

Peer Review in the DOE Office of Science

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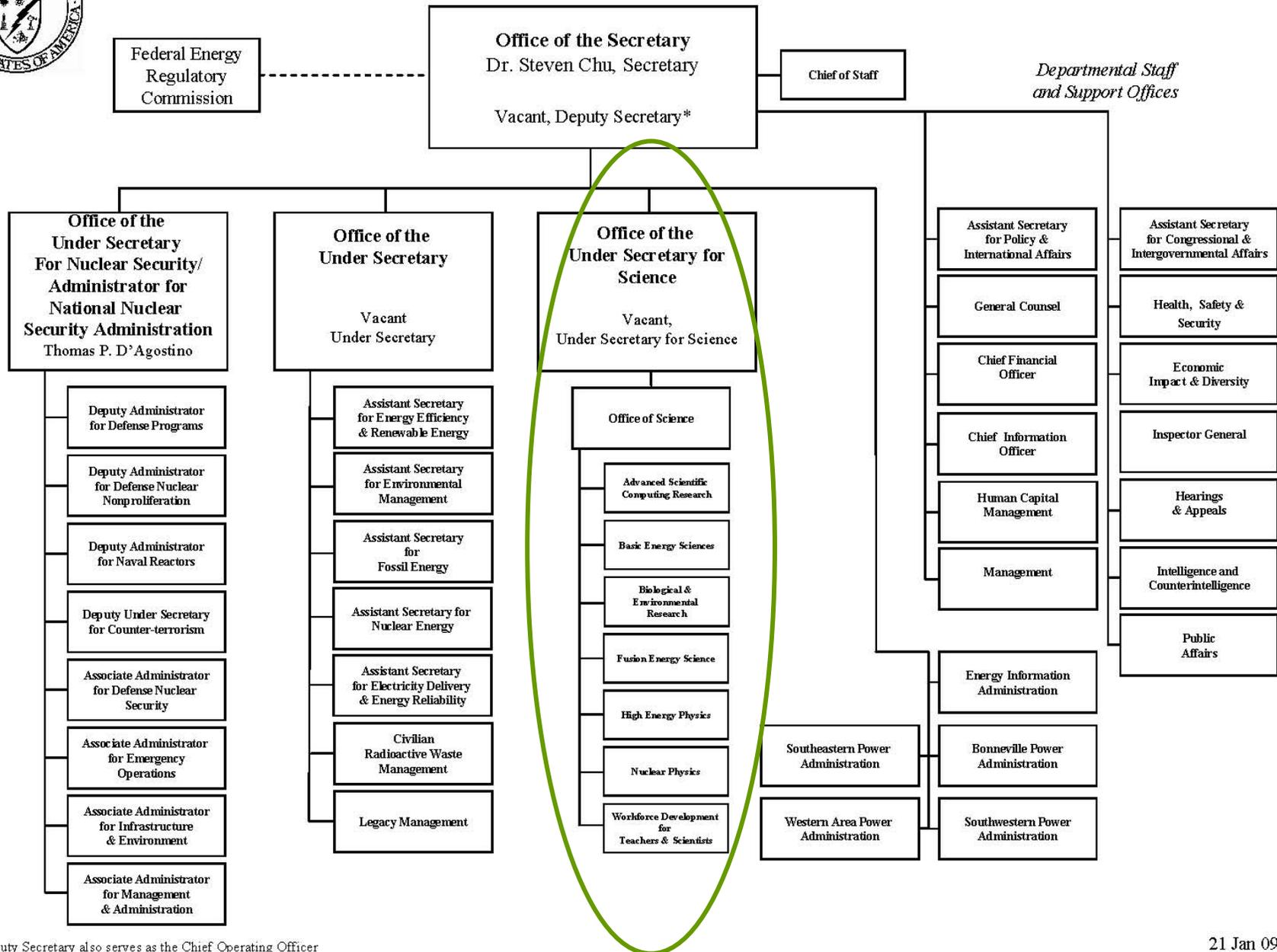


The Office of Science funds basic research in support of the DOE mission.

- The DOE is a mission agency with responsibilities in energy, environment, and national security.
- The Office of Science supports research within the DOE mission at universities and national laboratories.
- The Office of Science also plans, builds, and operates user facilities for the scientific community.



