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COMPLEX 2030:

The Costs and Consequences of the Plan to Build a New Generation of Nuclear Weapons

A Special Report By
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Summary of Findings

The Bush administration's nuclear policy has been marked by dangerous inconsistencies. It has taken a strong rhetorical stand against the spread of nuclear weapons, which President Bush has described as "weapons of mass murder."[1] But in the mean time, the administration's Nuclear Posture Review calls for the development of new nuclear weapons.

This "do as I say, not as I do" approach to nuclear weapons has undermined U.S. efforts to curb nuclear proliferation. Beyond this central contradiction, the administration's approach to the issue has ranged from launching a preventive war against a country that did not have a nuclear weapons program (Iraq), to threatening a country that most experts agree is years away from developing them (Iran), to delaying a critical dialogue with a country believed to have the beginnings of a nuclear arsenal (North Korea). To its credit, the administration has recently come to agreement with North Korea on initial steps that could lead to the elimination of Pyongyang's nuclear arsenal.

The centerpiece of the administration's move towards developing a new generation of nuclear weapons is "Complex 2030," a multi-year plan that would build new or upgraded facilities at each of the National Nuclear Security Administration's eight nuclear weapons-related sites. The plan also calls for building a new nuclear weapon, the Reliable Replacement Warhead (RRW). While current plans call for developing the RRW without nuclear testing, this attitude could change if the program moves towards deployment. In addition, the RRW program will establish the infrastructure needed to develop new warheads with new capabilities in the future. As the Department of Energy notes in its own summary of the Complex 2030 plan, one of the major goals of the effort is to "improve the capability to design, develop, certify and complete production of new or adapted warheads in the event of new military requirements."[2]

This report focuses on the economic and budgetary costs of the Complex 2030 plan, the interests that stand to benefit from it, and the domestic political debate that is likely to determine the future of this initiative.

Costs of the Complex 2030 Plan:

- ∞ The foundation of the plan for upgrading the nuclear weapons complex, the Reliable Replacement Warhead, is proposed for a threefold increase in the FY 2008 budget, from $27.4 million in 2007 to $88.7 million in 2008. Projected five-year NNSA funding for the RRW is $645.1 million. The Navy will spend at least an additional $80 million to adapt the RRW for use on Trident Submarine-Launched Ballistic Missiles (SLBMS).

- ∞ The Consolidated Plutonium Center (CPC), the most costly new facility in the Complex 2030 plan, is slated for $24.9 million the FY 2008 budget. Congress has eliminated funding for a similar project for each of the past two years. The CPC,

which could cost $3 to $5 billion to complete, is slated to receive $282 million in the NNSA's five-year budget plan.

∞ The spending on the RRW and the CPC is only a down payment on the full costs of the Complex 2030 initiative. So far, the Department of Energy has given no cost estimate for the 2030 plan, nor does its current budget indicate which items are devoted to carrying it out, other than the RRW and the CPC. However, the Secretary of Energy's Advisory Board's (SEAB) Nuclear Weapons Infrastructure Task Force has estimated that a more thorough consolidation plan would cost $155 billion, while sustaining the complex as is could cost up to $175 billion between now and 2030. Since the SEAB plan involves more consolidation of facilities, Complex 2030 costs would most likely exceed the $155 billion figure. And the likely costs of building new facilities, modernizing old ones, and adapting the newly developed RRW to fit on existing delivery vehicles will almost certainly drive costs beyond the $175 billion estimate for sustaining the current complex.

∞ The NNSA has a history of major cost overruns on large technology projects. To cite just two examples, the cost of the NNSA's MOX facility – which is designed to produce a blend of plutonium and uranium that can be used to fuel nuclear reactors – has grown from $1 billion at the project's inception to $3.5 billion currently; and the ambitious National Ignition Facility (NIF) – a project whose goal is to use powerful lasers to simulate a thermonuclear explosion – has gone from the Department of Energy's (DOE) initial estimates of total project costs of $1.07 billion in 1996 to an official price tag today of $3.5 billion. The Natural Resources Defense Council put the price at closer to $5 billion for the construction itself, and as high as $8.4 billion to make the facility "ignition ready" by 2014. These cost overruns on major DOE/NNSA projects do not bode well for the claims of "cost savings" or "efficiencies" flowing from the Complex 2030 plan. A conservative estimate suggests that allowing for cost overruns, the full costs of Complex 2030 could easily reach $300 billion. That is a $125 billion increase over the estimated costs of maintaining the current weapons complex.

Misplaced Budget Priorities

∞ According to its own budget figures, the NNSA spends over nine times as much on "Atomic Energy Defense Activities" – a category that includes nuclear weapons, naval nuclear reactors, and environmental cleanup at military nuclear facilities – as it does on nuclear arms reductions and non-proliferation.[3]

∞ Similarly, spending on nuclear weapons research, development and maintenance in the Department of Energy budget far outpaces the levels of energy and funding devoted to the development of alternative energy sources, a critical need in a period when fears of global warming are on the rise. The DOE's proposed budget for "Energy Supply and Conservation" – which includes non-nuclear, non-fossil fuel forms of energy – is only $1.2 billion for FY 2008, just over one-thirteenth

of expenditures on "Atomic Energy Defense Activities," and one-fifth of expenditures on nuclear weapons activities.

Contractors Cash In

- ∞ Eight nuclear weapons contractors and two universities split $11 billion in contracts from the Department of Energy in FY 2005, the most recent year for which full data is available. This represented 50% of all DOE contracts for that fiscal year. These contractors– Battelle, the Bechtel Group, CH2M Hill, Honeywell, Lockheed Martin, McDermott (parent company of BWX Technologies), SAIC and the Washington Group International, along with the University of California and the University of Tennessee-- are the most likely beneficiaries of the Complex 2030 project.

- ∞ Contractors receiving over $1 billion in nuclear weapons awards in FY 2005 included the University of California, $3.2 billion for running the Los Alamos (New Mexico) and Lawrence Livermore (Northern California) nuclear weapons laboratories; Lockheed Martin, $2.3 billion to run Sandia National Laboratory, a nuclear weapons engineering and development lab based in New Mexico; Washington Group International, $1.3 billion for running the Savannah River Plant in South Carolina; and the Bechtel Group, $1 billion for work at the Oak Ridge National Laboratories (Tennessee) and the Nevada Test Site. These figures do not include contracts for $776.1 million for a partnership between Bechtel and BWX Technologies to run the Y-12 plant at Oak Ridge National Laboratories in Tennessee; or a $347.8 million contract for a partnership between Bechtel and the SAIC Corporation to run the Nevada Test Site.

- ∞ Eight major nuclear weapons contractors spent $22.4 million in political donations from 1998 to 2006 to influence members of Congress. These same firms spent $15.3 million on lobbying in 2006 alone. Some of these expenditures have failed to exert influence over lawmakers' decisions on the upgrade of nuclear warheads and facilities, as members who have received significant contributions have still expressed extreme skepticism over the Complex 2030 plan.

Should the Complex 2030 Plan Move Forward?

In addition to the costs involved, the Complex 2030 has disturbing policy implications. Under the Nuclear Nonproliferation Treaty (NPT) the United States has committed itself to eliminate its nuclear arsenal within a definite time frame. The Complex 2030 plan implies that the United States will maintain its nuclear arsenal for decades to come. These plans in turn reduce U.S. credibility in attempting to persuade nations like Iran and North Korea to curb or roll back their nuclear weapons programs.

Complex 2030 is by no means a "done deal." There are a wide range of views on the program in Congress, from unqualified support to energetic criticism. The budget battle over this project will be one of the most important activities of the Congress in the run-up to the 2008 presidential elections.

Introduction: The Bush Administration's Nuclear Revival

Nuclear weapons have been a major focus of the Bush administration's foreign policy. From Vice President Cheney's claim that Iraq was reconstituting its nuclear weapons program in the run-up to the Iraq war, to concerns about capping or heading off nuclear programs in Iran and North Korea, stemming the spread of nuclear weapons has been one of the administration's top priorities.

