

# **TRILLION DOLLAR TRAINWRECK**

**Out-of-control U.S. nuclear weapons programs  
accelerate spending, proliferation, health and safety risks**



**A REPORT FROM THE WEAPONS COMMUNITIES  
of the ALLIANCE FOR NUCLEAR ACCOUNTABILITY**

**APRIL 2016**

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## Avoiding the trainwreck

**P**roliferation begins at home. That has never been clearer than now, as the United States embarks on what many scientists at its nuclear weapons laboratories are calling “the second nuclear age.” The United States plans to spend \$1 trillion over the next 30 years to “modernize” all aspects of its nuclear arsenal: the bombs and warheads, the production facilities, the delivery systems, and command and control systems.

This plan directly benefits the private corporations that are invested in the maintenance and production of nuclear weapons and raises major questions of accountability. The directors of the Los Alamos, Livermore, and Sandia weapons labs also serve as CEOs of the for-profit corporations that are contracted to manage the labs. When they propose a never-ending cycle of Life Extension Programs, they are literally lining their own pockets!

*Trillion Dollar Trainwreck* focuses primarily on the FY 2017 budget for nuclear weapons and wastes. It highlights Life Extension Programs (LEPs), proposed new production facilities, and other projects at Department of Energy sites. Most of them are completely unnecessary for national security. All of them are mismanaged, behind schedule, and wildly over budget.

Despite a clear obligation under Article VI of the Nuclear Non-Proliferation Treaty to “pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date,” the United States continues to pursue LEPs that introduce exotic elective changes to the nuclear stockpile. Many LEPs will result in nuclear weapons with new military capabilities—contrary to promises made in the 2010 Nuclear Posture Review and assertions made by President Obama at the Nuclear Security Summit in March 2016.

The modernization programs outlined in this report, if carried out, will create untold tons of additional radioactive waste.

This would be irresponsible under the best of circumstances. Given the indefinite closure of the Waste Isolation Pilot Plant and the absence of any method of responsibly treating and storing high-level waste, the plan is reckless. Considering the astounding mess that already exists at former nuclear weapons production sites, including the Hanford Reservation, the Savannah River Site and many others, any proposal that will create additional waste is inexcusable.

Communities around former and current weapons facilities face on-going, increasing risks because the Department of Energy does not clean up its messes. In Washington state, leaking underground tanks are releasing high-level radioactive waste. Across the weapons complex, hundreds of abandoned nuclear production facilities remain contaminated, forcing NNSA to spend millions on maintenance to try to contain contaminants. While DOE demands, and Congress grants, an ever-larger budget for its nuclear weapons program, the budget to address DOE’s environmental mess is nearly flat year after year.

Add to this the problems with nuclear waste that has been generated over the past seven decades—high-level waste, transuranic waste, commercial spent nuclear fuel. Each kind of waste requires its own storage or disposal path. DOE’s attempts to build facilities or to persuade communities to host waste dumps is prone to the same mismanagement and procedural failures as its over-budget and over-schedule construction projects. For the time being, the safest, least expensive, and most sensible option is to store waste safely and securely where it is generated.

The Alliance for Nuclear Accountability, acting as a public interest watchdog over one of the federal government’s most dysfunctional agencies, can be expected to be critical of the culture of mismanagement and waste that prevails across the weapons complex. But there are some positive signs in the President’s FY 2017 budget that should be reinforced.

The DOE request that the Mixed Oxide fuel project (MOX) be terminated is one example. After years of throwing good money after bad,

**Trillion Dollar Trainwreck focuses primarily on the FY 2017 budget for nuclear weapons and wastes, highlighting projects at Department of Energy sites that are mismanaged, behind schedule, and wildly over budget.**

this pork-barrel project is finally getting what it deserves: closure. While termination of the project will cost \$500 million or more, it will result in significant cost savings in the long-term and will allow the United States to pursue safer, more sensible alternatives for plutonium disposition.

The W78/88-1 Interoperable Warhead, which was delayed for five years in the FY2015 budget, should be cancelled outright. The cost of this plan, which is opposed even by the Navy, is in the tens of billions of dollars. Even more worrying, the radical changes that could ensue from the mash-up of designs and components may compromise the weapon's reliability, leading to pressure to resume full-scale nuclear testing.

*Trillion Dollar Trainwreck* recommends an alternative approach to the nation's nuclear weapons stockpile—Curatorship—that would avoid making unnecessary and destabilizing changes to warheads.

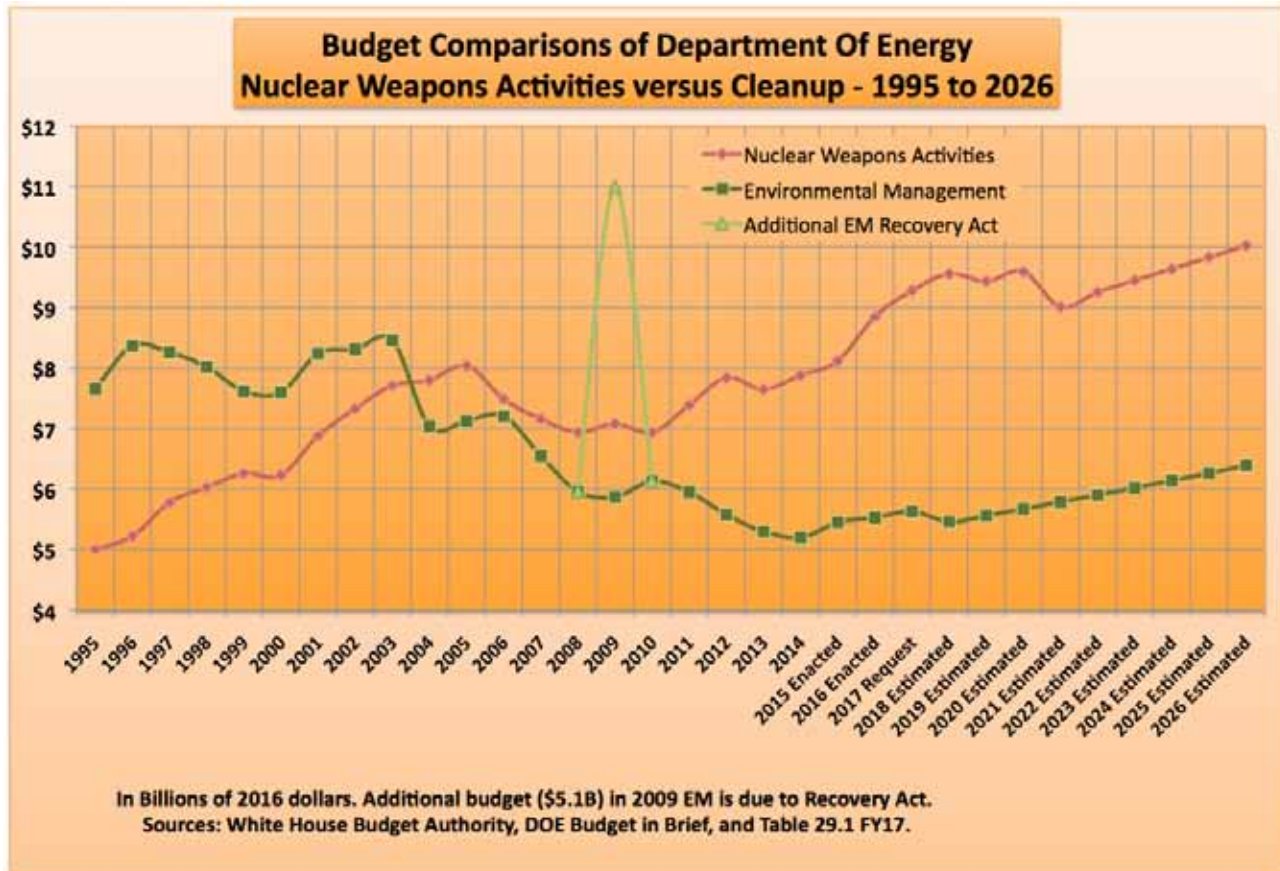
Curatorship is a conservative approach that requires rigorous surveillance of the active stockpile on an ongoing basis. Components are replaced only if compelling evidence from surveillance demonstrates that they have degraded to a point that significantly compromises safety or reliability. Replacement parts would be

