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United States General Accounting Office
Washington, DC 20548

June 26, 2002

The Honorable Sonny Callahan
Chairman
The Honorable Peter J. Visclosky
Ranking Minority Member
Subcommittee on Energy and Water Development
Committee on Appropriations
House of Representatives

Subject: Department of Energy: Observations on Using External Agencies to Regulate Nuclear and Worker Safety in DOE's Science Laboratories

Unlike other government and private industrial facilities in the United States, virtually all of the Department of Energy's (DOE) vast complex of research and nuclear facilities is not inspected or licensed by an independent external regulator, such as the Nuclear Regulatory Commission (NRC), to help ensure safe operations. Instead, DOE and its predecessors[1] have, since 1946, been granted legislative authority to self-regulate nuclear and worker safety in the department's facilities. We have long criticized DOE for weaknesses in its self-regulation of the environment, safety, and health (ES&H) at its own facilities.

DOE recognized the need for external safety regulation in 1993, when Secretary Hazel O'Leary announced that the department would seek external regulation for worker safety. In 1994, legislation was proposed and hearings held on externally regulating nuclear safety at DOE facilities. Although no legislation was enacted, DOE responded by creating advisory groups to help formulate its policies and implement plans to eliminate self-regulation of nuclear and worker safety in all of its facilities. To achieve this goal, in 1996 DOE endorsed recommendations to phase out its self-regulation practices over a 10-year period. In late 1997, however, DOE took a more cautious approach when Secretary Federico Peña embarked on a 2-year pilot program to simulate regulation by the Nuclear Regulatory Commission and the Occupational Safety and Health Administration (OSHA) at selected facilities.[2] The objectives of these simulations included testing regulatory approaches and determining the cost of

[1] DOE's predecessor agencies are the Atomic Energy Commission and Energy Research and Development Administration.

[2] These facilities include all or part of the Lawrence Berkeley National Laboratory in California, the Oak Ridge National Laboratory in Tennessee, and the Savannah River Site in South Carolina. OSHA participated in the California and Tennessee sites and had previously conducted a pilot program at DOE's Argonne National Laboratory in Illinois.

moving to external regulation. Despite NRC and OSHA conclusions from these pilots that externally regulating DOE's science laboratories is achievable, Secretary Bill Richardson decided not to pursue external regulation, citing cost and other regulatory uncertainties. In this context, we reported in 1998 (and again in congressional testimonies in 1999 and 2000) that DOE did not have a clear strategy on external regulation. In a subsequent overview report on DOE, we recommended that eliminating self-regulation would, among other necessary actions, help improve the accountability of the department.[3]

In its October 2001 report on energy and water development appropriations for fiscal year 2002, the conference committee directed DOE to prepare an implementation plan for transitioning to external regulation at the department's 10 science laboratories. For the purpose of preparing this plan, the conference report stated that the department should assume that NRC would take over regulatory responsibilities for nuclear safety and OSHA would take over regulatory responsibilities for worker safety at these facilities. The plan was to address all details necessary to implement external regulation, including

- estimates of additional resources NRC and OSHA would need,
- estimates of corresponding reductions in funding and staffing at the department,
- specific facilities or classes of facilities for which external regulation cannot be implemented in a timely manner,
- necessary changes to existing management and operating contracts, and
- changes in statutory language necessary to effect the transition to external regulation.[4]

The implementation plan was due to the House and Senate Appropriations Committees by May 31, 2002. DOE has, however, not completed its plan by the date of this report.

As part of an ongoing monitoring effort, you asked us to (1) identify current stakeholder positions on external regulation of DOE's science facilities, (2) summarize the costs and benefits of using external agencies to regulate DOE nuclear and worker safety, and (3) determine how comparable domestic and European science facilities are regulated for nuclear and worker safety. We briefed your offices on the results of our review on June 3, 2002, using the enclosed charts. This report summarizes the results of that briefing.

To address these objectives, we asked DOE, NRC, OSHA, and the major science laboratory contractors for their current position on external regulation. We obtained cost and benefit information from these officials and visited major DOE science laboratories. We also obtained pertinent information on domestic facilities similar to DOE, but externally regulated, and comparable facilities in Belgium, the United Kingdom, France, and Switzerland.