As a candidate for president in 2000 and during his first months in office, George W. Bush suggested that there should be significant cuts in the U.S. nuclear arsenal, and he described excess nuclear weapons as "relics of the Cold War."[4] He followed through on this pledge with the 2002 Strategic Offensive Reductions Treaty (SORT), which calls for reducing the U.S. and Russian nuclear arsenals from 6,000 each – the limit established under the Strategic Arms Reduction Treaty (START) – to 1,700 to 2,200 each over a ten-year period. The SORT Treaty is seriously flawed, however. It has no method for verifying that each side is meeting its commitments under the agreement; the agreement expires the day it comes into force; and it makes less ambitious reductions in nuclear arsenals than Russia had intended to make. The only silver lining in the agreement is that it reduces the U.S. strategic stockpile – including deployed and non-deployed weapons – from roughly 10,000 to about 6,000, a cut of 40%.[5]

The Bush administration has taken a few positive steps in the nuclear sphere, but they are far outweighed by negative and destabilizing actions and statements. Beyond the problems with the SORT Treaty cited above, the administration's January 2002 Nuclear Posture Review (NPR) states that "The need is clear for a revitalized nuclear weapons complex that will… be able, if directed, to design, develop, manufacture, and certify new warheads in response to new national requirements; and maintain readiness to resume underground testing if required."[6] A critical element of the posture review was the introduction of the concept of a "new Triad" composed of nuclear and non-nuclear strike capabilities, defensive systems, and "responsive infrastructure" for maintaining and/or producing nuclear weapons as requested. In short, a policy which has publicly stressed reductions in nuclear weapons is being accompanied by a modernization of the nuclear weapons research and production complex which could potentially produce new, more usable nuclear weapons.

The rationale for investing additional billions in the nuclear weapons complex is based in part on a decision to give these armaments a more central role in U.S. military strategy. As the NPR puts it, "Nuclear weapons play a critical role in the defense capabilities of the United States, its allies and friends. They provide credible military options to deter a wide range of threats, including WMD and large-scale conventional military force. These nuclear capabilities possess unique properties that give the United States options to hold at risk classes of targets [that are] important to achieve strategic and political objectives."[7]

The Bush NPR explicitly lists a range of potential targets that includes Iran, Syria, North Korea, China and Russia. The review also elaborates the circumstances under which the

use of U.S. nuclear weapons might be considered, including retaliation for the use of chemical or biological weapons against U.S. targets, as the ultimate tool in a military conflict over Taiwan, or simply as a response to "surprising developments."[8]

The posture review also endorses the development of new, lower-yield nuclear weapons and higher-yield "bunker busters" designed to hit underground targets "capable of withstanding non-nuclear attack." Initial efforts to promote this concept, in the form of research on a system known as the Robust Nuclear Earth Penetrator, were de-funded by Congress for two years running and have been eliminated from recent administration budget proposals.

Despite this setback, the Bush administration has continued its efforts to reestablish nuclear weapons' centrality in U.S. security policy and is taking steps that will enable the development of new nuclear weapons that will allegedly address the new threats of a post-Cold War, post-9/11 world. As Steve Maaranen, a senior adviser in National Security at Los Alamos, observes, the Nuclear Posture Review is a "fairly radical departure" from past policies. The notion of "full spectrum deterrence," he says, includes a perspective that "the current bombs and missiles might be too powerful to use in a smaller conflict and other nations are aware of that." Thus, he argues that "a new more diverse arsenal of smaller weapons would lend more credibility to the nuclear portion of deterrence."[9]

In line with this search for new capabilities and applications for nuclear weapons, the Department of Energy's National Nuclear Security Administration has released a new plan for "modernizing" the United States nuclear weapons infrastructure, entitled "Complex 2030." The main thrust of the plan calls for research and production of the Reliable Replacement Warhead (RRW), which NNSA officials have described as the "enabler" of the transformation of the nuclear complex as a whole; consolidation of production of uranium, plutonium, and non-nuclear components for use in nuclear weapons; and enhanced capabilities to test and produce new warheads as requested.[10]

While Congress has placed specific limits on the RRW program that include preventing it from being used to develop new weapons designs, the weapons research and development (R&D) capacity that will be maintained under RRW could be utilized to develop new weapons at some future date. Contrary to U.S. commitments to eliminate its nuclear arsenal under the terms of the Nuclear Non-Proliferation Treaty (NPT), the RRW project will establish the capability for building new weapons.

The official rationale for the RRW program is to produce weapons that are safer and more durable than the warheads in the current stockpile. This reasoning has been called into question by a recent NNSA study that indicates that the existing plutonium "pits" – the triggers that set of the explosion of a hydrogen bomb – may be viable for another 90 to 100 years.[11] Since a large part of the Complex 2030 plan hinges on the need for the RRW, and for increased capabilities to produce new plutonium pits in the proposed Consolidated Plutonium Facility, critics have suggested that the stated mission for the new warhead is no longer operable. The issue of the reliability of current warheads will

play an important part in the debate about how, or whether, to proceed with the RRW program.

The next section will review the potential costs of pursuing this particular vision of the future of the U.S. nuclear weapons complex.

The Costs of Nuclear Weapons

The quest for a new mission for U.S. nuclear weapons means stable funding for the nuclear weapons establishment at a time when budgets for this purpose would otherwise be likely to face significant cuts. As noted below, plans to modernize and expand the nuclear weapons complex could mean far higher funding increases than have been witnessed in recent years.

During the Cold War, spending on nuclear weapons averaged $4.2 billion.[12] In 2001, Department of Energy's weapons activities budget totaled $4.9 billion. By 2007, that figure jumped to $6.4 billion. Adjusting for inflation, the increase since 2001 is 13.7%, or slightly over 2% per year. More importantly, almost two decades after the end of the nuclear animosity with the USSR, the United States is spending one-third more than the Cold War average on nuclear weapons, in inflation-adjusted, constant dollars. See Table I (below) for figures on NNSA's nuclear weapons spending from 1998 to the present.

Table I: U.S. Nuclear Weapons Spending, Fiscal Years 1998 to 2008
figures in billions

Year	Budget
1998	$4.1
1999	$4.4
2000	$4.5
2001	$4.9
2002	$5.5
2003	$5.8
2004	$6.4
2005	$6.2
2006	$6.6
2007	$6.4
2008	$6.5 (request)
Total	**$61.3**

Source: DOE Budget Request to Congress, FY 2000 to FY 2008 editions.

The National Nuclear Security Administration (NNSA), formed in 2000 to manage the nation's nuclear weapons complex within the Department of Energy, has a five-year "National Security Plan" which calls for continuing annual increases that will push the nuclear weapons budget to $7.4 billion by 2012.[13]

Compare these significant increases in nuclear spending to what the Department of Energy is allocating for non-proliferation and prevention of nuclear conflict. According to its own budget figures, the NNSA spends over nine times as much on "Atomic Energy Defense Activities" – a category that includes nuclear weapons, naval nuclear reactors, and environmental cleanup at military nuclear facilities – as it does on nuclear arms reductions and non-proliferation.[14]

In addition, spending on nuclear weapons research, development and maintenance in the Department of Energy budget far outpaces the levels of energy and funding devoted to the development of alternative energy sources, a critical need in a period when fears of global warming are on the rise. The DOE's proposed budget for "Energy Supply and Conservation" – which includes non-nuclear, non-fossil fuel forms of energy – is only $1.2 billion for FY 2008, just over one-thirteenth of expenditures on "Atomic Energy Defense Activities," and one-fifth of expenditures on nuclear weapons activities.

For many, at the end of the Cold War, it seemed logical to turn the nuclear weapons laboratories into something else. George Brown, then the chair of the House Science Committee, proposed making Lawrence Livermore a civilian technology lab. Hazel O'Leary, Energy Secretary under President Clinton, pushed the idea of reorienting the nuclear labs towards green technology. These proposals were sidetracked in favor of new military missions for the labs.

As suggested above, at the moment the biggest potential cost driver for nuclear warhead spending is the Reliable Replacement Warhead (RRW) program, which was officially slated for $27.7 million for research in the FY 2007 budget. The costs of developing the new warhead jump to $88.7 million in the FY 2008 budget proposal, nearly three times FY 2007 levels. For the five years from 2008 through 2012, the NNSA proposes to spend a total of $645.1 million.[15] This figure does not include an additional $80 million set aside for adapting the RRW for deployment on Trident Submarine Launched Ballistic Missiles (SLBMs).