(re)manufactured as closely as possible to their original designs, with a bias toward minimizing changes and preserving the weapon's reliability. Elective modifications to upgrade weapons would be curtailed.

While Curatorship is not in and of itself the disarmament called for under the Non-Proliferation Treaty, forswearing novel designs and features is more consistent with our treaty obligations and more supportive of our global nonproliferation objectives than the current program.

Examined together, the issues raised in this report are cause for great alarm. Some problems can be alleviated and dramatic cost savings realized by scrapping plans for future projects or reining in unnecessary elements. Other problems, most notably existing environmental contamination and high-level waste, must be addressed by redirecting the ever-rising budget for nuclear weapons production to cleaning up the widespread, dangerous mess that has already been made.

Failure to do so places workers, the public and the environment at ever greater risk of catastrophic consequences.



## RECOMMENDATIONS

- Congress should not appropriate the \$220.25 million requested in FY 2017 for the development of a new Long-Range Stand Off warhead. Instead, delay or cancel the program.
- Congress should ensure that any FY 2017 funding for the B61-12 Life Extension Program includes a NATO cost-sharing agreement before funds are released.
- At a minimum, Congress and the Administration should maintain the 5-year delay (to FY 2020) on development of novel “Interoperable Warhead” designs. Better yet, cancel the program.

## Life Extension Programs

The escalating cost of maintaining US nuclear weapons is due not to the difficulty of the task or to excessive “aging.” It is due to elective changes the National Nuclear Security Administration is introducing into the stockpile through Life Extension Programs (LEPs).

The FY 2017 budget request sets in motion a potential trainwreck of multiple overlapping LEPs and major alterations—W76-1, B61-12, W88, and W80-4—competing for facilities and personnel. Additionally, NNSA still has the ill-advised Interoperable Warhead LEP queued up for 2020. Each of these warhead programs requires close scrutiny of its rationale, the proposed scope of its design change, and its corresponding price tag.

Congressional leadership is essential this year to examine the W80-4 mission, decelerate its schedule, and constrain or eliminate its cost. For the B61-12, Congress should ensure that a NATO cost sharing agreement be instituted before any production units roll off the assembly line for deployment in Europe.

### W80-4 AND THE LRSO MISSILE

The Air Force plans to field 1000 new Long-Range Stand Off (LRSO) cruise missiles to replace the current air-launched cruise missile. The LRSO will be capable of carrying conventional or thermonuclear warheads. The nuclear version, indistinguishable from the conventional one, would be “uniquely destabilizing” according to former Defense Secretary William Perry, who called on President Obama to



Thermonuclear physics package—plutonium pit and highly enriched uranium secondary—of a W80 warhead.

cancel the LRSO and pursue a global ban on this weapon type.

NNSA is charged with developing a new nuclear warhead for the Air Force’s new LRSO missile. The proposed W80-4 would be a variant of the W80-1 that sits atop current cruise missiles. The Lawrence Livermore National Laboratory in California is the “lead lab” to design the W80-4.

The FY 2017 budget request seeks more than \$220 million for the W80-4 LEP, up from \$9 million two years ago, with funding slated to increase to more than \$636 million in FY 2021. Independent estimates of the overall LRSO missile and warhead costs come in around \$30 billion. Currently, NNSA’s W80-4 warhead development is at least a full year out in front of the Pentagon’s LRSO missile design, a “cart-before-the-horse” situation that may cause a significant escalation in the estimated pricetag.

**The new LRSO missile will be “uniquely destabilizing,” says former Defense Secretary William Perry.**

What does the nation get for \$30 billion? Certainly not a weapon required for “deterrence,” however one considers it. The US already possesses highly accurate, long-range land-based and sea-based ballistic missiles as well as nuclear gravity bombs. A new, stealthy, radar-evading LRSO weapon able to launch a sneak nuclear attack from thousands of miles away is by definition a potential first-use weapon.

In March 2016, Senator Dianne Feinstein, ranking member on the Senate Appropriations Energy & Water Development subcommittee, noted: “The so-called improvements to this weapon seem to be designed, candidly, to make it more usable, to help us fight and win a limited nuclear war. I find that a shocking concept.” In sum, the LRSO may cause nuclear instability greater than any calculated value to the arsenal.

At a minimum both the W80-4 warhead and the LRSO missile should be delayed. Cancellation of this costly, potentially destabilizing weapon, would save taxpayers \$30 billion or more.

### THE B61-MODIFICATION 12

The B61-12 bomb introduces significant modifications to the design of an already tested weapon. The B61-12 combines three tactical, or “battlefield,” versions of the B61

with a strategic version, the B61-7, to create a new all-purpose gravity bomb that will erase the distinction between tactical and strategic weapons. The Los Alamos and Sandia national laboratories, both in New Mexico, are the “lead labs” in this effort. Of the approximately 480 B61s slated to become B61-12s, about 180 will be forward deployed at six bases in five NATO countries, with the remainder housed at four bases in the US.

The NNSA FY 2017 budget requests more than \$616 million for the B61-12. Add a guided tail-fin kit, being designed separately by the Pentagon to create the world’s first nuclear “smart” bomb (another \$1.8 billion) and the total price estimate is \$10 billion or more, making each bomb worth about twice its weight in solid gold. The B61-12 will be designed to interface with future aircraft at an additional cost. For example, the estimate for the F-35 interface is \$350 million. Despite plans to deploy more than a third of the B61-12s in Europe for NATO defense, US taxpayers alone are footing the bill.

### W78/88-1: INTEROPERABLE WARHEAD

Ultimately, NNSA proposes to redesign the entire US nuclear weapons stockpile by creating three warhead types that could be

**The radical changes that could ensue from the mash-up of designs and components may lead to pressure to resume full-scale nuclear testing.**

launched from both land-based and sea-based platforms (hence, “interoperable”) along with the two new air-launched weapons noted above. NNSA has dubbed this the 3+2 strategy.

