

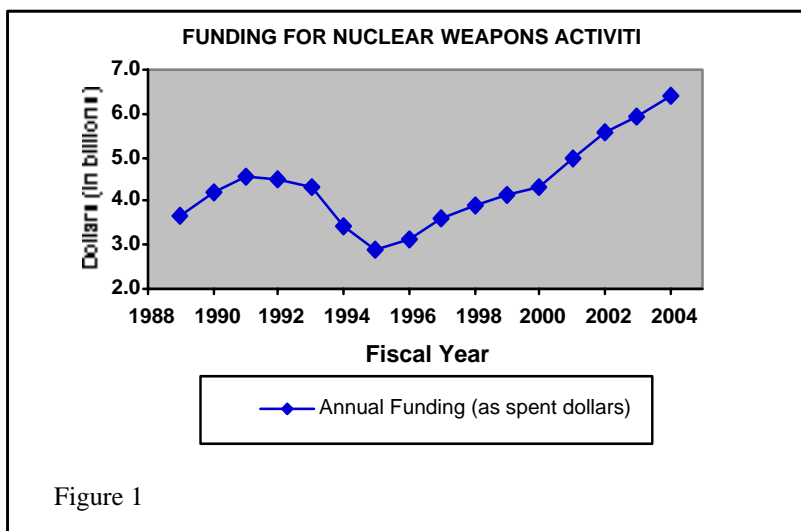
Fiscal Year 2004 Budget Request For Nuclear Weapons Activities

an analysis
by Dr. Robert Civiak

OVERVIEW OF THE REQUEST

On February 3, 2003, President Bush submitted his budget request for fiscal year 2004, which begins October 1, 2003. **The budget requests \$6.38 billion for Nuclear Weapons Activities.** That is an increase of \$422 million, or 7.1 percent, over the 2003 appropriation, which the Congress finally approved on February 14.

The 2004 budget request continues a massive upsurge in funding for nuclear weapons that has been underway for nearly a decade. Funding for Nuclear Weapons Activities declined for several years following the end of the Cold War, but has been increasing rapidly since 1995. The 2004 request is more than 2.2 times what DOE spent in 1995 for Nuclear Weapons Activities. Even after accounting for inflation, the nuclear weapons budget has grown 84 percent since 1995, and is now more than one and one-half times the average annual spending for development of nuclear weapons during the Cold War (\$4.2 billion in 2003 dollars).



In May 2002, Presidents Bush and Putin signed a treaty that purports to reduce the number of nuclear warheads operationally deployed by each of their nations (the Treaty of Moscow). However, the 2004 budget for Nuclear Weapons Activities gives no indication that the National Nuclear Security Administration (NNSA), a semi-independent agency within the Department of Energy (DOE), is planning to support a smaller nuclear weapons arsenal. The budget requests increases for the NNSA in every major category of funding.

The 2004 budget:

- o Provides for upgrades to every nuclear weapon in the U.S. stockpile;
- o Funds major improvements in facilities and infrastructure at each of the eight major sites in the nuclear weapons complex;
- o Continues feasibility and cost studies for a Robust Nuclear Earth Penetrator (RNEP), which would be the first completely new nuclear weapon to enter the U.S. arsenal since 1989;
- o Speeds up plans to design, site, and build a new facility capable of producing 500 new plutonium pits (the core first stage component of a nuclear weapon) per year; and

- o Reduces the time needed to conduct a full-scale, underground nuclear weapons test.

INCREASES FOR ALL PROGRAM ELEMENTS

This year's budget continues the recent trend of increases in all program elements of the Stockpile Stewardship Program (see Table 1).

The budget requests \$1,365 million (or \$1.37 billion) for **Directed Stockpile Work (DSW)**. The DSW program element funds activities that contribute directly to maintaining and upgrading nuclear weapons and developing new weapons systems. The increase supports so-called Life Extension Programs, called LEPs, (see below) for the W76, W80, and W87 warheads and for the B61-7 and B61-11 bombs.