Actual cost figures for the RRW may be much higher than those listed in the official budget. Dr. Robert Civiak, a physicist who served in the White House Office of Management and Budget under President Ronald Reagan, estimates that the total costs of the Reliable Replacement Warhead (RRW) program for 2007 alone could be over $300 million, counting RRW work hidden in other parts of the NNSA budget.[16] Without greater transparency on the part of NNSA, it is impossible to tell what the true costs of the Reliable Replacement Warhead may be for the 2008-2012 period. Civiak was a Program Examiner for DOE national security programs in 1988 and 1989 and is now performing research for the advocacy group Tri-Valley Cares. If his analysis is correct, the true costs could clearly be some multiple of the official figure of $645.1 million, perhaps in the range of several billion dollars. In that instance, the additional funds would be hidden in other parts of the NNSA budget, safe from Congressional and public scrutiny.

The RRW program was established by Congress in 2005 to "improve the reliability, longevity, and certifiability of existing weapons and their components."[17] In reality, if it proceeds according to the terms of the Complex 2030 plan, the RRW program will involve replacing every warhead in the current U.S. arsenal over a period of years. As Civiak notes, this could have a ripple effect on total nuclear weapons costs: "Fabricating new warheads will require costly new facilities to process plutonium and uranium and to produce new nuclear components."[18]

This expansive approach to the RRW program was not what was envisioned by Rep. David Hobson (R-OH) when he took the lead in establishing it. His approach involved relatively modest changes in existing warheads, including periodically changing the tritium gas that helps keep them operative. He also viewed the RRW program as part of an extensive consolidation of the nuclear weapons complex into one production facility – the Consolidated Nuclear Production Complex (CNPC). As he said in a letter to Energy Secretary Samuel Bodman late last year, "If the department is not willing to conduct a thorough and objective analysis of reform alternatives including the CNPC, and instead is determined to conduct an obviously prejudicial process aimed at ensuring the department's preferred outcome, then I will not support the Complex 2030 efforts, including the Reliable Replacement Warhead program."[19]

One key cost of replacing so many warheads would be the need for a new facility to produce "pits," the plutonium triggers that set off the explosion of a hydrogen bomb. One such proposal, the Modern Pit Facility, has had its funding rejected by Congress for two years running, in part because of its $3 to $5 billion projected price tag. If Congress wants to avoid this expense in the future, it would be necessary to stop the Complex 2030 plan before it obtains so much momentum that the construction of special facilities to support the RRW program becomes *a fait accompli*.

As it is now, the NNSA is pushing the idea of a Consolidated Plutonium Center which "is not based on the concept for a modern pit facility but on a far broader and more aggressive concept employing consolidation to a single site of all R&D and production involving… plutonium."[20] The new facility would be a sort of "modern pit facility-plus," capable of producing 125 plutonium pits or triggers for nuclear weapons per year while carrying out a variety of other research and development activities involving military applications of plutonium. This more expansive concept is likely to cost more than the $3 to $5 billion estimate for a pit facility alone, but so far the NNSA has not provided a cost estimate to Congress.

A small down payment for the Consolidated Plutonium Center – $24.9 million – is proposed in the FY 2008 budget; projections for 2008 through 2012 total $282 million.[21]

Under the Complex 2030 plan, the new Consolidated Plutonium Center (CPC) will be just one of a series of new or upgraded facilities that will be pursued in the name of "transformation" and "consolidation." There are eight major sites in the current nuclear weapons complex. If the Complex 2030's "consolidation plan" is implemented; there will still be eight sites. In April 2006 testimony to the House Armed Services Committee's

Subcommittee on Strategic Forces, Thomas P. D'Agostino, the Deputy Administrator for Defense Programs at the National Nuclear Security Administration, gave the following summary of the current complex:

> "Today's nuclear weapons enterprise consists of eight, geographically separated sites that comprise the R&D and production capabilities of the complex. There are three nuclear weapons design laboratories: Los Alamos National Laboratory (LANL), Lawrence Livermore Laboratory (LANL) and Sandia National Laboratories (SNL). In addition, numerous R&D activities, including sub-critical experiments, are carried out at the Nevada Test Site (NTS). The production complex, which has undergone significant downsizing since the end of the Cold War, consists of the following 'one of a kind' facilities: the Y-12 Plant (uranium and other components), Pantex Plant (warhead assembly, disassembly, disposal, HE components), Kansas City Plant (KCP) (non-nuclear components) and Savannah River Site (SRS) (tritium extraction and handling). In addition, production activities for specific components occur at two national labs: Sandia (neutron generators) and Los Alamos (plutonium/beryllium parts, detonators)."

As noted above, the Complex 2030 plan would maintain the same eight nuclear weapons research, production, and testing sites as exist in the current complex. While some of the sites would have a smaller "footprint" (less floor space), they would also require the investment of tens of billions of dollars for new or upgraded factories. In addition to the Consolidated Plutonium Center mentioned earlier, the new complex would involve building two new factories at the Oak Ridge Y-12 site, a Highly Enriched Uranium Materials Facility (HEUMF) and a Uranium Processing Facility (UPF); a new Chemistry and Metallurgy Research Replacement facility at Los Alamos National Laboratory to "support plutonium operations at LANL"; a new factory for the production of non-nuclear components of nuclear weapons at the current site of the Kansas City plant; and upgrading the Pantex warhead assembly/disassembly facility.[22]

The spending on the RRW and the CPC is only a small portion of the full costs of the Complex 2030 initiative. So far, the Department of Energy has given no cost estimate for the 2030 plan, nor does its current budget indicate which items are devoted to carrying it out, other than the RRW and the CPC. However, the Secretary of Energy's Advisory Board's (SEAB) Nuclear Weapons Infrastructure Task Force has estimated that a more thorough consolidation plan would cost $155 billion, while sustaining the complex as is could cost up to $175 billion between now and 2030. Since the SEAB plan involves more consolidation of facilities, Complex 2030 costs would most likely exceed the $155 billion figure. And the likely costs of building new facilities, modernizing old ones, and adapting the newly developed RRW to fit on existing delivery vehicles will almost certainly drive costs beyond the $175 billion estimate for sustaining the current complex.[23]

An additional factor in considering the possible costs of implementing the Complex 2030 plan is the Department of Energy's record of cost overruns on major technology and

construction projects. For example, in just six years – from 1987 to 1993, the Superconducting Supercollider Project went from a $5.3 billion initial estimate to $12 billion actually spent, at which point the project was cancelled. The National Ignition Facility, described in more detail below, has grown from a $1 billion estimate in the mid-1990s to a current estimate of over $5 billion, a figure which some non-governmental experts argue could grow to $8 billion or more. The Dual Axis Radiographic Hydrodynamic Test Facility (DARHT) project has grown ten-fold, from a $30 million estimate in 1988 to $327 million actually spent by 2003.

Other major projects cited in Table II have grown by one and a half times or more, with many of them yet to be completed. Given the complex, multi-pronged nature of the Complex 2030 plan, it is likely that it will undergo significant cost increases in the two decades-plus currently estimated for completion of the project.

Table II: Cost Growth on Major DOE Projects

Project	Early Estimate	Later Estimate	Final Estimates or Additional Notes
Super-Conducting Super-Collider	$5.3 billion (1987)	$8.25 billion (1991)[24]	This program was cancelled by Congress in 1993. By that time, $12 billion had been allocated to the Supercollider.[25]
National Ignition Facility	$1.074 billion (1996)	$1.196 billion (1998) $2.12 billion (2000)	Between fiscal years 2001-2006, Inertial Confinement Fusion at the NIF facility received $2.6 billion in funding.[26]
	$0.8331 billion (1998)	$1.137 billion (2000)	
	Total $2.03 billion (1998)	**Total $3.26 billion (June 2000)[27]**	
Savannah River Site Defense Waste Processing Facility	$1.2 billion (1987)	$2.1 billion (1992)	In April 2003, DOE estimated it could shorten the waste cleanup schedule by 20-35 years, saving up to $29 billion. At the Savannah River Site in South Carolina, this accelerated schedule is purported to save $2.8 billion (in 2003 dollars). The GAO found that "the DOE faces significant legal and technical challenges to realize the estimated savings."[28]
		And another $1.8 billion (1992) to build supporting facilities[29]	
Hanford Tank Waste Project (Phase I)	$4.3 billion (before September 1996)	$8.9 billion (August 1998)[30]	The Department of Energy currently estimates the total cost of cleaning up the tank waste at Hanford to be more than $50 billion.[31]

All High-Level Waste Management Programs	$63 billion (1996)	$105 billion (2003)[32]	A July 2005 GAO report asserts that the DOE's most recent estimate of a $129 billion total program cost for nuclear waste clean-up by 2035 is difficult to measure or confirm because there are is not a clear and "discernible relationship between cleanup accomplishments and cost."[33]
Fernald Vitrification Project	$14.1 million (February 1994)[34]	$20.6 million (December 1994) $56 million (July 1996) $66 million (September 1996)	The Office of Environmental Management estimated that the total cost of life cycle clean-up at Fernald will be $3.341 billion.[35]
Yucca Mountain	$17.5 billion (30 year cost estimated in 1990 adjusted to year 2000 dollars)[36]	$58 billion (DOE's 100-year cost estimated from 2000, in year 2000 dollars) DOE contractors later said that estimate was understated by $3 billion since repository would not likely open in 2010 as they claimed.[37]	Recently, the DOE has estimated that with $23 billion in investment, Yucca Mountain can open in 2017.[38]

Source: This table was adapted from Arjun Makhijani, Institute for Energy and Environmental Research (IEER), "Comments of the Institute for Energy and Environmental Research on the Department of Energy's Notice of Intent to Prepare a Supplement to the Stockpile Stewardship and Management Programmatic Environmental Impact Statement – Complex 2030," January 17, 2007, p. 4.