DEPARTMENT OF ENERGY



* The Deputy Secretary also serves as the Chief Operating Officer

The Office of Science supports research and facilities within defined scientific programs.

- Advanced Scientific Computing Research

Discover, develop, and deploy the computational and networking tools that enable researchers in the scientific disciplines to analyze, model, simulate, and predict complex phenomena important to the DOE.

- Biological and Environmental Research

Understand complex biological, climatic, and environmental systems across spatial and temporal scales ranging from sub-micron to the global, from individual molecules to ecosystems, and from nanoseconds to millennia.

- Basic Energy Sciences

Understand, predict, and ultimately control matter and energy at the electronic, atomic, and molecular levels in order to provide the foundations for new energy technologies and to support other aspects of DOE missions in energy, environment, and national security.

- Fusion Energy Sciences

Expand the fundamental understanding of matter at very high temperatures and densities and the scientific foundations needed to develop a fusion energy source.

- High Energy Physics

Understand how our universe works at its most fundamental level.

- Nuclear Physics

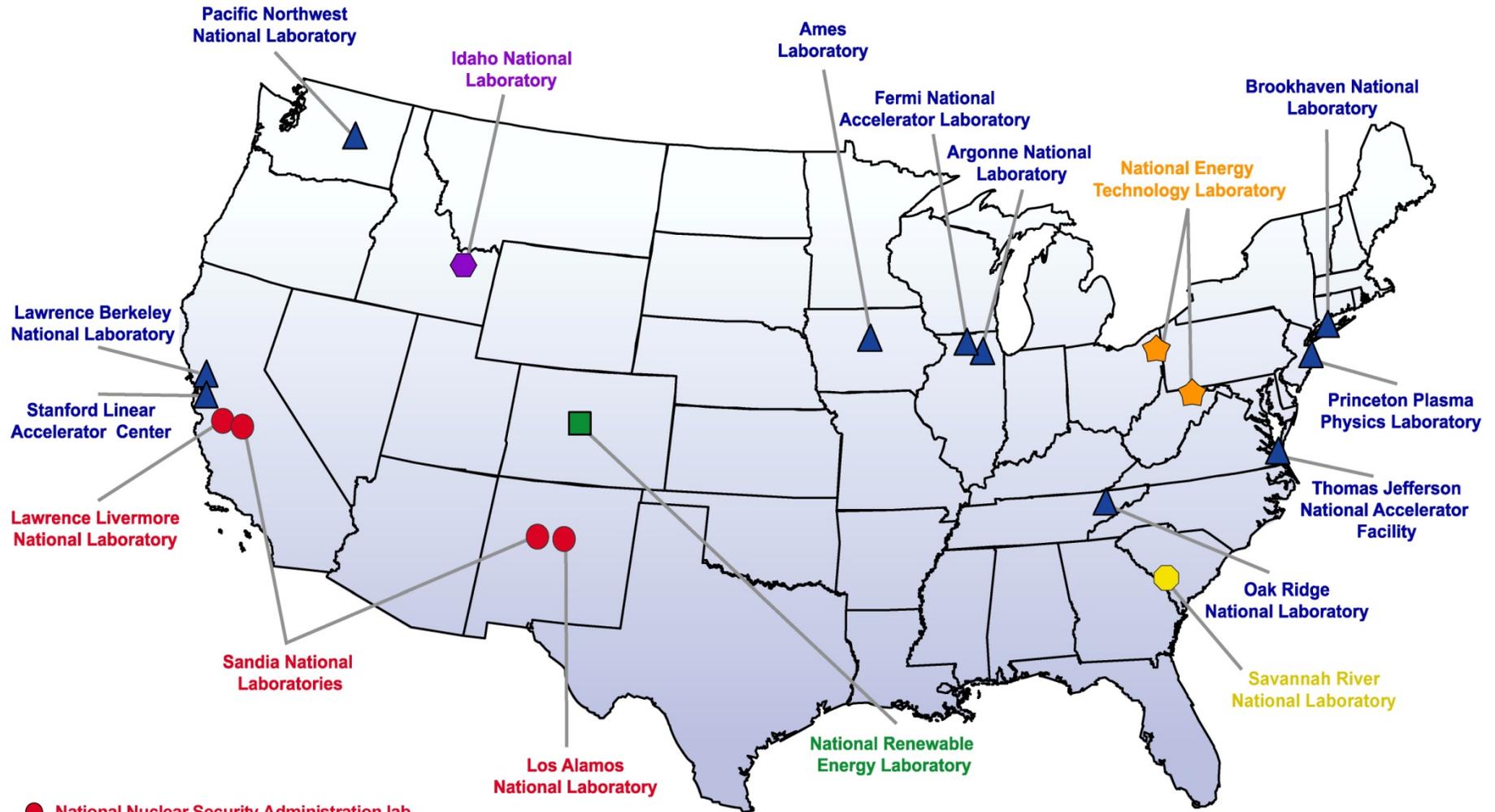
Discover, explore, and understand all possible forms of nuclear matter.