Table 1 -- **FUNDING FOR NUCLEAR WEAPONS ACTIVITIES**
(Dollars in millions)

<u>Program Element</u>	<u>FY 2002 Appropriation</u>	<u>FY 2003 Appropriation</u>	<u>FY 2004 Request</u>	<u>2004 vs 2002</u>	<u>2004 vs 2003</u>
Directed Stockpile Work	1,108	1,234	1,365	+23%	+11%
Campaigns	2,189	2,134	2,395	+9%	+12%
Readiness in Technical Base and Facilities	1,377	1,832	1,613	+17%	-12%
Facilities and Infrastructure Recapitalization	197	243	265	+35%	+9%
Secure Transportation	159	153	182	+14%	+19%
Safeguards and Security	554	526	586	+6%	+11%
Adjustments	<u>-42</u>	<u>-168</u>	<u>-29</u>	na	na
Weapons Activities Total	5,542	5,954	6,378	+15.1%	+7.1%

The budget requests \$2,395 million (or \$2.40 billion) for **Campaigns**. This program element is a collection of 17 separately managed subprograms. Each Campaign seeks to improve the understanding of a particular aspect of nuclear weapons physics or engineering or to expand NNSA's capabilities for research, development, production, or testing of nuclear weapons. The largest increases are for:

- o The **Pit Manufacturing and Certification Campaign** (+\$98 million or 44 percent), which aims first to resume small scale production and certification of new plutonium pits for nuclear weapons primaries and eventually to build a larger pit production facility;
- o The **Primary Certification Campaign** (+\$19 million or 40 percent), which is intended to improve techniques for examining and certifying the performance of existing and rebuilt primaries (the first stage of a nuclear weapons); and
- o The **High Explosives and Non-Nuclear Readiness Campaigns** (+\$33 million or 94 percent), which are two separately managed campaigns to improve NNSA's capabilities to manufacture high explosives and other non-nuclear components.

The budget requests \$1,613 million (or \$1.61 billion) for **Readiness in Technical Base and Facilities (RTBF)**. That is \$219 million less than the 2003 appropriation, after Congress added \$330 million to the Administration's 2003 request. RTBF supports the base operations of the laboratories and production sites in the NNSA weapons complex. Funding for RTBF is directed at specific sites.

Members of Congress, who represent states or districts that contain NNSA facilities, routinely add pork barrel spending for their sites to the RTBF budget.

The **Facilities and Infrastructure Recapitalization** program element is a three-year-old initiative to fund major improvements to weapons complex facilities. The budget requests \$265 million for these improvements (see below).

The budget requests \$182 million for **Secure Transportation** of nuclear weapons and components. In addition to meeting NNSA's transportation needs, this program element supports the transport of nuclear weapons and fissile materials for the Department of Defense and for DOE's Environmental Management (EM) Program. The increase this year is driven largely by expanding transportation needs in the EM program, as DOE seeks to close facilities and consolidate nuclear materials at a smaller number of sites.

The budget requests \$586 million for **Safeguards and Security**. That is only 6 percent more than 2002 spending. It is the smallest two-year increase for any program element within Weapons Activities. Despite the events of 9/11 and a claim in the NNSA Budget Summary that "Security continues to be one of the highest NNSA priorities," that priority is not reflected in the funding request. The NNSA gives higher priority to funding for producing new and improved nuclear weapons and for expanding and enhancing its capabilities for nuclear weapons production, than it does to protecting the security of the existing nuclear weapons and materials under its control.

MAKING NUCLEAR WEAPONS MORE MILITARILY USABLE

The NNSA's number one goal is to enhance the capabilities of the US nuclear weapons stockpile. In that pursuit, NNSA is modifying, altering, refurbishing, performing life extensions on, and replacing limited life components in all of the weapons in the stockpile (see text box). A huge portion of NNSA's budget is devoted to these weapons "improvement" programs. However, the budget contains very little information about them.

For the past two years, Congress has directed NNSA to provide detailed information by weapons system in its budget justification. This year, however, the publicly available version of the budget does not contain any funding information by weapon system. Rather, the budget notes that it will be supplemented with a classified annex that will address weapons system costs. DoD routinely presents information by weapon system in its unclassified budget, including information on the delivery systems for nuclear weapons. There is no reason for the NNSA to classify similar information, other than to limit public debate on the cost effectiveness of the upgrades to nuclear weapons.

