



# ACCOUNTABILITY AUDIT

Reducing risks and saving billions  
across the US nuclear weapons complex



Alliance for Nuclear Accountability  
May 2017



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# Let's talk about winning

**W**INNING FOR the American people has been a constant theme of Donald Trump's campaign and presidency thus far. In this report, we do not talk about winning a nuclear arms race or a nuclear war.

As President Ronald Reagan said in the 1984 State of the Union address, "A nuclear war cannot be won and must never be fought. The only value in our two nations possessing nuclear weapons is to make sure they will never be used. But then would it not be better to do away with them entirely?"

The Department of Energy (DOE)'s National Nuclear Security Administration (NNSA) is doing the exact opposite of what President Reagan suggested thirty-three years ago. NNSA's many in-process and planned programs to "modernize" or extend the lives of nuclear warheads, along with its ambitions to pour tens of billions of dollars into the nuclear weapons production complex, would ensure that the United States continues to possess nuclear arms through the end of the 21st century. Some Life Extension Programs seem designed precisely to make the nuclear bombs and warheads more "useable" in a battlefield scenario.

NNSA's Life Extension Program follows the DOE tradition of low-balling initial cost estimates for major projects, relying on Congress to provide ever-increasing funding as the projects inevitably balloon in cost.

Effective oversight and accountability, rarely exhibited in the world of DOE, can save taxpayers billions of dollars, increase protections for worker and public health and safety, provide better options for cleaning up and dealing with extraordinarily toxic wastes, and enhance our national security.



**BREAKING: Trump to #morningjoe on the nukes tweet: 'Let it be an arms race'**

This report, prepared by the Alliance for Nuclear Accountability, details many of the problems at Department of Energy nuclear facilities and what must change in order to produce results that benefit the environment and the American people.

## Over budget, behind schedule

Billions of dollars flow without accountability to contractors working on botched facilities such as the Uranium Processing Facility (UPF) in Tennessee, the Mixed Oxide Fuel Fabrication Facility (MOX) in South Carolina, and the Waste Treatment Plant in Washington State.

The UPF is already \$3 billion in the hole, and the project design won't reach 90% completion until September 2017. This for a facility originally projected to begin operations in 2018 at a total cost of \$1.5 billion at the upper end.

Five billion dollars has already been wasted on MOX construction. The facility is only 28% complete. The MOX program poses grave proliferation risks and its product has no potential customers. In each of the last two years, Congress allocated \$340 million to MOX, putting the project on a termination track. MOX must be put to bed for good.

## Dangerous and unnecessary

The Los Alamos National Laboratory (LANL) plans to spend at least \$5 billion to expand and upgrade its facilities in order to increase plutonium pit production capacity from 20 pits per year to 80. However, new plutonium pits are not needed for the existing nuclear weapons stockpile, and over 15,000 excess pits are in storage at the Pantex Plant

By shifting our attention from winning a nuclear arms race to winning for the human race, we can clean up the mistakes and accidents of the past and create an environment in which this generation and future generations can thrive.

in Texas. This \$5 billion plan is being pushed by the congressional armed services committees, which are requiring LANL to have the capability to produce up to 80 new pits per year by 2027.

NNSA's skyrocketing costs are also the result of increasingly exotic elective changes to nuclear warheads and bombs that are being introduced through Life Extension Programs (LEPs). Three LEPs are of immediate and extreme concern: the Long-Range Stand Off missile and warhead, the B61-12 nuclear "smart bomb," and the IW-1 "interoperable" warhead. These LEPs are extremely expensive, uniquely destabilizing, and largely unnecessary.

### Outdated priorities

In President Obama's final budget, funding for nuclear weapons projects rose while NNSA nonproliferation programs were cut by 20%. All indications point to President Trump continuing these cuts, or even deepening them. Programs such as Global Nuclear Security, which aims to keep nuclear weapons and materials out of terrorists' hands, deserve support.

Meanwhile, dismantlement of retired nuclear warheads continues to receive less than 1% of NNSA's nuclear weapons budget. An estimated 2,500 nuclear weapons are currently queued for dismantlement. The Obama administration had a poor dismantlement record, managing to dismantle approximately 300 weapons annually. Increasing dismantlement capacity would set a solid nonproliferation example for the rest of the world. It would also save hundreds of millions of taxpayer dollars by eliminating the need to guard "retired" nuclear warheads indefinitely.

Over the decades, Congress has provided billions of dollars in subsidies to the nuclear energy industry. Time and again, the nuclear energy industry has proven that it is incapable of competing on a level playing field with other energy sources. Congress should refuse further public subsidies or bailouts to the nuclear industry, including for "small modular reactors."

### A win-win on cleanup

The legacy of the Cold War nuclear arms race is still with us today. DOE estimates it will cost \$400 billion over 75 years to clean up large volumes of contaminated soil and water, and dispose of large quantities of radioactive waste. This estimated cost of comprehensive cleanup is less than half the cost of the planned 30-year, \$1 trillion nuclear weapons "modernization" plan. Cleanup can be a real win-win for the people and the environment, creating thousands of high paying jobs while permanently protecting the public and the environment.

### Who wins?

There is a disconnect between what best serves taxpayers and the activities being funded by Congress in DOE's nuclear weapons programs. Instead of prioritizing cleanup and waste treatment programs and requiring contractors to deliver on time and on budget, DOE's programs and projects are protected by key members of Congress who sit on the committees that control the agency's budget.

Many of these members represent districts that stand to benefit from money poured into DOE site budgets; they also receive campaign contributions from the corporations who contract to do the work at DOE sites. So an economic arrangement drives programs that should, instead, be driven by concerns about nuclear security, public and worker health and environmental protection concerns, as well as by common sense decisions about nuclear waste and nuclear power.

Right now, the big winners in the Department of Energy's nuclear weapons and waste programs are corporations that ignore budgetary and schedule constraints, and nuclear weapons laboratories that seek ever-more-complex nuclear weapons "modernization" programs to keep themselves in business.