- Workforce Development for Teachers and Scientists

Help ensure that DOE and the Nation have a sustained pipeline of highly trained STEM workers.



DEPARTMENT OF ENERGY NATIONAL LABORATORIES



- National Nuclear Security Administration lab
- Office of Energy Efficiency and Renewable Energy lab
- Office of Environmental Management lab
- ★ Office of Fossil Energy lab
- Office of Nuclear Energy, Science and Technology lab
- ▲ Office of Science lab

Office of Science User Facilities



- Four operating **synchrotron light sources**, and two next-generation light sources
- Three **neutron sources**
- **Particle accelerators/colliders** for high energy and nuclear physics
- **Fusion/plasma facilities**, including **ITER** which aims to demonstrate the feasibility of fusion energy
- **Joint Genome Institute** – for rapid whole genome sequencing
- **Three Bioenergy Research Centers**
- Five **Nanoscale Science Research Centers** – assembly of capabilities unmatched in the world
- **Environmental Molecular Science Laboratory** – integrated experimental resources for discovery and innovation in the environmental molecular sciences
- Advanced **Computational Resources** – terascale to petascale computing and networks for open science

All research funded at laboratories and universities, including facilities construction and operations, is awarded through a peer-reviewed, merit-based process.

- The Office of Science (SC) is executing a \$4.7B budget in fiscal year 2009.
- SC is a steward for 10 of 17 DOE national labs and operates more than 30 major scientific user facilities.
- Approximately 1/2 of the budget supports operations of the scientific user facilities and construction of new facilities; the other 1/2 supports research at the national laboratories and universities.
- About 1/3 of SC research funding goes to support grants at more than 300 colleges and universities nationwide.
- In FY 2009 SC is supporting ~24,000 faculty, postdoctoral researchers, graduate students, and undergraduates.
- ~20,000 users of scientific facilities a year
 - ~1/2 of the annual 20,000 facility users come from universities;
 - ~1/3 of the users come from DOE national laboratories;
 - the remaining come from industry, other agencies, and international entities.

DOE Financial Assistance Program (10 CFR 600)

- It is the policy of DOE that discretionary financial assistance be awarded through a merit-based selection process.
- Merit review means **a thorough, consistent, and objective examination of applications based on pre-established criteria by persons who are independent of those submitting the applications and who are knowledgeable in the field of endeavor for which support is requested.**
- Each program office must establish a **merit review system** covering the financial assistance programs it administers. Merit review of financial assistance applications is intended to be advisory and is not intended to replace the authority of the project/program official with responsibility for deciding whether an award will be made.

Office of Science Merit Review System (10 CFR 605)

- Program managers perform an initial evaluation of all applications to ensure that the required information is provided; the proposed effort is technically sound and feasible; and the effort is consistent with program funding priorities.
- For applications that pass the initial evaluation, program managers use peer review to evaluate them based on criteria specified in 10 CFR 605.

Peer review is the cornerstone of our work.

- *Funding decisions in the Office of Science are made based on peer review.*
- 10 CFR 600 and 10 CFR 605 apply to financial assistance (grants and cooperative agreements).
- However, the Office of Science generally applies 10 CFR 605 principles to the review of national laboratory work as well.*
 - National laboratory employees are contractors
 - Peer review is used for both research and facilities
- DOE reviews research and facility operations at least once every three years.
- User facilities allocate facility time based on peer review. The facility directors carry out these reviews.
- CPU time at our computational facilities is allocated based on peer review executed either by DOE or by facility directors.
- In a special process, construction is reviewed by DOE at regular intervals (sometimes every few months) by the Office of Project Assessment in concert with program offices.