The budget does give some figures for part of the proposed spending to upgrade nuclear weapons within the DSW program. The budget proposes to spend \$208 million on "Research and Development on Refurbishments" and \$282 million on "Life Extension Operations, Repairs, and Maintenance." However, this is only the tip of the iceberg. Unspecified amounts that support nuclear weapons improvement programs are included in many other program elements. For example:

- o Within the \$278 million requested for Production Support under DSW is an unspecified amount for development and pre-production support for the W76, W80, and B61 LEPs;
- o Within the \$50 million requested for R&D on Maintenance under DSW is an unspecified amount for "continued development of a small neutron generator to support the W80 refurbishment and the W87, and continued engineering development in support of Life Extension Programs;"
- o Under four Readiness Campaigns, the NNSA requests a total of \$257 million to fund "technology base efforts designed to re-establish, maintain, and enhance manufacturing and other

capabilities needed for the future production of weapon components, mostly needed for the near-term LEPs; and

- o Under the Primary Certification Campaign, the budget requests \$66 million to, "Conduct scheduled major hydrotests at DARHT and the Contained Firing Facility to support Life Extension Programs."

UPGRADING NUCLEAR WEAPONS TO MAKE THEM MORE USABLE

The NNSA uses a confusing array of terms to refer to the many types of upgrades it performs on nuclear weapons. The most ambitious upgrades have the innocuous sounding name of "**Life Extension Programs**" (LEPs). NNSA periodically conducts comprehensive LEPs for each type of weapon. As part of an LEP, NNSA reevaluates the design of every component in the weapon. Once a plan is set, each weapon of that type is disassembled and dozens of components are replaced. Few, if any, of the replacements are strictly required to extend the life of aging components. The vast majority of them are intended to improve the performance of the component or of the entire weapon. Improved components may be lighter, more rugged, more tamper proof or radiation resistant, or may be intended to improve the consistency of the weapon's explosive yield, add new yield options, conserve tritium use, or improve the accuracy of delivery. An LEP for a single weapon system might cost billions of dollars and take up to 10 years to plan and execute. At the end of an LEP, NNSA has a substantially new nuclear weapon, but it retains the previous designations, e.g. W76, W87 ...

The next most ambitious type of upgrade is a **Modification or Mod**. Mods are multifaceted-design changes in response to requests from DoD to add a new capability to a weapon design or to modify it for a different mode of delivery. A typical Mod was to change the W80 design for a sea-launched cruise missile to the W80-1 air launched cruise missile. The B-61 bomb has seen numerous modifications. NNSA made extensive changes to the B61 bomb in the late 1990s to give it a new capability to burrow underground before exploding. The new bomb was given the name B61-11 to indicate it is the 11th "modification" to that bomb.

A third type of upgrade is an "**Alteration or Alt**." Alts are generally upgrades to one or to several related components to improve a specific aspect of a weapon's performance. NNSA may be working on as many as 10 Alts for various weapons at any given time. Some recent Alts include: replacing the tritium reservoirs and neutron generators of the W76 warhead with new designs (Alt 317); changing the bomb fin angle on some B61 bombs to improve the accuracy of delivery (Alt 354); making follow-on structural enhancements to the modified B61-11 (Alt 349); altering the radar on the B83 bomb to change the height of its detonation (Alt 752); and changing the tritium gas transfer system in the W78 warhead (Alt 351).

The simplest upgrades are **replacement of limit life components (LLCs)**. A small number of components truly have limited lifetimes and have to be replaced regularly. These include batteries, supplies of tritium gas, and neutron generators. Designers anticipated that DoD personnel would replace those components in the field with identical versions supplied by NNSA. However, recently NNSA has chosen to replace some LLCs with completely new designs, which usually involves much more work.

Lastly, NNSA uses the term "**refurbishment**" to refer to all of the above improvement programs. The term implies a modest effort, like what an automobile might go through at its 25,000-mile checkup. However, it belies the substantial modifications, alterations, and upgrades that are described above.

The point is that the majority of the Weapons Activities budget supports the refurbishment and improvement of nuclear weapons in order to make them more militarily usable in the present-day world. As stated above, that is NNSA's number one goal. A full accounting of the cost of upgrading each nuclear weapons system would likely find that the NNSA typically spends several hundred of millions

of dollars each year over a ten or more year period on every single Life Extension Program. In view of the large cost of those programs, Congress should require NNSA to present a full life cycle cost estimate and a cost-benefit analysis for each LEP, before it approves any funds to upgrade a nuclear weapon design.

NNSA is currently conducting Life Extension Programs on the W76, W80, and W87 warheads and the B61-7 and B61-11 bombs, which together account for 6,400 of the approximately 10,000 nuclear weapons in the "active" stockpile. The total number of those warheads is three times the 1,700 to 2,200 actively deployed strategic warheads specified under the Treaty of Moscow. There is no public information on whether NNSA plans to perform the life extension on all 6,400 warheads or only a portion of them.

