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CRS Report for Congress

Department of Energy Abolition? Implications for the Nuclear Weapons Program

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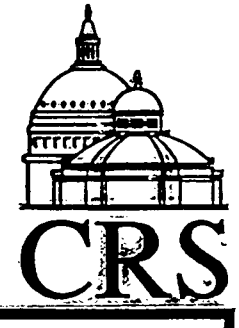

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Department of Energy Abolition? Implications for the Nuclear Weapons Program

Summary

Congress has been considering whether to abolish the U.S. Department of Energy (DOE). A key aspect of any decision will be what to do with the nuclear weapons program, which DOE and its predecessors have managed since 1946. This report examines how four alternatives current in 1995 might affect this program.

Critics contend that DOE manages the weapons program poorly. They charge that DOE's procedures, audits, regulations, management layers, etc., are so burdensome as to strangle productive work. Some believe, for example, that DOE is inadequately responsive to the needs of the Department of Defense (DoD), undermining U.S. security; that it has made inadequate progress toward producing tritium for warheads; and that its "zealousness" in pursuing environmental, safety, and health concerns impairs the functioning of the weapons program.

Such criticisms form the backdrop for alternatives. All agree that changes must be made; at issue is how to proceed. In judging alternatives, questions that Congress may consider include: Should the weapons program be in an agency independent of DOD? How can it be assured that the program is adequately responsive to DoD? Can changes at DOE remedy perceived problems? What balance between science and manufacturing should the United States use in maintaining its nuclear arsenal? Which agencies can manage the weapons laboratories well? Which can manage weapons production well?

Four options for DOE were before Congress in 1995. This report presents pros and cons of each in terms of how they might affect the weapons program. Views on the six questions noted above affect one's choice among these four alternatives.

Modify DOE and keep the nuclear weapons program there: The Administration proposes this option.

Move the NWP to the Department of Defense (DOD): Representative Todd Tiahrt introduced the Department of Energy Abolishment Act, H.R. 1993, which would establish a Defense Nuclear Programs Agency within DoD.

Move the program to an independent Defense Nuclear Programs Agency: Representative Martin Hoke introduced H.R. 1628, the Defense Nuclear Programs Agency Organization Act, to support DOE abolition by establishing a Defense Nuclear Programs Agency outside of DoD that would house several nuclear weapons-related agencies.

Move the program to a new Department of Science: The House Science Committee was considering a Department of Science Organization Act of 1995 to create this department. The draft legislation would, among other things, transfer the nuclear weapons program to this department.

ABSTRACT

From time to time, some in Congress have expressed interest in abolishing the Department of Energy (DOE). This report considers how abolition might affect the U.S. nuclear weapons program. It provides background on the weapons program and the debate on what organization should control it; summarizes the debate over managing the program, including criticisms of DOE's management and issues in deciding where to place the program, and presents four options for the weapons program. It considers pros and cons for each option. This report should be of value for understanding consequences of alternative organizational "homes" for the weapons program for those considering legislation to abolish DOE. This product will not be updated. For further information, see CRS Issue Brief IB97012, *Restructuring DOE and Its Laboratories: Issues in the 105th Congress*.

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Department of Energy Abolition? Implications for the Nuclear Weapons Program

Introduction

Congress is considering whether to abolish the U.S. Department of Energy (DOE). The House budget resolution for FY1996 called for this action, though the final budget resolution did not because of Senate opposition. Senator Robert Dole established the Senate Task Force on Elimination of Government Agencies, a Republican group that he charged with preparing plans to eliminate DOE and three other agencies.[1] Pending legislation makes this an ongoing issue.

If DOE is abolished, Congress must decide where to put the nuclear weapons program (NWP), which DOE and its predecessors have operated since 1946. This report provides background for this decision and discusses, in a pro-con format, how four institutional alternatives may affect the NWP. Former Secretary of Energy James Watkins stressed the importance of this decision:

> whether or not the Department of Energy is abolished is not the most important issue. In fact, it misses the point, and masks the much tougher issue of who is going to have responsibility for . . . the safe and effective management of the nuclear weapon stockpile.[2]

Four main options are currently before Congress:

Modify DOE and keep the nuclear weapons program there: The Administration proposes this option.

Move the NWP to the Department of Defense (DOD): House Republican freshmen have organized an effort to abolish DOE and several other departments. On June 30, 1995, Representative Todd Tiahrt, chairman of the group's task force on DOE, introduced the Department of Energy Abolishment Act, H.R. 1993, which would establish a Defense Nuclear Programs Agency within DOD.

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[1]Testimony of Senator Lauch Faircloth. Senate Committee on Government Affairs, May 18, 1995, prepared statement, p. 1; and Stephen Barr, "Republicans Promise Bills To Kill 4 Cabinet Agencies," Washington Post, May 19, 1995: 23.

[2]Admiral James D. Watkins, U.S. Navy (Retired), testimony before a hearing of the House Subcommittee on Government Management, Information and Technology of the House Committee on Government Reform and Oversight, May 23, 1995, p. 1-2.

Move the program to an independent Defense Nuclear Programs Agency: On May 12, 1995, Representative Martin Hoke introduced H.R. 1628, the Defense Nuclear Programs Agency Organization Act, to support DOE abolition by establishing a DNPA outside of DOD that would house several nuclear weapons-related agencies.

Move the program to a new Department of Science (DOS): The House Science Committee is preparing legislation, the Department of Science Organization Act of 1995, to create a DOS. The draft legislation would, among other things, transfer the NWP to DOS.[3]

The choice among options is important for the future of the weapons program. The United States has halted nuclear weapons testing, has committed to conclude a comprehensive test ban treaty (CTB)[4] by late 1996, has closed many nuclear weapons production facilities, and no longer develops or produces new types of nuclear weapons. Nonetheless, it retains nuclear weapons and plans to maintain them. As President Clinton said, "I consider the maintenance of a safe and reliable nuclear stockpile to be a supreme national interest of the United States."[5] Which agency houses the NWP, and how it is structured to handle that program, may affect how, and how well, nuclear weapons are maintained. For example, the choice of agency may affect whether the NWP emphasizes science or manufacturing; how well the program can recruit and retain technical staff; and how responsive it is to the Nation's perceived security needs.

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[3]Department of Science Organization Act of 1995, unnumbered draft House bill provided by the House Science Committee. For further information on this bill, see Robert Walker, "The Need for a Department of Science," Issues in Science and Technology, Summer 1995: 19-21; and Graeme Browning, "Bob Walker's Got an Idea," National Journal, Aug. 12, 1995: 2062-2064.

[4]Negotiations to achieve a CTB, a ban on all nuclear weapons tests, are ongoing at the Conference on Disarmament in Geneva. At the Nuclear Nonproliferation Treaty Extension Conference in May 1995, the nuclear weapons states pledged to reach a CTB by the end of 1996. As a result of the FY1994 Energy and Water Development Appropriations Act (Pub. L. 102-377, sec. 507), the United States entered a moratorium on nuclear testing in October 1992, which President Clinton extended indefinitely, assuming a CTB can be agreed to by September 30, 1996. In a press conference of August 11, 1995, he declared that the United States "will insist" on a "true zero yield" CTB, one that "prohibits any nuclear weapons test explosion or any other nuclear explosion."

[5]William Clinton, "Briefing on President's Decision To End All Nuclear Testing," August 11, 1995. Transcript from Federal Document Clearing House, Inc., via Reuters newswire, August 11, 1995: n.p.

Background

Organizational Control

The Army owned and managed the atomic bomb project -- the "Manhattan Engineer District" -- from 1942 through 1946. The Atomic Energy Act of 1946 set as policy the development of atomic energy for military and peaceful purposes. The Act established the Atomic Energy Commission (AEC), an independent civilian agency, and moved the weapons program from the Army to the AEC. (DOD was not established until 1947. It is a civilian agency because it is controlled by civilians even though it also contains the military services.)

The decision on whether to have atomic energy under civilian or military control -- an issue of current relevance -- was bitterly contentious in 1946 to an extent hard to grasp now. Some feared that military control would impede or prevent the development of atomic energy for peaceful purposes, would impede the free international exchange of information on the basic science of atomic energy, would stifle independent inquiry, and would impede efforts to have international control of atomic energy.[6] Senator Brien McMahon, Chairman of the Senate Special Committee on Atomic Energy, feared that failure to transfer control to a civilian agency would signal to the world that an arms race had started.[7] Some feared the political power of the military. Secretary of Commerce and former Vice President Henry Wallace testified before the Senate that

> We must insist on adherence to the traditional principle of civilian control over military matters -- and avoid any possibility of military domination or dictatorship.[8]

The armed services and some Members of Congress were concerned about the need to preserve secrecy and to have the weapons program be responsive to the needs of the military. Meeting these concerns, in this view, required continued military control over atomic energy. General Leslie Groves, who headed the Manhattan Project, raised these points in Senate testimony (as summarized in a study):

> National security (Groves said) depended upon the Army and Navy having a voice in developing `the most powerful military weapon in existence.' And by service representation, he did not mean putting a civilian head of a department on the commission (the AEC) but a man with extensive military experience `who is not going to forget for one minute that . . . defense must

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[6]Richard Hewlett and Oscar Anderson, Jr., The New World, 1939/1946: A History of the United States Atomic Energy Commission, Volume I. University Park, PA, Pennsylvania State University Press, 1962, p. 489-490.