By shifting our attention from winning a nuclear arms race to winning for the human race, we can clean up the mistakes and accidents of the past and create an environment in which this generation and future generations can thrive.

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# A new Cold War

**P**RESIDENT-ELECT Donald Trump tweeted, “The United States must greatly strengthen and expand its nuclear capability...” The following day he reportedly said, in reference to Russia: “Let it be an arms race.”

On Inauguration Day, the new President was briefed on the US stockpile of 4,000 nuclear warheads and bombs plus the 2,800 nuclear weapons administratively “retired” but not dismantled. The nuclear launch codes and “briefcase” containing them began accompanying him at all times.

President Trump has denounced the New START agreement limiting strategic (long range) deployed nuclear weapons equally between the US and Russia as a “bad deal.” He has rebuffed Russian President Vladimir Putin’s inquiry about its possible extension, embraced a science advisory board’s recommendations to develop novel nuclear options including extremely low-yield nukes as a “tailored option for limited use” on a conventional battlefield, ordered a new Nuclear Posture Review using language mimicking the advisory board’s report, sparked calls for resumption of nuclear explosive testing in Nevada, and tweeted incorrectly that “we have fallen behind on nuclear weapons capacity...”

The nuclear risks are many and growing. A new nuclear arms race is gaining speed. The US and Russia today possess more than 90% of the world’s nuclear weapons. Former Secretary of Defense William Perry noted in January, “We are starting a new Cold War. We seem to be sleepwalking...”

A February report by the Congressional Budget Office suggests that the trillion dollar nuclear modernization program begun under President Obama, now being accelerated by Trump, may cost

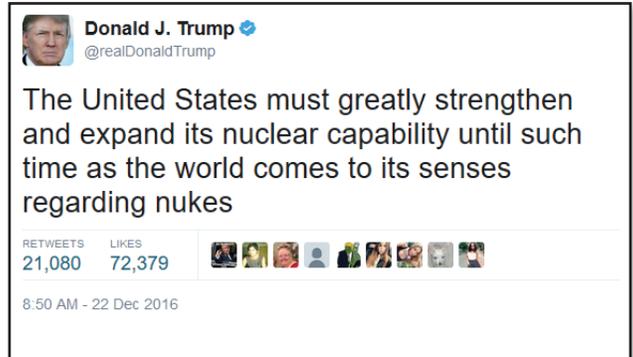
more than a trillion over the coming 30 years. In March, the Trump Administration produced the outlines of its fiscal year 2018 budget with an 11.3% increase for DOE’s National Nuclear Security Administration, offering an extra \$1.4 billion for weapons development and production. As we go to press, a provocative war of words and posturing has arisen between Trump and North Korea’s Kim Jong-un.

Clearheaded thinking and a rational stance are necessary to de-escalate rising nuclear dangers and ensure the safety of US citizens and people around the world. The humanitarian consequences of a nuclear exchange are so profound that, as President Ronald Reagan famously said, such a war “must never be fought and cannot be won.”

Today, it is time to emphasize longstanding policy and treaty commitments, including but not limited to continuing the quarter-century ban on nuclear explosive testing and observance of New START and the Treaty on the Non-Proliferation of Nuclear Weapons (NPT).

The NPT entered into force in 1970, and was indefinitely renewed in 1995. With 189 signatory countries, including the US, it represents a grand bargain obligating the nuclear weapons states to negotiate disarmament of their arsenals and to not assist a non-nuclear weapon state in obtaining a nuclear weapon. At the same time, the NPT requires non-nuclear weapons states to forgo acquisition of such weapons and to place their nuclear facilities under international safeguards verified by the International Atomic Energy Agency.

The New START Treaty is a bilateral treaty



## RECOMMENDATIONS

The fiscal year 2018 budget must constrain nuclear weapons development and new production activities. No money should be expended to increase US nuclear explosive test readiness.

The Nuclear Posture Review process must be transparent and inclusive. The NPR should reaffirm the centrality of treaty compliance, including the Non-proliferation Treaty disarmament obligation, and avoid exacerbating nuclear dangers represented by explosive nuclear tests, novel weapon designs, and the notion of “limited nuclear war.”





# LEPs: Introducing stockpile uncertainty

**T**HE ESCALATING COST of maintaining US nuclear weapons is due neither to the difficulty of the task nor to their excessive aging. It is caused by increasingly exotic elective changes that NNSA is introducing into the stockpile through Life Extension Programs (LEPs).

NNSA has multiple LEPs and a major alteration competing for many of the same facilities and personnel: the W76-1, B61-12, W80-4, and W88 Alt370. In addition to these, some weapons designers are pressing to resume development of an Interoperable Warhead (IW-1) deferred by Congress and the prior administration until FY2020.

The Trump Administration's top-line "skinny budget" released in March calls for a \$1.4 billion

increase for NNSA and singles out LEPs as a beneficiary. Before Congress acquiesces to this kid-in-the-candy-store budget request, leaders should examine the W80-4 mission and schedule, take a fresh look at estimates for the B61-12, and investigate the IW-1 technical uncertainties and cost.

## Curtail or cancel the LRSO

The Air Force plans to field approximately 1,000 Long-Range Stand Off (LRSO) cruise missiles to replace current air-launched cruise missiles. The LRSO will be capable of carrying conventional or thermonuclear warheads, making it "uniquely destabilizing" according to former Secretary of Defense William Perry and others. Former Assistant Secretary of Defense Andy Weber has called on the Trump Administration to cancel the LRSO and instead pursue a global ban on nuclear-tipped cruise missiles.

