U.S. DEPARTMENT OF ENERGY | Office of Nuclear Energy

Idaho National Laboratory: *Five Years Later*

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April 29, 2010

INL

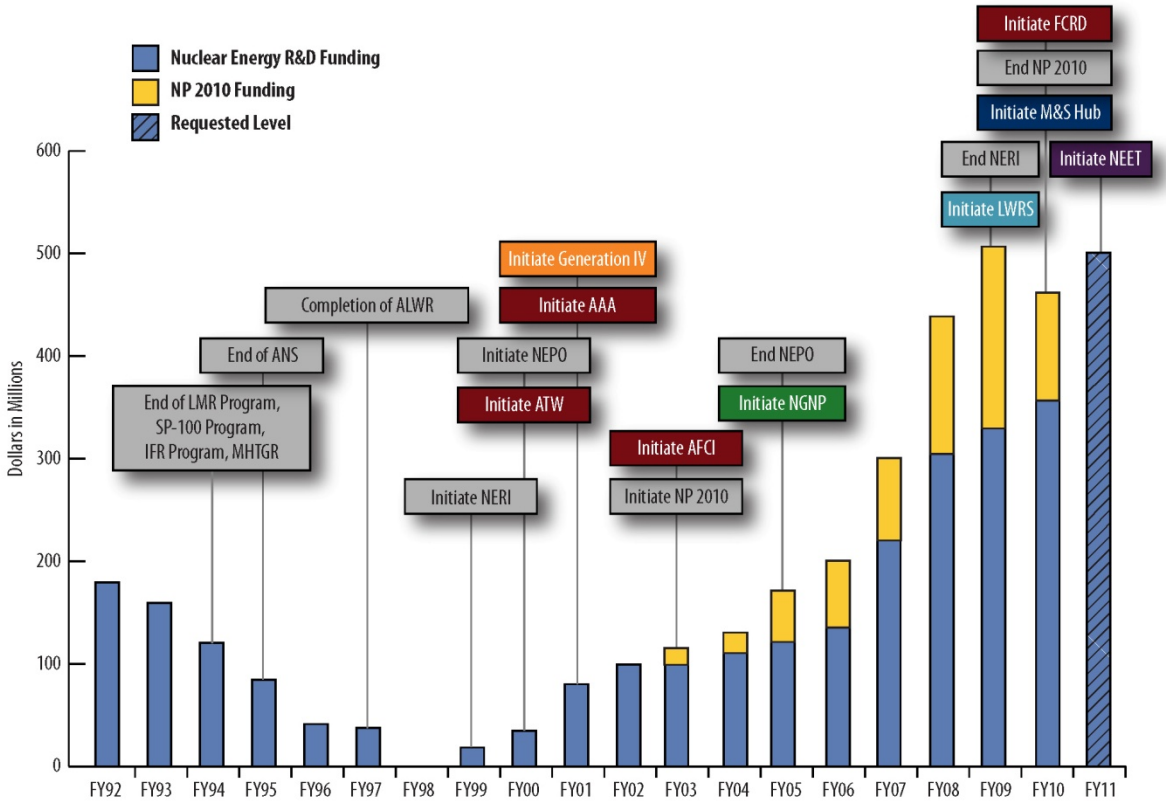
- INL is a unique applied science and engineering laboratory
- INL is closely coupled with NE and the focus is on the NE mission
- Good people are coming to the INL because of the mission and the R&D leadership
- INL is working closely with the other DOE labs and universities
- INL faced significant obstacles from the onset of the lab (2005) --
  - An R&D culture in decline
  - Broken or non-existent management systems
  - A decade of under investment (priorities focused on cleanup/shutdown)
  - Under utilization of ATR and MFC
  - Barriers to doing commercial work, including the Settlement Agreement
  - Unfunded liabilities
  - And many more…….
- Some of these are not yet resolved however…..

INL is a far different institution from what it was in 2005.