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[3] U.S. General Accounting Office, *Department of Energy: Fundamental Reassessment Needed to Address Major Mission, Structure, and Accountability Problems*, GAO-02-51, (Washington D.C. Dec. 21 2001).

[4] H.R. Rep. No. 107-258, Oct. 30, 2001, at 109-110.

We did not verify the costs and benefits reported by these sources, but we did review the reasonableness of their claims. We conducted our review from November 2001 through May 2002 in accordance with generally accepted government auditing standards.

In summary:

The positions of DOE and its potential regulators—NRC and OSHA—are essentially unchanged since the 1999 congressional hearing held on the results of simulated inspections at several DOE facilities.[5] DOE officials told us that (1) the department's current position on external regulation is "neutral" because the Secretary has insufficient information on which to make a decision, (2) another study is needed to develop data on the costs and benefits of making the transition to and operating under external regulation, and (3) a realistic implementation plan cannot be developed until the study is completed, which DOE estimates will take 6 to 9 months. On the other hand, NRC and OSHA report that they are currently prepared to begin regulating the department's 10 science laboratories, given adequate resources to do so. The two safety regulators are familiar with most of the facilities they would regulate and are already regulating parts of DOE where the Congress has given them specific authority. The laboratory contractors that we spoke with—representing most of DOE's science work—were unanimous in their support for external regulation under certain conditions, primarily that DOE will reduce its current level of nuclear and worker safety oversight once NRC and OSHA assume these responsibilities.

Data from past regulatory simulations, and ongoing work by DOE, NRC and OSHA, show that shifting to external regulation of science laboratories would not be prohibitively expensive. For example, NRC's and OSHA's estimates to regulate the 10 science laboratories are potentially less than DOE expenditures to regulate itself in terms of personnel costs. The cost of upgrading DOE facilities to regulator standards is less certain, but may not be significant for a variety of reasons: (1) NRC concluded from its simulations that few, if any, changes to DOE facilities are needed to meet NRC's licensing requirements; (2) NRC stated that it would be flexible in applying its standards to DOE's unique facilities without compromising safety; and (3) OSHA concluded from its simulations that DOE deficiencies are similar to levels found in the private-sector (DOE has adopted OSHA-like standards). DOE needs to make several decisions that will affect costs, the most important of which is determining what the role of its field staff will be under external regulation. These and other decisions form the assumptions upon which an implementation plan must be based, but have not been made.

The potential benefits of external regulation have been widely reported. A 1996 DOE task force concluded that externally regulating DOE facilities would improve safety, eliminate the inherent conflict of interest from self-regulation, achieve consistency with current domestic and international safety management practices, and gain

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[5] *External Regulation of DOE Facilities: Pilot Project Results*, Hearing before the Subcommittee on Energy and Environment of the Committee on Science, House of Representatives, Serial No. 106-29, July 22, 1999.

credibility and public trust.[6] Potential cost-saving benefits were also noted. For example, the task found that seven large contractors regulated by NRC and OSHA employed substantially fewer dedicated ES&H staffs than were found at DOE facilities. More recently, DOE's major science laboratory contractors told us that they could reduce their ES&H staff by up to 30 percent if DOE relinquished its oversight to external regulators. DOE's largest science contractor, Battelle Memorial Institute,[7] reported that it spends one-half to one-third less (as a percent of total costs) on ES&H in its externally regulated private sector laboratories.[8] DOE found similar results in a recent study comparing the management of its Lawrence Berkeley National Laboratory with two other federal agencies that use externally regulated contractors to manage their laboratories—the National Atmospheric and Space Administration's (NASA) Jet Propulsion Laboratory and the National Science Foundation's (NSF) National Center for Atmospheric Research.[9] Contractors operating these laboratories had a smaller ratio of ES&H staff to total workers than exists in DOE's Berkeley lab contractor. In addition, NASA and NSF were able to rely on far fewer staff to oversee ES&H responsibilities at their laboratories. For example, while there was only 1 ES&H person out of 23 NASA site office personnel at its Jet Propulsion Laboratory, there were 5 dedicated ES&H personnel out of 15 at DOE's Berkeley site office.[10] On average, we found that DOE dedicated about 30 percent of its site office staffs to ES&H oversight, not including technical staffs at the operations offices and several offices at headquarters.

