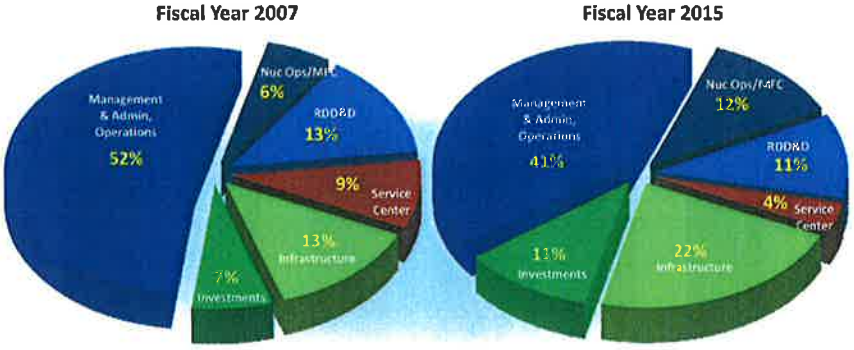
We are Using the Taxpayers Dollars Wisely



Indirect budgets reflect two primary drivers: market forces influencing fringe benefit costs, and the need to build intellectual and physical mission-related capability

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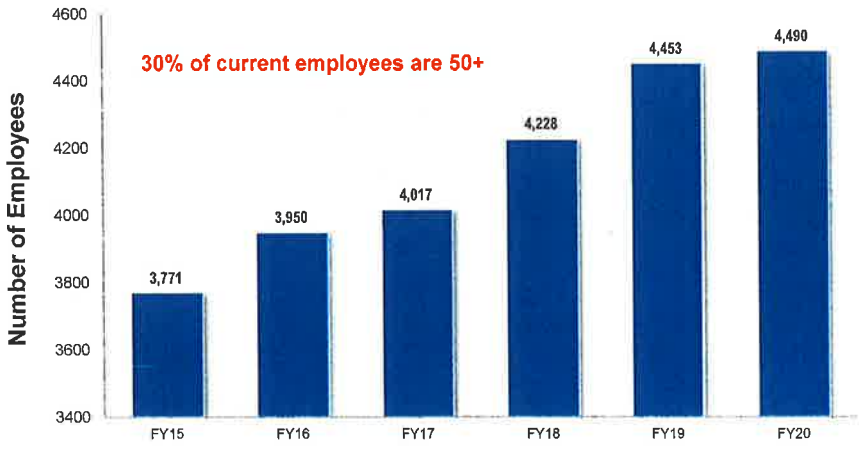
Where We are Going 2015-2020 – Potential Employee Growth



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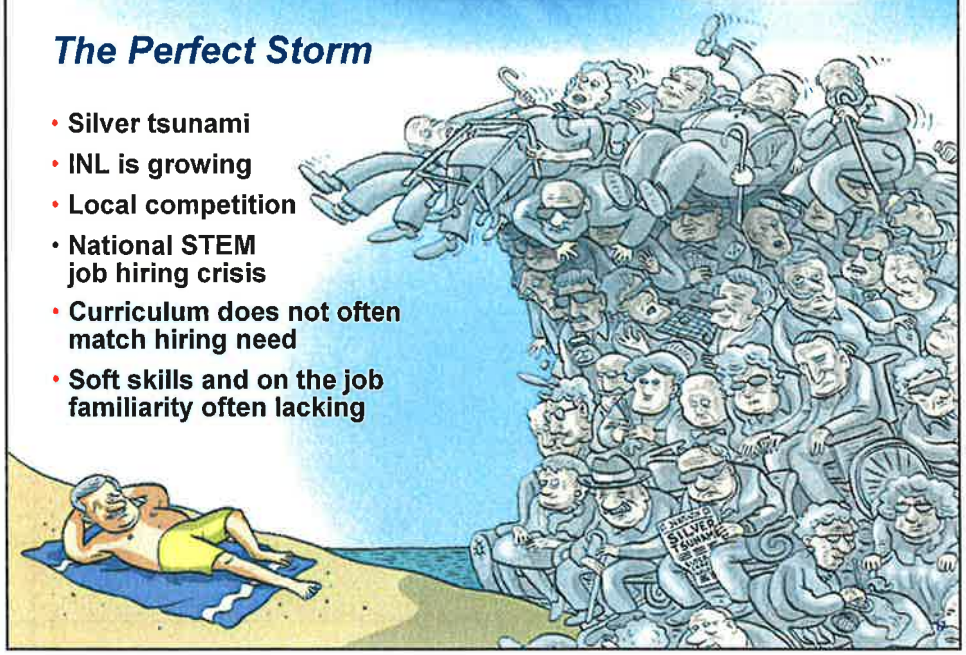
The Perfect Storm