Establishing the Idaho National Laboratory

Office of Nuclear Energy

- Resurgence of nuclear energy over last decade established a need for a national laboratory dedicated to nuclear energy RD&D
- In 2003 DOE decided to:
- Consolidate ANL-West / INEEL
- Split NE laboratory operations from cleanup
- DOE issued an RFP in May 2004, calling for establishment of the INL
- September 2004, NERAC issued recommendations on world-class lab
- In November 2004, DOE awarded INL contract to BEA team
- February 2005 INL launched



DOE Vision of INL (2004)

- Enhance the Nation's energy security by becoming the preeminent, internationally-recognized nuclear energy research, development and demonstration (RD&D) laboratory within 10 years
- Establish itself as a major center for national security technology development and demonstration
- Be a multi-program National Laboratory with world-class nuclear capabilities
- Foster academic, industry, government and international collaborations to produce the investment, programs and expertise that assure this vision is realized

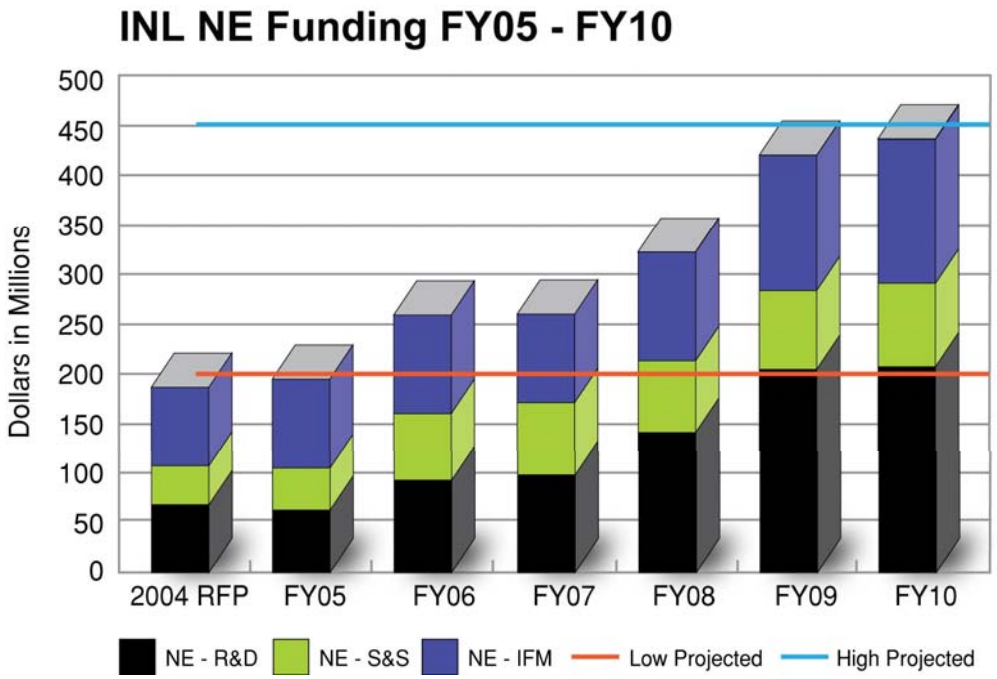
Vision has not changed but strategies and tactics to achieve the vision have evolved. Areas of policy emphasis have also evolved.

Performance Against NERAC Recommendations

Number	High Priority Recommendation
1	Highest priority is to fund INL and allocate resources to build-up of facility and staff capabilities. Recognize and allow for contributions of other national laboratories.
2	Understand and agree on vision and mission
3	Develop policies and practices that attract/retain best and brightest scientists, engineers and technical managers
4	Identify and recruit the best and brightest scientists and engineering to be involved as collaborators. Ensure workforce and users/collaborators comprise a diverse population.
5	Create a culture where research and scholarship encouraged and rewarded
6	Fund INL to develop and maintain high quality, state of the art research facilities. Operate many if not most of the facilities as user facilities.
7	Select M&O contractor with superb qualifications and a credible plan to achieve the vision
8	DOE focus on managing the contract, not the contractor. Hold the contractor accountable.
9	INL should Visit and benchmark world-class labs in NE and other fields

1 - Commitment, Vision and Funding

- **Highest priority is to fund INL and build up facility and staff capabilities**
  - **Significant funding appropriated for INL RD&D and through Idaho Facilities Management account**