The greatest beneficiaries of the Complex 2030 plan are likely to be the current firms involved in maintaining the U.S. nuclear weapons complex. In the next two sections, we will examine the major facilities in the complex and the firms involved in their maintenance and management.

Major Nuclear Weapons Facilities

The Nuclear Weapons Labs:
"Remember, the Soviets are the Competition, Los Alamos is the Enemy."
Sign once posted at Lawrence Livermore.[39]

Started as the super-secret "Project Y" in 1943, Los Alamos National Laboratory (LANL) in New Mexico has long been the keystone institution of the American nuclear-weapons production complex. Currently, it employs more than 13,000 people and has an estimated $2.2 billion annual budget. The birthplace of Fat Man and Little Boy, the two nuclear bombs the U.S. dropped on Hiroshima and Nagasaki in August 1945, the lab

covers 43 square miles, and has its own waste dump as well as a large plutonium infrastructure.[40]

Lawrence Livermore National Laboratory (LLNL) was established in 1952 at the University of California, Berkeley with the work of Ernest O. Lawrence and Edward Teller. The first megaton class warhead, built to be launched from a submarine, was developed there. LLNL employs more than 8,000 people, and operates on a $1.6 billion annual budget. These two labs, along with Sandia in Albuquerque, New Mexico – where the nuclear weapons "physics packages" become "weaponized" – form the heart of the nuclear weapons complex.

According to David Samuels, writing in the June 2005 *Harpers,* throughout the life of the two labs– Los Alamos and Livermore– scientists have designed 71 different warheads for 116 nuclear-weapons systems.

With the fall of the Berlin Wall, new missions for the country's top nuclear weapons scientists have proliferated—the Reliable Replacement Warhead, Stockpile Stewardship Management, and warhead Life Extension Programs are a few major examples. In the work to maintain and promote themselves, the labs have contributed to a nuclear renaissance that brings new tensions and threats to an already fragile world. In a July 2005 report, the Department of Energy's Nuclear Weapons Complex Infrastructure Team asserted that the nuclear weapons labs are "directionless, unresponsive and largely obsolete."[41] But this critique has not stopped the federal government from keeping the money spigot open.

While the Labs are pushing hard for the capability to produce new warhead designs, not everyone agrees that the current slate of projects is necessary. Rep. David Hobson (R-OH), who has been instrumental in cutting unnecessary nuclear funding, has asserted that the weapons complex can be "viewed as a jobs program for PhDs… The ultimate white collar welfare."[42]

As Congress provides funding for the nuclear research and development programs each year, it routinely gives the laboratory complex a very long leash, allowing those in the nuclear weapons business to determine their own funding needs. Jeff Bingaman, Democratic Senator from New Mexico, argues that "Congress has essentially abdicated its responsibility in this area in the last few years; there is very little effective oversight on these issues by the House or Senate."[43]

Jas Mercer-Smith, a director for nuclear weapons at Los Alamos, describes the power his institution wields in colorful terms: "Blowing a huge hole in Nevada was great for the ego… Nuclear weapons play the same role in society as the wicked witch in Grimm's' fairy tale. Their job is to scare small children (i.e. irresponsible countries). Personally, I'm worried that this country hasn't been scary enough recently."[44] Political clout and aggressive self-promotion like Mercer-Smith's add up to lots of funds, but little in the way of useful research and development aimed at improving security in the United States.

This is evident from even a brief review of some of the nuclear weapons complex's flagship projects.

Beyond the Labs – The U.S. Nuclear Complex 101

Given the lack of public attention to these issues, a brief review of the U.S. nuclear complex is warranted. Nine types of bombs and missiles make up our nuclear weapons stockpile. They are currently either stored at military locations or deployed on aircraft, missiles and submarines.

Supporting this stockpile is the complex of nuclear weapons design laboratories and production facilities referenced above. The complex is divided among research and development, production and testing sites. Table III, below, elaborates on the information provided earlier, noting locations and corporate contractors for each site.

Table III: The U.S. Nuclear Weapons Complex – Major Facilities and Key Contractors

Name	Location	Primary Contractors
Research Facilities		
Los Alamos National Laboratory	Los Alamos, NM	Bechtel University of California, Washington Group Int'l, BWX Technologies (BWXT)
Lawrence Livermore Labs	Livermore, CA	University of California
Sandia National Laboratories	Albuquerque, NM	Lockheed Martin
Production Sites		
Pantex Plant	Amarillo, TX	BWXT-Pantex LLC; a partnership of BWX Technologies, Honeywell, and Bechtel National
Y-12 Plant	Oak Ridge, TN	BWX-Y-12; a partnership of BWX Technologies and Bechtel National
Kansas City Plant	Kansas City, MO	Honeywell
Savannah River Site	Savannah River, SC	Washington Savannah River Company, subsidiary of Washington Group International*
Testing		
Nevada Test Site	North Las Vegas, NV	Bechtel Nevada; a partnership including Bechtel

		and Lockheed Martin

Source: *Department of Energy, National Nuclear Security Administration*
** Companies participating in the WSRC consortium include Bechtel, BNG American, BWX Technologies and CH2M Hill.*

Major Nuclear Weapons-Related Programs

The Stockpile Stewardship and Management Program (SSMP)

Since 1992, the United States has observed a moratorium on the underground testing of nuclear weapons. As a tradeoff for this move, the nuclear weapons complex was funded to carry out the stockpile stewardship program as a way of "preserving the core U.S. intellectual and technical competencies in nuclear weapons in a non-testing environment."[45] Stockpile stewardship projects include the development of simulations designed to test nuclear weapons without resort to underground explosions and the construction of advanced science facilities, such as the National Ignition Facility (NIF).

Internal Confinement Fusion and High-Yield Campaign–The National Ignition Facility (NIF): The National Ignition Facility, being built at Lawrence Livermore National Laboratory is the single largest project in the NNSA budget. The Natural Resource Defense Council's Christopher Paine describes it as "quite possibly the most expensive experimental facility ever built."[46]

According to the GAO: "The stadium-sized NIF (85 by 200 meters) will focus 192 laser beams on a tiny capsule of nuclear fuel, compressing it by pressure. Each laser would have to be 60 times as powerful as any laser built prior to the initiation of the NIF project. If NIF achieves its ultimate goal, the compressed nuclear fuel will 'ignite' to release more energy than was added and simulate a thermonuclear explosion."[47] The DOE and NNSA project $3.5 billion in costs for NIF, up from an original DOE estimate of $1.07 billion.[48] The Natural Resources Defense Council estimates the costs through FY 2008 at $5.2 billion, with costs reaching at "at least $8.4 billion" by 2014 – the DOE's target date for achieving ignition.[49] NRDC has also questioned whether the system can ever be made to work as advertised, and whether – given the cost overruns – such a facility is even worth it.[50] See Table II (page 13), for examples of cost overruns in other major DOE/NNSA nuclear programs.