Experiences from foreign governments and their laboratories provide additional evidence that external regulation is feasible and beneficial. The United Kingdom, France, Switzerland, and Belgium all have science facilities operated by contractors on behalf of sponsoring government agencies. These governments have long traditions of using external regulators; essentially none of them self-regulate nuclear and worker safety. All told us that external regulation is valuable and necessary to ensure safety and public credibility. Two countries, the United Kingdom and France, also use external regulators to oversee parts of their nuclear defense research and development establishment. The United Kingdom, after transferring its two nuclear defense research facilities to private sector contractors, shifted much of the oversight of the facilities to external safety regulators within a 2-year period. United Kingdom officials told us that the shift to external regulation not only increased safety and improved public credibility but also provided greater freedom to voice worker safety concerns.

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[6]Report of Department of Energy Working Group on External Regulation, DOE/US-0001, December 1996, p.1-1.

[7] Battelle Memorial Institute is DOE's management and operating contractor for the Pacific Northwest National Laboratory, and manages Brookhaven National Laboratory (in partnership with the State University of New York at Stonybrook), and for the Oak Ridge National Laboratory (in partnership with the University of Tennessee).

[8] Battelle has also concluded that the aggregate hazards associated with the R&D activities at these institutions cannot account for these cost differences.

[9] *DOE Best Practices Pilot Study*, Berkeley Lab, LBNL/PUB-865, February 2002.

[10] We were not able to disaggregate department staff overseeing environmental issues from those involved in safety and health.

Overall, growing evidence suggests that external regulators can potentially oversee DOE science laboratories more effectively and at less cost than DOE's internal staff.We believe that their greater independence, coupled with use of national nuclear and worker standards and enforcement powers, will also make them more effective regulators. Ultimately, shifting to external regulation should allow DOE and its contractors to potentially re-direct ES&H resources to other mission priorities. We also believe that DOE has had ample time to develop an implementation plan to externally regulate its 10 science laboratories.

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We met with DOE officials and provided them with a draft of our briefing charts for comment. The department offered several clarifying changes, which we have incorporated as appropriate. DOE officials told us that the Secretary needs more cost and other information before making a decision on external regulation and completing an implementation plan.

As agreed with your offices, we will make copies of this report available to others upon request. This letter will also be available at no charge on GAO's Web site at http://www.gao.gov.

If you have any questions or need additional information, please contact me at (202)-512-3464 or Gary Boss, Assistant Director, at (202) 512-6964. Major contributors to this letter include Charles Egan, Thomas Laetz, and Michael Sagalow.

(Ms.) Gary Jones
Director, Natural Resources
and Environment

Enclosure

BRIEFING PRESENTED ON JUNE 3, 2002

Observations on Using External Agencies to Regulate Nuclear and Worker Safety in DOE's Science Laboratories

Prepared for the Subcommittee on Energy and Water Development, House Committee on Appropriations

June 3, 2002

1

GAO's Objectives

Identify current stakeholder positions on external regulation of DOE's science facilities

Summarize the costs and benefits of using external agencies to regulate DOE nuclear and worker safety

Determine how comparable domestic and European science facilities are regulated for nuclear and worker safety

2

Scope and Methodology

For our review, we

- interviewed DOE, NRC and OSHA officials and examined past studies;
- visited major DOE science laboratories (Lawrence Berkeley, Stanford, Argonne, and Oak Ridge);
- obtained information on other domestic facilities; and
- visited comparable facilities in Belgium, the United Kingdom, France and Switzerland, and interviewed government agencies, contractors, and regulators.

We did not verify the costs and benefits reported by federal agencies, contractors, or foreign officials we interviewed, but we did review the reasonableness of their claims.

3

Background

DOE is the only federal agency whose facilities are essentially exempt from regulation by NRC for nuclear safety and OSHA for worker protection

History of DOE External Regulation Activities

1989: Significant workplace safety and health problems found in its facilities (Tiger Team reviews).

1992: OSHA and DOE formalize relationship for technical assistance and consultation.

1993: Energy Secretary announces intention to end DOE self-regulation of worker safety and health.