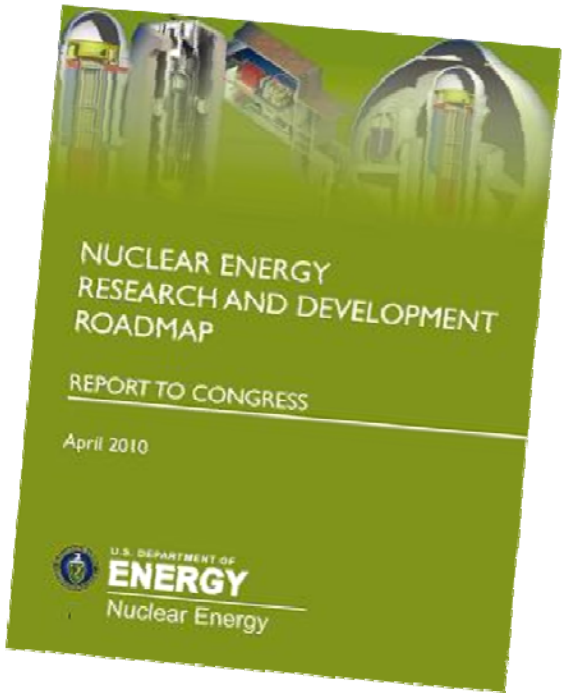


NERAC Recommendation 1 Commitment, Vision and Funding

- **Recognize and allow for the contributions of other national laboratories**
  - **Technical integration of NE RD&D led by INL involves the best experts from across the national labs and universities**
  - **INL implemented Technical Integration Offices for major research initiatives**
    - **SRNL, ANL, and ORNL are deputies on FCRD TIO**
    - **Major research components of NE R&D led by INL and other labs, according to the strengths of the national labs**

NERAC Recommendation 2 Commitment, Vision and Funding

- **Understand and agree on vision**
  - **Original vision centered on NGNP, 4 Gen IV reactor concepts, and AFCI**
  - **Shift in NE RD&D focus with GNEP in 2006**
  - **NE and INL vision begins to evolve by 3rd and 4th years with standup of ATR NSUF**
  - **By year 5, back on track – INL, ORNL with involvement from other labs assist NE on vision and implementation plans. INL mission and vision is well defined.**



NERAC Recommendations 3 & 4 People

- Attract/retain best and brightest scientists, engineers and technical managers. Develop the related policies/procedures

  - INL has attracted and retained some of the best and brightest researchers and technical leaders
  - INL has implemented policies and procedures that are comparable to other national laboratories
  - *Quality of the research* is why people are attracted to and stay at the lab
  - INL leveraging the best experts from across the labs in technical leadership of NE research initiatives and the research

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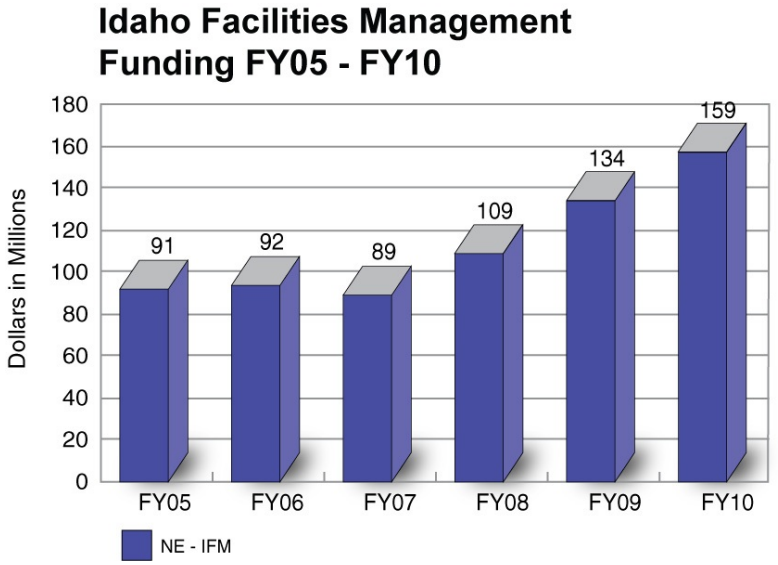
NERAC Recommendation 5 People