[7]Ibid., p. 503.

[8]Cited in ibid., p. 490.

> come first and other things will have to come afterward until the international situation is resolved.[9]

The Atomic Energy Act of 1946 institutionalized civilian control. It authorized the AEC to do R&D on military applications of atomic energy and produce atomic bombs and their components, but "only to the extent that the express consent and direction of the President of the United States has been obtained." The Act gave the President further control:

> The President from time to time may direct the Commission (1) to deliver such quantities of fissionable materials or weapons to the armed forces for such use as he deems necessary in the interest of national defense or (2) to authorize the armed forces to manufacture, produce, or acquire any equipment or device utilizing fissionable material or atomic energy as a military weapon. (sec. 6(a))

It established a Military Liaison Committee, and directed the AEC to "advise and consult with the Committee on all atomic energy matters which the Committee deems to relate to military applications." (sec. 2(c)) Civilian control went so far that the fissile core of early nuclear weapons was, by design, separated from the rest of the weapon; the AEC maintained custody of the cores. This practice continued until the middle 1950s when integrated warheads were designed, produced, and turned over to DOD.[10]

The reorganization of the Federal energy function in the 1970s resulted in moving the NWP. In the wake of the 1973 energy crisis, the Energy Reorganization Act of 1974 (P.L. 93-438) established the Energy Research and Development Administration (ERDA) as the lead agency in the energy program and the repository of the NWP. The Act abolished the AEC and merged into ERDA elements of the AEC and other agencies.[11] In 1977, the Department of Energy Organization Act (P.L. 95-91) created DOE to "promote the general welfare by assuring coordinated and effective administration of Federal energy policy and programs." (sec. 102) It transferred to DOE most of ERDA, including the nuclear weapons program, and components of other agencies. (Title III)

The Nuclear Weapons Program

To develop, test, and manufacture nuclear weapons, the United States created the nuclear weapons complex, a vast array of facilities throughout the Nation. A few were built in World War II, notably the laboratory at Los Alamos, NM (called Site Y in World War II, now Los Alamos National Laboratory), which designed nuclear

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[9]Ibid., p. 502.

[10]Thomas Cochran, William Arkin, and Milton Hoenig. Nuclear Weapons Databook: Volume I, U.S. Nuclear Forces and Capabilities. Cambridge, MA, Ballinger, 1984, p. 6, note 13.

[11]U.S. Congress. Office of Technology Assessment. An Analysis of the ERDA Plan and Program. Washington, U.S. Govt. Print. Off., October 1975, p. vii, 311.

weapons; the Hanford plant (WA), which produced plutonium, and plants at Oak Ridge, TN, which produced uranium enriched in the fissile isotope 235. The weapons program proceeded slowly in the late 1940s; for example, the United States conducted only five nuclear tests from 1946 through 1950, out of a total to date of 1,054.[12]

With the Korean War, the Cold War, and the development of the hydrogen bomb, nuclear weapons work proceeded on a crash basis. By late 1952, as part of this effort, new production plants were planned or under construction and existing plants were being expanded. These included plants at Savannah River, SC, Portsmouth, OH, Oak Ridge, TN, Paducah, KY, Hanford, WA, Fernald, OH, Rocky Flats, CO, Albuquerque, NM, and Kansas City, MO.[13] Each performed a particular task, such as enriching uranium, fabricating plutonium components, or fabricating nonnuclear components. Typically, only one plant would perform a given task, though there was some redundancy early on. The overriding goal of the nuclear weapons complex was to produce large numbers of nuclear weapons. It met this goal. While the U.S. nuclear stockpile had few weapons in the late 1940s, it reached a level of approximately 19,000 by 1960.[14] Also essential for the nuclear weapons complex were laboratories to research, develop, design, and test nuclear weapons, as well as sites at which to conduct tests. Los Alamos was started in 1942, Sandia in 1945, and Livermore in 1952. The site for the Nevada Test Site was selected in 1950; other tests were conducted in the South Pacific, and a few tests were conducted at other locations.

From 1942 to 1989, facilities to produce weapons and, especially, weapon materials consumed the lion's share of the budget of the nuclear weapons complex. For example, the Manhattan Project (plant plus operations) cost $1.890 billion (then-year dollars) through Dec. 31, 1945. Of that, Los Alamos accounted for only $74 million, and R&D another $70 million; three uranium enrichment plants at Oak Ridge accounted for $1.005 billion and the Hanford plant accounted for $390 million.[15]

The ending of the Cold War has had many consequences for the NWP. Demand for new warheads plummeted. Several warheads under development were canceled in the late 1980s and early 1990s. President Bush canceled production of the W88, the last warhead being produced, in 1992. At present, no new warheads are under development or in production. As a result of treaties, agreements, and unilateral decisions, many thousands of warheads have been withdrawn from active service.

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[12]U.S. Department of Energy. Nevada Operations Office. Office of External Affairs. United States Nuclear Tests, July 1945 through September 1992. DOE/NV-209 (Rev. 14). Washington, U.S. Govt. Print. Off., 1995, p. viii, 1. Note that of the 1,054 tests, 24 were joint U.S.-U.K tests.

[13]Richard Hewlett and Jack Holl, Atoms for Peace and War, 1953-1961: Eisenhower and the Atomic Energy Commission. Berkeley, University of California Press, 1989, p. 10-11.

[14]U.S. Department of Energy. Openness Press Conference Fact Sheets, June 27, 1994. Fact sheet entitled "Declassification of Certain Characteristics of the United States Nuclear Weapons Stockpile," p. 166.

[15]Hewlett and Anderson, The New World, 1939/1946, p. 723.

Some are held for possible future use, some are in storage awaiting dismantlement, and others have been dismantled. The Pantex (TX) Plant, which used to assemble new nuclear warheads and disassemble old ones, no longer assembles new warheads. (As in the past, some of the warheads Pantex disassembles are disassembled so that it and other nuclear weapons complex sites can monitor their condition.) The end of the Cold War also brought legislation that imposed a moratorium on nuclear testing.[16] President Bush signed the measure into law; President Clinton has extended the moratorium three times.

With the urgency of production ending, concerns over environmental, safety, and health (ESH) consequences of nuclear weapons production came to the fore. It became apparent that massive environmental contamination had occurred at various sites within the nuclear weapons complex. Some plants were closed because of ESH concerns; many of these plants halted production permanently, and their mission became cleanup. For example, 70 FBI agents raided the Rocky Flats (CO) Plant in June 1989 to search for evidence that the plant's managers had deliberately violated environmental laws. DOE found evidence of environmental, safety, and health problems, halted plutonium operations at Rocky Flats in late 1989, and replaced the contractor with a new one. DOE formally ended Rocky Flats' defense production mission in 1992 after it became clear that no new warheads would be needed in the foreseeable future, and transitioned the plant to cleanup. As Rocky Flats was the only plant that produced large numbers of the plutonium components used in almost all warheads, its closure prevented the other plants from producing warheads.

Even as the role of the production facilities has plunged, the role of the laboratories has increased. New production of warheads resulted in frequent replacement of warheads, often before aging problems emerged. Without new production, the monitoring and maintenance of existing warheads have become the main defense mission of the nuclear weapons complex, a mission in which the labs have a large role. The labs produce some replacement components for nuclear weapons and may expand this role. They are also involved in designing, developing, and supporting the manufacture of new components. As a result, the labs perform the bulk of the work of the nuclear weapons complex other than dismantlement of warheads and cleanup of weapons complex sites.

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[16]Energy and Water Development Appropriations Act, 1993, Pub. L. 102-377, sec. 507.

Cleanup

Cleanup is a larger item in DOE's budget than is national security. For FY1996, DOE requests $4.97 billion in budget authority for weapons activities, materials support, and other defense programs, as compared to $6.01 billion for defense environmental restoration and waste management.[17] Cleanup is a huge problem for many reasons: potential danger to workers and the public, high cost, incomplete knowledge of what wastes are to be cleaned up, legal and regulatory complexity, inadequate technology, and so forth. While this report does not focus on this issue, the choice of the agency to perform cleanup if DOE is abolished could affect the recipient agency's ability to run the weapons program. Moreover, States and citizens will be concerned about which agency is responsible for cleanup, and will want assurance that the agency will make steady progress in this area.