Estimates for the missile and warhead come in around \$30 billion. The warhead for the new missile, dubbed the W80-4, would be a variant of the W80-1. The

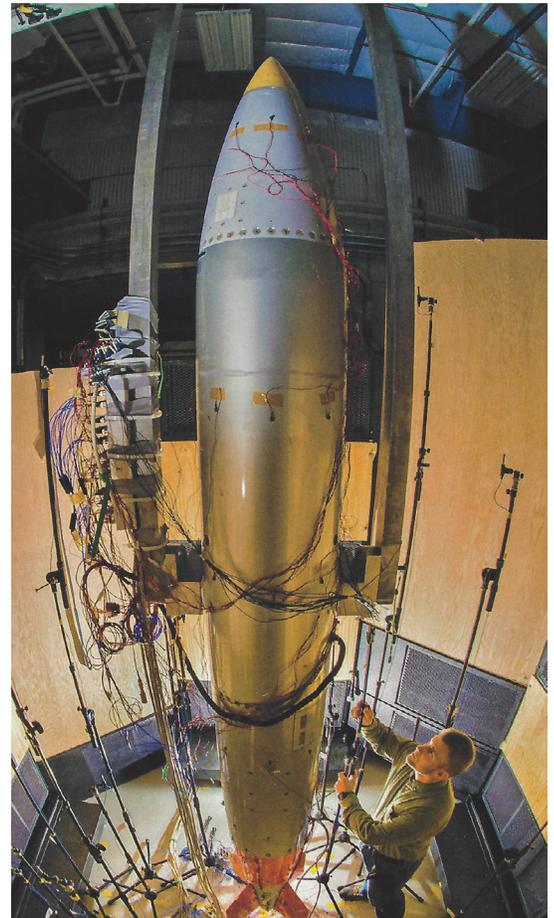
## RECOMMENDATIONS

LEPs should be limited to maintenance of existing designs, and re-manufacture of parts should hew carefully to original specifications. This approach, called Curatorship, will best ensure the US arsenal remains safe, secure, and reliable until it is dismantled. It will also save billions.

W80-4 funding should be constrained pending elimination of the LRSO program.

The B61-12 should not proceed in the absence of a NATO cost-sharing agreement.

The IW-1 funding delay should remain in place pending investigation into the warhead's technical risk and cost. Subsequently, the IW-1 should be considered cancelled.



A B61 undergoes assessment during the Life Extension Program at Sandia National Lab.

Lawrence Livermore National Laboratory (LLNL) has been designated as lead lab for the W80-4.

Last year's budget request revealed W80-4 warhead development is a full year ahead of its missile design, which could cause a significant escalation in cost. An April 2017 Government Accountability Office (GAO) audit of NNSA found the W80-4's low-range cost estimate lacks credibility.

What's the nation getting for its billions? Certainly not a weapon required for deterrence. The US already possesses highly accurate, long-range land and sea-based ballistic missiles as well as nuclear gravity bombs. A new, radar-evading LRSO weapon able to launch a sneak nuclear attack from thou-

**If NNSA had its way, it would redesign the entire stockpile, creating three warhead types that could be launched from land- and sea-based platforms along with the air-launched LRSO and B61-12 gravity bomb.**

sands of miles away qualifies as a potential first-use weapon.

The Nuclear Cruise Missile Reconsideration Act of 2017 (S.574) would cap LRSO funding at fiscal 2017 levels until the Trump Administration submits its Nuclear Posture Review to Congress. Said co-sponsor Senator Dianne Feinstein, “The LRSO is a new nuclear weapon that by the Pentagon’s own admission would have a role ‘beyond deterrence.’ Congress shouldn’t fund dangerous new nuclear weapons designed to fight unwinnable nuclear wars.”

W80-4 warhead funding should be delayed at a minimum. Cancellation of this costly, potentially destabilizing LRSO weapon could save taxpayers \$30 billion or more.

### **B61-12: Budget defies gravity**

The B61-12 introduces significant modifications to the design of an already tested weapon. The B61-12 will combine three tactical, or “battlefield,” versions of the B61 with a strategic version, the B61-7, to create an all-purpose nuclear gravity bomb that erases the distinction between tactical and strategic weapons. Both Los Alamos and Sandia national laboratories serve as lead labs in this effort. Of the approximately 480 B61s slated to become B61-12s, about 180 will be deployed at six bases in five NATO countries, with the remainder at four US bases.

According to GAO’s April 2017 analysis, the B61-12 will cost 35% more than NNSA has budgeted for it. The GAO’s \$10 billion estimate agrees with an earlier Defense Department analysis that NNSA called inaccurate. GAO also projects that B61-12 production will not begin until 2022, two years behind the present schedule and five years later than originally scheduled.

The B61-12 will be fitted with a guided tail-fin kit designed by the Pentagon to create the world’s first nuclear smart bomb. The tail-fin kit will add another \$1.8 billion to the B61-12 bill. In the end, the cost of each B61-12 may exceed twice each bomb’s weight in gold. While the Trump Administration talks about NATO countries sharing costs, US taxpayers alone are footing the bill for the B61-12, due in no small measure to the widespread resistance in Europe to the B61 deployment there.

### **IW-1: Freeze or cancel**

If the NNSA had its way, it would redesign the entire nuclear stockpile according to its 3+2 strategy, creating three warhead types that could be launched from both land- and sea-based platforms (i.e., be interoperable) along with the air-launched LRSO and B61-12 gravity bomb.

The first Interoperable Warhead (IW-1, or W78/88-1) will be designed principally by LLNL at an estimated cost of \$12.4 billion, although technical uncertainty and changes in the nuclear weapons complex needed to implement the program will add tens of billions more. President Obama delayed IW-1 development until fiscal 2020. LLNL has been pressing to reinstate the program.

The IW-1 concept would use elements of the W78 (Minuteman) and the W88 (submarine-based) warheads and a plutonium core similar to a third design, the W87. A fourth weapon design may be considered for the IW-1 secondary. While these individual parts have been tested in their original configurations, the mash-up IW-1 would diverge significantly from anything in the stockpile, raising questions about its certification as reliable.

The Navy has raised technical and cost concerns about the IW-1. Other experts have raised concerns that the extensive modification/mash-up, along with proposed novel components, could push the US to resume nuclear explosive testing to certify it. Additionally, the IW-1 reportedly will carry different fuzing mechanisms for its land- and sub-based variants, compromising the stated goal of interoperability.

