



## FFRDC – Best Practices

*Lessons from DOE Laboratories*

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## Areas for Discussion

**What can we learn from other FFRDCs to enhance the quality and impact of the science being done at FNLCR?**

- **How do DOE Laboratories operate?**
- **What are they doing that might improve FNLCR?**
- **What areas does the NCI-Frederick Advisory Committee (NFAC) think we should focus on?**

*This is a presentation-catalyzed discussion*

# Sources

*How do DOE Labs operate?*

- **NFAC Visit to Lawrence Berkeley Laboratory – Feb 2013**
- **Other National Laboratory Interactions**
  - Visit to Sandia & Lawrence Livermore Labs (FNLCR - Heimbrook, Kuki)
  - Visit to Jefferson National Laboratory (FNLCR – Carpenter *et al.*)
  - Visit from G. Kubiak, COO, LBL (FNLCR and NCI)
  - Dr. P. Gilna (Director BioEnergy Science Center, Oak Ridge Nat. Lab.)
    - Member SAIC-Frederick Board of Directors
- **Published External Reviews**
  - “Positioning DOE’s Labs for the Future” – Jan 2013
    - National Academy of Public Administration
  - “Reimagining the National Labs in the 21<sup>st</sup> Century Innovation Economy” - June 2013
    - Information Technology & Innovation Foundation, Center for American Progress, and Heritage Foundation

# Fundamental differences between DOE FFRDCs and FNLCR

- **DOE Laboratories and academia provide the science for all of DOE's needs**
  - The NIH and NCI have robust intramural science programs
- **DOE Laboratories compete with each other for much of their funding**
  - As the only NIH FFRDC, FNLCR does not *directly* compete with other National Laboratories for NIH funding
- **Many DOE laboratories have a “User Facility” which is functionally unique, sustainably funded and draws users from the external research community to the National Laboratory**
  - FNLCR has no comparable facility
- **DOE Laboratories have access to Congressionally-mandated Lab-directed Research and Development funds (LDRD) via a 3% to 6% “tax” on all expenditures**
  - No formal “LDRD” at FNLCR
- **Contract employees provided “reasonable and competitive” salaries**
  - At FNLCR, contract-allowable compensation capped at \$180 k / year
    - Contractor supplements compensation from its Award Fee pool to achieve “reasonable and competitive” salaries

# Visit to Lawrence Berkeley National Laboratory - *Recap*



- **Operational Model : By U. California-Berkeley for DOE Department of Science**
  - 4200 employees, \$820M annual budget
  - Co-location between the University and LBL is essential to the culture and science of LBL, with 190 shared faculty
    - “I do my core science at UC, and my team science at LBL.”
  - University reinvests almost all of earned award fee in the Laboratory
- **Reinvented itself when the cyclotron became obsolete**
  - Material science, biology, computation (esp. biosciences)
- **Institutional “pride of ownership” – make own decisions in strategic framework**
  - Modest government presence on site
- **Most major projects started with LDRD funding**
  - \$15.8 M in 2013 ; Lab Director decides what to spend in on (with input)
- **Tenure-like system for investigators, with 5-year internship**
  - Set own path, find own funding – academic mindset

# Visit to Lawrence Berkeley National Laboratory – Recap (2)

- **Extensive collaboration and funding from outside sources**
  - \$124 M in “work for others”
    - At what point does it distract from mission?
  - Supercomputer, Molecular Foundry, Bioenergy
    - Access is free if you publish, otherwise cost recovery
  - 15000+ scientific visitors per year
- **Strategic effort to expand commercial access to LBL know-how**
  - Richmond Bay campus integrates and extends Biosciences capabilities in an open site
    - Focus on Biosciences for Energy and Environment and Bio-manufacturing
  - Catalyst for regional growth
  - U. California has recently taken a more prominent role

Other observations?