The first of these “interoperable” warheads, the W78/88-1, to be designed principally at Livermore, is estimated to cost around \$12 billion. Technical uncertainty and changes in the nuclear weapons complex necessary to implement the program will add tens of billions more. In 2015, development of the first Interoperable Warhead was frozen for five years. Still, NNSA insists the interoperable concept is on track to commence in FY 2020.

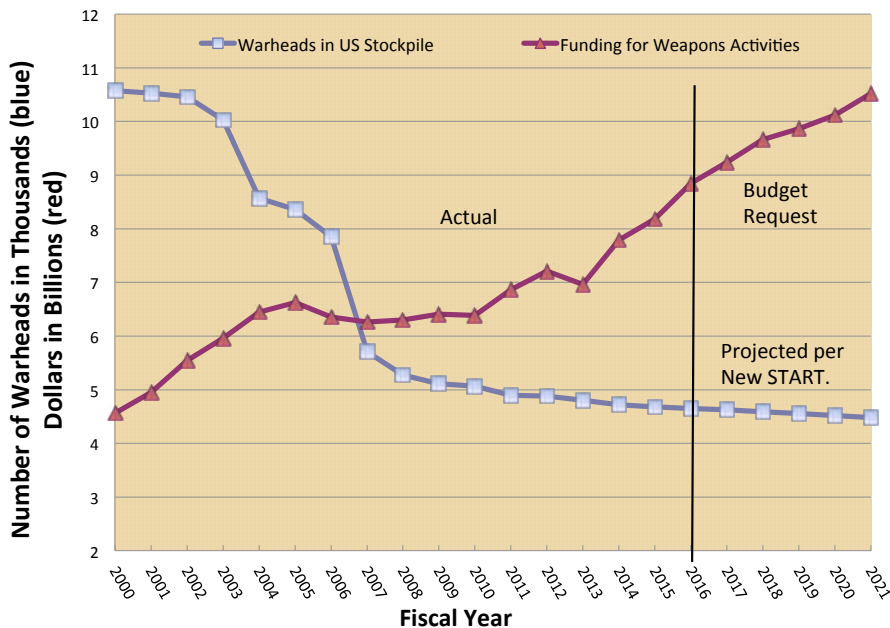
The W78/88-1 LEP concept is to use some elements from two ballistic missile warheads, the W78 and W88, and the plutonium core design from a third warhead, the W87. Some knowledgeable sources report the secondary for the W78/88-1 may come from a fourth weapon design. The resulting “interoperable” weapon could diverge significantly from anything in the stockpile and would contain components never tested together. An announcement that the W78 and W88 will be designed with different fuzing mechanisms further suggests the stated goal of interoperability may be compromised.

The Navy objected to the concept in September 2012. Further, the radical changes that could ensue from the mash-up of designs and components may compromise the weapons’ reliability, leading to pressure to resume full-scale nuclear testing.

Since the budget freeze was instituted, NNSA has announced that the W78 is “aging gracefully” and does not require a LEP. And the W88 is undergoing a significant alteration that includes a “refresh” of its high explosive component, obviating any need for a near-term LEP. No mash up of differing designs is required to maintain the safety and reliability of these warheads. The Interoperable Warhead program should be terminated.

### Fewer Warheads, More Spending

By Robert Civiak and Hans Kristensen 4/2/16



## RECOMMENDATIONS

Congress should stop pouring money down the Uranium Processing Facility drain until:

- A Site-Wide Environmental Impact Statement on the Modernization of the Y-12 Nuclear Weapons Complex is prepared.
- The UPF project has received formal Critical Decision-1 approval.
- The budget for Y-12 modernization, including the UPF, is made public.
- The secondary lifetimes report required by Congress has been produced by NNSA and an unclassified version made public.

## Billions for “secret” bomb plant

While Congress debates “modernization” of warhead designs and delivery vehicles expected to cost hundreds of billions of dollars, Tennessee Senator Lamar Alexander is keeping one key piece of the effort flying under the radar.

The Uranium Processing Facility, a bomb plant slated to be built in Oak Ridge, Tennessee, to manufacture the highly enriched uranium thermonuclear cores (also called secondaries) of warheads, was first proposed in 2005. The first UPF design collapsed when designers, who were 85% finished with their prints, realized the building was too small for the equipment it would need to house. This “space/fit” fiasco cost taxpayers more than half a billion dollars.

Fast forward to 2016. More than \$2 billion has been spent on the design of the UPF, with \$575 million more in the proposed FY 2017 budget. The latest version of the UPF is a bomb-production-only plant; other uranium operations originally planned for the UPF will continue to take place in dangerously deteriorating facilities at the Y-12 complex in Oak Ridge.

The total cost of this “modernization” is unknown. Senator Alexander is trying to hide this problem by withholding information from the public. He asserts the UPF will be built for \$6.5 billion, a number that is no longer credible. Estimates of upgrades to other Y-12 facilities range from the hundreds of millions to more than a billion dollars. The Defense Nuclear Facilities

By October 2017, NNSA will have spent \$3 Billion on the design of the Uranium Processing Facility; the design is expected to be nearing completion at that time.

\$3B

If NNSA meets the industry standard for design costs (6% of total cost for highly technical projects), the total cost of construction of the UPF will be around \$50 Billion.

NNSA insists the UPF will be completed for \$6.5 Billion meaning design costs will account for 50% of the total cost of construction.

\$3B

### REALITY CHECK

If design costs are as high as 20% of total construction costs, the UPF will cost \$15 Billion.

\$3B

**No credible budget? No schedule? No approved plan? No problem! Half a billion dollars is proposed for the UPF in FY 2017.**

Safety Board says the old buildings cannot be retrofitted to meet current seismic standards.

Adding to the mystery of Y-12 modernization are these three facts:

- No current plan for the UPF bomb plant has received Critical Decision-1 approval, a basic level of approval, from the Department of Energy.
- The Environmental Impact Statement being relied upon dates back to the initial design that has long since been scrapped.
- No need for the facility has been documented—Congress has twice required the NNSA to produce a study of secondary lifetimes; the agency has declined to provide any publicly accessible report.

Given the NNSA's consistent track record of massive cost overruns and almost infinite schedule delays, the refusal of any government official to account for the billions being spent on the UPF is outrageous.

## RECOMMENDATIONS

Congress should withhold funding for expanded plutonium pit production capacity until:

- Pit production is justified by actual, documented requirements for the existing stockpile, not controversial new nuclear weapons designs;
- All nuclear criticality issues are resolved;
- A formal Record of Decision to expand pit production is published following public review under the National Environmental Policy Act;
- The Waste Isolation Pilot Plant is fully reopened and all radioactive waste handling and treatment procedures at WIPP and LANL are certified to be safe.

Molten plutonium in a crucible



LOS ALAMOS NATIONAL LABORATORY

## Why more plutonium pits?

Independent experts have found plutonium pits—the radioactive trigger of every nuclear weapon—have reliable lifetimes of more than 85 years. That finding doomed the National Nuclear Security Administration’s last attempt to expand pit production capacity at the Los Alamos National Laboratory (LANL). No plutonium pits are currently scheduled for production, none are needed for the existing nuclear weapons stockpile, and more than 15,000 pits are in storage at the Pantex plant in Amarillo. Nevertheless, LANL is now planning to spend around five billion dollars to upgrade facilities to quadruple production capacity from twenty pits per year to eighty.