The Debate over Managing the Nuclear Weapons Program

Criticisms of Doe's Management of the Weapons Program

Critics charge that DOE's management approach is strangling productive work through multiple layers of management, excessive reviews and audits, unneeded regulations, and so on. Secretary O'Leary stated that

> Fundamental processes which govern how the Department operates are cumbersome, inefficient, and drain our employees of energies that could be spent more productively in other ways. . . . Like most bureaucracies, the Department has responded to problems in the past by adding new layers of management and new processes on top of old ones. . . . Redundancies within the Department and inefficient procedures have persisted from one Administration to the next.[18]

These concerns are vivid in regard to DOE's management of cleanup of the nuclear weapons complex. A 1995 report discussing DOE's role in the cleanup of the Hanford Nuclear Reservation, stated that "Hanford is floundering in a legal and regulatory morass."[19] Further, "(t)he cleanup is already terribly complex and yet DOE

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[17]U.S. Department of Energy. Chief Financial Officer. FY 1996 Congressional Budget Request: Budget Highlights. DOE/CR-0032, February 1995, p. 106-107.

[18]Statement of Hazel R. O'Leary, Secretary of Energy, Department of Energy. House Committee on Government Reform and Oversight, Subcommittee on Government Management, Information and Technology, May 16, 1995, prepared statement, p. 15-16.

[19]Steven Blush and Thomas Heitman, Train Wreck Along the River of Money: An Evaluation of the Hanford Cleanup. A report for the U.S. Senate Committee on Energy and Natural Resources, March 1995, p. ES-3.

has been adding organizational complexity on top of the existing technical complexity."[20]

Critics allege other management problems at DOE. The General Accounting Office recommended that DOE make major changes to its contracting system if it is to accomplish its changing missions, charged that DOE's field offices are slow to respond to changing needs and an impediment to coordination, and argued that "DOE now needs to impose modern standards for accountability and performance."[21] DOE has used a "GOCO" (government-owned, contractor-operated) structure to manage its laboratories, partly to insulate weapons technology development from political and administrative pressure.[22] DOE's Task Force on Alternative Futures for the Department of Energy National Laboratories (the Galvin panel), however, concluded that "Government ownership and operation of these laboratories does not work well." It felt that the GOCO system, under increased government direction, has become virtually a government-owned, government-operated system, a change that may affect laboratory vitality.[23] It blamed Congress for part of the problem.

> As a function of the detail with which the Congress prescribes what should be done in the laboratories and the Congress's obsession with the issue of accountability, the Department is driven both to honor the prescriptions from Congress and to overprescribe in order not to be at risk of failing to be super attentive to the Congress's intentions. . . . more and more of the science intended resources are having to be redirected to the phenomenon of accountability versus producing science and technology benefits.[24]

Critics hold that DOE's management style has led to a number of problems that make DOE unsuitable to manage the NWP. They contend that DOE has been inadequately responsive to the nuclear weapon needs of DOD as the agent for meeting U.S. national security needs, and cite several particulars.

(1) DOE's management of the NWP, it has been charged, undercuts the U.S. deterrent. According to the House National Security Committee, "the infrastructure necessary to design, produce, and maintain U.S. nuclear weapons has suffered significant erosion resulting from the Department's (DOE's) neglect over the past

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[20]Ibid., p. ES-6.

[21]U.S. General Accounting Office. A Framework for Restructuring DOE and Its Missions. Washington, August 1995, report GAO/RCED-95-197, p. 4, 15.

[22]See note on this point. Other purposes of establishing GOCOs were to bring accepted business practices into nuclear weapons work in order to promote cost-effective operations, and to foster relations with industry to benefit nuclear energy and nuclear medicine, which were expected to be strong components of the AEC's work.

[23]U.S. Department of Energy. Secretary of Energy Advisory Board. Task Force on Alternative Futures for the Department of Energy National Laboratories. Alternative Futures for the Department of Energy National Laboratories. P. 53-54. Hereinafter Galvin report.

[24]Galvin report, p. A-1.

several years."[25] The report says DOE has proposed an inadequate program to remedy the problem. The Senate Armed Services Committee "is concerned that science-based stockpile stewardship (SBSS) (see page 13) is insufficient to maintain confidence in the enduring stockpile."[26] Compounding this problem, DOE did not request sufficient funds for SBSS, in the latter committee's view, despite explicit congressional direction in the FY1995 budget cycle to do so.[27] Because DOE "has failed to develop a requirements-based plan for stockpile stewardship and stockpile management," it "is not in a position to develop a detailed plan for assuring the safety, reliability and effectiveness of the enduring stockpile."[28]

(2) Critics say that DOE has done an inadequate job providing for tritium, a radioactive gas used to boost the yield of nuclear weapons. As it decays over time, tritium must be replenished on an ongoing basis; if the amount of tritium in a warhead declines too much, the warhead will explode with a force far less than its design yield. DOD has included in its requirements to DOE that the latter maintain an adequate supply of tritium. Yet the United States currently has no tritium production facility. DOE plans to bring one on line in order to produce tritium by 2011, when, it calculates, new tritium will be needed. Critics, however, fear that DOE will not do this. Senator Strom Thurmond said in 1994,

> I feel that we can trust the Department of Defense to do everything it can to ensure that the nuclear stockpile does not wither away for lack of tritium, whereas I believe that the Department of Energy no longer deserves our trust in this matter. . . . It is so important to (DOE) to have the cachet of anti-nuclear groups, that DOE is willing to put us at risk of losing our nuclear stockpile by cunningly devised deferral and delay.[29]

(3) DOE's management problems, some contend, thwart productive work at the nuclear weapons laboratories. According to C. Bruce Tarter, Director, Lawrence Livermore National Laboratory,

> . . . requirements for documentation that vastly exceed those practiced by successful research and development organizations; numbers of employees whose entire jobs are devoted to interacting with regulators and auditors; and the inculcation of a climate where risk is forbidden, there is the de facto presumption of guilt rather than innocence, and process rather than results is the driving force. Analogously, the Department and other oversight

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[25]U.S. Congress. House. Committee on National Security. National Defense Authorization Act for Fiscal Year 1996. House report 104-131, June 1, 1995. 104th Congress, 1st Session. Washington, U.S. Govt. Print. Off., 1995, p. 298.

[26]U.S. Congress. Senate. Committee on Armed Services. National Defense Authorization Act for Fiscal Year 1996. Senate report 104-112, July 12, 1995. 104th Congress, 1st Session. Washington, U.S. Govt. Print. Off., 1995, p. 368.

[27]Ibid.

[28]Ibid., p. 384.

[29]U.S. Congress. Senate. Debate on amendment no. 2213 to S. 2182, FY1995 National Defense Authorization Act. Congressional Record (daily edition), July 1, 1994: S. 8287.

> bodies have devoted more and more time and people to enforcing the growing mass of regulations, and on justifying the need for additional effort on the basis of uncovering deviations from administrative perfection. It is an escalating spiral in which audits and reviews feed further regulations which need subsequent audits and so on.[30]

(4) Critics charge that DOE's focus on cleanup and environmental, safety, and health issues at the nuclear weapons complex, and the manner in which DOE's directions to the complex are to be implemented, consume so much time, money, effort, and administrative attention as to impair the functioning of the weapons program. By one estimate, five years of ESH changes cut productivity in a 250-person weapons group at Livermore by perhaps one-third.[31] Another organization might implement cleanup and ESH mandates differently, achieving the desired results in a manner less burdensome.

Issues in Deciding Where to Place The Weapons Program

In deciding what to do with the NWP, Congress may wish to consider six issues. One's perception of these issues affects one's choice among the four institutional options for housing the NWP. This section explains these issues; the next section considers them in the framework of institutional choices.

1. *Should there be civilian control over the NWP, with that program in a civilian agency independent of DOD and the armed services?* The issue of *operational* control and custody of nuclear warheads has long since been resolved; DOD has that responsibility. Other issues raised in 1946 are recognizable in the current debate although the particulars have changed. Some analysts feel that placing the NWP under DOD could stifle the high-quality science that has led to highly sophisticated and capable nuclear weapons and that will be needed to maintain them in the future. They believe that the tension between DOD and DOE has been beneficial, as discussed on page 21. Another fear is that DOD might use control of the NWP to thwart goals in arms control and nonproliferation that are set by political leaders. For example, DOD argued for conducting nuclear tests at several hundred tons of explosive yield to help maintain U.S. nuclear weapons under a CTB.[32] A

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[30]C. Bruce Tarter, Director, University of California Lawrence Livermore National Laboratory. Testimony on the Management and Missions of the Department of Energy National Laboratories. House Committee on Science, Subcommittees on Basic Research and on Energy and Environment, March 9, 1995, prepared statement, p. 2.

[31]Estimate provided by Michael Anastasio and Richard Guarienti, Lawrence Livermore National Laboratory, March 1994. These costs include staff members added for ESH; time spent on audits, safety procedures, and training; delays while waiting for approval of modifications to projects; and monetary costs for facility fixes, delays, and overhead. Cited in U.S. Library of Congress. Congressional Research Service. Nuclear Weapons Stockpile Stewardship: The Role of Livermore and Los Alamos National Laboratories. May 12, 1994. CRS Report 94-418 F, by Jonathan Medalia. P. 39.