Since inception of the IW-1 freeze, NNSA announced that the W78 is “aging gracefully” and does not require a near-term LEP. The W88 alteration includes refreshing its high explosive component among other changes, obviating any need for a near-term LEP. Further, no interoperability is required to maintain the safety and reliability of these two warheads.

GAO has been tasked to analyze IW-1 technical, cost and program risks. The IW-1 funding delay should continue in fiscal 2018 pending GAO submittal of its analysis to Congress. This analysis, if it substantiates cost and risk concerns, would support the position of the Alliance for Nuclear Accountability that the IW-1 program should be terminated outright before additional funds are committed.



# The runaway bomb plant

**THREE BILLION DOLLARS.** That's a pretty deep hole for the Uranium Processing Facility bomb plant in Oak Ridge, Tennessee. And that's just for the design team, which is still digging.

How much will the entire project cost? Taxpayers have no idea. When the cost estimate for the original UPF plan soared to more than \$19 billion, officials re-worked the project, cutting its scope and, at the same time, cutting corners on safety. They then declared the new plan would cost no more than \$6.5 billion. But NNSA provided no hard numbers, just an assurance that is no longer credible.

The 90% design completion milestone, expected in September 2017, will trigger a "validated cost projection," though the question of who validates the numbers is critical. NNSA has consistently demonstrated that its cost estimates on major construction projects can't be trusted. NNSA prefers to low-ball the initial cost estimate and then extract ever-increasing funding from Congress as pricetags soar. This year's budget includes \$575 million for the UPF—in 2005 the low-end of the cost estimate for the entire UPF was \$600 million.



Site preparation is underway for the Uranium Processing Facility bomb plant in Oak Ridge, Tennessee. The Oak Ridge Environmental Peace Alliance estimates the UPF will cost more than ten times its original estimate, topping \$10 billion.

safety standards will be used for dangerous uranium operations for another 20 to 30 years. NNSA has dismissed critics who charge this significant revision of the plan should be subjected to a thorough environmental analysis.

Since the taxpayer-fueled UPF train got up a head of steam, it has proven almost impossible to derail. With Tennessee Senator Lamar Alexander protecting the project and refusing to provide any accountability, NNSA has happily continued doing what it does best—giving taxpayer money to private corporations. In this case, Bechtel is the recipient of the government's largesse.

## The cost only matters because...

NNSA claims the UPF bomb plant, whose sole mission would be the production of thermonuclear secondaries for US nuclear warheads, is vital to our national security.

But when the cost soared to nearly \$20 billion, Congress balked, and the "vital" UPF bomb plant was exposed for what it is—a pit into which Senator Alexander continues to funnel money to his home state, half a billion dollars a year, for a bomb plant the nation does not need.

In fact, the UPF is being designed to have a production capacity of 80 warheads/year despite NNSA's admission in its first Environmental Impact Statement that it can fully meet its mission requirement to assure a safe and reliable stockpile with a production capacity of less than 10 warheads per year.

## RECOMMENDATIONS

Congress should hit the pause button on funding for the UPF until:

- a legally required Supplemental Site-Wide Environmental Impact Statement for the most recent Y-12 modernization plan is completed;
- a realistic cost projection, validated independently of the DOE/NNSA, is prepared;
- the necessity of replacement secondaries for Life Extension Programs is documented.

## Plagued from the beginning

The UPF bomb plant didn't start out as a money-sucking boondoggle, but it quickly became one. The first design effort was so poorly managed the team was 85% finished with the design when they realized the building they were drawing was not big enough to hold all the equipment it would need to hold. The "space/fit issue" resulted in a half billion dollar write-off, no investigation, no management restructuring, and bigger budgets.

The current plan, based on the recommendation of a hastily assembled DOE "Red Team," recast the mission of the UPF. No longer will it consolidate all enriched uranium operations under one roof; instead, five new buildings will be built and two aging facilities that do not meet environmental or

# How many plutonium pits are enough?

**I**NDEPENDENT EXPERTS have found plutonium pits—the radioactive trigger of every US nuclear weapon—have reliable lifetimes of more than 85 years. That finding doomed NNSA'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 excess pits are in storage at the Pantex Plant near Amarillo, TX.

These facts have not deterred those in DOE and Congress who want to line the pockets of contractors and bring home the bacon. LANL is now planning to spend at least five billion dollars—probably much more—to upgrade two existing facilities and build new ones for expanded plutonium pit production. Ironically, NNSA wants expanded

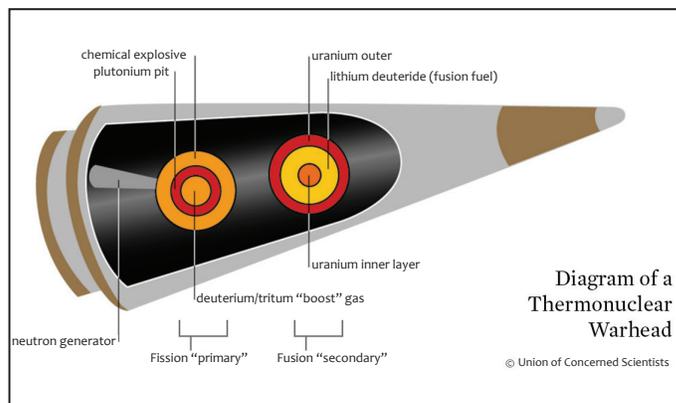
production for an Interoperable Warhead that has been postponed for at least five years and may never happen, largely because the Navy doesn't want it.

In addition, LANL has only recently resumed major plutonium operations after a three and a half year hiatus because it failed to meet nuclear criticality safety requirements—the only DOE site in the country to get a “red” grade from the Defense Nuclear Facilities Safety Board.

NNSA has also failed to conduct the legally required public environmental review under the National Environmental Policy Act for proposed expanded production.