*Hereafter in this presentation, the word *proposal* refers to either a national laboratory technical proposal or a financial assistance application.

Expert federal program managers are critical for high-quality peer review.

- Our federal program managers generally hold science doctorates and are experienced researchers.
- The Office of Science employs about 150 federal program managers, all stationed in Germantown, Maryland.
- Program managers stay current in their fields.
 - Have access to the Web of Science and full text articles of important journals
 - Host and attend workshops
 - Host regular meetings of Principal Investigators with invited speakers and attendees
 - Attend conferences (within travel budget allowance)
 - Converse with the leaders in the field frequently
 - Organize and attend peer review panels and site visits, where they listen to debate
- External experts from national laboratories and universities rotate and bring fresh perspectives.
- Program manager decisions are reviewed by committees of visitors at regular intervals.

The Office of Science selects reviewers on the basis of professional qualifications and expertise. (10 CFR 605)

- The Office of Science obtains about 10,000-12,000 reviews per year.
- Reviewers may be selected based on (a few examples):
 - Authors of papers references in the proposal
 - Cross-references from journal publication databases
 - Program manager professional contacts and personal knowledge of the field
 - Reviewer publication record and reputation
 - Pool of volunteers
 - No apparent conflict of interest
- Reviewers can come from around the world and from universities, national laboratories, government agencies, industries, nonprofits, etc.
- Diversity (of topic, type of institution, demographics, etc.) among reviewers selected for a given proposal or set of proposals is important.

Reviewers comply with conflict of interest rules and are asked to keep review information confidential. (10 CFR 605)

- **A person has a conflict of interest (COI) if reviewing**
 - a particular matter that would have a direct and predictable effect on any person, company or organization with which he/she has a relationship, financial or otherwise. The interests of a spouse; minor child; general partner; organization in which he/she serves as officer, director, trustee, general partner, or employee; and any person or organization with whom he/she is negotiating employment are attributed to the reviewer.
- **All reviewers agree that they will not participate in the review of any proposal with which they have a COI.**
- **Reviewers agree to disclose any COI's discovered during the course of the review process.**
- **An individual with a COI cannot participate in the review of a proposal involving a matter that would cause a reasonable person with knowledge of the relevant facts to question impartiality.**
- **During a review, if a reviewer learns of a COI, the reviewer is asked to stop the review and report it to the program manager.**
- **For federal employees, the COI statutes and regulations that apply in regular employment apply if one is a reviewer.**

Three or more reviews per proposal are obtained.

- The most important components of a review are the narrative responses to specified review criteria.
- Scoring or adjectival ratings not standardized and used at the discretion of the program manager.
- Reviewer identities and review contents are kept confidential.
- Review contents are released to the Principal Investigator at the time of award or declination. Information that reveals the identity of the reviewer or is inflammatory is redacted.

The review method varies according to need.

■ Mail Review

- Generally used for the open solicitation, when proposals arrive throughout the year.
- Reviews trickle in over time.
- Reviewers are generally given six weeks to return the review.
- Reviewer identity kept confidential.

■ Panel Review

- Generally used for targeted solicitations when many proposals arrive simultaneously
- Multiple panels of 10-15 people apiece convene in Washington D.C. and submit reviews; the total number of panelists at a given time can total in the hundreds.
- Each panelist provides his/her own input.
- Reviewer identity kept confidential.

■ Site Visit or “Reverse Site Visit”

- Generally used for large, group programs such as national laboratory efforts, large facility competitions, etc.
- Researchers make presentations to a site visit team.
- The site visit team may interact with and ask questions of the investigators.
- The site visit team members submit independent reviews to DOE.

Common review criteria are used. (10 CFR 605)

Scientific and/or technical merit of the project;

Appropriateness of the proposed method or approach;

Competency of applicant's personnel and adequacy of proposed resources;

Reasonableness and appropriateness of the proposed budget; and

Other appropriate factors, established and set forth in a notice of availability or in a specific solicitation.