1994: Legislation proposed requiring NRC licensing of all new DOE nuclear facilities.

1995: DOE blue ribbon panel recommends, “essentially all aspects of safety at DOE nuclear facilities should be externally regulated.”

1996: DOE sets a 10-year timetable for ending self regulation.

1996: OSHA conducts simulated inspections at DOE’s Argonne Lab.

4

Background

1997: NRC and OSHA to conduct simulated inspections at several DOE facilities.

1998: Appropriations conference report directs DOE to build new non-defense nuclear facilities (2000 and beyond) to NRC standards.

1999: Energy Secretary decides to continue self-regulation, citing cost and regulatory uncertainties.

2001: GAO recommends DOE end self-regulation to improve its accountability

5

Background

The 2001 Appropriations Conference Report directed DOE to prepare a plan to implement external regulation that

- includes only its 10 science laboratories (see appendix)--defense facilities are excluded,
- addresses all details necessary to implement external regulation,
- estimates additional resources NRC and OSHA need and corresponding reductions in DOE staff, and
- identifies contractual and legislative changes needed to effect the transition to external regulation.

Plan was due May 31, 2002.

6

Stakeholder Positions

DOE officials told us that their current position on external regulation is "neutral" because the Secretary has insufficient information with which to make a decision on external regulation; a 6 to 9 month study is planned to develop the cost and other information he needs.

DOE's potential regulators--OSHA and NRC-- support new responsibilities, assuming resources are available and new authority is granted.

Contractor directors representing 6 of DOE's 10 science laboratories (and nearly 90 percent of DOE's 10-lab budget) told us they support external regulation if they hold the license and DOE substantially reduces its safety oversight (other directors were not contacted).

7

Stakeholder Positions

NRC and OSHA interact with DOE in several areas specifically authorized by the Congress, thus giving DOE valuable experience operating under external regulators.

NRC:

- is participating in over 20 DOE sites and activities in which it licenses, certifies or consults. For example, NRC regulates the:
  - high-level waste repository (Yucca Mountain),
  - gaseous diffusion plants,
  - uranium mill tailings sites,
  - Independent Fuel Storage Facility at Fort St. Vrain, and
  - West Valley Demonstration Project.
- participated in DOE studies of external regulation at several laboratories.

8

Stakeholder Positions

OSHA:

- regulates non-Atomic Energy Act sites (e.g., power administrations, technology office, and petroleum reserves),
- regulates the gaseous diffusion plants leased by DOE to a private sector company, and
- participated in early DOE studies of external regulation and was part of the late 1980s DOE inspection teams (Tiger Teams).

NRC and OSHA, however, have no regulatory presence at the 10 science laboratories.

9

Cost Issues

External regulatory costs cannot be reasonably ascertained until DOE benchmarks its facilities against regulatory standards, decides on license holder, and defines its roles and responsibilities.

- Costs are dependent on the regulatory flexibility applied by NRC to DOE's unique facilities. For example, NRC
  - gives exemptions and waivers, as its did when it waived its seismic requirements at a DOE-licensed facility in Idaho, saving $7 million.
  - reports it will waive it decommissioning and decontamination (D&D) requirements for DOE facilities.
  - says that applying regulatory flexibility would not compromise safety.
- NRC simulated inspections found few facility changes needed to meet its standards.

10

Cost Issues

OSHA simulated inspections identified a level of deficiencies only slightly above national averages.

OSHA noted that the cost of correcting "legacy" hazards (i.e., facilities that were built to older standards) is substantial, and needs to be addressed independent of external regulation decisions.

Continued substantial DOE oversight under external regulation would result in costly dual regulation.