[32]Reuter, "Perry Calls Renewed Nuclear Tests a Possibility," Washington Post, June 19, (continued...)

different view, as articulated by General Groves in 1946, is that defense must come first. In this view, the NWP is less than adequately responsive to military needs, and only control by DOD can remedy this problem. Some holding this view see some arms control measures as irresponsible. They believe that a CTB is incompatible with maintaining nuclear weapons because lack of testing will in some cases preclude confidence in the safety, reliability, and performance of U.S. nuclear weapons.

2. *How can it be assured that the NWP, wherever housed, is adequately responsive to its customer, DOD?* A central charge against DOE in the defense area is that DOE has not been adequately responsive to DOD's needs. But the question is only one of a series of related questions. First, is responsiveness the right criterion? Would the benefit of more responsiveness outweigh the benefits of having an independent agency responsible for nuclear weapons technology? Second, has DOE been adequately responsive? How is this measured? Judging DOE as adequately responsive strengthens the case for keeping the NWP in DOE, and for keeping DOE. Judging the opposite leads to a third question: Is the lack of responsiveness seen as a short-term problem or one resulting from major structural problems? If the latter, can these problems be fixed within DOE? If not, what is the reason to expect that only another agency can fix them?

3. *Can DOE be reformed so that perceived problems would be no greater than those of other agencies?* As noted, some argue that DOE's management approach has created great problems. DOE plans to correct these problems, as discussed on page 13. While there is no guarantee that DOE's proposed corrections would work, neither is there a guarantee that the NWP would be better run if it were moved to another agency. At issue are whether DOE's proposed changes go far enough in theory to resolve the problems and whether the plans have a realistic chance of being implemented. If both questions are answered in the affirmative, the issue then becomes whether the revised DOE's handling of the NWP would be better than that of alternative organizations.

4. *What balance between science and manufacturing should the United States use in maintaining its nuclear arsenal?* Any plan for maintaining the arsenal must draw on both science and manufacturing. Yet plans differ in emphasis. This difference has consequences for: how the arsenal is maintained, costs of so doing, how money is spent (e.g., on experimental vs. production facilities), recruitment and retention of technical personnel, which laboratories and production facilities are retained and which are eliminated, and which agency is best suited for operating the NWP.

5. *Which agencies can manage the nuclear weapons laboratories well?* Different agencies would take different approaches to managing the labs. The likely

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[32](...continued)
1995: 9. For comparison on explosive yield, the Hiroshima bomb had a yield equivalent to 15,000 tons of TNT, while the Threshold Test Ban Treaty sets a yield ceiling on nuclear weapons tests at 150,000 tons. See also Ann Devroy and R. Jeffrey Smith, "White House Defuses Nuclear Test Proposal," Washington Post, June 23, 1995: 7. Footnote discusses CTB efforts.

success of these approaches is a key issue in determining which agency should manage the nuclear weapons program because of the centrality of the labs to that program. The choice of a science-based or manufacturing-centered approach to maintaining the arsenal, for example, will affect the relative merits of the agencies in managing the labs, the relationship between the labs and production facilities, and the future course of the laboratories.

6. *Which agencies can manage nuclear weapons production well?* In choosing which agency should have the nuclear weapons function, it is important to consider the ability of the agencies to manage production. The quality of science at the labs will not enable correction of problems that affect warhead safety, reliability, and performance unless the United States can produce warheads or their components as needed. On the other hand, it is argued, high-quality science is important for determining whether a problem is serious enough to warrant fixing, and can help resolve problems in remanufacturing defective warheads. Different agencies would likely have different approaches to managing production; the efficacy of these approaches will depend in part on whether a science-based or manufacturing-centered stewardship approach is used, or the balance chosen between them.

Options under Consideration by Congress

This section discusses the four options being considered by Congress to house the NWP. For each, this section describes the option, then presents arguments and rebuttals.

Option 1: Modify Doe and Keep the Nuclear Weapons Program There

Description. The Galvin Task Force recommended various changes regarding DOE's management of its national (nuclear weapons and other) laboratories. It said that the current Government-laboratory relationship "does not work well," and should be replaced with "a new *modus operandi* of Federal support, based on a private sector style `corporatized' laboratory organization system."[33] The Task Force recommended several changes if the current GOCO system is retained:

> Base DOE Oversight on Laboratories' Performance . . . Consolidate roles of DOE oversight offices . . . Apply rational, consistent business management principles . . . Manage lab infrastructure in a responsible fashion . . . Challenge labs to reduce costs . . . Simplify CRADAs (cooperative research and development agreements) much more.[34]

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[33]Galvin report, p. 53-54; original emphasis.

[34]Galvin report, p. A-7, A-8.

DOE has evaluated these and other Galvin panel recommendations, has accepted most of them, and has presented plans to implement those it accepts,[35] and in general to overhaul DOE. Several proposed changes address criticism of DOE's handling of the NWP.

> DOE plans to "(e)liminate unnecessary and redundant regulations and red tape that impose excessive cost burdens on the Department's performance of its missions." This would be done by, among other things, cutting DOE directives by 50 percent by December 1995; simplifying DOE audits and appraisals of its laboratories; and changing procurement practices for DOE's contractors.[36]

> "(W)e (at DOE) are simplifying our oversight of the laboratories and will greatly reduce micromanagement -- one of the principal concerns of the Galvin Task Force. These actions will enable the laboratories to remove costly and redundant administrative systems and personnel that drive up costs."[37]

DOE also proposes programmatic changes, restructuring the NWP so as to make it more responsive to U.S. post-Cold War needs. Key among these changes is to create a Stockpile Stewardship and Management Program (SSMP). According to a recent DOE report, "The Stockpile Stewardship and Management Program is a single, highly integrated technical program for maintaining the safety and reliability of the U.S. nuclear stockpile in an era without nuclear testing and without new weapons."[38] The Stockpile Management Program performs the day-to-day tasks of monitoring, maintaining, and dismantling nuclear weapons, while the Stockpile Stewardship Program increases understanding of nuclear weapons science to support stockpile management.[39]

In turn, "maintaining this (nuclear weapons) competency base, which exists primarily at the weapons laboratories, is one of the highest priorities of the Stockpile Stewardship and Management Program."[40] DOE and its predecessors have gone to great lengths to make the three weapons labs among the world's best laboratories, and

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[35]Statement of Hazel R. O'Leary, Secretary of Energy, Department of Energy. House Committee on Science, Subcommittees on Basic Research and on Energy and Environment, March 9, 1995, prepared statement, appendix.

[36]U.S. Department of Energy. Saving Dollars and Making Sense: Strategic Alignment and Downsizing. May 1995 (n.p.), p. 12.

[37]Statement of Hazel R. O'Leary, Secretary of Energy, Department of Energy. Senate Committee on Energy and Natural Resources, July 11, 1995, prepared statement, p. 17-18.

[38]U.S. Department of Energy. Office of Defense Programs. The Stockpile Stewardship and Management Program: Maintaining Confidence in the Safety and Reliability of the Enduring U.S. Nuclear Weapon Stockpile. May 1995, p. 1.

[39]See U.S. Library of Congress. Congressional Research Service. Department of Energy Programs: History, Status, Options. Report 95-508 ENR, coordinated by Carl Behrens and Richard Rowberg, April 20, 1995, p. 29-36.

[40]DOE, The Stockpile Stewardship and Management Program, p. 13.

they are generally recognized as such. This excellence, DOE argues, has always been essential for the nuclear weapons program, and becomes even more critical in the absence of testing and as the labs become relatively more important within the nuclear weapons complex. The key to excellent science appears to be recruiting, retaining, and developing the skills of outstanding technical personnel. Indeed, the Galvin panel attached first priority in science-based stockpile stewardship to "(a)ttracting and retaining skilled scientists, engineers, and managers over the years ahead with the expertise required for the complex and demanding stewardship role."[41]

Arguments on Option 1

1. DOE is doing a good job of managing the nuclear weapons program.

Pro: The SSMP will be the key to managing the NWP in the future, and will require outstanding laboratories. Advocates of Option 1 argue that DOE and its predecessors have created the conditions under which such labs operate effectively, and have run them for nearly a half-century. Warheads are highly complex and develop defects over time; maintaining them without testing is a major new technical challenge that requires at least as high a level of scientific excellence as did maintaining them with testing. Advocates of this view believe it would be taking a huge risk to impose a drastic organizational change that could destroy the current approach to science, jeopardizing the labs' ability to recruit and retain top people. Regarding tritium, they argue, there is ample time to build a production facility, and DOE will meet the schedule that the Nation requires.