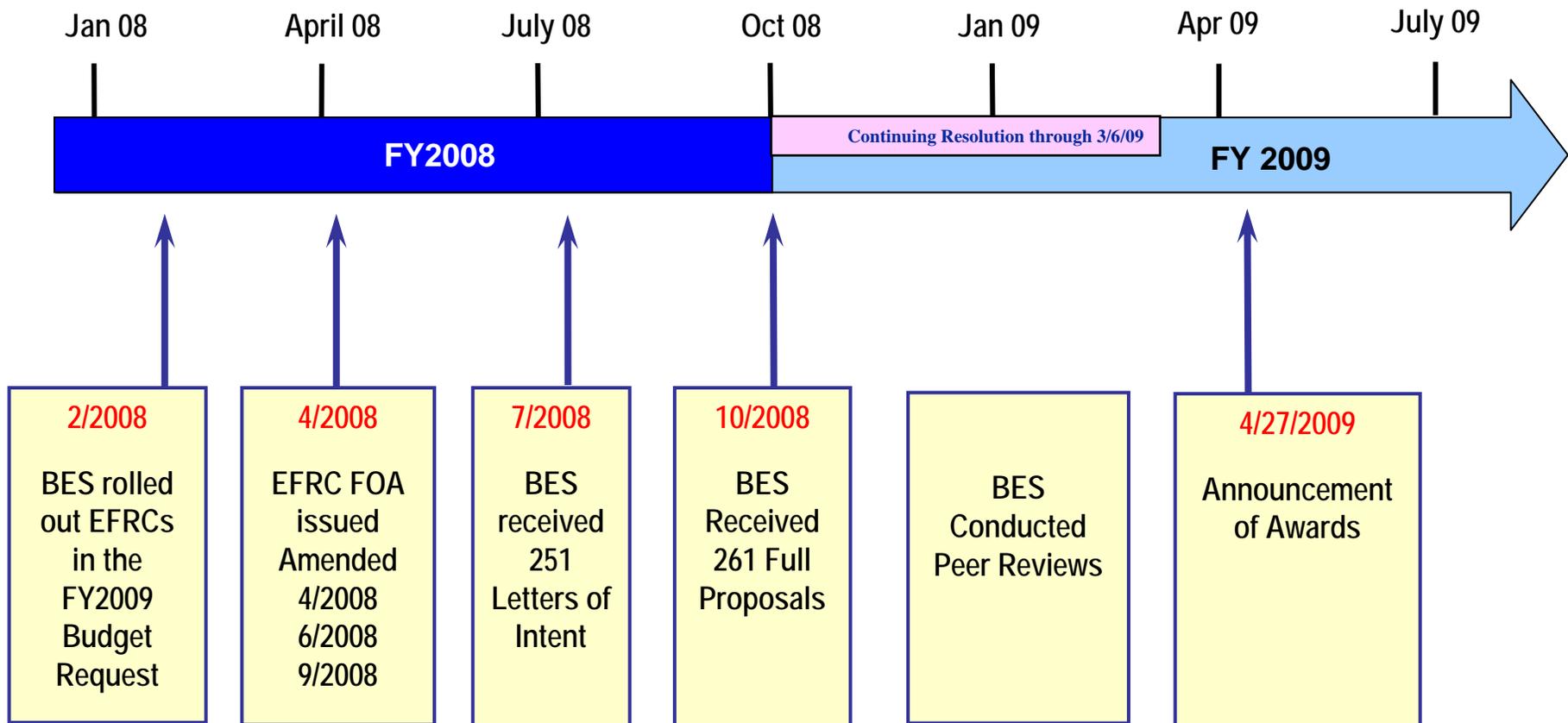
For renewals, continuations, and supplementals, program managers also consider performance under current award.

Award selection is informed by peer review. (10 CFR 605)

- Merit review is advisory and does not replace the authority of the program manager or contracting officer.
- Recommendations for awards are based upon
 - the findings of the technical peer review
 - the importance and relevance to the Office of Science and program mission
 - the availability of funds
 - Other program policy factors, e.g., program balance
- Program managers recommend awards to the contracting officers, who make the final decisions.
 - All financial assistance contracting officers are located in Chicago.
 - Each national laboratory has a federal contracting officer on site.

Proposals are reviewed generally within 6 months and no longer than 12 months from the date of receipt.