LANL envisions future pit production for an “interoperable” warhead, but the Navy doesn’t want the warhead. The program has been put on hold for at least five years and may never happen. At the same time, criticality safety issues have forced suspension of major plutonium operations since June 2013, and there has been no required public review under the National Environmental Policy Act of proposed expanded production. Moreover, LANL has no place to send radioactive wastes from pit production since an improperly prepared drum the lab sent to the Waste Isolation Pilot Plant ruptured, closing the multi-billion dollar repository indefinitely.

Despite all this, the congressional armed services committees are requiring LANL to demonstrate the capability to produce up to 80 pits per year by 2027. The committee’s “authorization” does not actually provide funding though, setting the

stage for budget battles in the appropriations committees.

The last plan for pit production, a super-sized “Nuclear Facility” for the Lab’s Chemistry and Metallurgy Research Replacement Project (CMRR), was cancelled in 2012 when its cost estimate exploded from an original \$750 million to \$6.5 billion. The latest plan to create the infrastructure for expanded plutonium pit production is to:

- Raise the amount of plutonium that can be used in the already built CMRR Radiological Laboratory from 8.4 grams to 400 grams, increasing its capacity for analytical chemistry samples to support expanded plutonium pit production. The remodeling and additional equipment will cost up to \$1 billion, when “only” \$400 million was spent to build and equip the Rad Lab in the first place.
- Upgrade and extend the life of LANL’s existing plutonium pit production facility. Cost: up to \$1 billion more.
- Build two or three “modular” underground structures by 2027 for the more hazardous production operations, expected to cost a billion dollars each. Given NNSA’s usual cost overruns, total costs may exceed the cancelled \$6.5 billion CMRR-Nuclear Facility.

Expanded plutonium pit production is not needed for maintenance of the existing reliable, extensively tested stockpile. Its purpose is to manufacture pits for future new nuclear weapons designs.

**No plutonium pits are currently scheduled for production, and none are needed for the existing nuclear stockpile.**



## RECOMMENDATIONS

- Shift funding from Life Extension Programs to non-proliferation and dismantlement programs.
- Terminate the boondoggle MOX program and increase funding for genuine nonproliferation programs.
- Prioritize verification and monitoring technologies to make a world free of nuclear weapons more technically and politically possible.
- Save taxpayer dollars in the long run by doubling funding for dismantlement capacity and operations.
- Make information about dismantlement progress transparent to the public.
- Dismantlements should be irreversible, leading to the global nuclear disarmament mandated by the Nuclear Non-Proliferation Treaty.

## Dismantlement and nonproliferation

Residents Obama and George W. Bush have agreed that nuclear terrorism is the single biggest threat facing our nation. Yet vital nuclear security programs are not being prioritized, even though they cost a small fraction of “modernization” programs and new production facilities. Adding nuclear weapons to an already bloated stockpile will not enhance our security against today’s global threats, but a comparatively small investment in nonproliferation would.

While funding for NNSA’s nuclear weapons research and production programs is slated to jump 14% to \$10.5 billion over the next five years, funding for crucial NNSA nonproliferation programs is being cut from 2016 levels—including a 21% cut to Global Nuclear Security, a program to keep nuclear weapons and materials out of terrorists’ hands; a 21% cut to Nonproliferation and Arms Control, designed to strengthen international nuclear safeguards and treaty compliance; and a 6% cut to Nonproliferation Research and Development, designed for enhanced detection of nuclear weapons and materials.

However, not all programs that claim to promote nonproliferation merit support. The boondoggle MOX program, which would use plutonium as fuel in civilian reactors, is a case in point.

It is in the security interests of the United States to provide consistent global leadership toward universal nuclear disarmament. The U.S. can start with increased funding for genuine nonproliferation programs.

### DISMANTLEMENTS

Dismantlement of retired US nuclear weapons has historically been a low priority of NNSA, Congress and the Administration. Even with a 33% increase (to \$69 million) in FY 2017, funding will be less than one percent of the NNSA’s nuclear weapons budget.

Even though NNSA’s dismantlement goals are remarkably unambitious, the agency fell short of its own goal by one-third in 2015.

Meanwhile, funding for Life Extension Programs to modify and upgrade existing nuclear weapons has jumped 25% to \$1.34 billion since FY 2015, with an additional 42% increase planned over the next five years.

Since the same facilities and workforce at the Pantex and Y-12 plants are needed to both build and disassemble nuclear warheads, life extension programs block dismantlements. Even with the 33% funding increase, NNSA expects only a 20% increase in actual dismantlements. The Obama Administration has dismantled only around 300 nuclear warheads per year. Increasing that to 360 warheads per year is of no real significance when there are up to an estimated 2,500 nuclear weapons awaiting dismantlement.

Investing in increased dismantlement capacity at NNSA’s Pantex and Y-12 plants would help enhance national security, set a solid nonproliferation example for the rest of the world, and permanently save hundreds of millions of taxpayer dollars by eliminating the need to indefinitely guard nuclear warheads.

**Investment in genuine nonproliferation and dismantlement programs is a win/win for the taxpayer, delivering more security per dollar than modernization programs.**

## RECOMMENDATIONS

- The scope of all Life Extension Programs should be limited to Curatorship.
- Maintaining fully tested designs and remanufacturing parts as closely as possible to original specifications will ensure the US arsenal remains safe, secure, and reliable until it is dismantled.
- The President should not request and Congress should not fund elective design changes for nuclear weapons.

## Curating a safe, reliable stockpile

The National Nuclear Security Administration is in the process of changing every warhead in the nuclear weapons stockpile. In pursuit of this goal, the agency has spent more than one hundred billion dollars over the last two decades. Billions more are sought today for new facilities and Life Extension Programs (LEPs) that go far beyond extending the service life of the weapons by adding novel capabilities and new military uses for them.

This enterprise is increasingly expensive. More than \$9 billion is requested for nuclear weapons research, development, testing and engineering in FY 2017. That's twice the amount spent in 2000 even as the number of warheads in the stockpile has dropped by half.

The proposed design changes are not needed to preserve the "safety" and "reliability" of existing warheads until the weapons are dismantled pursuant to the Non-Proliferation Treaty.

Fortunately, a superior, more conservative alternative exists: Curatorship.

The principles of Curatorship include:

1. Rigorous surveillance of the active stockpile.
2. Component replacement only if compelling evidence from surveillance indicates degradation with a significant loss of safety or reliability.
3. Replacement parts (re)manufactured as closely as possible to their original designs, with replacement protocols biased toward minimal changes.
4. Elective changes to upgrade weapons curtailed.

Curatorship preserves a safer, more reliable arsenal and would save taxpayers billions of dollars. While Curatorship falls short of US disarmament obligations in the NPT, forswearing novel designs and features is more consistent with our obligations and more supportive of our global nonproliferation objectives than the current program.