# Visit to Lawrence Livermore National Laboratory



**Sponsored by the DOE National Nuclear Security Administration**

- **Operated by a joint LLC (Bechtel, U. California...)**

- **6700 employees (1/3 ST&E), budget of \$1.6 B**
  - 180 postdocs, 200 grad students – mainly engineering
- **Core mission – attest to the safety, security, and functionality of the nuclear stockpile**
  - Also – address chemical, biological, and explosives security, and climate change (adapt nuclear winter to global warming)
- **Closer government interface in Contractor operations (personnel, etc).**
  - Performance Evaluation plan “in flux”
  - Contract Assurance System implemented, but under review
- **LDRD “tax” yields approximately \$85 M / year**

## Livermore partnering efforts

- **Established joint “open campus” with Sandia in 2009**
  - Energy, healthcare, IT, manufacturing, supercomputing, smart grid
- **Partnering vehicles**
  - High-performance computing and laser (500 terawatts) facility are main draws
  - cCRADA's
  - Work for Others
  - Advancing Commercial Technology (ACT)
    - Contracts with partner directly and accepts liability and risk for delivery; no government involvement or reach-in
  - Licenses technology to enable startups



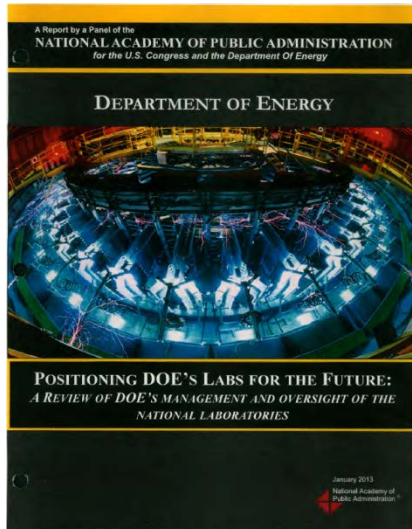


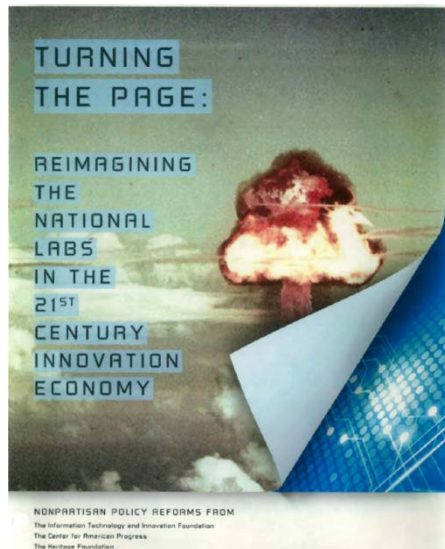
- **Sponsored by Nuclear National Security Agency (NNSA); Operated by Sandia Corp (wholly owned subsidiary of Lockheed Martin Corp)**
  - Twelve thousand employees (10 % in CA)
    - R & D – 4000 (520 in CA)
- **Primary academic tie to UC Davis – not as close as Berkeley**
- **Core missions - ensure nuclear weapons stockpile is safe, secure, and reliable**
  - Operates Combustion Laboratory, which provides sustained funding
  - Secondary efforts – Energy (esp. H<sub>2</sub>), cyber- and infrastructure security
    - Highly entrepreneurial – proposals on most any topic within very broad limits
      - Go after funding and mission supporter
      - Concerns about dilution of expertise and loss of synergy?
- **LDRD funds foundational science – \$160 M annually - high risk, high payoff**
  - Proposals have about 10% approval rate from “idea” to “project”

# DOE National Labs

## *DOE Management and Oversight*

- **DOE Management and Oversight of FFRDC's reviewed by the National Academy of Public Administration (published Jan 2013)**
- **Key Recommendations**
  - DOE should take an integrated strategic view of the National Labs
  - Lab Evaluations based on expected key outcomes, rather than specific tasks or outputs
  - Replace award fee performance incentives with contract term extension incentives
  - Implementation of Contractor Assurance Systems to mitigate operational risks





## Key Recommendations

- **Transforming lab management from DOE micromanagement to contractor accountability**
  - Performance-based contractor accountability model, with expanded and unified Performance Evaluation Management Plan
- **Unify lab stewardship, funding, and management stovepipes with innovation goals**
  - Enable labs greater latitude to use overhead funds and remove cap on LDRD
- **Move technology to market with better incentives and more flexibility**
  - Expand ACT for use for any type of partner
  - Enable flexible market-based pricing for proprietary research and technical facilities
  - Add “Technology Impact” category to PEMP

# Key Opportunities illuminated by DOE Labs

*Opinions will vary.....*

- **Build strong ties to local academic institutions**
- **Culture an entrepreneurial mindset**
  - “Venture” funding of exploratory projects is required to get them started
    - DOE labs use LDRD as the primary vehicle
- **Contract Assurance System to enable contractor accountability without transactional oversight**

**Some of these opportunities are enabled, facilitated, or implemented with the RAS Program**

- Test case for a new model?
- Are the principles broadly applicable?