- Silver tsunami
- INL is growing
- Local competition
- National STEM job hiring crisis
- Curriculum does not often match hiring need
- Soft skills and on the job familiarity often lacking



Some Solutions

- **Hiring Solutions**
  - Improve new employee onboarding
  - Partner with University Programs to target schools that best match skill set/degree needs
  - Partner with the community to recruit to East Idaho
- **University/Workforce Development**
  - Strategically tie interns into needed disciplines
  - More joint appointments in areas of need
  - Target the universities/colleges that match best to INL need
  - Increase intern and postdoc opportunities
  - Design and build and change curriculum
- **K-12 STEM**
  - Tie to industry and INL needs - bring awareness of future career opportunities in Idaho
  - Promote and encourage diversity and rural school connections
- **Community**
  - Increase talent pipeline economic development partnership-grants, bring awareness of need, highlight and promote community/state

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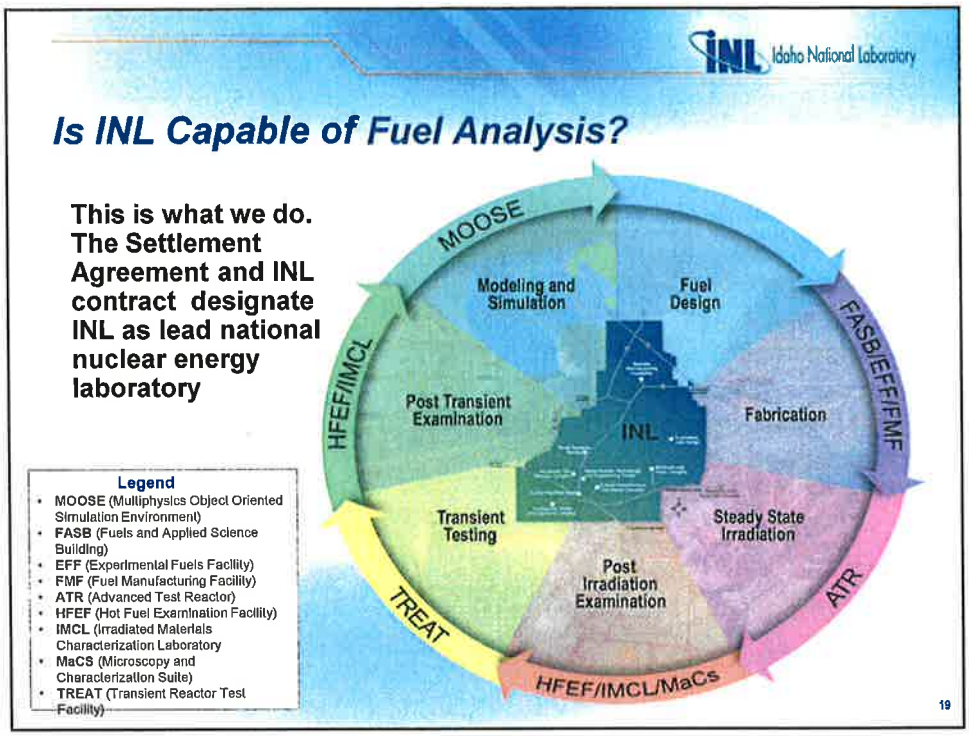
Idaho National Laboratory
Is INL Capable of Fuel Analysis?
This is what we do. The Settlement Agreement and INL contract designate INL as lead national nuclear energy laboratory
MOOSE
Modeling and Simulation
Fuel Design
FASB/EFF/FMF
Fabrication
Steady State Irradiation
ATR
HFEF/IMCL/MaCs
Post Irradiation Examination
TREAT
Transient Testing
HFEF/IMCL
Post Transient Examination
INL
Legend
MOOSE (Multiphysics Object Oriented Simulation Environment)
FASB (Fuels and Applied Science Building)
EFF (Experimental Fuels Facility)
FMF (Fuel Manufacturing Facility)
ATR (Advanced Test Reactor)
HFEF (Hot Fuel Examination Facility)