The R&D 100 Awards demonstrate DOE labs' excellence. *R&D Magazine* presents these awards each year to "the 100 most technologically significant new products in the world,"[42] as selected by expert panels. For the years 1990-1994, 500 awards were presented. The three nuclear weapons laboratories won 61 awards; 11 other DOE laboratories, research institutes, and technology centers won 71; and the DOD laboratories, of which there were 76 in 1991, won 12.[43]

DOE and its predecessors have used several approaches to foster excellence. Three are noted here. (1) They set up and maintained the labs and the nuclear weapons production facilities as GOCOs. The University of California (UC) has operated Livermore and Los Alamos, the two nuclear design labs, since their inception. C. Bruce Tarter, then Deputy Director (and now Director) of Livermore, wrote in 1994 that "the UC connection is part of the warp and woof of the entire research

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[41]Galvin report, p. 13.

[42]"World's Most Brilliant Inventions Honored by R&D 100 Awards," R&D Magazine, September 1994: 14.

[43]Data compiled for the author by R&D Magazine, June 1995. The number of DOD laboratories is from U.S. Library of Congress. Congressional Research Service. Defense Laboratories: Proposals for Closure and Consolidation. Report no. 91-135 SPR, January 24, 1991, by Michael Davey, p. 1.

enterprise here. It is probably essential to our past and continued success."[44] A 1990 report by a UC advisory committee held that UC management created a buffer between the Government and the laboratories, shielding the latter from "undue political pressures," and brings a tradition "emphasizing the importance of research excellence, intellectual freedom, and openness."[45]

Sandia was managed by UC from 1945 to 1949, when it was still considered part of Los Alamos, and was then managed by AT&T on a no-fee no-profit contract.[46] The contract was taken over by Martin Marietta in 1993, and by its successor, Lockheed Martin, in 1994. As with UC's relationship to Los Alamos and Livermore, these corporations have since 1949 run Sandia as a public service using accepted business practices. They have had extensive dealings with the administration of Sandia but have had little direct impact on the conduct of the science and engineering programs. (Now, the contractors receive a modest sum for operating the weapons laboratories. For FY1995, the University of California received a total of $14.0 million for operating Lawrence Livermore and Los Alamos National Laboratories, as well as Lawrence Berkeley Laboratory, a nonweapons lab, while Lockheed Martin received $14.5 million for operating Sandia National Laboratories.[47])

(2) DOE and its predecessors have obtained outstanding experimental facilities for the labs. These facilities permit research on nuclear weapons. Even in the nuclear testing era, it was often faster and cheaper to perform experiments on machines than in a nuclear weapons test. Now, better facilities are needed because the halt to testing often makes facilities the only way to gain data. Such facilities are also crucial for recruiting and retaining top scientists and engineers, for whom the ability to conduct cutting-edge research is paramount.

(3) DOE and its predecessors have sponsored multidisciplinary projects and programs at the weapons labs. Most weapons problems draw on many skills. Staff at the weapons labs with a wide range of skills are therefore indispensable. The many nonweapons projects and institutes attract staff to the labs whose expertise the weapons program can tap. Moreover, many weapons program staff are initially drawn to the weapons labs by nonweapons programs.

Con: Opponents of Option 1 argue that DOE's priorities have changed over time. It has, in their view, become less responsive to the needs of DOD, as detailed

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[44]Letter from C. Bruce Tarter, Deputy Director, Lawrence Livermore National Laboratory, to Robert Kuckuck, Special Assistant for Laboratory Affairs, Office of the President, University of California, on Tangible Contributions of UC to the Laboratories, March 10, 1994, p. 1.

[45]University of California. Scientific and Academic Advisory Committee. On Renewal of the University of California Contracts with the Department of Energy for Management of the Livermore and Los Alamos National Laboratories. May 18, 1990, p. 3.

[46]Thomas Cochran et al., Nuclear Weapons Databook, Vol. III: U.S. Nuclear Warhead Facility Profiles. Cambridge, Mass., Ballinger, 1987, p. 90.

[47]Information provided by Albuquerque Operations Office, Department of Energy, September 22, 1995.

on pages 8-10. They hold that it spends inordinate amounts on cleanup, but has delayed a decision on how to produce tritium, delayed development and construction of new facilities for producing nuclear weapons, conducted technology transfer projects that are often related to weapons only tangentially, and underfunded the weapons program.

Even DOE's emphasis on science and technology is not necessarily all to the good. The science culture at the labs has become self-perpetuating; technical staff and management hold that the only way to attract and retain people like themselves is to give them costly, sophisticated experimental facilities. George Keyworth, Science Adviser to President Reagan, said in recent testimony that the trust that the American people have had in the science establishment "has begun to erode," in part because "we scientists are simply spoiled -- the result of too much wealth, acquired too easily, granted more with the accomplishments of our forebears in mind than our own." Moreover, he perceives "a deeply ingrained lack of accountability."[48] Some opponents of Option 1 hold that DOD or an independent Defense Nuclear Programs Agency could operate the nuclear weapons complex with more emphasis on manufacturing and less on science, at lower cost, and with increased responsiveness to DOD, as discussed under Options 2 and 3.

2. DOE is improving its ability to manage the weapons program.

Pro: Advocates of Option 1 believe that DOE will do an even better job managing the weapons program once DOE implements its reforms. Restoring an original GOCO concept -- allowing the contractor to be a buffer between DOE and the laboratories and production facilities -- will make it easier for the weapons complex to do its work. Streamlining administrative chores will permit weapons complex staff to spend more time on their work. Constructing an SSMP that offers a major technical challenge, it is argued, should aid in recruiting and retaining outstanding staff.

Con: DOE's current institutional culture of micromanagement, regulation, and audits is so ingrained that it cannot be changed. This leads to major problems that impair the functioning of the weapons complex, as detailed on pages 9-10. The only way to have confidence that DOE's priorities and culture are changed, in the view of opponents of Option 1, is to terminate DOE.

Option 2: Move the Nuclear Weapons Program to Dod

Description. While DOE is responsible for the design, production, maintenance, and disposition of nuclear warheads, DOD is the user or "customer." By placing the nuclear weapons program in DOD, it is hoped that the program would be more responsive to the needs of DOD and the Nation.

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[48]Proposed Testimony of Dr G.A. Keyworth, II, Chairman and Senior Fellow, The Progress and Freedom Foundation. House Committee on Science, June 28, 1995, prepared statement, p. 1-3.

Many House Republican freshmen have taken the initiative to eliminate DOE, along with the Departments of Commerce, Education, and Housing and Urban Development, and set up a task force to prepare legislation to do so. As part of their effort, Representative Todd Tiahrt, Chairman of the Energy Task Force that the freshmen organized, introduced the Department of Energy Abolishment Act (H.R. 1993), which would eliminate DOE over three years. The bill had 49 cosponsors when introduced. Representative Tiahrt stated,

> All of the defense-related components of the DOE would be immediately transferred to the Department of Defense (DOD) under civilian control. Matching like mission statements within the federal government will result in economic efficiencies and more effective management.
>
> The national DOE labs and the research currently being performed at them (except defense-related programs), will all be evaluated through the establishment of a Base Closure-like Commission.[49]

H.R. 1993 would create a Defense Nuclear Programs Agency in DOD, to be headed by an Under Secretary for Defense Nuclear Programs. (sec. 502) The bill would transfer to DNPA all functions performed by the Defense Nuclear Agency (an element of DOD) and the independent Defense Nuclear Facilities Safety Board, as well as all DOE functions "relating to the national security functions of the Department (of Energy), including defense, nonproliferation, and defense-related environmental management programs." (sec. 504) Note that Options 2 and 3 would both place the NWP into a Defense Nuclear Programs Agency. DNPA for Option 2 would be within DOD, while DNPA for Option 3 would be outside of DOD. The discussion of each option refers only to the DNPA associated with that option.

Arguments on Option 2

1. Moving the weapons program to DOD will make that program more responsive to DOD's needs.

Pro: This view holds that DOD, as the user of nuclear weapons, should control how they are maintained. DOD has set forth certain "infrastructure requirements" that it, as the "customer" of nuclear weapons, wants DOE to meet. DOD stated its requirements as follows:

1. Maintain nuclear weapon capability (without underground nuclear testing or fissile material production)

- Develop stockpile surveillance engineering base
- Demonstrate capability to refabricate and certify weapon types in enduring stockpile
- Maintain capability to design, fabricate, and certify new warheads
- Maintain science and technology base

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[49]Representative Todd Tiahrt, "Why It's Time to Turn the Lights Out at Energy." Statement released at press conference presenting the Department of Energy Abolishment Act, Washington, D.C., June 8, 1995, p. 2.

2. Tritium supply

- DOD and DOE must decide on:
  - -- Source
  - -- Production program
- Upload hedge requires prompt decision

3. No new-design nuclear warhead production[50]

In this view, DOE has not been doing an adequate job in meeting these requirements. There is little capability to refabricate core warhead components or to design, fabricate, and certify new warheads, and none to produce tritium. Supporters of Option 2 believe the nuclear weapons program would be more responsive to DOD's needs if it were moved to DOD.