GOLD PLATING THE NUCLEAR WEAPONS COMPLEX

Perhaps the only NNSA priority that rivals improving the capabilities of nuclear weapons is enhancing the resources and infrastructure of the nuclear weapons complex. The Bush Administration's Nuclear Posture Review, submitted to the Congress at the end of 2001, made revitalizing the nuclear weapons complex the third leg of the New Strategic Triad. Thus, it elevated enhanced nuclear weapons production capabilities to the level of an essential element of U.S. national security.

The "**Facilities and Infrastructure Recapitalization Program (FIRP)**" is the NNSA's means for meeting the Administration's priority to enhance the nuclear weapons complex. The FIRP is a new program that grew from nothing in 2001 to a request for \$261 million in 2004. It is a targeted program that goes beyond normal maintenance and capital upgrades, which are funding in the **Readiness in Technical Base and Facilities** program. The goals of the FIRP are to significantly increase the effectiveness of the NNSA weapons complex and improve weapons making capabilities. The FIRP amounts to a gold plating of the weapons complex, under which sites seek to acquire state-of-the-art equipment in every conceivable technology, whether or not they need it.

The FIRP is the fastest growing program in the NNSA budget. In addition to the \$448 million appropriated for FIRP since FY 2001, approximately \$1.9 billion is planned for the five-year period FY 2004 through FY 2008. The major criterion for FIRP funding seems to be to spread the wealth, rather than to respond to any substantive analysis of the needs to upgrade the nuclear weapons complex. The budget proposes increases of a remarkably consistent 33 to 34 percent above the 2002 funding level for six of the eight major sites in the complex. The request for the Sandia National Laboratory is 37 percent above 2002 and that for the Y-12 complex, in Oak Ridge Tennessee, is 40 percent over 2002.

INERTIAL CONFINEMENT FUSION AND THE NATIONAL IGNITION FACILITY

The **Inertial Confinement Fusion (ICF) Ignition and High Yield Campaign** supports R&D on high-energy-density physics and pursues the ignition of tritium-fueled pellets through inertial confinement fusion. The budget requests \$467 million for this campaign, which is \$14 more than the Administration requested last year, but \$37 million less than the \$504 million that Congress provided in 2003.

More than two-thirds of the funding for this campaign directly or indirectly supports activities at the **National Ignition Facility (NIF)**. The NIF, which is under construction at Lawrence Livermore National Lab, will be the world's largest laser when it is completed. A large portion of NIF's budget is commingled with funds for other activities or other sites, so it is impossible to determine the total funding request for the NIF from the budget documents. Some portions of NIF funding are identifiable.

The budget requests \$150 million for NIF construction, compared to \$215 million (including \$1 million for "other project costs") in 2003. The 2004 level is consistent with NNSA's 2001 program plan for NIF and reflects the completion of most conventional construction items. The budget requests \$96.3 million for the NIF Demonstration Program, compared to \$75.7 million in 2003. The Demonstration Program includes costs for the integration, planning, assembly, installation, and activation of the NIF. Two other programs support activities that are heavily NIF-related. They are the Ignition program and the Experimental Support Technologies program. Funding for these four programs, which include most NIF-related activities, is summarized below.

Summary of Identifiable NIF-Related Funding (Dollars in Millions)

	<u>FY2003</u> <u>Request</u>	<u>FY2003</u> <u>Approp.</u>	<u>FY2004</u> <u>Request</u>
NIF Construction and Other Project Costs	215.0	215.0	150.0
NIF Demonstration Program	75.7	75.7	96.3
Ignition	47.8	47.8	56.1
Experimental Support Technologies	<u>30.4</u>	<u>38.4</u>	<u>63.3</u>
TOTAL	368.9	376.9	365.7

The first four out of 192 planned laser beams at the NIF started operating at low power early this year, though they have yet to be focused on any target. As the power available from these beams increases and additional beams are brought into operation, NNSA will use funds from other program elements and from other campaigns to support experimental operations at the NIF. Funding for experiments may come from the Support of Stockpile Program in the ICF Campaign (2004 request = \$32 million); from the Primary Certification Campaign (2004 request = \$66 million); from the Dynamic Materials Properties Campaign (2004 request = \$82 million); and from the Secondary Certification Campaign (2004 request = \$55 million). However, it is impossible to determine from the budget request how much funding from those programs might be spent at the NIF.