11

Cost Issues

NRC estimates to regulate DOE's 10 science laboratories

Transition Period:

- FY 2003 -- 42.1 FTEs, $6.8 million total costs
- FY 2004 – 41.0 FTEs, $6.4 million total costs

- Steady State or Annual: 22.1 FTEs, $4.5 million total costs
- Six Labs: Ames, Berkeley, Fermi, Thomas Jefferson, Princeton Plasma and Stanford require only one license for each site
  - Transition per year -- 0.2 FTEs per site & $30 thousand travel
  - Steady state per year -- 0.2 FTEs per site & $20 thousand travel
- Oak Ridge (most complex): Requires three separate licenses
  - Transition per year -- 15 FTEs, $0.7 million in FY 2003 & $0.5 million in FY 2004)
  - Steady state per year -- 5 FTEs annually, $0.1 million including a resident inspector.
- Incremental cost to include accelerators: 7.3 FTEs in FY 2003 ($1.4 million), 5.8 FTEs in FY 2004 ($1.0 million), and 1.5 FTEs steady state ($0.3 million)

12

Cost Issues

KEY assumptions for NRC estimates

- All DOE facilities would be licensed in 2 years (ORNL a possible exception).
- Management and operating contractor is the licensee.
- NRC D&D requirements would be suspended.
- Estimates are based on experience in similar facilities, and pilot results.
- DOE facilities are generally in safe condition.

13

Cost Issues

OSHA estimates to regulate DOE's 10 science laboratories (provided to DOE)

- Transition costs: $445,000 to create a special office to inspect DOE sites.
- Annual costs: $2.13 million and 19 FTEs.
- Other costs: $6.35 million to develop revised standards for ionizing radiation, spread over 5 years.

Key assumptions:

- Estimates are based, in part, on its OSHA simulated inspection of Argonne in 1997.
- OSHA would inspect DOE science laboratories in the same way it inspects any other facility.

14

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Benefits

DOE's 1996 Working Group on External Regulation, which included DOE and other federal executives, said external regulation would:

- improve safety,
- eliminate the inherent conflict of interest from self-regulation,
- become more consistent with current domestic and international safety management practices, and
- gain credibility and public trust.

15

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Benefits

Stronger NRC and OSHA enforcement powers should lead to improved safety culture (1999 hearings):

- NRC: "external oversight…provides an increased assurance of safety in the long run."
- OSHA: "it appears that there is room for improvement in safety and health at DOE sites."

16

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Benefits

Other Potential Savings Could Offset Some Costs

- Reduction/redirection of DOE staff.
  - DOE's 2002 Best Practices study found that NASA and NSF required fewer resources than DOE to oversee their contractor-operated facilities.
  - About 30 percent of staff at the 4 major site offices we visited are dedicated to ES&H oversight (excluding significant staff in operations and headquarter offices).

17

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Benefits

- Reduction/redirection of contractor staff
  - Lab directors representing DOE's five multi-program science labs told us they could reduce or redirect their ES&H staff by up to 30 percent under external regulators (assuming DOE reduced its oversight).
  - Battelle, manager of 3 of these science labs, told us that it spends one half to one third less (as a percent of total costs) on ES&H at its externally regulated private-sector labs.
  - DOE's 1996 report found that 7 large companies used from 47 to 92 percent fewer ES&H staff per 1000 employees than DOE.

18

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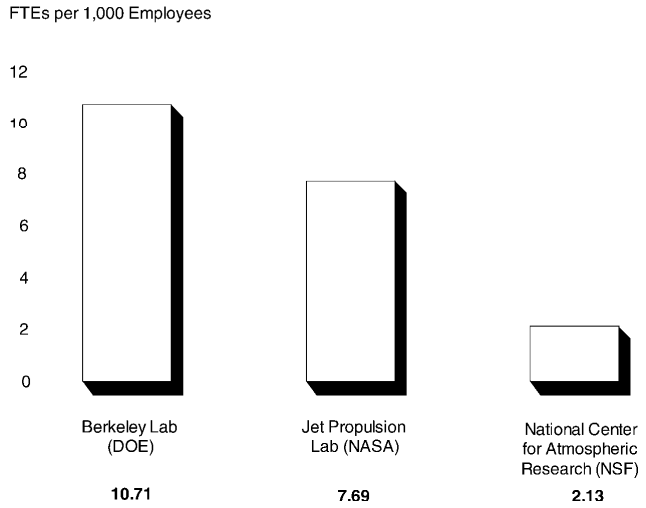
Benefits

Comparison of ES&H Staff across Three Government Laboratories



Source: DOE Best Practices Pilot Study (February, 2002)