The entire Inertial Confinement Fusion (ICF) and High Yield project, of which the National Ignition facility is a part, has a proposed budget of $412.3 million in FY 2008, down from $451.2 million in 2007. ICF and High Yield activities are slated for $2.1 billion in total expenditures from 2008 through 2012. The National Ignition Facility alone is slated for $379.2 million in spending on experiments, construction, and other activities during FY2008. Five year costs from 2008 to 2012 are currently proposed at $1.5 billion.[51]

Dual Axis Radiographic Hydrodynamic Test Facility (DARHT): This high-energy x-ray machine is being built at Los Alamos National Laboratory. Plans call for construction of two x-ray beams, which, when fired at a target, give scientists a three-dimensional look inside a nuclear blast. In 1988, DARHT was proposed as a $30 million project. It is

still not fully operational. While one x-ray beam has been built, the second beam broke during construction. An $89.8 million *reconstruction* is underway. By 2003 the DOE had spent $327 million, more than ten times the original cost projection. Auditors have rightly complained that the project's budget estimates were unrealistic.[52]

The budget request for DARHT was $4.5 million in FY 2008, a drop from roughly $20 million per year from FY 2004 through FY 2007.[53]

Facility for Production of Plutonium "Pits": A pit is the heart of most nuclear weapons. It is a plutonium trigger that begins the chain reaction that results in a thermonuclear explosion. The NNSA wants to build a new facility to produce between 125 and 450 pits per year.[54] A modern pit facility would be hugely expensive, costing $3-5 billion to build, $200-300 million to operate each year, and billions of dollars to dismantle and clean up.[55]

As part of the 2005 appropriations, Congress decided not to fund environmental impact assessments for the five sites where the facility could be located, effectively stalling the pit process. However, as noted above, NNSA's new plans call for the building of a Consolidated Plutonium Center that would include pit production. An environmental impact review is now under way. Rather than looking at the pit production process alone, the new review is looking at the entire Complex 2030 modernization plan as a single package.

The Nevada Test Site: Now that the United States no longer engages in underground testing of nuclear weapons, does it need a nuclear test site? Throughout the Cold War, more than 100 above-ground nuclear tests and another 825 underground tests were performed on this site, which is about the size of Rhode Island.

The last nuclear test at the site was in 1992, but the Nevada Test Site still has a multi-million dollar annual budget– $268.5 million in the FY 2008 budget request, and a total of $1.3 billion for the five years from 2008 to 2012. Its current mission is focused on improving "test readiness," which means that if the United States decided to resume nuclear testing tomorrow, it would take three years for the site to be ready to perform the nuclear test. Engineers at the site are working to narrow the time to two years or 18 months.[56]

New Programs for Post-Cold War Nuclearism

The Life Extension Program (LEP): The life extension program for the W87 warhead is underway, and plans for "life extensions" for the B61 bomb, and the W76 warhead are in the works. LEP aims to extend the viability of the warheads for 30 more years (on top of the 20 or so years the warheads were designed to last).[57] Nuclear analyst Dr. Robert Civiak suggests cutting unnecessary and/or unproven programs like LEP and sticking to basic maintenance of existing systems as a cost saving measure. Nuclear Watch New Mexico estimates that canceling the life extension programs for three warhead systems would result in $2.5 billion in savings through 2009.[58]

The Reliable Replacement Warhead Program: As mentioned earlier, Congress created the Reliable Replacement Warhead Program in 2005 to "improve the reliability, longevity and certifiability of existing weapons and their components." The projected allocation for the program over the next five years is more than $645 million. Ambassador Linton Brooks, the former head of the NNSA, envisioned developing new warheads through the Reliable Replacement Warhead program as part of plans to reduce the number of deployed weapons from 5,300 to between 1,700 and 2,200, while increasing the power and yield of the weapons retained.[59]

Los Alamos and Livermore laboratories engaged in a competition to see which lab would take the lead in designing the RRW. On March 3 2007, the Livermore design was chosen in part because it had a "more conservative" approach that would be less likely to need to be verified via nuclear testing. NNSA officials also cited features that would make the new warhead harder to utilize by terrorists.[60]

Thomas P. D'Agostino of NNSA noted that elements of the Los Alamos design might be incorporated into the RRW down the road. He argued that "This is absolutely not an announcement to build a new warhead . . . This is absolutely proceeding on a design effort . . . This is not about starting a new nuclear arms race."[61]

D'Agostino's assertion is belied by the fact that NNSA's own planning documents call for the production of the first RRW by 2012. In addition, an analysis by James Sterngold of the *San Francisco Chronicle* noted that "lab officials said researchers not only have produced extensive designs . . . but they have already conducted non-nuclear tests of the critical detonation devices and other components. They have begun to plan in detail how the weapons would be manufactured."[62]

Rep. Pete Visclosky (D-IN), the chair of the subcommittee with jurisdiction over the DOE's nuclear weapons complex, has criticized the Reliable Replacement Warhead project to date for its "make-it-up-as-you-go-along" approach, arguing that "this announcement puts the cart before the horse. . . There appears to have been little thought given to the question of why the United States needs to build new nuclear warheads at this time. My preference is that the Department of Energy would have spent their resources reconfiguring the old Cold War complex and dismantling obsolete warheads."[63]

Sen. Pete Domenici (R-NM), whose state is home to Los Alamos, took a different view, arguing that "this is not the end of our RRW effort. One system is not equivalent to transformation, and we need to move on a second design competition."[64] In 2006, Domenici tried unsuccessfully to get funding for a second competition, but he clearly has not given up on this option.

In Dr. Robert Civiak's analysis, the NNSA sees the Reliable Replacement Warhead as a "multibillion dollar effort to redesign and replace every nuclear weapon in the US arsenal."[65] Jay Coghlan of Nuclear Watch of New Mexico agrees, calling RRW a "nukes forever program, and a Trojan horse for future new designs."[66]

New Nuke for New Threats?

The Robust Nuclear Earth Penetrator: The Robust Nuclear Earth Penetrator (RNEP) would be designed to destroy hardened and deeply buried targets, such as underground bunkers containing chemical and biological weapons and military command centers. In 2003, Congress allocated $15 million to study RNEP. The new warhead was still in an early development phase when Congress cut funding for the program. If funding were to be resumed, it would require six to ten years of work to produce a deployable version of the RNEP. Both Los Alamos and Livermore National Labs had hoped to participate in designing the RNEP. The total cost of deploying such a nuclear weapon has not been stated by the Administration, but could be several hundred million dollars.

As noted above, the RNEP has generated powerful opposition. In 2004 and 2005, Representative David Hobson (R-Ohio), then Chair of the Water and Energy Subcommittee of the House Appropriations Committee, led successful fights to de-fund the Robust Nuclear Earth Penetrator. Afterwards, he said "It's dead, forget about it! Go conventional. If I have to kick it 3 or 4 times, I'm going to keep kicking at it until we think we've totally gotten it out of the way."[67] If the RNEP project is indeed abandoned, critics are concerned that the Reliable Replacement Warhead program will sustain design capabilities that could be used to create a new bunker busting weapon – or other new nuclear weapons with new missions – at some time in the future.

Who Benefits: Corporate Contracts

The Department of Energy's nuclear weapons complex is a multi-billion dollar enterprise, with the main benefits concentrated in a handful of companies that specialize in this work. Table IV lists the largest nuclear weapons-related contractors for FY 2005, the most recent year for which full statistics are available.

Table IV: Department of Energy
Largest Nuclear Weapons-Related Contractors, FY 2005
figures in millions

Company	Value of Contracts Received	Largest Sources of Contract Money
University of California	$3,221.7	Los Alamos and Livermore Labs
Lockheed Martin	$2,314.5	Sandia National Laboratories
Washington Group International	$1,350.4	Savannah River Plant
Bechtel Group	$1,042.1	Oak Ridge National Laboratories, ($577.6 million) Nevada Test Site, ($464.5 million)
University of Tennessee/ Battelle	$ 943.1	Oak Ridge operating contract

McDermott/Bechtel Group	$ 776.1	Operation of Y-12 plant at Oak Ridge National Laboratories (under partnership, BWXT Y-12 Limited Liability Co.)
McDermott/BWX Technologies	$ 522.9	Pantex plant
Honeywell, Inc.	$ 503.8	Kansas City Plant
Bechtel/SAIC Co.	$ 347.8	Nevada Test Site

Source: Office of Management and Budget Watch, Fedspending.org data base.

The nuclear weapons companies and university partnerships enumerated in Table III split over $11 billion in nuclear-related prime contracts from the Department of Energy in FY 2005 (the last year for which full data is available).