A 1993 Sandia Laboratory Stockpile Life Study,

reviewing thirty years of data, stated: "It is clear that, although nuclear weapons age, they do not wear out; they last as long as the nuclear weapons community (DoD and DOE) desires. In fact, we can find no example of a nuclear weapons retirement where age was even a major factor in the retirement decision." These findings underscore the feasibility of a Curatorship approach to stockpile management.

That same year, President Clinton issued a Presidential Decision Directive for DOE to "establish a stewardship program to ensure preservation of the core intellectual and technical competence of the US in nuclear weapons." Though a Curatorship approach would have met the Presidential directive, DOE took a more ambitious approach, asserting, "An alternative to nuclear weapons testing must be developed to verify the safety and reliability of weapons."

DOE said it would need \$4 billion annually to accomplish this mission. Since then, DOE has requested ever more money annually even as the size of the arsenal declines.

The budget outyears show continued growth for weapons activities, topping \$10.5 billion in FY 2021. The B61-12 LEP is the most expensive undertaken to date. The new Long-Range Stand Off warhead development presently underway, the Interoperable Warhead program NNSA hopes to revive in 2020, and the new bomb plants that would build those weapons, all add up to multiple scores of billions more.

There are other costs. Each of the changes proposed in these LEPs will erode confidence in the tested stockpile. Significant design changes will increase pressure to resume nuclear testing, with profound negative implications for US nonproliferation efforts.

The NNSA's endless queue of increasingly novel LEPs that alter the design of US nuclear weapons provides an opportunity to reconsider this dangerous and costly path. Now is the time to embrace the multiple benefits of nuclear weapons stockpile Curatorship.

**Since 2000, the amount spent for nuclear weapons research, development, engineering, production and testing has doubled, even as the stockpile has been reduced by half.**

## RECOMMENDATIONS

- DOE should release the annual Performance Evaluation Reports for contractors at each site in January and provide Life-Cycle Cost cleanup numbers with each annual budget.
- Congress should improve whistleblower protection laws: stop reimbursing contractor attorney fees and allow whistleblowers to have a federal jury trial with punitive damages available.
- Congress should prohibit lab directors from acting as presidents of for-profit corporations.

## Less accountability = More waste

The Department of Energy spends tens of billions of federal dollars every year. Approximately 90% of DOE's budget goes to for-profit contractors and large construction contracts. Many DOE projects are plagued by mismanagement, lack of oversight, and incompetence, which lead to massive cost and schedule overruns. The corporate veil hides details of these mistakes from public view. Whistleblowers' battles are long. Lack of transparency and accountability are core challenges in the effort to protect workers, the public, and the environment now and in the future.

The National Nuclear Security Administration oversees an ever-increasing budget to manage fewer warheads. The directors of Los Alamos, Livermore, and Sandia National Labs certify the US stockpile safe and reliable annually; at the same time, as CEOs of for-profit corporations that manage the labs, they propose a never-ending cycle of lucrative Life Extension Programs.

DOE's Office of Environmental Management (EM) is responsible for cleaning up the nation's most dangerous nuclear sites: large amounts of radioactive wastes, spent nuclear fuel, thousands of contaminated facilities, and contaminated soil and groundwater.

### MISSING INFORMATION

One way DOE attempts to control site contractors is with annual award fees based on performance evaluations. The evaluations are usually released to the public by January each year, but they have not yet been released this year—including the one for Los Alamos, whose contractor was fired due to poor performance.

Also missing this year are the EM Life-Cycle Cost estimates that capture the total time and cost estimates for cleanup at every site. The Life-Cycle Cost estimates, which include the total cleanup costs back to 1997, are one tool for the public to use to evaluate the cleanup program.

### PLENTY OF WRONG TRACKS

In 2014, the Waste Isolation Pilot Plant was shut down when an improperly packaged nuclear waste drum from Los Alamos ruptured, releasing radiation. The current cost estimate to reopen WIPP to full operational status tops \$500 million.

When management failures led to the scrapping of the initial design of the Uranium Processing Facility in Oak Ridge in 2012, Congress declined to investigate, no one was held accountable, and a half billion dollars was written off. Two billion dollars later, no design has been produced, and public requests for information are ignored by NNSA and elected officials.

Hanford's Waste Treatment and Immobilization Plant (WTP) is a poster-child for lack of accountability in the nuclear weapons complex. DOE is now working on the fifth attempt to design and build the high-level waste facility. A March 2016 court order stipulates the WTP will be fully operational in 2036, decades later than originally anticipated. At the current rate of spending—nearly \$700 million a year—taxpayers will pay over \$30 billion for the facility.

Unfortunately for the taxpayer, these examples are repeated almost any time DOE or NNSA undertakes a major project.

### TOWARD A SOLUTION

Congress should hold hearings, investigate, and use the power of the purse to take quick and decisive action when agencies such as the GAO, Defense Nuclear Facilities Safety Board, DOE's Office of Enterprise Assessments or Inspector General raise concerns.

True accountability will be achieved only by removing conflicts of interest. Drivers don't issue their own speeding tickets, students don't grade themselves. DOE should be subject to external oversight. Private contractors should be held to the standards and consequences they would face in the private sector.

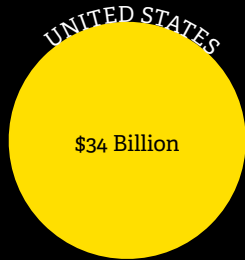
**Lack of transparency and accountability are core challenges in the effort to protect workers, the public and the environment now and in the future.**

# \$1 TRILLION TRAINWRECK

THE US PLANS TO SPEND A TOTAL OF \$872 BILLION TO \$1.082 TRILLION MAINTAINING THE CURRENT ARSENAL, BUYING REPLACEMENT SYSTEMS, AND UPGRADING EXISTING NUCLEAR BOMBS AND WARHEADS.