Finally, disposal of radioactive bomb-making wastes is seriously constrained since the Waste Isolation Pilot Plant is operating only on a limited basis after a LANL waste drum ruptured and closed that facility for almost three years.

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, regardless of the technical needs of the stockpile.



Schematic of a typical nuclear warhead's “physics package.” The plutonium pit, on the left, is the trigger; it explodes, creating the forces necessary to ignite the thermonuclear secondary.

## 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;
- Defense Nuclear Facilities Safety Board has certified that all nuclear criticality issues are completely 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 operational and all radioactive waste handling and treatment procedures at WIPP and LANL are certified to be safe.

The committees' authorization does not provide funding though, so the stage is set for budget battles in the appropriations committees.

The last plan for expanded pit production, a super-sized Nuclear Facility for the Los Alamos Lab's Chemistry and Metallurgy Research Replacement (CMRR) Project, 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 would:

- 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 quality control sampling to support expanded plutonium pit production. This remodeling, plus additional equipment, would cost up to \$1 billion, more than twice as much as 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 underground modules 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 real purpose is to manufacture pits for future new nuclear weapons designs.

# Dismantlement = nonproliferation

**P**RESIDENT TRUMP HAS STATED that US nuclear weapons capabilities should be expanded, even reportedly saying “Let it be an arms race.” Yet vital nuclear security programs are not being prioritized, even though they cost a small fraction of the trillion-dollar “modernization” program, initiated by President Obama—a program Trump says he will add to.

Increasing the US’ already bloated nuclear weapons stockpile will not enhance our security against today’s global threats, but a comparatively small investment in nonproliferation programs would.

Under Obama, funding for NNSA’s nuclear weapons research and production was slated to jump 14% to \$10.5 billion over the next five years. The Trump Administration has said that Life Extension Programs and responsive

infrastructure (new weapons production facilities) should be further increased.

Last year, Congress cut funding for crucial NNSA nonproliferation programs designed to keep nuclear weapons and materials out of terrorists’ hands by 20%. Trump is expected to continue those cuts and perhaps deepen them.

Not all programs that claim to promote nonproliferation deserve support. The boondoggle MOX program, which would use plutonium as fuel in civilian reactors, would undermine fundamental nonproliferation goals by making weapons-usable plutonium a commercial commodity.

Dismantlement of retired warheads is the other side of the nonproliferation coin. There are an estimated 2,500 nuclear weapons awaiting dismantlement in the queue.

The Obama Administration had a poor record of dismantling only around 300 nuclear warheads per year, but it did propose to increase dismantlement funding in FY2017 by 33% to \$69 million—less than one percent of the NNSA’s weapons budget. Congress rejected this



Workers at the Pantex Plant in Texas assemble and disassemble warheads.

## RECOMMENDATIONS

Congress should:

- shift funding from Life Extension Programs to nonproliferation and dismantlement programs;
- terminate the boondoggle MOX program once and for all and use the savings for genuine nonproliferation programs;
- prioritize enhanced detection, 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 dismantlements now.

DOE should make information about dismantlement progress available to the public.

Dismantlements should be irreversible, leading to the global nuclear disarmament mandated by the Nuclear Non-Proliferation Treaty.

badly needed increase in the recent funding deal for the remainder of this fiscal year.

Contrast this with funding for Life Extension Programs, which jumped 25% to \$1.34 billion since FY2015, with an additional 42% increase planned over the next five years.

The numbers don’t lie, and they also send a powerful message to the rest of the world. The US is investing pennies to dismantle nuclear weapons and billions to produce, upgrade, and “life-extend” them.

Since the same facilities and workforce at the Pantex and Y-12 facilities are needed to both build and disassemble nuclear warheads, increasing Life Extension Programs means limiting capacity for dismantlements.

Investing in increased dismantlement capacity at NNSA’s Pantex and Y-12 Plants would 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 guard nuclear warheads indefinitely.

It is in the security interests of the United States to provide consistent global leadership toward universal, verifiable nuclear disarmament. The US can start by increasing funding for genuine nonproliferation programs and accelerated dismantlements.

It is also in the security interest of the United States to provide leadership in the development of enhanced detection, verification, and monitoring technologies in order to assure ourselves that other nuclear weapons states are fully complying with agreements as they are being implemented.

# Solutions begin with accountability

**T**HE DEPARTMENT of Energy has an obligation to the American people to take care of the nation's nuclear stockpile and to clean up the widespread contamination at Cold War weapons sites. But a history of bad environmental practices, coupled with a failure to inform the public of health and safety risks, multiplied by massive cost overruns and schedule delays on project after project has bred a healthy skepticism in the public mind.

DOE must acknowledge this skepticism and respond with transparency and accountability. DOE spends tens of billions of federal dollars every year, ninety percent of which goes to for-profit contractors and large construction contracts.

Because DOE relies on large corporations to manage the day-to-day operations at its sites, the corporate veil can be used to hide details of mistakes and avoid financial responsibility.

Agencies charged with oversight of DOE and NNSA activities provide a level of accountability, though they lack enforcement powers and are limited to making recommendations.

First line accountability can happen when

workers themselves raise concerns. Unfortunately, too often this results not in concerns being addressed by management, but in workers being labeled troublemakers—they become whistleblowers. Their battles to be heard and appropriately responded to 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.

## Conflicts of interest

The directors of Los Alamos, Livermore, and Sandia national labs are required to certify the US stockpile safe and reliable every year. This analysis should rely on scientific data derived from the stockpile surveillance program.

At the same time, as CEOs of for-profit corporations that manage the labs, they have an incentive to propose a never-ending cycle of lucrative Life Extension Programs.

This is a clear conflict of interest—their responsibility as CEO is to maximize profits for their companies; they have a strong incentive to create work and a strong disincentive to exert cost controls that would minimize the cost to taxpayers.

## You're fired! —or not

There is some hope. When workers at Los Alamos National Lab improperly packed a waste drum that caught fire at the Waste Isolation Pilot Plant (WIPP), the resulting contamination caused waste backups throughout the nation's nuclear weapons complex and DOE ended the more than \$2 billion per year contract for the private consortium that ran LANL.