IMCL (Irradiated Materials Characterization Laboratory
MaCS (Microscopy and Characterization Suite)
TREAT (Transient Reactor Test Facility)
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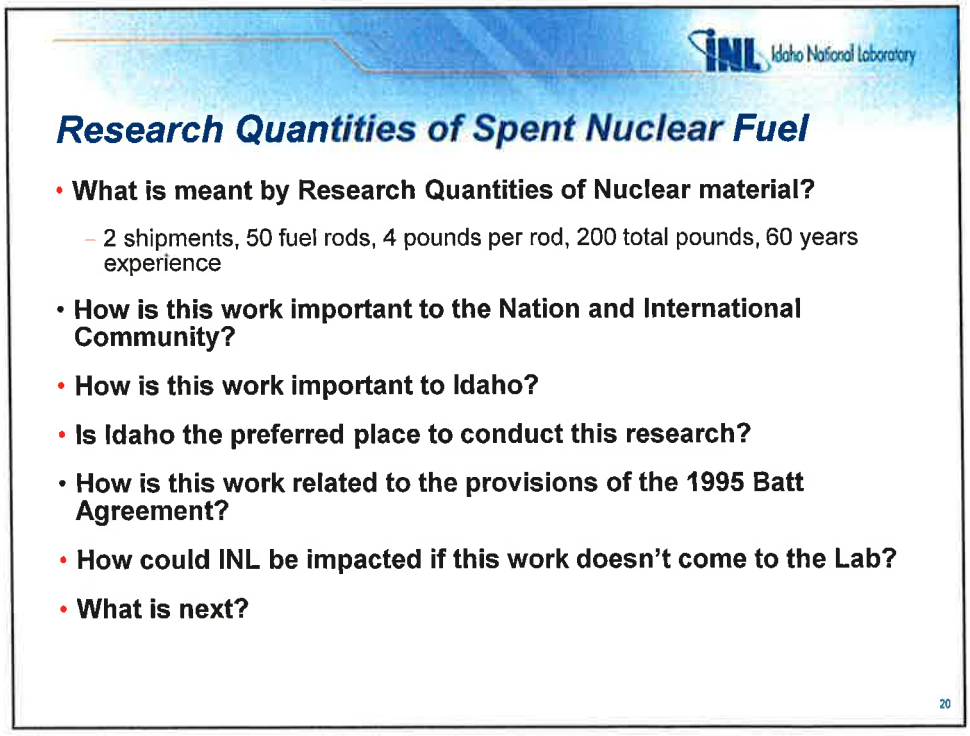
Idaho National Laboratory
Research Quantities of Spent Nuclear Fuel
What is meant by Research Quantities of Nuclear material?
2 shipments, 50 fuel rods, 4 pounds per rod, 200 total pounds, 60 years experience
How is this work important to the Nation and International Community?
How is this work important to Idaho?
Is Idaho the preferred place to conduct this research?
How is this work related to the provisions of the 1995 Batt Agreement?
How could INL be impacted if this work doesn't come to the Lab?
What is next?
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We Want to Build on Our Relationship with Idaho

- **Center for Advanced Energy Studies (CAES)**
  - Continue to grow CAES
- **Workforce Development**
  - Partner with Idaho Colleges and Universities to build talent pipeline
  - Partnerships in Talent Pipeline with IDOL/IDOC to drive high wage job growth
  - More Joint Appointments in areas of need
- **K-12 STEM**
  - Focus on reading competency is critical
  - Stem Action Center – other stem efforts are important
- **Utilize INL's Capabilities**
  - National User Facilities, other capabilities are available to state, universities, colleges
  - High performance computing
  - Cyber, Computer Engineering, Materials Science are areas of obvious collaboration
- **Advancing Programs in Washington, DC**
  - Work to ensure federal officials are certain of strong support for INL in Idaho
  - Work with regional partners to increase impact of our advocacy
  - LINE Commission

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