- Create a culture where research and scholarship in mission areas are encouraged and rewarded
  - Prior to the establishment of INL, R&D and the R&D culture at the lab was is serious decline
  - Re-building the NE R&D culture at INL --
    - Solid technical leadership team in place
    - Stable and growing funding in programs of national importance
    - Focus on technical accomplishment (incentivized by DOE and INL)
    - Significant collaborations with labs and universities

- International collaboration driven by NE program and lab-to-lab exchanges

NERAC Recommendation 6 Facilities

- Fund INL to develop and maintain high quality, state-of-the-art research facilities
  - NE funding for Idaho Facilities Management has increased from $91M in FY 2005 to $159M in FY 2010
  - Effort over first few years focused on stabilizing support infrastructure
  - Significant progress on capabilities and long-term operability of ATR complex
  - Consolidation of facilities and capabilities at the Research and Education Campus through build-lease arrangements (CAES building cost-shared with State, new offices)



While important progress has been made, the original condition of laboratory and lead time for new facilities makes it unlikely that we will achieve world class capabilities by 2015.

NERAC Recommendation 6 Facilities (continued)

- **Operate many if not most of the facilities as User Facilities**
  - ATR National Scientific User Facility launched 2007
    - Four cycles of experiment awards (61 proposals, 15 experiments)
    - Expanded to other university capabilities (MIT, UNLV, UMi, UWi, IIT, NCSU), with developing ties to other DOE BES User Facilities (APS, SHaRE)
    - CRADA with industry to study fuel/structural materials

- Fostering innovation by extending the NSUF beyond fuels/materials, expanding university and lab collaborations, and broadening targeted educational opportunities
- NE Programs, NR, and NSUF are fully utilizing ATR

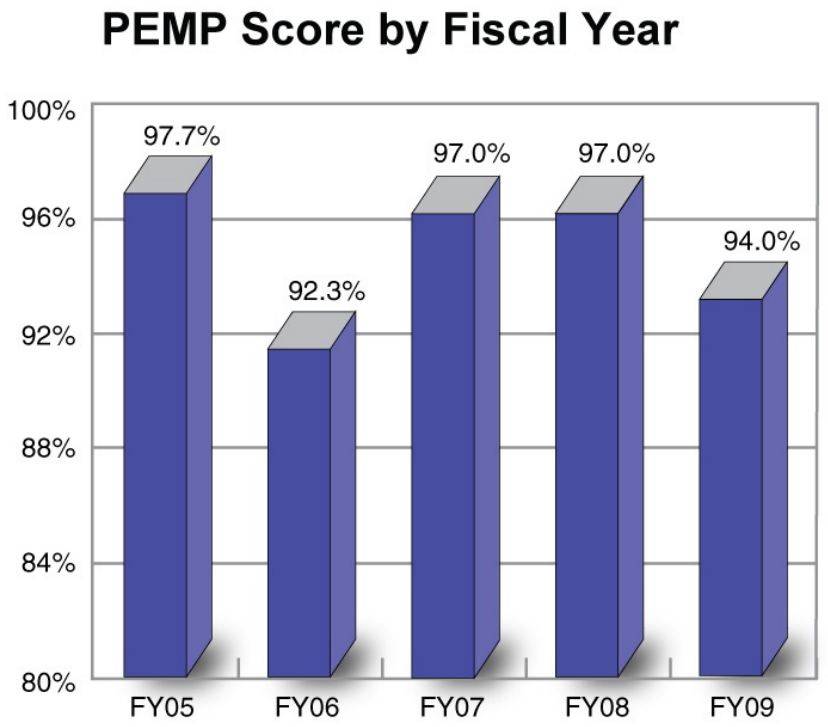
Most if not all of the core R&D facilities at INL, including unique capability for fuel studies, will be user facilities.