# Enabling stronger ties to local academic institutions

- **Potential benefits of stronger academic ties are apparent**
  - Joint appointments, new perspectives, reciprocal training, etc
- **FNLCR does not currently have a strategic research relationship with any local research institution**
  - Individual laboratories build collaborations based on expertise and mutual interest at the national level
  - The Visiting Scientist Program has not generated a robust flow of prominent scientists interested in coming to work at FNLCR
  - 26 Postdocs in FNLCR laboratories
- **How to implement, and with whom?**
  - Physical co-location akin to “Berkeley” not feasible – more of a “Sandia” model
  - RAS program (Spokes and RAS Community) - not regional, but provides a compelling draw
  - Frederick Regional Higher Education initiative with University System of MD & JHU
    - Fulfills a regional need for creating local Higher Education (post-baccalaureate) opportunities
    - Supported by MD General Assembly

# Entrepreneurial science enabled by academic mindset and “ownership” of the project

- **Our “core mission” remains the support of the NCI / NIH research agenda**
- **“Entrepreneurial scientists” can coexist with our core mission, which is to support intramural NCI and NIH science**
  - Two areas within FNLCR currently do independent, peer-reviewed research
    - AIDS and Cancer Virus Program (ACVP) within Office of the Director and Basic Sciences Program (BSP) within Center for Cancer Research
- **The RAS program creates an additional example of FNLCR-directed research – and is a paradigm for future such programs**
- **No other NIH FFRDC’s to compete with – so who do we compete for funding with? Academia? Cancer Center Cores? Biotechs?**

# “Venture” funding of Entrepreneurial Science

- **Virtually *all* significant entrepreneurial projects at the 3 DOE labs visited started with LDRD, funded by the Congressionally-mandated “tax” on all funding**
  - Varying levels of government involvement in project approval in different Labs
- **FNLCR does not have LDRD, but modest “Venture Funding” did exist**
  - “Technology development” funding from Office of Scientific Operations (OSO) solicited and funded Contractor-originated research proposals within the (now pivoted) Advance Technology Program – up to \$3M / year
  - SAIC Corporate provides a partial rebate of award fee to Laboratory Director to fund discretionary one-time or short-term research activities (\$0.2 to \$0.4 M / year)
- **Based on DOE Lab experience, a vibrant entrepreneurial scientific culture requires robust “venture” funding of pilot projects**

# Contract Assurance System to enable contractor accountability without transactional oversight

- **Contractor establishes a process to assure Sponsor and Contractor's management that operational and programmatic risks are effectively identified, controlled, & managed**
  - Defines processes and activities to identify/report deficiencies, opportunities for improvement, complete corrective actions, lessons learned
- **Enables Government to focus on approving Contractor systems, not day-to-day transactions, for example :**
  - Manage to an approved budget
  - Hire and replace within an approved staffing plan
  - Manage FNLCR laboratory and office space
- **Maturity & effectiveness of CAS varies by DOE FFRDC**
  - Requires trust, accountability, and transparency
  - Things can go wrong
- **Some elements of CAS-like “contractor accountability” approach are being applied to the RAS program**



## Discussion

*What should FNLCR focus on (opinions will vary)?*

**Elements of each of these key opportunities already exist or are being created within FNLCR – *but there is opportunity to do more***

- **Build strong ties to local academic institutions**
- **Culture an entrepreneurial mindset**
  - “Venture” funding of exploratory projects is required to get them started
- **Contract Assurance Plan to enable contractor accountability without transactional oversight**

Other ideas? *and* Discussion