This amount accounted for just under one-half of the $22.9 billion in contracts issued by DOE for fiscal year 2005.[68]

Battelle National Security Division

Based in Columbus, Ohio, Battelle is the world´s largest independent consulting, research and development non-profit organization with $2.86 billion in revenue in 2006. In association with other companies and collaborations, it has a hand in managing five national laboratories, including:

- Brookhaven National Laboratory, New York
- Idaho National Laboratory
- National Renewable Energy Laboratory, Colorado and Washington, DC
- Oak Ridge National Laboratory, Tennessee
- Pacific Northwest National Laboratory, Washington State

As a result of its work at the Oak Ridge Y-12 plant, Battelle ranks fifth among companies involved in work at nuclear weapons facilities, with a total of $943 million in NNSA prime contracts in Fiscal Year 2005. Battelle spent $660,000 on lobbying firms in 2006.[69]

Bechtel

"We are not in the construction and engineering business. We are in the business of making money."[70]

In December 2005, construction giant Bechtel was part of the consortium that won a $553 million seven-year management contract to run the Los Alamos National Laboratory. That may have been the first time many Americans heard the two words "Bechtel" and "nuclear weapons" in the same sentence, but the company has been profiting from nuclear weapons and power for generations.

The company is involved in work at a number of other facilities in the nuclear weapons complex, including the Pantex plant, the Y-12 plant at Oak Ridge National Laboratories, the Savannah River Site, and the Nevada Test Site. In FY 2005, Bechtel received over $1 billion in prime contracts for nuclear-related work at the Nevada Test Site and Oak Ridge

National Laboratories. It was also involved in partnerships at Oak Ridge and the test site that generated an additional $1.1 billion in prime contracts (see Table III, page 16).

The privately-held, San Francisco-based company has been involved in some of the world's largest and most ambitious construction projects– the Hoover Dam, the first oil pipeline in Saudi Arabia, the Alaskan oil pipeline, and the nation's first nuclear power plants.

Bechtel has helped design and/or build 45 nuclear power plants in 22 states.[71] The company also manages the missile test range on Kwajalein Atoll in the South Pacific, and is building the launch complex in Alaska for the Ground-based Midcourse Defense system.[72] But the company is currently most known- or most infamous- for its work in Iraq. The company has reaped tens of millions of dollars in contracts to repair Iraq's schools, for example, but an independent report found that many of the schools Bechtel claimed to have completed, "haven't been touched," and a number of schools remained "in shambles." One "repaired" school was overflowing with "unflushed sewage."

In 1951, Bechtel built the "world's first nuclear reactor designed to generate electrical power" in Idaho.[73] Far from America's heartland, the company planted the seeds for today's South Asian arms race, building India's first nuclear plant at Tarapur which produced the plutonium used in the country's 1998 atomic bomb test.[74]

Not only did Bechtel's activities help catalyze the nuclear arms race in South Asia, their plant created serious health risks—it experienced major leaks, causing severe radiation exposure in the area. This toxic phenomenon affected many of Bechtel's nuclear power stations. In fact, by the 1970s, the entire generation of reactor plants Bechtel began building in the late 1950s were not in compliance with minimum Atomic Energy Commission safety requirements. When Bechtel employees complained that the company used "substandard building techniques and faulty welding techniques in the construction of nuclear power plants," they were ignored. [75]

In the face of these challenges, Bechtel transferred its business emphasis from nuclear construction to nuclear cleanup—a lucrative switch. The company has been awarded numerous contracts for cleanup in past decades at some of DOE's largest former weapons productions sites. At the Hanford Waste Treatment Plant, for example, Bechtel is working on technology to turn nuclear waste into glass. But, the estimated costs of the plant doubled in one year to about $10 billion while the completion date slipped from 2011 to 2017. Members of Congress have proposed that the Nuclear Regulatory Commission take over Bechtel's management because of these cost overruns and delays.[76]

Bechtel president Steve Bechtel is not ashamed to talk about his company's use of influence peddling to promote its business interest: "In this business, you get to know people, sit on their boards and one day when something comes up, they ask you to take on a project. One thing leads to another."[77]

Bechtel alumni include former Reagan administration Secretary of State George Shultz., who served as the company's president and director from 1974-1982, right before being tapped President Ronald Reagan's Secretary of State.[78] Former Bechtel President, and current Bechtel board member W. Kenneth Davis served as President Reagan's deputy secretary of Energy and head of the Atomic Energy Commission.[79]

Bechtel spent $1.3 million in political contributions between 1998 and 2006. Its lobbying expenditures for 2006 totaled $620,000.[80]

BWX Technologies, McDermott International

A subsidiary of the energy services company McDermott International, BWX Technologies is headquartered in Lynchburg, VA. A partnership between BWX Technologies and Bechtel National earned $776 million in prime contracts in FY 2005 for managing and operating the Y-12 plant at Oak Ridge National Laboratories. The plant is known as the Fort Knox of uranium—as it retrieves and stores nuclear materials, and provides fuel for naval reactors. BWXT Pantex, a Limited Liability partnership with Honeywell International and Bechtel, dismantles nuclear warheads and plays a key role in the Stockpile Stewardship initiative by evaluating nuclear weapons in the stockpile. In FY 2005, the firm received $522 million for its work at Pantex.

In October 2005, the company announced that it was opening a Washington, DC office just blocks from Capitol Hill that would enable it to "work more closely with its Department of Energy, Department of Defense and NASA customers." According to a press release, the office boasted a large conference room and event facilities for "meetings with government representatives."[81]

McDermott International made just $124,000 in political contributions between 1998 and 2006, and spent more than $624,000 on lobbyists in 2006.[82]

Honeywell

Honeywell is headquartered in Morris Township, N.J. The firm's primary investment in the nuclear weapons complex is running the Kansas City Plant, which makes non-nuclear components for nuclear weapons. The company received $503 million for this work in FY 2005.

As part of its other nuclear-related work Honeywell is part of a team that has been contracted to build 100 centrifuges for USEC, the world's leading supplier of uranium fuel for nuclear power plants. As Zach Wamp, Republican from Tennessee, said of the project, "this is a big deal… This is some really neat stuff. If we are going to have energy independence, people who oppose nuclear energy will just have to get over it."[83] Wamp sits on the House Appropriations Committee's Subcommittee on Energy and Water where he is the number one recipient of contributions from Honeywell and other corporations working on nuclear weapons and energy. Wamp is profiled in greater depth later in the report.

Honeywell's current contract to run the Kansas City Plant was originally awarded in 2000. While a federal taskforce has recommended closing the plant, Congress stepped in to save the facility, which employs 2,700 people. In 2005, the Senate inserted language into the Energy Department's appropriations bill that would prevent any money from being spent on implementing the Nuclear Weapons Complex Infrastructure Task Force's recommendations during fiscal year 2006—including closing the Kansas City Plant. Senator Kit Bond, Missouri Republican and member of the Energy and Water Appropriations Subcommittee, is working to save the plant. "Senator Bond strongly supports this effort to block any hasty moves that would threaten Missouri workers," said a spokesman.[84]

The company, which boasts $30 billion in annual revenue, is reaching out to new markets, and its chief executive traveled to India with President George W. Bush in March of 2006, when he signed the new nuclear deal with New Delhi.[85]

The company made $3 million in campaign contributions between 1998 and 2006, and spent at an even quicker pace on lobbying, handing over $4.4 million to politically connected firms in 2006.[86]

Lockheed Martin

Lockheed Martin received $2.3 billion in nuclear weapons-related prime contract awards from the Department of Energy's National Nuclear Security Administration in FY 2005 for operating Sandia National Laboratories. While the Bethesda, Maryland-based company's position as the world's largest weapons contractor is well-known, its role in every phase of the nuclear chain is less familiar.

Nuclear Reach

The company manages Sandia Laboratories near Albuquerque, New Mexico where scientists design, manufacture and maintain nuclear weapons. The lab runs on an annual budget of $2.3 billion and employs more than 7,000 people.

Additionally, Lockheed Martin and Bechtel Corporation are partners in Bechtel Nevada, which manages the 1,375-square-mile Nevada Test Site for the Energy Department.

Lockheed Martin also makes delivery systems for nuclear weapons like the Trident D-5 missile– ten of which are on every Trident submarine. The D-5 missile carries eight 300-475 kiloton weapons, each the equivalent of 29 Hiroshimas.