Con: DOE has been doing what the Nation has required of it. Production facilities were built in the 1940s and 1950s on a crash basis, sized for large capacity, and with little concern for ESH or for minimizing waste. With post-Cold War production requirements so much lower and concern over meeting ESH standards so much higher, many of these facilities have closed. Yet DOE can still meet national needs. If DOE needed to make new plutonium components for warheads, for example, it might reuse existing ones or use Los Alamos's limited capacity to make new ones. DOE is preparing a plan that will produce tritium in time to meet the need assumed in current policy. Many concerns raised by this option's supporters result from shortages of funds that can be redressed and that are independent of which agency controls the NWP. Beyond that, as noted on p. 22, many observers see great value in retaining an independent agency to develop and maintain nuclear weapons. Independence inevitably means that the agency will not always see things the same as DOD; lack of reflexive responsiveness is the flip side of having a nuclear weapons agency separate from DOD.

2. DOD has the experience needed to manage the nuclear weapons complex.

Pro: DOD has different types of laboratories, with different management structures, to meet different needs. Some are direct Army, Navy, or Air Force labs, with technical staff being Federal civil servants. Some Federally-Funded Research and Development Centers and University Associated Laboratories have outstanding reputations, such as Lincoln Laboratory (associated with Massachusetts Institute of Technology), and Applied Physics Laboratory (Johns Hopkins University). Some direct DOD labs, whose technical staff are Federal civil servants, are also outstanding. According to Timothy Coffey, Director of Research, Naval Research Laboratory, "One of the magic things about NRL is the very broad scientific program. The great variety of disciplines and expertise is a key to NRL's success." He feels that it is possible to attract outstanding scientists and engineers; part of the "pay" is "psychic

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[50]U.S. Congress. Senate. Committee on Armed Services. Hearing: Briefing on Results of the Nuclear Posture Review. 103d Congress, 2d session, September 22, 1994. USGPO: 1994. Statement of John M. Deutch, Deputy Secretary of Defense, p. 21.

income," the value of working at a first-class laboratory on vital problems with outstanding people.[51]

UC may be willing to continue to manage Livermore and Los Alamos under DOD. Clair Bergener is a member of the Board of Regents, which decides whether UC will renew the contract, and Chairman of the UC Oversight Committee, which oversees UC management of these labs. In a discussion of June 1995, he expressed his strong preference to have a contract between UC and DOE. The current UC-DOE contract is the best ever, he said; it gives UC much more opportunity to manage the labs, and helps the labs get closer to UC faculty. At the same time, if the contract were with DOD, he would probably support renewing it as being in the public interest.[52] (He was speaking for himself only; other Regents may take different positions.) Supporters of Option 2, then, would hold that DOD could manage the nuclear weapons laboratories effectively, whether through a contract with UC, another university, or a private corporation, or through direct management by DOD.

Supporters of Option 2 question whether the weapons labs must dominate the future weapons complex. They see the U.S. nuclear arsenal as quite sufficient for current and foreseeable requirements, and believe there would be no point to developing new warheads without testing, as the required level of confidence could not be attained. They would, therefore, maintain the current stockpile in as close to its present condition as possible. While modifications and fixes may be possible and even desirable, they run the risk of introducing new defects while fixing known ones. They would focus on maintaining manufacturing capability and would buttress the remaining production facilities: Kansas City Plant (MO), Pantex Plant (TX), Savannah River Site (SC), and Y-12 (TN).[53]

Con: Opponents of Option 2 contend that the nuclear weapons program must be science-based. Warhead defects do emerge over time. To maintain confidence in warheads requires the ability to monitor, maintain, and if necessary modify warheads, presumably over many decades. The halt to testing renders this task more difficult. Opponents believe the best that can be done is to have a large, ongoing science program to study many technical areas that bear on weapons, such as in materials or nuclear physics. Without testing, the best tools available will be experimental facilities, computer models, and archived data from past tests.

Opponents of Option 2 doubt that DOD could manage the labs well. The nuclear weapons laboratories, they feel, can maintain the needed science program. They have a world-class reputation across a broad spectrum of technologies. In contrast, opponents of Option 2 see DOD labs as tending toward a product-

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[51]Telephone conversation with the author, June 9, 1995. Attributed with permission.

[52]Telephone conversation with the author, June 14, 1995. Attributed with permission.

[53]For example, the Senate Armed Services Committee "direct[ed] $100.0 million be provided to enhance the manufacturing infrastructure and modernize the manufacturing technology" of these four plants. U.S. Congress. Senate. Committee on Armed Services. National Defense Authorization Act for Fiscal Year 1996. S.Rept. 104-112, 104th Congress, 1st Session (Washington: U.S. Govt. Print. Off., 1995), p. 372.

improvement approach, making marginal changes in systems to meet pressing operational needs. That approach, it is argued, would hinder efforts to recruit top-quality technical staff for the weapons program. University of California management of Livermore and Los Alamos has contributed greatly to their excellence; it is dubious, in this view, that UC would continue to manage these labs if DOD owned them. Opponents of Option 2 also question whether DOD could manage nuclear weapons production. DOD does not manage production or own production facilities for major weapons systems, but contracts that work out to private companies, and has had its share of procurement problems.

Ray Kidder and Richard Garwin, physicists long active in addressing nuclear weapons issues for the Government, suggest an alternative to DOE's stewardship plan. They would go to great lengths to remanufacture warheads to certifiably identical specifications, such as stockpiling needed commercial materials that might not be produced in the future, and going to great lengths to protect workers using hazardous materials in order to enable the use of past fabrication processes.[54] But even this manufacturing approach would require a strong science base to support maintenance and manufacturing needs. Examples of such support include monitoring stockpiled warheads in detail, forestalling deterioration where possible, providing warning of when warheads would need to be remanufactured, and assuring that materials and processes remain identical.

3. The United States can maintain civilian control of the nuclear weapons program if it is moved to a Defense Nuclear Programs Agency within DOD.

Pro: The House Republican Task Force on Energy "believes that any concerns about civilian control of the weapons stockpile are effectively addressed by the civilian nature of the DNPA."[55] One salient aspect of civilian control has been physical custody of nuclear weapons. This was an issue in the late 1940s and early 1950s, but the armed services have had this custody for four decades, rendering this issue moot.

A second aspect of civilian control is whether it would exist. Civilian control has been real at DOD ever since its inception. While the uniformed military expresses policy preferences and gives advice, it follows the decisions and orders of its political leaders. If the nuclear weapons program were part of DOD, supporters of Option 2 contend, the many political decisions that this program entails would be made by civilian political appointees in conformance with Administration policy -- just as they are now under DOE. These include decisions on nuclear testing, arms control, production quantities, scientific facilities, and levels and distribution of funds. Congress shapes policy in these areas as well. If Congress and the Administration produced legislation directing, for example, that $100 million be spent on upgrading

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[54]Letter from Norris Bradbury, J. Carson Mark, and Richard Garwin to President Carter, August 15, 1978; reprinted in U.S. Congress. House. Committee on Foreign Affairs and its Subcommittee on Arms Control, International Security and Science. Proposals to Ban Nuclear Testing, Hearings and Markup on H.J.Res. 3, 99th Congress, 1st Session, USGPO, 1985, p. 214-215.

[55]U.S. Congress. House Task Force on Energy. Department of Energy Abolishment Act: Legislative Summary. News release, June 8, 1995, p. 4.

a production facility or that work on a particular scientific facility be terminated, it would be done whether the NWP were in DOD or DOE. Fears that the armed services would somehow seize control of defense policy in opposition to the orders of civilians fly in the face of more than two centuries of American history.

A third aspect of civilian control is whether the tension between DOD and DOE is needed to provide checks and balances on weapons technology. Supporters of Option 2 view this point as overstated. They believe that if DOD operated the nuclear weapons program, it would give ample weight -- and the necessary funds -- to nuclear weapons technology, production, and personnel because it wants its weapons to operate as intended. Having the weapons program in DOD, in this view, would make it more responsive to DOD's needs. This responsiveness, they believe, would also extend to work on arms control and nuclear nonproliferation issues that draw heavily on nuclear weapons science. If such work operated within DOD, the closer coupling to DOD would arguably make it more valuable to the armed services and, thereby, to the Nation.

Con: Opponents of Option 2 view the custody issue as moot, and do not contend that the NWP would cease to follow civilian direction under DOD. But they view the check and balance issue as critical. Having an independent agency responsible for developing and maintaining weapons gives technical concerns an independent advocate. Secretary O'Leary noted that all five declared nuclear weapons states have a separate nuclear weapons agency.[56] Secretary of Defense Perry stated:

> Over the past 50 years, there has been a clear and distinct separation of the nuclear weapons-related roles and responsibilities of the Department of Defense and the Department of Energy (and its predecessor agencies). This dual-agency approach has served the Nation well by creating institutional checks and balances that are vital for meeting the performance, safety, and reliability requirements of the nuclear arsenal. With the new technical challenges of providing stewardship of the stockpile in the absence of underground testing, this is not a time to be fundamentally restructuring the management of these activities.[57]

Opponents of Option 2 express several concerns. (1) DOD might oppose key weapons improvements. Albert Narath, President, Energy and Environment Sector, Lockheed Martin Corp., and former President of Sandia, said, "In 1990, I and the other directors of the DOE defense programs laboratories expressed concerns before Congress about the operational safety of the W69 short-range attack missile as then deployed. Our testimony brought into sharp focus the difficulties that can arise when safety considerations conflict with military utility."[58] (2) Placing the NWP in DOD

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[56]Hazel O'Leary, testimony before the Senate Energy and Natural Resources Committee, July 11, 1995 (based on author's notes).