But DOE doesn't say "You're fired" often enough. No one was fired in Oak Ridge when DOE was forced to scrap an 85% complete design for the Uranium Processing Facility because the building would have been too small to contain all the equipment it would require. No one was even reassigned. In fact, the project budget was increased the next year.

If DOE can't hold contractors accountable, it must at least not reward contractors for mistakes. The operating contractor of WIPP, the nation's repository for defense transuranic waste, has a contract that states it "shall be fully responsible and accountable for the safe accomplishment of all work."

That contract was less than 17 months old in February 2014 when WIPP was shut down due to a fire and a radiation release. Instead of terminating the contract, or reducing its value, DOE has paid the contractor more than \$334 million in additional funding (a 50% increase!) and has extended the contract.

## Transparency = Accountability

To add insult to injury, DOE and NNSA often refuse to talk directly to the public about their problem projects. Requests by citizen watchdog groups for information are often ignored, forcing citizens to resort to filing formal Freedom of Information Act (FOIA) requests, a process that costs the government additional money and typically requires the taxpayer to wait many months for information he or she paid to have prepared in the first place!

At many DOE sites, citizens have simply given up asking for briefings on critical issues because they are always denied. In the land of DOE, it is

## RECOMMENDATIONS

Congress should:

- strengthen whistleblower protections to hold contractors accountable and afford whistleblowers access to federal courts to seek redress;
- prohibit National Lab directors from acting as presidents of for-profit corporations;
- exercise rigorous oversight over DOE and NNSA using its power of the purse and investigatory powers to compel satisfactory performance from DOE, NNSA, and contractors.

extremely rare to find a Public Information Officer who believes his or her job is to provide information to the public.

### The watchdogs

Who acts on the public's behalf? Oversight agencies have access to information. In return, they conduct analysis, prepare reports, and provide recommendations.

The Government Accountability Office (GAO) is an independent, nonpartisan agency that works for Congress. Often called the "congressional watchdog," GAO investigates how the federal government spends taxpayer dollars. The Government Accountability Office regularly places DOE projects at the top of its "High Risk List," identifying them as prime candidates for project failure and good breeding grounds for fraud and corruption.

Over the past year, GAO has given DOE many recommendations. For instance, GAO recommended that NNSA assess the affordability of its nuclear weapons modernization programs. Since 1994, GAO has made at least 28 recommendations related to environmental liabilities; 13 remain unimplemented. GAO recommended that DOE establish a training program for program managers and recommended that DOE strengthen whistleblower protections.

The Defense Nuclear Facilities Safety Board (DNFSB) is tasked by Congress with exercising oversight at DOE nuclear sites that have a defense (nuclear weapons) mission on matters of safety. In recent years, budget constraints have forced DNFSB to cut back on the number of sites that have resident inspectors. Where DOE has hundreds of employees and thousands of contractor employees, DNFSB has one or two—or, too often, zero—resident inspectors filing weekly reports on operations, incidents, and safety issues.

DNFSB is rigorous, methodical, and thorough in carrying out its responsibilities. It is also a model of accountability to the public. Its Technical Reports, correspondence, and weekly inspector reports are published on its website. It was at a DNFSB board meeting in Knoxville, TN, in October 2012 that the public first learned of the half-billion dollar "space/fit issue" at the UPF noted above.

The mission of the DOE Inspector General (IG) is "to strengthen the integrity, economy, and

efficiency of the Department of Energy's programs and operations."

The IG's Office is an internal monitor that is able to highlight specific problems needing attention within DOE. In December 2015 the IG released a report that documented "High-Risk Excess Facilities" across the weapons complex. These are NNSA facilities that are no longer in use, in many cases abandoned, that pose "an ever-increasing risk to workers and the public."

The report spurred efforts by members of Congress who serve on the Cleanup Caucus to hold special meetings and tour some of the sites. Funding to stabilize some of the worst-of-the-worst is included in the Trump Administration's skinny budget.

Without the IG report, these facilities would still be sitting there, still posing an ever-increasing risk to workers and the public, and no one would be doing anything about it. Next year, instead of getting a new roof to help contain contamination, they would just be one year more rotted.

### The role of Congress

None of these agencies, on whom the public depends, has the power to regulate or to enforce regulations. That power belongs to Congress as it wields the power of the purse.

Congress should hold hearings, investigate, and use the purse to take quick and decisive action when agencies such as the GAO, Defense Nuclear Facilities Safety Board, DOE's Inspector General or other federal agencies raise concerns. Failure to back up these monitors when they do their job not only undermines their capacity to perform in the future, it tells DOE it can operate with impunity.

Those of us who live in communities that host weapons sites know all too well what that means. We live near contaminated creeks, streams, and rivers in our communities, and we were kept in the dark for years by DOE officials who knew the contamination was there.

Our only protection is accountability; we rely on those agencies that can provide the information that makes accountability possible—and on Congress to act on the recommendations of those agencies.

True accountability will be achieved only by increasing transparency and removing conflicts of interest. DOE should be subject to external oversight. Drivers don't issue their own speeding tickets, students don't grade themselves. Private contractors should be held to the standards and consequences they would face in the private sector. Egregious conflicts of interest—like lab directors whose corporate responsibilities directly conflict with their responsibilities to the government—are unacceptable.

Those of us who live near contaminated creeks, streams, and rivers in our communities were kept in the dark for years by DOE officials who knew the contamination was there. Our only protection is accountability.

# Regulation protects people

**O**NGOING PROGRAMS can be disrupted whenever a new Administration takes over, and that's particularly notable for projects as complex, time-consuming, and costly as some in the Department of Energy. Although it seems unlikely that Congress will adopt them all, some of the Trump Administration's proposals could do deep harm.