But the company faces difficulty in its nuclear work. The company has found it is easier to build nuclear components than it is to clean-up nuclear waste. In November 2004, the company was fined for failing to clean-up a one-acre nuclear wasteland in Idaho Falls. In a 100-page ruling closing a six-year battle, the presiding judge remarked that Lockheed Martin "failed to progress with the work, failed to give adequate assurances that it would perform in the future, and failed to adequately explain its failure to progress." Those four failures in one sentence add up to a hefty $110 million fine.

Other Work

In an undertaking that is tied to the nuclear arms race, Lockheed Martin is also working on missile defense systems that promise protection from nuclear weapons. The company is the prime contractor for at least five missile defense components, including the Theater High Altitude Area Defense system and the Aegis Ballistic Missile Defense System. With missile defense funding running about $9 billion for 2007, Lockheed Martin is well positioned for more BMD contracts, despite the fact that the system is neither technologically feasible nor politically relevant. More than 1,000 Lockheed employees in Sunnyvale, CA design, assemble and test elements of National Missile Defense. But they say they aren't in it for the substantial financial reward; rather, as Linda Reiners, Vice President of Missile Defense Program says, NMD is "a passion, if you will."[87]

Lockheed Martin was the nation's number one weapons contractor in FY 2006, with prime contract awards totaling $26.6 billion.[88]

Lockheed Martin is the "leader of the PACs" – Political Action Committees – among U.S. weapons manufacturing firms. The company has made over $13.5 million in campaign contributions to candidates and party committees since 1998, making it the 36th largest political donor overall.[89] The company's lobbying bill has also been high, with a total of $5.1 million in fees to lobbying firms in 2006.[90]

SAIC

A research and engineering company, SAIC (Science Applications International Corporation) works on national and homeland security projects. The San Diego-based company also has its hands in energy, environment, space, telecommunications, health care and logistics contracts. According to corporate press releases, SAIC had more than $7.8 billion in revenues in 2006 and employs 43,000 people in 150 locations. About two-thirds of its contracts come from the federal government.

Its primary role in the nuclear weapons complex is a partnership with the Bechtel Corporation to manage the Nevada Test Site. As noted in Table III (page 16), the two firms split $347 million in prime contract awards for this work in FY 2005.

As part of Bechtel SAIC Corporation LLC, the company describes on its website how it is working to "meet the unique challenge of science and engineering for the Yucca Mountain Project" where the Department of Energy hopes to inter 77,000 tons of highly radioactive waste.

Like many of its fellow nuclear weapons contractors, SAIC is well-connected. Duane Andrews, SAIC executive vice president and chief operating officer, is a former Pentagon official who oversaw CIA budgets as assistant secretary of defense. In February 2005, SAIC's vice president Christopher Ryan Henry took a trip through Washington's revolving door, entering the Pentagon's E-Ring as a senior policy official. Former SAIC CEO Wayne Downing, a retired army general and former head of Special Operations Command (SOC), has his own connections to Iraq as a former lobbyist for the Ahmed

Chalabi's Iraqi National Congress. He left SAIC to take Defense Secretary Donald Rumsfeld up on an offer to assess SOC and offer suggestions for improving the force.

SAIC contributed more than $2.8 million to elected officials and candidates between 1998 and 2006, and spent $1.9 million retaining lobbyists in 2006 alone.[91]

Washington Group International (WGI)

Based in Boise, Idaho, WGI is part of the consortium that won the management contract for Los Alamos National Laboratory in December 2005. As an industry watcher said of the contract, "the nice thing about these big federal contracts is that they are relatively safe, stable sources of revenue... and the government is good for the money."[92] As the lead firm in the Washington Savannah River Company (WSRC), WGI manages the Savannah River Site (SRS) which supplies tritium for use in nuclear weapons. WGI received $1.3 billion for its work at SRS in FY 2005. In addition, the company:

- ∞ Manages the Waste Isolation Pilot Plant, and West Valley Demonstration Project.
- ∞ Partners with Battelle Energy Alliance that operates the Idaho National Laboratory.
- ∞ Oversees radioactive clean-up at Welton Spring Remedial Action project, Miamisburg Closure Project, Rocky Flats Environmental Tec Site, Hanford River and Idaho National Laboratory.
- ∞ Provides technical support and consulting at numerous other nuclear weapons facilities, including: Los Alamos, Lawrence Livermore, Sandia, Hanford, Pantex and Oak Ridge.[93]

The company doled out $1.7 million to members of Congress between 1998 and 2006, and spent more than $1.2 million on lobbyists in 2006.[94]

Table V: **Contractor Contributions to Key Members of Congress**

Member of Congress	Congressional District	Nuclear Facility	Value of Nuclear Related Federal Contracts in the District, 2004-2005	1997-2006 contributions
Tom Udall, D 3rd District	3rd District, NM	Los Alamos Nuclear Laboratory, New Mexico	$2,105 million	$3,300
Jeff Bingaman, D-NM				$88,584
Pete Domenici, R-NM				$112,100
Heather Wilson, R	1st District, NM	Sandia Nuclear Laboratory, New Mexico	$32 million	$161,600
Ellen Tauscher, D	10th District, CA	Lawrence Livermore National Laboratory, CA	$886,129	$13,440
Barbara Boxer, D				--
Dianne Feinstein, D				$26,300
Mac Thornberry, R	13th District, TX	Pantex, Texas	$513.2 million	$107,448
John Cornyn, R				$25,000
Kay Bailey Hutchison, R				$12,500
J. Gresham Barrett, R	3rd District, SC	Savannah River Site, South Carolina	$122 million	$40,838
Jim DeMint, R				$64,958
Lindsey Graham, R				$93,086
Zach Wamp, R	3rd District, TN	Y-12 Plant, Tennessee	$1,453 million	$173,791
Lamar Alexander, R				--
Bob Corker, R				--
Emanuel Cleaver, D	5th District	Kansas City Plant, Missouri	$979 million	--
Christopher Bond, R				--
Clare McCaskill, D				--
Dean Heller, R,	2nd District, NV	Nevada Test Site, Nevada	$5,045,789	--
John Ensign, R				--
Harry Reid, D				--

Source: Center for Responsive Politics, Open Secrets Database.

Congress and the Bomb

Lobbying based on jobs and facilities in key districts – along with the notion that "the experts know best" about what shape the U.S. nuclear arsenal should take in this new period – are probably the two most important factors sustaining efforts to expand the nuclear weapons complex.

In addition, the companies that profit from the operations of the complex are significant players in the spheres of lobbying and political contributions. The nine most important nuclear weapons contractors spent $14.9 million on lobbying in 2006 alone, the most recent year for which full statistics are available. And these same nine firms have averaged $2 million per year in political contributions from 1998 to 2006, the period running from the late Clinton administration through the mid-point of George W. Bush's second term.[126] For more detail on contributions to specific members by nuclear weapons contractors, see Table V (page 27). It is interesting to note that both critics of Complex 2030 and boosters of the plan have received industry funding, suggesting that nuclear weapons contractors have not been fully successful in wielding influence on this particularly controversial issue.

Skepticism about the need for massive investment in nuclear weapons at a time of huge war bills and growing deficits, a growing sophistication about nuclear issues, and a Democratic majority, means that the nuclear weapons complex is feeling the heat for the first time in many years.

Congress has resisted initial funding for a new factory to build plutonium triggers for nuclear warheads. This suggests that despite support from the White House, the Department of Energy, key contractors, and a number of powerful members of Congress (some with nuclear weapons facilities in their states or districts), the Complex 2030 plan to modernize the U.S. nuclear weapons infrastructure may be scaled back or rejected by Congressional opponents, backed up by arms control and environmental organizations. This budget battle bears watching, as it has huge implications for the future of U.S. nonproliferation policy. It will not be as straightforward as the fight over funding for the Robust Nuclear Earth Penetrator (RNEP), because opponents of that project are divided in their opinions of the RRW – some are opposed outright, others have threatened to oppose it unless the DOE comes up with a more thorough consolidation plan for the nuclear weapons complex, while others have shown qualified support for the program. Profiled below are some of the nuclear weapons complex's biggest boosters and doubters.