19

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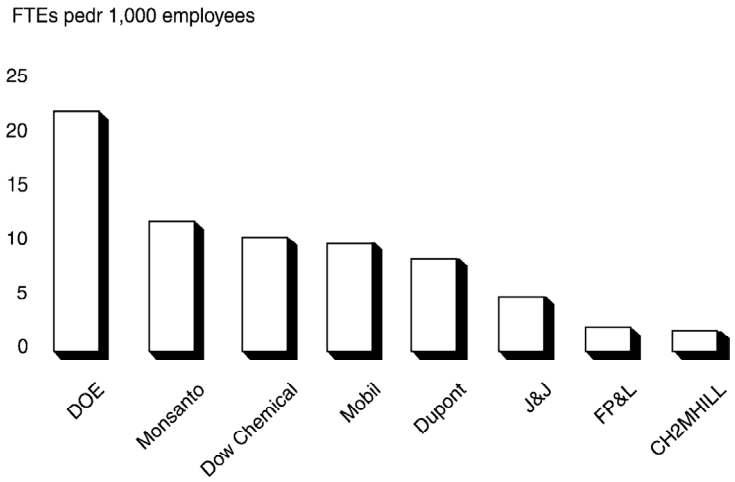
Benefits

Comparison of ES&H Staff Across DOE & Seven Private Sector Companies



Source: DOE Working Group on External Regulation (December, 1996)

20

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Benefits

- Contractors told us they can be more efficient:
  - external regulators are more consistent and predictable than DOE, making planning easier and improving efficiency;
  - reducing ES&H staff time could redirect scientists to mission work; and
  - working to NRC and OSHA standards allows consistency with other research facilities, making DOE labs more competitive and user friendly.

21

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Other Experiences

Belgium, the United Kingdom, France, and Switzerland value the benefits of external regulation

- All research facilities have been licensed and inspected by independent regulators for some time--most are variations of government-owned and contractor-operated sites.
- Public concerns for nuclear safety and radiation exposure have been forces behind recent legislative changes to establish even more layers of independence.

22

Other Experiences

Foreign government funding agencies and laboratory contractors cite several benefits of external regulation:

- Increasing safety
- Improving credibility with the public
- Leveraging funds for infrastructure improvements
- Fostering more efficient organizations

23

Other Experiences

The United Kingdom and France use external regulators to oversee safety in many defense facilities.

- The United Kingdom has an independent external regulator for defense R&D facilities shared with the civilian side, but uses an internal regulator for warheads and naval nuclear propulsion.
  - These facilities made the transition from internal to external regulation in just 2 years.
  - Only minor facility upgrades were needed.
- France has an independent external regulator for defense R&D facilities, parallel to the civilian side, but shares a common technical advisory agency.

24

Observations

External regulation would help improve public confidence and credibility in DOE, enhance the safety culture in its facilities, and provide DOE and its contractors with an opportunity to redirect their resources to important mission work.

Growing evidence shows that external agencies could potentially regulate DOE more effectively and at less cost than DOE's internal staff.

Experiences from research facilities in comparable domestic and European laboratories provide additional evidence that external regulation is feasible and has many benefits.

DOE has had ample time to develop an implementation plan to externally regulate its10 science labs. NRC and OSHA, as DOE potential external regulators, have provided DOE with the cost and implementation data necessary for developing a plan.

25

Appendix: DOE's 10 Science Labs

Multi-program

1. **Argonne National Laboratory**-East, Argonne, IL (University of Chicago)
2. **Brookhaven National Laboratory**, Upton, NY (Brookhaven Science Associates)
3. **Lawrence Berkeley National Laboratory**, Berkeley, CA (University of California)
4. **Oak Ridge National Laboratory**, Oak Ridge, TN (UT-Battelle, LLC)
5. **Pacific Northwest National Laboratory**, Richland, WA (Battelle Memorial Institute)

Single-purpose

1. **Ames Laboratory,** Ames, IA (Iowa State University)
2. **Fermi National Accelerator Laboratory**, Batavia, IL (University Research Association)
3. **Princeton Plasma Physics Laboratory**, Princeton, NJ (Princeton University)
4. **Stanford Linear Accelerator Center**, Menlo Park, CA (Stanford University)
5. **Thomas Jefferson National Accelerator Facility**, Newport News, VA (Southeastern Universities Research Association)

26

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