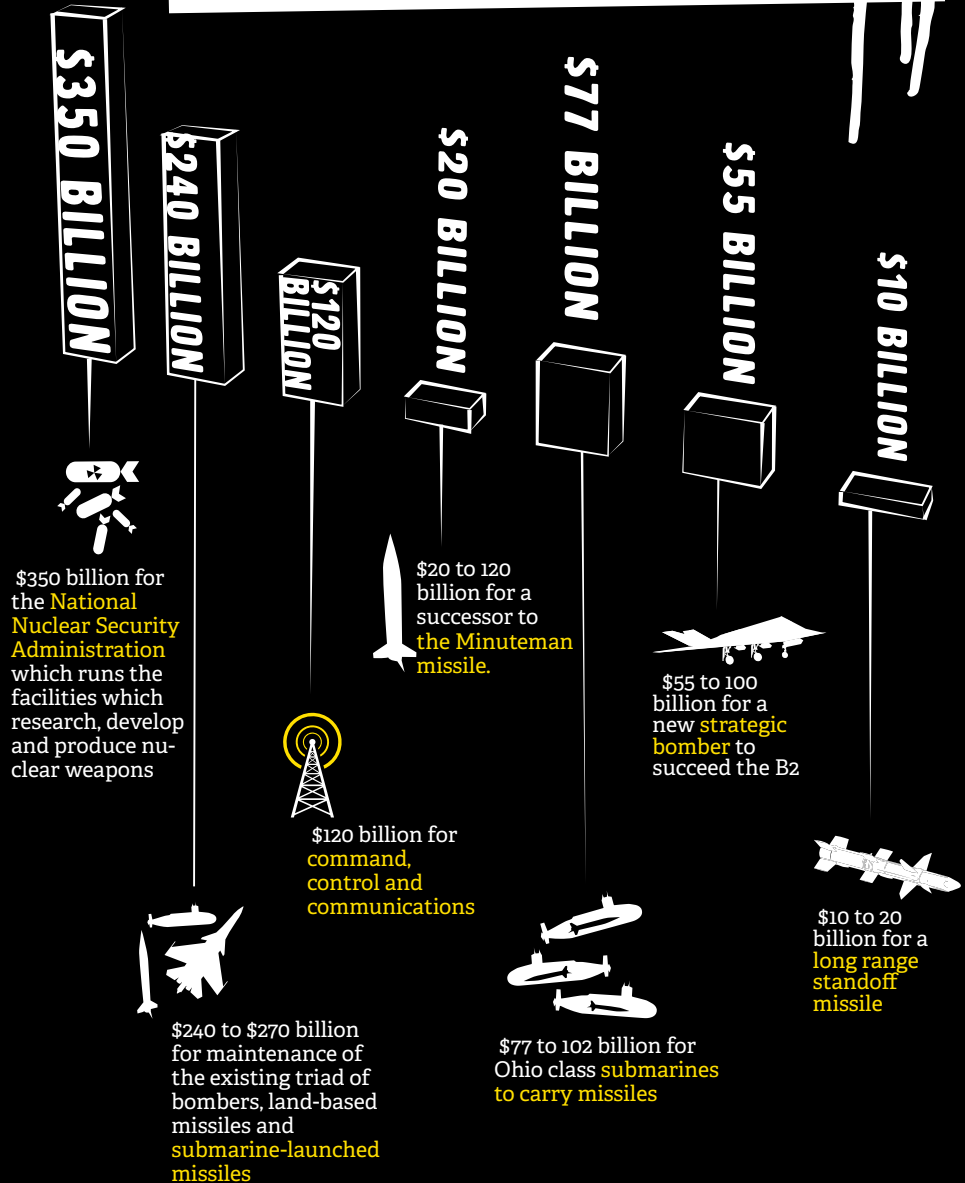
## HOW DO WE STACK UP?

ESTIMATED CORE COST OF NUCLEAR WEAPONS OF TOP 4 COUNTRIES IN 2011



\*Core costs refer to researching, developing, procuring, testing, operating, maintaining, and upgrading the nuclear arsenal (weapons and their delivery vehicles) and its key nuclear command-control-communications and early warning infrastructure

Analysts at the Monterey Institute of International Studies have projected likely expenditures on the program, based upon section 1251 of the National Defense Authorization Act for Fiscal Year 2010 and other official briefings. Their summary breaks down the 30 year budget in billions of dollars as follows:



**\$1 TRILLION SPENT OVER 30 YEARS = \$4 MILLION PER HOUR**

SOURCES: (1) *The Trillion Dollar Nuclear Triad: US Strategic Nuclear Modernization Over the Next Thirty Years* James Martin Center For Nonproliferation Studies, 2014 (2) *Global Zero Technical Report: Nuclear Weapons Cost Study*, Global Zero, 2011

## RECOMMENDATIONS

- Halt funding for the MOX Fuel Fabrication Facility and avoid devastating cuts to nonproliferation programs.
- Require DOE to begin an expedited environmental study of non-MOX plutonium disposition alternatives, including immobilization (via glassification) of plutonium in high-level nuclear waste and alternative use of the partially constructed MOX plant.
- Hold DOE and NNSA managers and contractor CB&I AREVA MOX Services accountable for massive cost overruns, project management failures, and design and construction problems.
- Modify the Plutonium Management and Disposition Agreement with Russia to stipulate the US will dispose of plutonium as waste, or exercise the agreement's provision allowing MOX not to proceed given unsustainable costs.

## MOX: Stumbling to termination

The problem-plagued plutonium fuel (MOX) project, to dispose of surplus weapons plutonium as nuclear fuel, is a monumental waste of money and is unlikely to ever accomplish its mission. Since the construction of the MOX plant at the Savannah River Site (SRS) is not financially sustainable, DOE requested in the Fiscal Year 2017 budget that the project be terminated.

The cost of construction of the MOX plant has soared from around \$1 billion to \$8 - \$12 billion and the project's life-cycle cost has skyrocketed to \$30 - \$50 billion or more. With \$5 billion already sunk into construction, MOX has become a pork-barrel program for SRS.

The NNSA's budget request of \$270 million to begin termination of MOX should be affirmed by Congress, which has consistently failed to provide proper project oversight. Termination could cost \$500 million or more, but it will result in large future savings.

The budget request states "the MOX fuel approach will be significantly more expensive than anticipated and will require approximately \$800 million to \$1 billion annually for decades." By appropriating \$345 million for MOX in each of the last two years, Congress has effectively placed the project on a shut-down track.

The Government Accountability Office has long-maintained MOX is subject to waste, fraud, abuse and mismanagement. Design flaws, construction errors, and lack of MOX customers could all be show-stoppers. DOE and its contractor,



HIGH FLYER, SPECIAL TO SRS WATCH

The MOX project at the Savannah River Site, March 2016

CB&I AREVA MOX Services, both bear responsibility for these failures.

Advocates of MOX argue the US-Russia agreement requires the US to dispose of 34 metric tons of plutonium as MOX fuel. The US should either exercise the agreement's provision allowing MOX not to proceed given its unsustainable cost, or modify the agreement to specify that the US will dispose of plutonium as waste.

The FY 2017 budget request includes millions of dollars for development of an alternate disposal option, "dilute and dispose," which would mix plutonium with a secret material called "stardust" for disposal in the now-closed Waste Isolation Pilot Plant. This questionable approach could cost around \$400 million per year. It faces major legal and environmental hurdles.

DOE must continue secure storage of plutonium and promptly reconsider "immobilization" of plutonium in high-level waste at SRS, a promising option that was terminated in 2002 for political reasons.

**With \$5 billion already spent on construction, MOX has become a pork-barrel program for the Savannah River Site.**

## RECOMMENDATIONS

- Congress should not fund consolidated interim storage for spent nuclear fuel. On-site storage at nuclear power reactors avoids transportation and handling risks and additional costs.
- Congress should not fund the proposed Yucca Mountain repository, which is technically flawed and strongly opposed by Nevadans.
- Congress should not fund additional “consent-based” programs which are premature until technical standards, a site selection roadmap, and a new nuclear waste agency are established.