Sample Review Time Line – Energy Frontier Research Centers

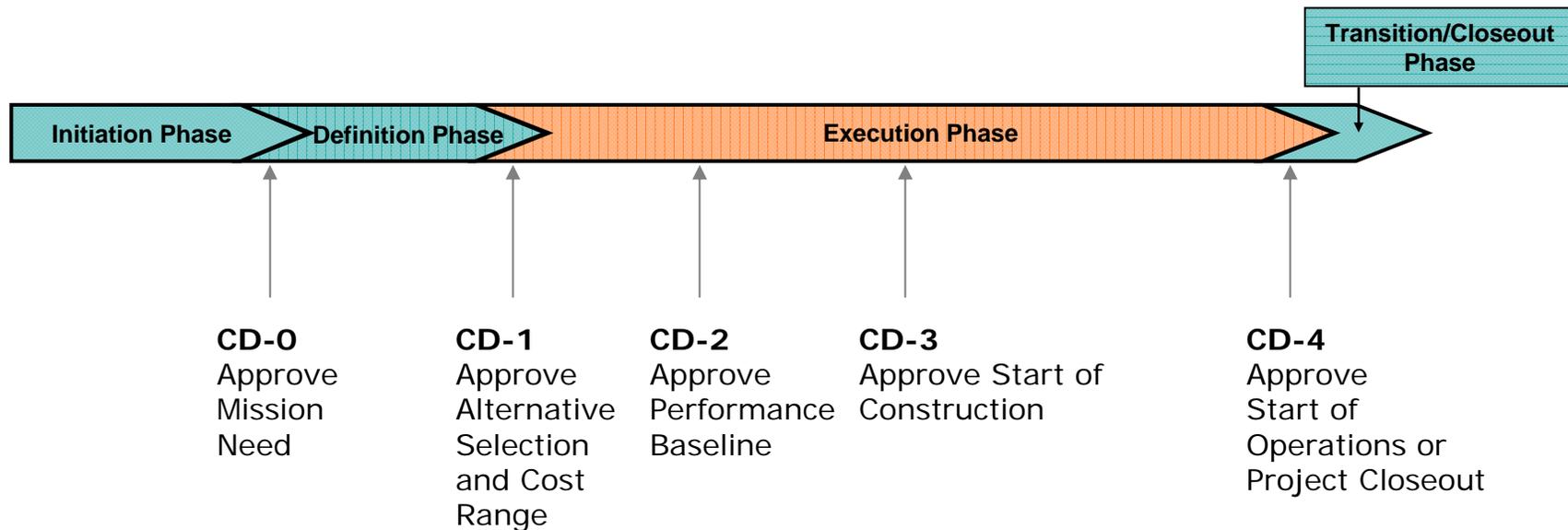


Office of Project Assessment Reviews

- **The Office of Science uses peer review to ensure projects are**
 - on schedule,
 - within budget, and
 - capable of meeting mission performance & environmental safety and health standards.
- **Project reviews are executed by the Office of Project Assessment within the DOE Office of Science.**
 - provides independent advice to the Director of the Office of Science (SC) relating to those activities essential to constructing and operating major research facilities.
 - provides professional management and staff support regarding these functions to SC program offices.
 - is directed by Daniel R. Lehman (“Lehman Reviews”)

<http://www.science.doe.gov/opa/>

Lehman Reviews are a best practice.



■ A Lehman review

- is performed prior to project critical decisions; semi-annually on large projects
- relies on expert knowledge and experience of peers (world-class scientists, engineers and managers)
- examines project cost, schedule, funding and management in detail
- ensures project team is executing project according to agreed upon plans
- informs senior management on status and readiness to proceed to next phase

Committees of Visitors evaluate how well we execute peer review.

- The quality of the peer review process as well as the standing of each research portfolio is evaluated every three years by external experts from the scientific community who come together to form Committees of Visitors (COV).
- Every three years, a COV is asked to
 - Assess the efficacy and quality of the process used to solicit, review, recommend, and document proposal actions and to monitor active awards, projects, and programs.
 - Comment on the breadth and depth of portfolio elements and the national and international standing of the portfolio.
- Guidance documents, COV reports, and program responses are archived:

http://www.science.doe.gov/SC-2/Committe_of_Visitor.htm

Thank You

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