The Nuclear Boosters

Pete Domenici

The nuclear laboratories call him St. Pete; he calls himself a "sucker for big science."[127] In January 2006, Domenici helped break ground on the Los Alamos National Laboratory's Chemistry and Metallurgy Research Replacement (CMRR) facility, an

estimated $975 million nuclear facility construction project.[128] In his speech, he warned: "Without what goes on in this building, the existing (nuclear weapons) stockpile cannot be certified and the state of the stockpile cannot be verified…This lab is critical, just as it was in WWII and continues to be to this day. You can't allow people like you, institutions like this, to become some kind of endangered species."[129] The facility– where plutonium and other nuclear material would be analyzed– is now in jeopardy, with members of Congress calling it "simply irrational" to build a brand new facility before final decisions about the consolidation of the nuclear weapons complex are made.[130]

Domenici has received $112,100 from nuclear-related corporations since 1997. But, more than cash ties Domenici to the nuclear cycle. His office is a virtual revolving door– and the case of Alex Flint is just the most recent example. Until 2003, Flint worked as a lobbyist for the Nuclear Energy Institute and companies in the nuclear power arena. He then took a post on Capital Hill, working as the majority staff director for Domenici's Energy and Natural Resources Committee. There he played a key role in the passage of legislation providing billions in subsidies to the nuclear industry.

Flint left the Hill this year to become the Nuclear Energy Institute's chief lobbyist. [131] The NEI knew exactly what they bought- direct access to Domenici. In their press release announcing Flint's arrival, they boasted the fact that "Working daily with Senator Pete Domenici, Alex has played a vital role in developing a bold future for nuclear energy in America… and was key adviser to Senator Domenici during Senate consideration and passage of the Energy Policy Act of 2005."[132]

With the change in Congress, Domenici's role is down-graded slightly, but he remains a major player. In February, Congress wanted to cut $495 million from the budget for nuclear weapons activities, but settled on a much smaller $95 million cut, in part "out of deference to Domenici," according to a February 2007 *Albuquerque Journal* article.[133]

As noted above, he has also been a supporter of locating design work for the RRW at his home state laboratory, Los Alamos. When the lab lost the initial competition to design the warhead, Domenici immediately called for a second competition aimed at producing an additional RRW design.

Joe Barton

President Bush nicknamed him "Big Dog" and *The Hill,* Congress's newspaper, calls the Texas Republican "Bruiser Barton."[134] The nuclear energy industry calls him friend. Until January 2007, Barton was the chair of the House Energy and Commerce Committee– with jurisdiction over more than half the legislation that moves through Congress.[135] When he was tapped to chair the Committee, Barton hired Bud Albright, a former chief lobbyist for Reliant Energy, as the committee's chief of staff. Albright in turn hired Margaret Caravelli, a lobbyist for methyl tertiary butyl ether– the gas additive being subjected to nationwide litigation because it pollutes the groundwater. Kurt Bilas, a former senior counsel for Reliant, became the committee's council.[136]

Barton was a strong supporter of a consortium led by Lockheed Martin and the University of Texas that competed to take over the management of the Los Alamos National Laboratory from the University of California. When the UT group lost the competition in late 2005, Barton was furious. He demanded an explanation from Energy Secretary Samuel Bodman, arguing that given the "seemingly invulnerable culture of mismanagement at Los Alamos, I am surprised to learn that the current contractor has been invested with new trust."[137] While the Department of Energy was deliberating on the decision, Barton used his position at Energy and Commerce to request a Government Accountability Office report on the costs of security lapses at Los Alamos, and held hearings on the subject as well.[138] While Barton's scrutiny of the University of California's performance in managing the Los Alamos lab was certainly legitimate, it was no doubt motivated in part by his support for the University of Texas/Lockheed Martin bid to run the facility.

Zack Wamp

Zach Wamp, a Republican who represents the Tennessee district where the Y-12 plant is located, is actively involved in nuclearizing his region. He received more than $173,000 in contributions from companies involved in the nuclear weapons complex over the last decade, including $40,200 from McDermott International and $11,500 from Bechtel—the two companies that manage the Y-12 plant—in 2005-2006 alone.

Under Complex 2030, the NNSA proposes building two new factories at the Y-12 site. Along with the rest of the Tennessee delegation, Wamp is courting additional federal investment—like nuclear power plants. He is pursuing Global Nuclear Energy Partnership, which could locate a site for reprocessing spent nuclear rods into fuel, calling it an "exciting opportunity for East Tennessee." [139]

The Nuclear Doubters

Representative David Hobson, Republican of Ohio, served as the chairman of the House Energy and Water Appropriations Subcommittee until Democrats took control of the House in January 2007. The Representative has continuously challenged the nuclear weapons infrastructure and the Bush administration. When the White House wanted low-yield and bunker-busting nuclear weapons, arguing for them in part because scientists need new problems to solve, Hobson cut initial funding from these provocative new systems. Instead he suggested the Reliable Replacement Warhead, which in his view would involve designing a safer, more secure warhead with minor modifications from existing designs and no new military capabilities. In addition, in response to the sprawling nuclear complex's desire for post-Cold War relevancy, Hobson envisioned a single "Consolidated Nuclear Production Complex."

Hobson and others saw the RRW as a way of pushing the administration to make good on promises to cut the nuclear stockpile, while allowing for some new weapons development. The Congressman explained; RRW is "an incentive" for the NNSA "to get behind a smaller nuclear arsenal and a smaller complex."[141]

So, when the NNSA made it clear in its Complex 2030 visioning document that it was in favor of keeping nuclear capabilities spread throughout many different states, Hobson felt like they were not keeping up their end of the bargain and made his feelings known in a strongly worded letter to Secretary of Energy Samuel Bodman. In the November 16, 2006 letter, the Congressman threatened to cut off funding for RRW, writing that the new warhead program "is a deal with Congress, but the deal requires a serious effort by the Department to modernize, consolidate and downsize the weapons complex. Absent that effort, there is no deal."[142]

Hobson is growing frustrated with the nuclear weapons complex's insistence on new nuclear weapons and no long term planning, "they've been running with RRW like you wouldn't believe. They see it as a big pot of money to get into."[143]

The 110th Congress: The Looming Battle Over Funding

When the Democrats took control after the November 2006 elections, Hobson lost his chairmanship to Peter Visclosky (D-IN). But it appears that his work will continue. Visclosky has indicated that he will hold oversight hearings on the nuclear weapons complex, and he has not rule out slowing or eliminating the RRW if the administration is unable to present a strategy "that defines the future mission, the emerging threats and the specific U.S. nuclear stockpile necessary to achieve strategic goals." [144]

As nuclear issues come up in the 110th Congress, members are likely to be more skeptical of the promises made by the nuclear weapons complex and the corporations involved. Senator Dianne Feinstein represents the state that includes Lawrence Livermore National Laboratory, which recently won the Reliable Replacement Warhead competition. She said "While I appreciate the fact that Lawrence Livermore was selected, this in no way answers my questions about the Reliable Replacement Warhead program," and asserted that she remains "100 percent opposed" to building the RRW.[145] That is the kind of leadership that members of Congress are going to need to demonstrate in the coming years as the administration continues to push for a radical revival of nuclear weapons.

Representative David Hobson, Republican of Ohio, said in a speech in August 2004 to a symposium on post-cold war nuclear strategy that he saw the administration's call for research on new bombs and the earth penetrator as "very provocative and overly aggressive policies that undermine our moral authority to argue that other nations should forgo nuclear weapons."[146] The principles underlying Hobson's remarks are shared by a number of his colleagues including Rep. Ed Markey (D-MA), John Spratt (D-SC), and Lynne Woolsey (D-CA), all of whom joined him in successfully leading an effort to de-fund the Robust Nuclear Earth Penetrator. Congress has also resisted initial funding for a new factory to build plutonium triggers for nuclear warheads.

Congressional attitudes towards the Reliable Replacement Warhead are more complex. Some members who opposed the "bunker buster" see the RRW as a reasonable program worth supporting. Others have doubts about the need for the RRW but feel that it may be worth letting it move forward in exchange for cuts in the "non-deployed" part of the U.S.

nuclear stockpile. Another group would call for a more extensive trade-off in exchange for funding the RRW, including movement towards U.S. support for the Comprehensive Test Ban Treaty (CTBT) *and* substantial additional reductions in the U.S. nuclear arsenal. Last but not least is a group that opposes the RRW in its current form – as a new warhead that is being used as the lynchpin for a thorough modernization of the nuclear weapons complex that does not include substantial consolidation of facilities now based in different geographic areas. This suggests that despite support from the White House, the Department of Energy, key contractors, and a number of powerful members of Congress (some with nuclear weapons facilities in their states or districts), the debate over the Complex 2030 plan to modernize the U.S. nuclear weapons infrastructure is far from over.

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