## Safeguarding nuclear wastes

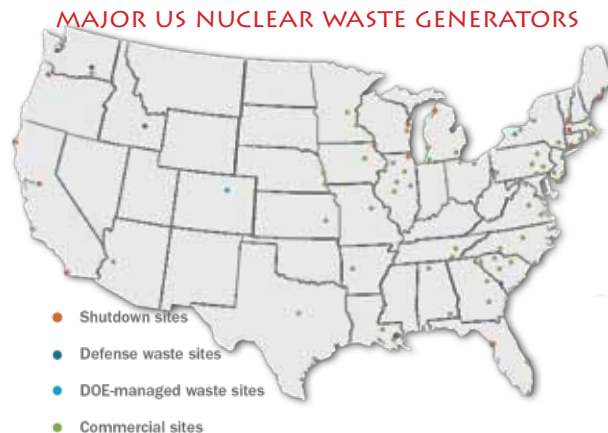
Nuclear weapons production and nuclear power plants continue to generate high-level waste and spent nuclear fuel, adding to the trillions of curies of radioactivity created in a variety of forms during the past 70 years.

Under existing law, the Department of Energy is responsible for siting and operating deep geologic repositories for those highly radioactive wastes that will threaten humans and the environment for thousands of generations.

Federal law required the first repository to operate by January 31, 1998; it was to become home to up to 63,000 metric tons of commercial spent fuel and 7,000 metric tons of defense high-level waste and spent fuel. But the site chosen for the repository by Congress in 1987—Yucca Mountain in Nevada—is technically flawed. It is also strongly opposed by the majority of Nevadans and will never operate.

Clearly, the law is unworkable and must be changed. Congress should begin an extensive public process to enact a new law that requires development of standards for technically suitable repository sites, establishes a nuclear waste agency, defines federal and state regulatory roles, provides for federal funding for defense wastes and utility funding for commercial spent fuel, and sets out a process for siting nuclear waste facilities based on free, prior, and informed consent.

The DOE’s current “consent” process is premature because there are no technical standards and DOE is not the proper waste management agency. As the Blue Ribbon



Commission on America’s Nuclear Future concluded in 2012: “A new single-purpose organization is needed to provide the stability, focus and credibility that are essential to get the waste program back on track.”

Defense high-level waste and spent nuclear fuel must continue to be safely stored at DOE sites—including Hanford, WA; Savannah River Site, SC; Idaho National Lab, ID; and West Valley, NY—and commercial spent fuel must be safely stored at sixty-one operating reactor sites and thirteen closed commercial plants.

Congress should not fund consolidated interim storage, which is dangerous because of the additional handling and transportation required, unnecessary because waste can remain at the existing locations for decades, and expensive because it adds its own unneeded costs to what will be an expensive repository program. Hardened, on-site storage is a more reasonable alternative at the present time.

**DOE’s current “consent” process is premature because there are no technical standards.**

## RECOMMENDATIONS

- Congress should provide sufficient funding for safe transuranic waste storage at existing sites.
- DOE should not re-open the contaminated Waste Isolation Pilot Plant site until all safety requirements are met.
- DOE and Congress should re-affirm that WIPP is only for defense transuranic waste.

## Leaving radioactive waste where it is

**M**anufacturing plutonium pits for nuclear weapons has produced more than 145,000 cubic meters of transuranic (TRU) waste, the majority created at the Rocky Flats Plant in Colorado. Much of that waste was shipped to the Idaho National Laboratory (INL) for storage. Idaho was promised that the waste would be removed by 1980; instead, shipments to INL continued even after that date.

In 1979, Congress authorized the Waste Isolation Pilot Plant in southeastern New Mexico as the first deep geologic repository site for that TRU waste. The WIPP Land Withdrawal Act of 1992 established numerous safety, financial, and transportation requirements for the waste repository. In 1995, the state of Idaho and the Department of Energy signed a Settlement Agreement that set milestones to remove TRU waste from Idaho by 2018.

WIPP received its first waste shipment in March 1999. By then, WIPP was supposed to dispose of the “legacy” waste from Rocky Flats and other sites by 2024. New waste would thereafter be disposed in other unspecified repositories.

However, WIPP has been shut down since February 2014 following two events: an underground fire and a radiation release caused by improper packaging of a drum from Los Alamos National Laboratory.

More than 91,000 cubic meters of waste has been placed in WIPP. But with thousands of feet of underground tunnels contaminated by the radiation release, WIPP can no longer be a “start clean, stay



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DOE sites across the country produced transuranic waste.

clean” facility and must have safety upgrades.

The schedule and cost to restore underground air ventilation to the previous operational requirements are unknown, but DOE reports it plans to resume normal operations in 2021. In the meantime, Congress must provide adequate funding for the waste to be safely stored at INL, as well as Hanford, WA; Savannah River Site, SC; Los Alamos, NM; Oak Ridge, TN; and smaller amounts at nine other sites.

Although WIPP is shut down and more than 35 years of federal laws and agreements with New Mexico limit the site to defense TRU waste, there are proposals to expand the facility to accept commercial waste and defense high-level waste. Congress should reject any expansion of WIPP.

Congress should also begin an extensive public process for new federal legislation to develop the multiple repositories necessary for TRU and high-level waste and spent nuclear fuel.

**WIPP has been shut down since February 2014 following a fire and radiation release.**

## RECOMMENDATIONS

- DOE and Congress should fully fund high-level waste stabilization at Hanford, Savannah River, and Idaho. Funding should provide for new environmentally compliant tanks at Hanford and meeting tank closure milestones at Savannah River.
- Congress should require an independent audit of Hanford's Waste Treatment Plant.

## The high-level waste threat

Where does plutonium for bombs come from? When enriched uranium is irradiated in a nuclear reactor, it creates plutonium and other radioactive elements in the fuel rods. Bombmakers extract plutonium from spent fuel to use in bombs by “reprocessing” it. This produces high-level waste (HLW), a chemically toxic, intensely radioactive liquid.

The Department of Energy has spent tens of billions of dollars trying to safely store and stabilize this single waste stream at three of its sites, and it will spend tens of billions more in the coming decades.

The waste treatment plants in Washington state and Idaho do not work. DOE ignored its own experts' warnings and lessons that could have been learned from the South Carolina site.

Compounding its problems, DOE has frequently failed to ask for adequate funding to meet the challenges posed by high-level waste, leaving workers, public health, and the environment threatened, and ultimately increasing the final cost of solving its high-level waste problem.

Hanford, bordering the Columbia River in Washington state, stores 56 million gallons of HLW in 177 old, buried tanks. A third of the tanks have leaked. So far, \$19 billion has been spent on HLW treatment at Hanford. Taxpayers have paid more than \$7 billion for the Waste Treatment Plant, designed to immobilize this waste in glass. The final bill for the WTP will be \$30 billion if the current rate of spending continues. The WTP won't be fully operational until 2036. New tanks are needed now.



\$7 billion has already been spent on the Waste Treatment Plant at Hanford; it won't open for decades.

At the Savannah River Site in South Carolina, the HLW program is set to produce only 100 canisters of glassified waste (about 60 cubic meters) in FY 2017, far below capacity. After agreeing to a tank closure schedule with the state of South Carolina, DOE has failed to ask Congress for enough money to fund the program, and only 8 of 51 tanks have been “closed.” Even though DOE has asked for more funding in 2017 to close tanks, it will still take decades to solidify the remaining waste. The production rate for canisters should be doubled.