NERAC Recommendation 7 Governance and Metrics

- **Select M&O contractor with superb qualifications and a credible plan to achieve vision**
  - Selected Battelle Energy Alliance, LLC, comprised of Battelle, URS, B&W, EPRI, and MIT-led National University Consortia with expertise in:
    - Lab management expertise and proven track record managing large projects
    - Ability to link INL with other labs
    - Experience with reactors and fuel cycle
    - 75-year history in RD&D

NERAC Recommendation 8 Governance and Metrics

- **DOE oversight must focus on managing the contract and not the contractor**
  - Performance Evaluation and Metric Plan is performance based and fully aligned with NE priorities
  - Implemented Contractor Assurance System, which is the model for DOE
  - Removed levels of review and approvals, number of formal reviews by field and corporate elements



NERAC Recommendation 9 Governance and Metrics

- **Visit and benchmark several world class labs in NE and other fields**
  - In 2006, DOE hired PTC to benchmark INL scientific and technical performance against several world class labs, recommended actions similar to NERAC
  - In the first two years, INL benchmarked the lab against other Battelle labs, ANL, and EPRI
  - Bisconti Research benchmarked and conducted surveys for ATR NSUF
  - Informal benchmarking in research continues through lab to lab exchanges (MOU with UK Nuclear National Lab, Visits to CEA, Japan, China, etc.)
  - Annual review of NS&T by INL-chartered independent peer review group
  - Extensive surveying and benchmarking annually for support functions (HR, IT, ESH, facilities, procurement)

Performance Against NERAC Recommendations

Number	High Priority Recommendation	Rating
1	Fund INL and allocate resources. Involve other labs	✓
2	Understand and agree on vision and mission	✓
3	Policies that attract/retain best and brightest	✓
4	Recruit best and brightest scientists, engineers, & technical managers	✓
5	Create a culture where research and scholarship encouraged	✓
6	Fund high quality research facilities. Operate as user facilities.	✓
7	Select M&O contractor with superb qualifications and a plan	✓
8	DOE focus on managing the contract, not the contractor	✓
9	Visit and benchmark world-class labs in NE and other fields	✓

Performance Against Additional DOE Expectations

Additional DOE Expectations	Rating
Be a traditional, multi-program laboratory	✓
Build on the existing management and administrative systems	✓
Build a nuclear reactor to lead the nuclear renaissance (NGNP)	✓
Attract commercial RD&D to INL	✓
Build strong ties to university programs. Establish a joint laboratory/university center for advanced energy studies in Idaho	✓
Establish a major center for national security technology	✓

While we are not precisely where we intended to be, we are in a better place than we could have imagined.

Summarized from the DOE Request for Proposals for the M&O contract

Peer Review Committee Evaluates NS&T Progress Annually

"The Committee believes the overall objective of bringing the Nuclear Science and Technology Directorate activities to world-class level and confirming the leadership of INL for the development of future nuclear energy systems, is achievable in a reasonable timeframe."

Jacques Bouchard, CEA
George Apostolakis, MIT
Co-Chairs of the INL Peer Review Committee
August 2009