DOE has had control of hundreds of sites all across the country. At its peak, sixteen sites made up the core of the nuclear weapons complex. DOE's activities have contaminated the air, land, and water in every place it has ever operated. With no mechanisms to hold the agency to account, it did so for many years without consequence.

For the first decades of the Cold War, there were no environmental laws. Common sense should have

limited environmental harm, but the Cold War arms race did not follow the rules of common sense. As a result, site after site was contaminated. By the time the Environmental Protection Agency established the National Priorities List (also known as Superfund), DOE sites were waiting to be listed.

Starting in the 1980s, citizen pressure and litigation opened DOE practices to public scrutiny, Congress held hearings, and the *New York Times* published a series of articles documenting conditions at many DOE weapons sites. These pressures, along with a growing awareness of the importance of protecting the environment, forced DOE to adopt better practices.

To this day, the DOE self-



Before regulation: Radioactive waste containers in a flooded area of the Idaho National Lab.

## RECOMMENDATIONS

Congress should:

- maintain a strong regulatory framework to protect public and environmental health;
- provide sufficient funds for oversight and regulatory activities to the Environmental Protection Agency at DOE sites;
- assure funding in the budget adequate to meet milestones in agreements with states.

regulates its radioactive material. Self-regulation is, in far too many cases, no regulation at all.

The results of this lack of accountability were predictable. Getting waste out of sight and moving on to the next project has long been the *modus operandi* across the weapons complex. Consideration of environmental consequences was rare. When there were concerns, they were not made public. In Oak Ridge, Tennessee, more than two million pounds of toxic mercury were, in DOE's words, "lost to the environment." Much of it flowed off the bomb site and into the community. DOE never told the public of the releases or the risks. In fact, when the city used mercury-laden soil to provide backfill for the sewer line beltway, the local middle school, and a church playground, DOE remained silent.

It will take longer to clean up the mess than it took to make it. Repeated efforts to "accelerate cleanup" have proven that words are cheaper than actions, and the nation now faces a 75-year cleanup project with a price tag approaching \$400 billion.

It is not just the environment that has suffered from lack of accountability and oversight. After denying for more than 40 years that workers at nuclear sites were put in danger, the federal government was



MARK MCCAULEY

**Before regulation:** Thousands of barrels filled with radioactive and toxic sludge sit on a pad at the K-25 site in Oak Ridge, TN. Every barrel is in violation of hazardous waste storage laws. Eventually, the barrels leaked; cleaning up the mess cost taxpayers \$126 million.

forced to admit that constant exposure to radioactive and hazardous materials did compromise workers' health. To date, DOE has paid out more than \$13 billion to the many thousands of people who were sickened and even killed by their work at DOE sites.

The funding priorities in the Trump Administration's 2018 "skinny budget" are a cause for renewed concern to communities near DOE sites. The modest increase—to \$6.5 billion—proposed for the cleanup program is not sufficient to meet legal cleanup milestones that are included in agreements between the DOE and states that host weapons sites. This continues a trend from previous administrations—if milestones are to be met, Congress will have to provide funds in excess of Administration requests.

What's more, the Environmental Protection Agency's budget would be slashed by 31 percent. These cuts would cripple federal oversight of the DOE. Equally important, states that rely on EPA for funding and authority to conduct their own oversight and regulatory programs would suffer.

The damage could well go deeper. The current administration has demonstrated antipathy to the enforcement agencies and to the regulatory framework itself. In the past, harm has been mitigated and practices improved because states can impose fines and penalties if DOE pollutes. There are consent orders guiding the pace and direction of improvements. There are controls on toxic releases. This is the fruit of regulation.

Environmental regulations have provided crucial protections to the public and communities where DOE workers live.

Communities that host current and former nuclear weapons installations know well what Trump Administration officials seem not to understand; we have seen our water quality improve and our air get cleaner because regulators are able to hold DOE accountable. We are not willing to go back to the dark days of unbridled DOE operations that poisoned people across the nation in the name of "national security."

Cutting regulations and de-funding regulatory agencies is a step back into the dark ages, when the public was routinely placed at risk and kept ignorant, the environment was polluted, and workers were exposed to avoidable hazards as they worked for the government. This is not acceptable.



MARK MCCAULEY

**Before regulation:** Mercury released from the Y-12 Nuclear Weapons Plant traveled for 18 miles through the community before reaching the Clinch River. DOE never informed the public of the risks. After the mercury releases became public the state of Tennessee posted the creek.



# New nuclear ideas, same old problems

**A**T THE BEGINNING of the 21st century, nuclear power supporters were heralding a nuclear renaissance right around the corner. The industry planned to build thirty-two new reactors in the United States. Critics said the math didn't work, because reactors are far too expensive to compete with other energy sources.

Since then, the number of US commercial nuclear power plants has actually declined. Only four new reactors are under construction, and it's not certain they will ever be completed following the bankruptcy of their builder, Westinghouse.

The nuclear industry, including Westinghouse, has long depended on subsidies and loan guarantees from Congress to build their reactors, after which the costs are passed on to customers. This practice dooms ratepayers to higher bills and, as Westinghouse has demonstrated, does not fix the economic reality that nuclear power is unaffordable.

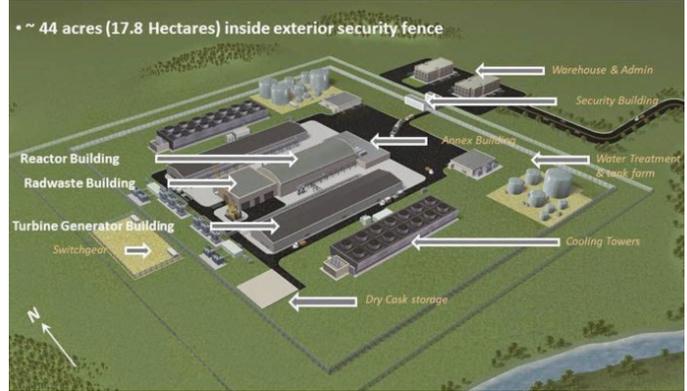
Instead of enjoying a renaissance, the industry has seen six operating nuclear reactors closed. Three additional shutdowns are planned, and five more are possible.