The Idaho National Laboratory has 900,000 gallons of liquid HLW remaining in buried tanks. INL has already missed the deadline for treating them and will quite possibly miss the revised deadline as well. State of Idaho fines have added to DOE's HLW price tag, which will eventually exceed \$1,000 a gallon.

DOE's newest plan—to dispose of HLW in a defense-waste-only repository—has already created stiff public opposition. A defense-only repository couldn't solve the tank waste problems anyway, since most HLW won't be ready to ship for decades. In the meantime, tanks deteriorate and erode, and the risks posed by the highly radioactive wastes inside grow.

**DOE's failure to seek adequate funding to address high-level waste now increases current and future risks and costs.**



## RECOMMENDATIONS

- Congress must provide sufficient funding for timely cleanup to meet all state and federal legal milestones.
- Spending on nuclear weapons should not undercut funding for DOE's cleanup program.
- Congress should increase federal and state regulatory authority over DOE.

## Bombs? Yes! Cleanup? Not so much

The Department of Energy established its Environmental Management program in 1989 after decades of uncontrolled pollution from nuclear weapons production turned weapons facilities into Superfund sites, caused grave environmental harm, and imperiled public health. Decades later, despite significant progress, much remains to be done.

Why? One major reason is that DOE demands and Congress grants an ever-larger budget for its nuclear weapons program. The country is well on its way to spending \$1 trillion in the next thirty years to make our nuclear weapons more deadly than ever. But there is no such commitment to growing the budget to address DOE's environmental mess. In the competition for limited dollars, cleanup funding always loses to production. It is perennially flat even though some of the most serious environmental challenges remain or are growing.

More than forty percent of the cleanup budget goes to one waste stream: high-level liquid waste (HLW) stored in buried tanks at the Hanford Reservation in Washington, the Savannah River Site in South Carolina, and the Idaho National Laboratory. To say that none of these programs is going particularly well is an understatement; DOE has missed legally enforceable deadlines for emptying the buried waste tanks at all three sites.

At the same time, other essential work is underfunded, which ultimately results in higher costs for the taxpayer and environment. The President's 2017 budget request for all the cleanup work at Hanford besides the HLW tanks and treatment



Until 1970, plutonium waste was dumped in unlined trenches at many DOE sites. It may never be cleaned up.

**At Los Alamos, buried plutonium waste is moving toward public drinking water supplies. There is no funding to clean it up.**

plant is a whopping 20% smaller than this year's budget.

Until 1970, DOE dumped plutonium-contaminated waste in unlined pits at a number of sites, including the Idaho and Los Alamos national laboratories. Though contamination from the Los Alamos pits is migrating toward public drinking water supplies, there is no funding to dig up the waste and remove it. At sites run by the NNSA weapons program, heavily contaminated, unoccupied buildings are not being cleaned up.

Strengthening federal and state regulatory authority over DOE would help correct this downward drift. Presently, DOE is "self-regulating" with respect to management of radioactive material, but, of course, self-regulation is no regulation. Congress should amend federal laws to remove exemptions and permit regulation of radioactive materials by states and other federal agencies.

## RECOMMENDATIONS

- Congress should authorize, appropriate and “fence” funds in the FY 2017 NNSA budget to establish a separate account to initiate cleanup of the agency’s highest priority “excess high-risk facilities.”
- Congress should authorize a separate line item, with proposed deactivation and decommissioning funds coming from NNSA and Environmental Management, in future budget requests.

## “Ever-increasing levels of risk...”

At NNSA sites across the country, “cleanup” is further complicated by the presence of heavily contaminated, deteriorating facilities that are no longer occupied, not slated for future use and not scheduled at a date certain for Deactivation and Decommissioning.

In 2015, the Department of Energy’s Office of the Inspector General identified 374 of these “excess high-risk facilities” and pegged the likely date for their cleanup at 2035 or later. NNSA wants to transfer these facilities to the DOE Office of Environmental Management for decommissioning. EM does not have the funds to accept them.

The top ten list of these hazardous facilities includes three sites at the Y-12 complex in Oak Ridge, Tennessee, four at Livermore Lab in California, two at Los Alamos Lab in New Mexico, and one in Kansas City, Missouri.

News reports of the top ten list included dramatic photos of contaminated buildings with several inches of standing rainwater covering the floor.

The competition between weapons production activities and cleanup/health/safety issues is thrown into stark relief when it comes to abandoned facilities.

Cleaning up these facilities is hampered not only by inadequate funding, but also by security issues. At Y-12, for example, the number one facility on the list, the Alpha-5 building, is in the restricted high security area that includes on-going production of nuclear weapon components, so security concerns severely limit access to the site.



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A 2008 estimate of the cost of cleaning up the Alpha-5 building in Oak Ridge was \$873 million; seven years later, the facility was ranked #1 on the “Excess high-risk facilities” list.

Delays in cleaning up these facilities expose “employees and the public to ever-increasing levels of risk,” according to the Inspector General’s report.

NNSA is now spending millions to fix leaking ventilation systems and put new roofs on abandoned facilities to prevent the weather from further mobilizing contaminants.

One million dollars will be spent this year to re-roof Livermore Lab’s four highest-risk facilities alone. Millions more will be spent across the complex for stop-gap measures and temporary “fixes.”

Communities that have served the nation for decades, and continue to perform “essential missions,” deserve protection from avoidable risks. Congress fails its constituents when it leaves them exposed to ongoing, growing threats.

**Workers and the public are exposed to “ever-increasing levels of risk,” according to DOE’s Inspector General.**

## Acronyms

CMRR	Chemistry and Metallurgy Research Replacement Project
DoD	Department of Defense
DOE	Department of Energy
EM	Environmental Management
FY	Fiscal Year
HLW	High-Level Waste
INL	Idaho National Laboratory
LANL	Lawrence Livermore National Laboratory
LEP	Life Extension Program
LLNL	Lawrence Livermore National Laboratory
LRSO	Long Range Stand Off
NATO	North Atlantic Treaty Organization
NNSA	National Nuclear Security Administration
NPT	Nuclear Non-Proliferation Treaty
MOX	Mixed Oxide Fuel
SRS	Savannah River Site
TRU	Transuranic
UPF	Uranium Processing Facility
WIPP	Waste Isolation Pilot Plant
WTP	Waste Treatment and Immobilization Plant

## ALLIANCE FOR NUCLEAR ACCOUNTABILITY

Beyond Nuclear  
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Concerned Citizens for Nuclear Safety  
Fernald Residents for Environmental Safety and Health  
Georgia WAND (Women's Action for New Directions)  
Hanford Challenge  
Heart of America Northwest  
Institute for Energy and Environmental Research (IEER)  
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Savannah River Site Watch  
Snake River Alliance  
Southwest Research and Information Center  
Tri-Valley CAREs (Communities Against a Radioactive Environment)  
WAND (Women's Action for New Directions)  
Western States Legal Foundation  
Women's International League for Peace and Freedom

The Alliance for Nuclear Accountability is a national network of organizations working to address issues of nuclear weapons production and waste cleanup.

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