Summary

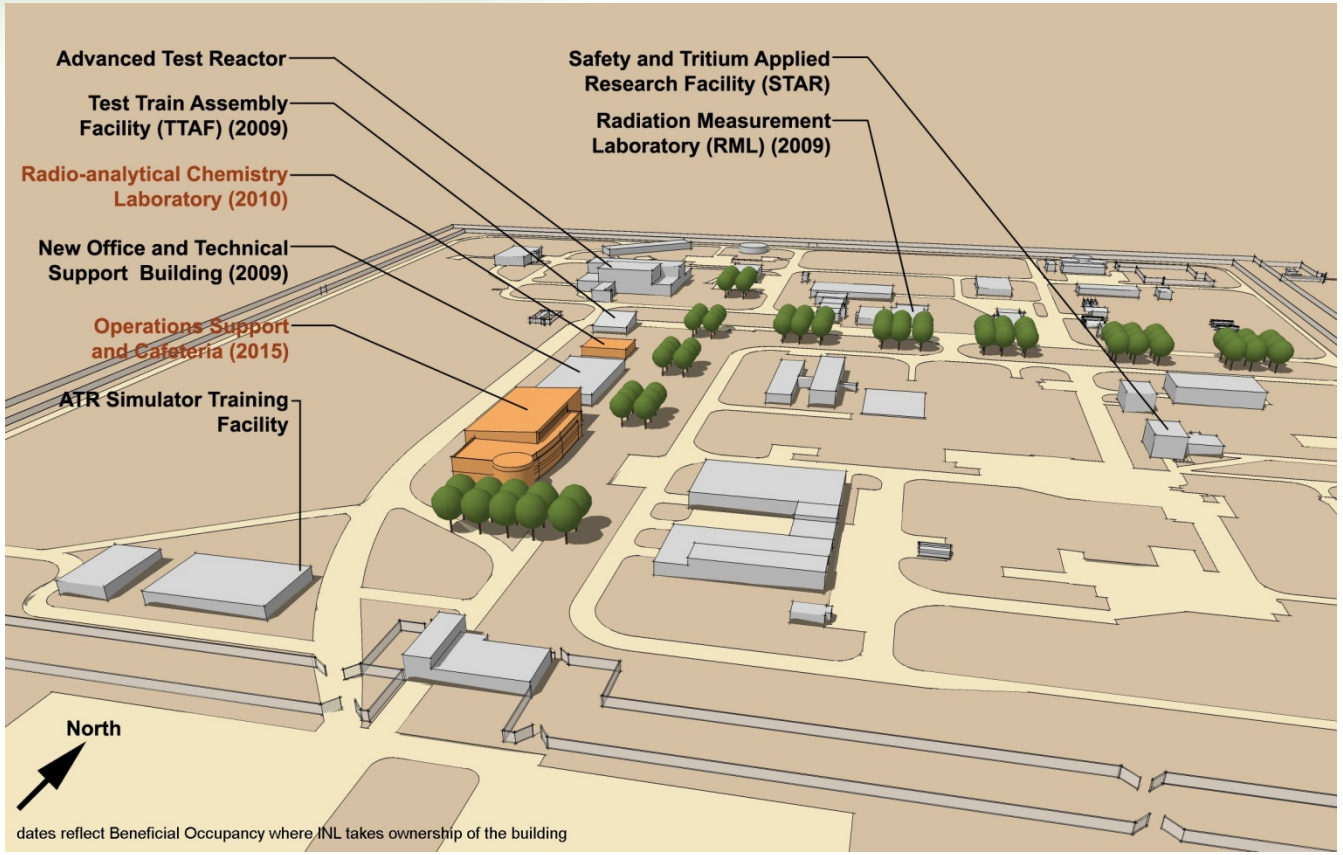
- INL has made major progress
  - Common understanding of vision and mission
  - Systems and facilities stabilized
  - NSUF concept progressing
- Changing circumstances impact prospects for future success
  - Still work to do internally
  - NSUF concept will require a shift in funding strategy
  - Industry engagement remains an issue – resolution of Settlement Agreement issue is important to this issue
  - Sustenance of the nuclear renaissance

The Next Five Years

- INL serves as lead laboratory, managing a “virtual” NE capability set (including other labs, universities, industry) instead of physical consolidation of NE expertise in Idaho
- Build a National Laboratory with the physical infrastructure and inherent strengths that best meet the needs of the nation
- Incorporate capabilities into the NE program wherever they exist
- Build all new nuclear facilities requiring relative isolation and high security at the INL
- *Realities of cost sharing large commercial scale demonstrations means that the NGNP may not be built or built at INL*