OTHER PROGRAMS OF INTEREST

Following is funding information on additional specific programs of high public interest.

- o The budget requests \$320 M for the **Pit Manufacturing and Certification Campaign**. That is \$98 million (44 percent) above the 2003 appropriation of \$222 million, which includes \$25 million that Congress added to the 2003 request. Most of the funding is to be able to replace one W88 pit, which is destroyed during surveillance testing, every other year. From 1999 through 2004 over \$1.1 billion will have been spent on this program. At least another \$1 billion will be spent through 2008 to produce about 20 warheads to supplement the 400 W88s in the active stockpile. About \$40 million from the 2004 request is to develop technology, prepare a conceptual design, and site a multibillion dollar **Pit Production Facility**, capable of producing as many as 500pits/yr. Detailed design of that facility is scheduled to begin in 2006.
- o The 2004 request includes \$15 million for feasibility and cost estimates (phases 2 and 2a of the weapons acquisition schedule) for the **Robust Nuclear Earth Penetrator (RNEP)** warhead. Despite efforts by the U.S. Senate to prohibit the development of this new warhead last year, the House prevailed in authorizing the NNSA to continue work. Livermore Laboratory is reportedly redesigning the B83 nuclear "lay down" bomb under this program, while the Los Alamos Laboratory is further modifying the B61-11 for the same "bunker-busting" mission.

- o The budget requests \$24.9 million for **Enhanced Test Readiness** to reduce the time needed to prepare for and conduct a full-scale underground nuclear test from 3 years to 18 months. The Administration says that it has no plans to actually conduct a nuclear weapons test. However, such statements belie the fact that the NNSA is pursuing weapons developments that it will almost certainly have to test, before they can be adopted into the stockpile. The minutes of a Pentagon meeting, which were recently made public by the Los Alamos Study Group, revealed that Administration officials are planning to "reexamine the policy issues of the various levels of testing."
- o The budget requests a 52 percent increase for **Weapons Dismantlement and Disposal**. However, that brings the total to only \$37.7 million, or less than six-tenths of one percent of the Weapons Activities budget. In 2004, NNSA plans to increase dismantlement activities for the W56 (the last of which was removed from active deployment in 1990) and begin preparations for the B53 disassembly (all but seven of which were removed from active deployment in 1986). Thousands of additional warheads are no longer actively deployed, but have not been scheduled for dismantlement.
- o The 2004 request includes \$10 million to resume technology development for an **Advanced Hydrotest Facility (AHF)** that would be based on proton radiography instead of X-rays. The Administration proposed suspending work on the AHF in 2003. However, Congress provided \$20 million in the 2003 appropriation to continue research, development, and conceptual design activities. The Administration is joining the Congress in proposing continued study for this facility, which would cost about \$2 billion to build.
- o The budget requests \$134.9 million, an increase of \$13.7 million (14 percent) for the **Tritium Readiness Campaign**, which aims to resume producing tritium for nuclear weapons. Initial deliveries of tritium are now scheduled for 2007, which represents a one and a half-year delay, due to delays in construction of the **Tritium Extraction Facility (TEF)**. NNSA has increased its estimate of the total project cost for the TEF from \$401 M to \$506 M. The budget acknowledges that the Treaty of Moscow will reduce tritium needs. However, NNSA has not yet readjusted its production plans to correspond to the numbers in the Treaty. The Treaty calls for reducing the number of actively deployed strategic nuclear weapons by about half. A corresponding reduction of 50 percent in tritium requirements would delay the need to begin producing tritium by about 10-12 years.
- o The budget calls for conducting four **subcritical nuclear weapons tests** underground in Nevada, but it does not separately identify the funds needs for those tests.
- o The budget requests authority to expand the number of positions for which NNSA can pay its employees more than what the civil service laws allow from 300 to 800 positions.

About the Author: Dr. Robert Civiak has been doing research and policy analysis for more than twenty-five years. He received a Ph.D. in Physics from the University of Pittsburgh in 1974. From 1978 through 1988, he was a Specialist in Energy Technology and Section Head in the Science Policy Research division of the Congressional Research Service. During the spring and summer of 1988, he was a Visiting Scientist at Livermore Lab. From November 1988 through August 1999, he was a Program Examiner with the White House Office of Management and Budget. At OMB, his primary responsibilities included oversight of the national security activities of the Department of Energy.