[57]Letter from William J. Perry, Secretary of Defense, to Senator Strom Thurmond, Chairman, Senate Armed Services Committee, March 29, 1995.

[58]Albert Narath, Statement of Albert Narath, President, Energy and Environment Sector, (continued...)

could lead to sharp cuts in research on arms control, nonproliferation, and other areas in which the NWP can make unique contributions. (3) Some laboratory staff members fear that DOD might downplay their role. (4) The NWP might receive inadequate funding if it were part of DOD, whether because of pressure to meet operational, schedule, or budget requirements or because DOD might be tempted to reduce funds for the nuclear weapons program to fund aircraft, tanks, or ships. Sidney Drell, Deputy Director, Stanford Linear Accelerator Center, who has chaired numerous studies of nuclear weapons issues, said:

> Within DOD, it would be more difficult to assure an appropriately high priority for the critically important nuclear responsibility. We also recall the important role that has been played by joint DOE/DOD responsibility in ensuring a balance among the competing demands for nuclear weapons safety, reliability, durability, and operational effectiveness.[59]

For reasons such as these, the Galvin panel found:

> The Task Force, however, agreeing with most previous studies of this issue, sees no compelling reason for DOD to manage the national security activities at the weapons laboratories. Indeed, the Task Force believes that there is much value at this time in maintaining an independent and technically expert organization to focus on nuclear stockpile issues and to continue to ensure that decisions regarding the safety, control, and stewardship of nuclear weapons are raised to the high policy level that they deserve.[60]

Option 3: Move the Nuclear Weapons Program To a New Defense Nuclear Programs Agency Associated with DOD

Description. Representative Martin Hoke has introduced a bill, H.R. 1628, "To establish a Defense Nuclear Programs Agency to carry out all defense nuclear programs matters." The bill (sec. 6) would transfer to DNPA all DOE functions "relating to the national security functions of the Department, including defense, nonproliferation, and defense-related environmental management programs," as well as "all functions relating to the oversight of the defense and nondefense functions and budgets" of the three nuclear weapons laboratories. DNPA would receive as well all functions of DOD's Defense Nuclear Agency, the Department of the Navy's Strategic Systems Programs, and the Defense Nuclear Facilities Safety Board. This bill would

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[58](...continued)
Lockheed Martin Corporation. U.S. House. Committee on Science. Subcommittees on Basic Research and on Energy and Environment. Joint Hearing on the DOE National Laboratories, September 7, 1995 (prepared statement), p. 11.

[59]Letter from Sidney Drell, Chairman, National Security Panel of the UC President's Council on the National Laboratories, to Jack Peltason, President, University of California, Feb. 16, 1995, p. 2.

[60]Galvin report, p. 17.

make DNPA an independent agency; the DNPA in H.R. 1993 would be part of DOD. References to DNPA in this section are to the DNPA in H.R. 1628.

Representative Hoke indicated in a press conference that DNPA would be "a civilian-controlled Department of Defense associated agency."[61] The legislation notes that the Administrator of DNPA shall act "under the direction of the Secretary of Defense." (sec. 4(b)) Representative Hoke indicated that

> This structure (of DNPA) will ensure continued civilian control and management of the nuclear weapons infrastructure. At the same time, it also will foster a more efficient and responsive relationship for our armed services with the nuclear infrastructure.[62]

Mr. Brett Coulson of Representative Hoke's staff elaborated on these points. DNPA would be an agency associated with DOD in the sense that the Arms Control and Disarmament Agency is associated with the State Department. DNPA would be more independent of DOD, or less, depending on what the President wanted. DNPA would be under the policy direction of the Secretary of Defense; the Administrator of DNPA, however, would not be answerable to him, but would serve at the pleasure of the President. DNPA would not be a part of DOD, in contrast to the DNPA of H.R. 1993. The nuclear weapons laboratories would retain their current status.[63]

This bill would put into DNPA DOE's nuclear weapons program and two agencies with which the latter has close working relationships, Defense Nuclear Agency (DNA) and Defense Nuclear Facilities Safety Board (DNFSB). This combination may save money on administrative duplication; at issue is if having the nuclear weapons program and DNA in the same agency would reduce any benefits of DOD-DOE tension, or if auditors (DNFSB) and auditees (the nuclear weapons program) belong in the same agency. DNPA would also contain the Navy's Strategic Systems Programs (SSP), which designs missiles and reentry vehicles for ballistic missile submarines and the interface between ship and missiles. The nuclear weapons program designs warheads according to DOD's specifications to fit in SSP's missiles, in effect supplying "components" for SSP's "products." This relationship might continue little changed under DNPA.

Arguments on Option 3

1. DNPA would assure visibility for nuclear weapons issues.

Pro: DNPA assures that weapons program funds will not be "raided" to fund nonweapon programs within DOE, or to fund weapon systems within DOD. An

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[61]Representative Martin Hoke. Statement by U.S. Rep. Martin R. Hoke (R-OH), Chairman, House Budget Committee Working Group on National Security. Released May 16, 1995, at a press conference, Washington, D.C. P. 2.

[62]Ibid., p. 3.

[63]Discussion with the author, July 19, 1995. Attributed with permission.

Administrator dedicated to the weapons program will assure that weapons issues are not buried under concerns of other parts of a large department.

Con: Congress and the Administration can direct DOE or any organization to take certain actions on warheads, or to not transfer funds from military to civilian programs, if they so choose.

2. DNPA would increase responsiveness to DOD while preserving civilian control.

Pro: DNPA will be a separate agency, not a part of DOD. As such, proponents argue, it maintains the benefits of civilian control as discussed on page 3, and preserves the "creative tension" that flows from having the weapons program outside of DOD. At the same time, they believe, it will make the nuclear weapons program more responsive to DOD than is the case under DOE because DNPA can deal with DOD directly, rather than having the NWP deal with DOD as an element of DOE, which must address varied concerns in addition to nuclear weapons.

Con: The NWP under DOE is responsive to DOD except on the rare occasions when DOE, exercising its independence from DOD, disagrees with a recommendation of DOD. Opponents see more responsiveness to DOD as coming at the expense of less independence of the civilian-controlled agency managing nuclear weapons. One cannot increase responsiveness and independence together.

3. DNPA would maintain the multiprogram nature of the nuclear weapons labs.

Pro: Multiple programs in different areas of science and technology are a key source of strength for the weapons labs. The labs engage in programs as diverse as global climate modeling, stellar dynamics, the human genome project, and inertial confinement fusion. These programs are a small part of the labs' total effort. Nonetheless, they are important to the weapons program. They draw to the labs outstanding scientists and engineers. They facilitate an intellectual cross-fertilization that benefits the NWP and nonweapons programs, that is crucial for the labs' excellence, and that helps recruitment. They make specialized skills available that the weapons program may draw on from time to time. DNPA would recognize the importance of nonmilitary programs at the weapons labs for the weapons program. That is why H.R. 1628 transfers "the oversight of the defense and nondefense functions and budgets" of the weapons labs to DNPA (sec. 6(a)(2)).

Con: Critics of Option 3 fear that DNPA would inevitably emphasize the weapons program, such as by shifting funds and personnel to it from the civilian side, or by approving military projects at the expense of nonmilitary projects. With the weapons program in DOE, that agency funds both military and civilian functions at the labs because it is responsible for both. Supporters of Option 3 recognize the importance of this balance to the NWP; their critics fear that this balance will be unsustainable under DNPA.

Option 4: Move the Weapons Program to a New Department of Science

Description . A Department of Science (DOS) would combine various science-related agencies and programs into one cabinet-level department. Proposals to this effect have been made repeatedly over the last half-century.[64] Representative Robert Walker, the Chairman of the House Science Committee, is preparing a bill, the "Department of Science Organization Act of 1995," to establish a Department of Science. (See footnote 3; as of September 29, 1995, the bill had not yet been introduced.) This bill, in its draft form, would transfer to DOS the National Aeronautics and Space Administration, National Institute of Standards and Technology, National Science Foundation, National Oceanic and Atmospheric Administration, Environmental Protection Agency, several other agencies, and most of DOE including the Office of Defense Programs, which manages the nuclear weapons program. DOD would receive several offices from DOE: the Office of Environmental Management, which is responsible for cleanup of nuclear weapons complex sites and of all other DOE sites; the Office of Nonproliferation and National Security; the Office of Fissile Materials Disposition; and the Office of Civilian Radioactive Waste Management.