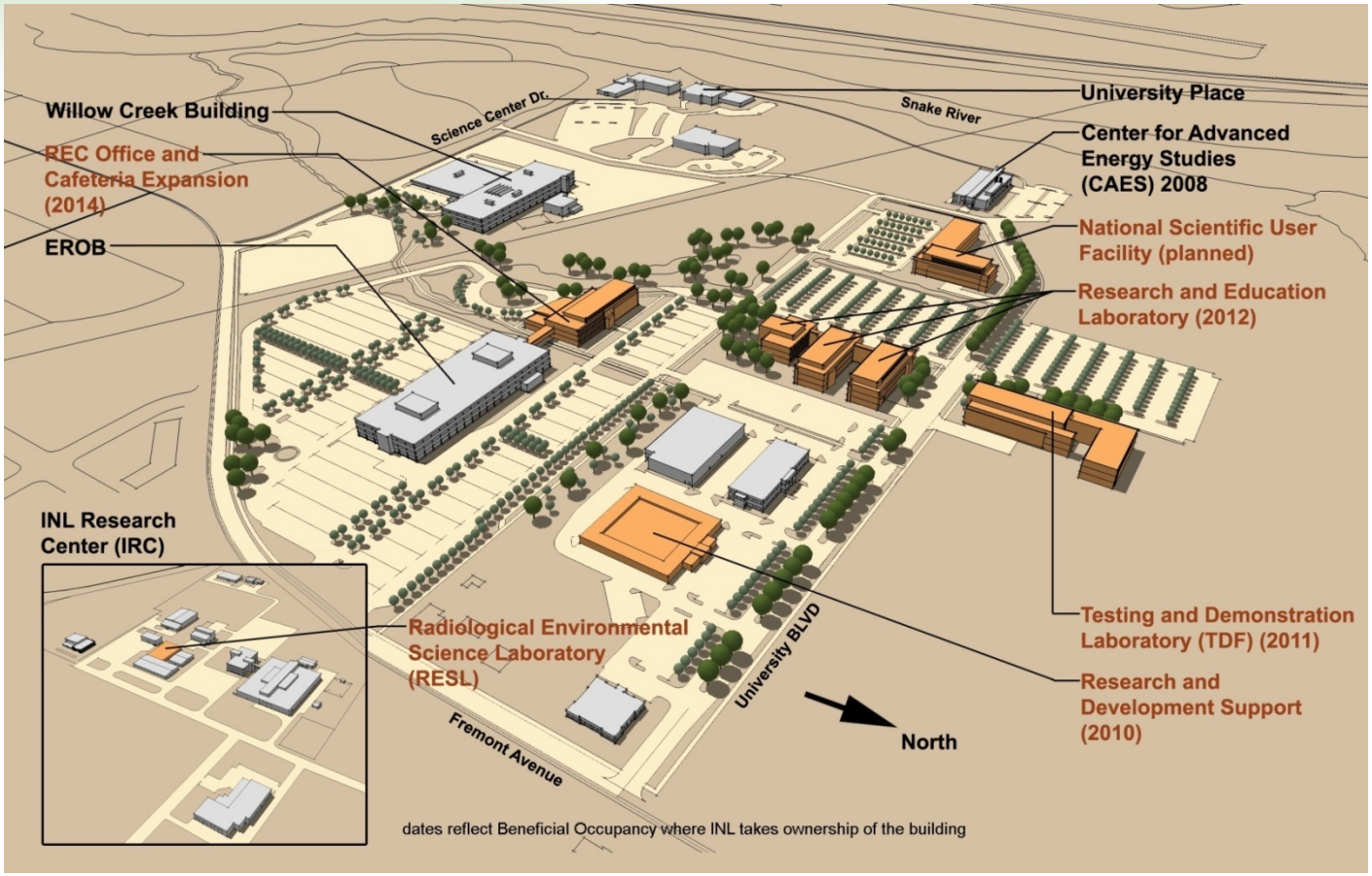
Backup

Advanced Test Reactor Area Master Plan



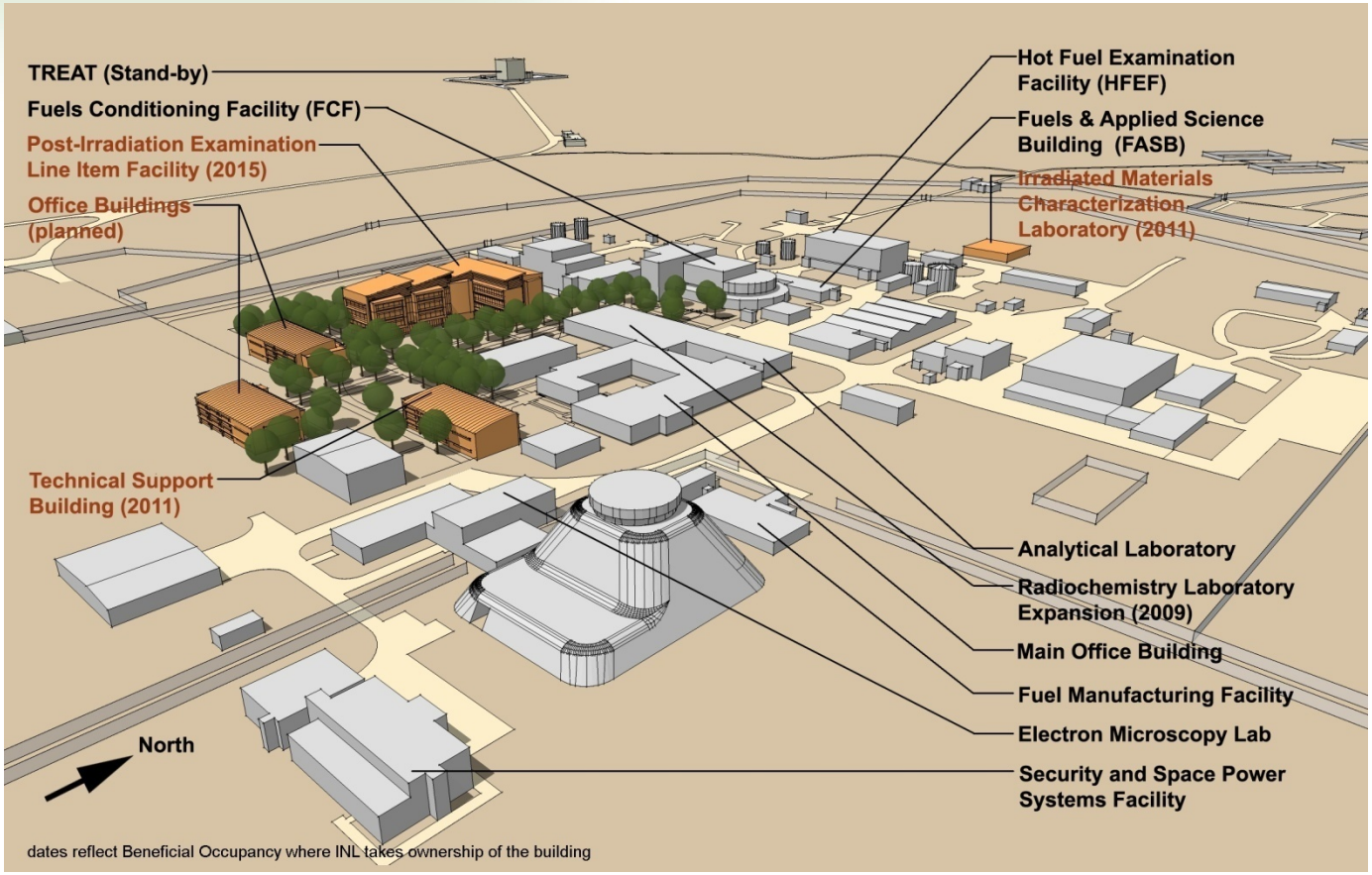
Significant progress on capability enhancement and long term operability since beginning of contract

Research and Education Campus Master Plan



An open campus, establishing increased capabilities to handle lower hazard level radiological materials and collaborate with research underway at MFC

Materials and Fuels Complex Master Plan



Establishing unique-in-the world capabilities that expand DOE capabilities to examine and test fuels and materials on the micro, nano, and atomic scale

Elements of a World Class Laboratory	NERAC Subcommittee, 9/2004	INL Contract, 11/2004	PTC, 10/2006	Peer Review Committee Report, 8/2009
Vision – Shared vision across the organization.	2. Vision & Mission	Vision statement	Strategic Planning	Strategy Development
People – Attract, hire and retain the best and brightest to support vision	3./4./7 Best & Brightest (People)	Seeks exceptional scientific, business and technical talent	World Class Scientist and Engineers	People
Facilities – acquire or provide access to needed capabilities	1./6. Facilities &capabilities	NGNP	▪ Leveraging Public and Private sector capabilities ▪ Facility Planning	▪ Facilities & Equipment ▪ Operations
Culture – Incentives, policies, leadership all focused on excellence	5./8. Culture			
Collaboration and Outreach	User facilities	▪ Major center for national security technology ▪ Collaborations ▪ Nuclear eng. education	▪ Contract work for Commercial Organizations ▪ Strong Affiliation with one or more University	▪ Integration ▪ Outreach

INL Business Volume