Arguments on Option 4

Arguments made for and against a Department of Science in general seem of little relevance to how this Department might affect the nuclear weapons program, and are beyond the scope of this report.[65] This section focuses on weapons program-specific arguments related to the creation of a DOS.

1. A DOS would help the weapons program by promoting science.

Pro: In DOE's plan, science would form the core of stewardship in the future, and the labs are the stewards of science. Therefore, a DOS, as a strong advocate for science, would arguably be a good custodian of the weapons program. It would likely push for new experimental facilities for stewardship, especially as these could be of value for other agencies within DOS. Placing the weapons program in a DOS should encourage multidisciplinary projects and programs, and should help integrate the NWP with the broader scientific community. Both factors should facilitate weapons program recruitment. They should also facilitate access to expertise outside of that program but within other agencies that make up DOS.

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[64]See U.S. Library of Congress. Congressional Research Service. A Department of Science and Technology: A Recurring Theme. By William Boesman. Report 95-235 SPR, Feb. 3, 1995, 6 p.

[65]For general debate on a Department of Science, see Boesman, A Department of Science and Technology: A Recurring Theme; Daniel Greenberg, "Who Needs a Department of Science?," Washington Post, May 10, 1995: 25; Graeme Browning, "Bob Walker's Got an Idea," National Journal, Aug. 12, 1995: 2062-64; Robert Walker, "The Need for a Department of Science," Issues in Science and Technology, Summer 1995: 19-21; and John Gibbons, "Do We Need a Department of Science?," ibid.: 22-26.

Con: Critics of Option 4 see two flaws. First, this approach may not be better at promoting science than another agency. Multidisciplinary projects at the labs now would continue under DOE, an independent DNPA, and perhaps under DOD. Placing the weapons program in DOS might not help integrate that program with broader civilian scientific community if the latter did not want to deal with the NWP. Indeed, there could be a clash between civilian and defense research. Second, a DOS may tend to promote science at the expense of manufacturing; that could reduce U.S. ability to maintain the nuclear arsenal.

2. The DOS culture would likely be more consonant with that of the weapons labs.

Pro: One criticism of DOE is that its culture has become so hidebound that it is incapable of change. This would not be the case for a new agency. DOS, it could be argued, would have a "science-friendly" culture that would help promote weapons science. While the "culture" of science may seem vague, it is important to consider in evaluating alternatives because it is real in its effects on the quality of work done and the type of people recruited. Elements of scientific culture include giving researchers or research teams discretion in how best to approach a problem, accepting failure in research projects from time to time as an inevitable consequence of pressing the bounds of the unknown, and preferring to set goals rather than processes -- setting the destination rather than the route -- whether on regulations or the mode of inquiry. Bureaucratic culture is seen as disagreeing with each element.

Con: Any bureaucracy must follow certain procedures, many of which are statutory and others are administrative. A DOS would not have the authority to disregard them. Even if the elimination of administrative redundancy permitted sizable cuts in staff, DOS would be large. It is unrealistic to think that a bureaucratic culture would not quickly emerge. Moreover, DOE may become more consonant with scientific culture as a result of the changes it proposes, such as reducing regulations and giving laboratory management more discretion.

3. A DOS could, with proper planning, manage weapons manufacture.

Pro: The draft legislation establishing DOS would transfer the weapons program, including its manufacturing facilities, to DOS. That transfer would bring with it the expertise from the labs and from the production facilities that manufacturing requires. Nuclear weapons manufacturing has always drawn on a scientific base to design the processes and to have confidence in the weapons produced. Future manufacturing seems sure to involve more advanced technologies to reduce waste streams, reduce worker exposure to hazardous materials, ensure accurate replication of parts over a period of decades, and accommodate small manufacturing runs. Manufacturing under these circumstances would be a technical challenge. Expertise from the laboratories could benefit the production plants on an ongoing basis. Alternatively, it might be advantageous to manufacture components in the "physics package," the part of a nuclear weapon that explodes, at the weapons labs so technical staff there could oversee and learn from production. These parts have always been manufactured by DOE's production facilities. Nonnuclear components, such as parachutes, radars, and timers, form the vast majority of types of parts in a nuclear weapon. Many of these are manufactured by private industry,

with assembly at DOE facilities. This practice, which presumably would continue, would mean that DOS would not have to manufacture most components at its own facilities.

Con: During World War II and the Cold War, the United States set up a vast nuclear weapons complex for manufacturing at a high rate. Future manufacturing, while not likely to be at as high a rate, will still be complicated. A DOS, whose mission is science, may well view manufacturing as peripheral to its interests and might divert manufacturing funds to science. DOS would possess little expertise in manufacturing. Critics of Option 4 would therefore find it unwise to place manufacturing in a DOS.

Conclusions

Many in Congress are seriously considering the elimination of the Department of Energy. There is also sentiment to save DOE; the outcome of the debate is unclear. In the early stages of the debate, little consideration was given to what would be done with the nuclear weapons program if DOE were abolished. Now, it is realized that that decision must be made if Congress decides to undertake major institutional changes relating to DOE. How each alternative will affect the nuclear weapons program is an important element in deciding which of the four alternatives presented above to choose, or whether another path may be preferable. One's perceptions of the issues raised in this report will affect one's choice among the four institutional options for housing the weapons program.

1. *Should there be civilian control over the NWP, with that program in a civilian agency independent of DOD and the armed services?* If one answers yes, one would reject placing the NWP in DOD but would accept keeping it in DOE or moving it to a DOS or to a DNPA that was independent of DOD. Alternatively, those who would place the NWP in a DNPA that would be part of DOD claim that so doing also would retain civilian control because DOD is a civilian agency. If one believes that civilian control is unimportant, this question becomes irrelevant.

2. *How can it be assured that the NWP, wherever housed, is adequately responsive to its customer, DOD?* Those who would retain DOE argue that the current arrangement is responsive to DOD, while at the same time protecting the technical integrity of nuclear weapons development and manufacture. Others believe that this "protection" and what they perceive as an antinuclear attitude in the current DOE[66] make DOE unresponsive and require moving the NWP to DOD or to an independent DNPA. It is unclear what, if any, arrangements would have to be made to ensure the NWP's responsiveness to DOD under a DOS.

3. *Can DOE be reformed so that perceived problems would be no greater than those of other agencies?* A "yes" answer would strengthen the case for leaving

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[66]For example, see remarks by Senator Thurmond. U.S. Congress. Senate. Debate on amendment no. 2213 to S. 2182, FY1995 National Defense Authorization Act. Congressional Record (daily edition), July 1, 1994: S. 8287.

the NWP in DOE; a "no" answer would undercut that case seriously but would not favor any one of the three non-DOE alternatives over the others.

4. *What balance between science and manufacturing should the United States use in maintaining its nuclear arsenal?* Any plan must combine both. But DOE and DOS would likely stress the former approach, while DOD and, to a lesser extent, an independent DNPA might move toward the latter. This choice has implications for the shape of the NWP, e.g., for the level of spending on experimental facilities and the need to maintain a large scientific cadre to maintain warheads.

5. *Which agencies can manage the nuclear weapons laboratories well?* DOE has demonstrated its ability to do so, although many observers believe changes are needed to reduce the regulatory and administrative burden on the labs. A DOS would presumably be able to manage laboratories well in general, at least through contractors, as it should be acutely aware of what actions would foster science and which would not. Questions have been raised about DOD's ability to manage its labs, but there are two countervailing points. First, many DOD requirements are met by narrow-gauged, product-improvement technical work, so it has not needed labs like the three nuclear weapons labs. There are arguments on both sides as to whether DOD could run the nuclear weapons labs effectively. DOD manages some labs widely recognized as outstanding; but could it attract to the nuclear weapons labs the high level of scientific and engineering skills now present there? Second, a manufacturing-centered approach to maintaining the nuclear arsenal would reduce the importance of having the weapons labs run as they are now.

6. *Which agencies can manage nuclear weapons production well?* DOE and its predecessors managed the production complex effectively, producing tens of thousands of warheads in GOCO facilities. Many problems of the complex stem from requirements that no longer exist (high capacity) and requirements that did not exist when the complex was built (more stringent environment, safety, and health regulations). Future production will likely be quite different in terms of scale and technology. Arguably, DOE's experience with previous production and with advanced technology would help it with future production. DOD does not manage production facilities for major weapons, but has much experience in contracting out this work, albeit with some substantial procurement problems over the years. Some question whether DOD could manage this work as closely as DOE has done. Alternatively, those who have criticized DOE's management style might see benefits to moving to a DOD type of management style. An independent DNPA should be able to manage production satisfactorily, though it is difficult to evaluate how a new agency would function, and unclear if DNPA's association with DOD would result in some loss of independence in production decisions. DOS might tend to make decisions favoring science at the expense of production because production is at odds with an organization whose mission is science. A science emphasis might not be bad in this case, however; manufacturing will almost surely use advanced technology to produce warhead components in small lots with minimum waste, minimum worker exposure to hazardous materials, and with maximum replicability of parts over time.