Facing this dire financial landscape, reactor developers are hoping for a future generation of "advanced" reactors based on designs first rejected in the 1950s and '60s.

In the meantime, nuclear proponents' hopes rest on "small modular reactors," which haven't been licensed let alone built yet. SMRs range up to 300 megawatts. Their cost—in money and in water use—appears small only when compared to 1,000MW traditional reactors.

When it comes to waste, the amount of spent fuel per watt produced would be larger than in conventional reactors.

DOE gave matching funds—taxpayer dollars—to two SMR developers for their initial design and licensing work. One abandoned the effort. The other, NuScale, will seek additional public money to continue its project, which will take another \$2.5 billion and a decade or more to develop.



NuScale Power wants to build a dozen small modular reactors at the Idaho National Lab.

## RECOMMENDATIONS

Congress should not provide additional funds or loan guarantees to the nuclear industry, including for small modular reactor development or deployment.

DOE, NRC, and Congress should require the nuclear industry to transfer all on-site spent fuel into hardened on-site storage (HOSS).

The Tennessee Valley Authority is also pursuing an SMR. The hope that an SMR manufacturing sector will emerge and save the nuclear power industry is unrealistic. It is unlikely to realize any success unless one counts the consumption of taxpayer dollars as a success. Congress should refuse further public subsidies to the nuclear industry.

Congress should instead affirm that the 75,000 tons of spent fuel already in storage in the US is the responsibility of the utilities that produced it. It should not be consolidated at private storage sites in the West nor should the federal government assume the costs of its management.

Spent fuel will—and should—remain at the reactor sites that generated it for the decades it will take to develop a technically sound, publicly accepted repository program. Transporting the highly radioactive spent fuel to an interim storage site would only serve to unnecessarily increase risks from accidents and exposures.

Working with DOE and the Nuclear Regulatory Commission (NRC), Congress should require the nuclear power industry to transfer spent fuel out of dangerously overcrowded storage pools at reactors to avoid the possibility of catastrophic radiation releases in case of fire or other events. Fukushima reminds us that we must think about the unimaginable and take whatever preventative steps are necessary.

Spent fuel should be placed in safe, secure, dry cask hardened on-site storage (HOSS). The storage should provide increased protection for workers and the public against accidents, natural disasters, or terrorist attacks.



# Nuclear waste — safeguard in place

**S**PENT NUCLEAR FUEL and high-level waste are among the most radioactive substances on earth. The safe handling and eventual disposal of this deadly waste challenges both the nuclear industry and nuclear weapons manufacturers. Figuring out what to do with it is not a matter of choosing among options; once the waste is created, we have no good options left.

More than 75,000 tons—trillions of curies—of this waste has been created. Most of it is in storage at sixty-one operating and thirteen closed nuclear plant sites across the country. Though we have no plan for disposing of the waste, nuclear power plants continue to generate more.

The responsibility for storing “spent” fuel lies with the nuclear utilities that have generated it. Federal law places the responsibility for siting and operating deep geologic repositories for spent fuel on the Department of Energy.

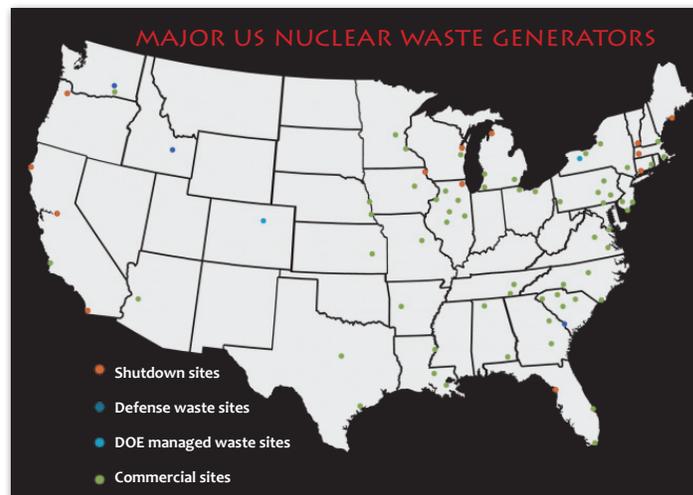
In recent years, private companies have been working to site waste storage sites in Texas and New Mexico; these sites would store and manage

waste until it could be disposed of. Such sites are not needed; it is safer to leave the waste where it is now. Transporting the waste to an interim storage site and then later to a repository unnecessarily multiplies the risk of accidents and exposure.

There is an additional risk as well. Consolidating spent fuel in an interim facility runs the real risk that the waste will remain in an above-ground “interim” facility forever.

Utilities would also like to be relieved of the responsibility for the waste they have generated; they want DOE to take title to the spent fuel, but there is no reason for taxpayers to assume this burden.

Decades ago, Congress decided that DOE should site and operate deep geologic repositories for those highly radioactive wastes that threaten humans and the environment for tens of thousands of generations.



The law required that the first repository should be operational 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.

Taxpayers spent approximately \$7 billion to develop a repository in Nevada, but the site Congress chose, Yucca Mountain, is unsuitable for waste disposal. It is also strongly opposed by Nevadans. The Obama Administration made a decision to cease development of the Yucca Mountain site, and Congress stopped appropriating money for the project in FY2010.

The Trump Administration has indicated it will try to revive the Yucca Mountain proposal, but additional money will not change the geology on the ground or the staunch public resistance in Nevada. The ending of the Yucca Mountain story is already written—it will never open. The only question is how many tax dollars Congress will pour into the project.

Meanwhile, there is no program to select alternative repository sites, which means there will be no repository for decades. Waste will remain at nuclear plants. This underscores the need for hardened on-site storage to enhance safety.

It also underscores the need for new legislation that will direct future attempts to site a waste disposal facility. Lessons learned from the Yucca Mountain failure can inform the next process.

A successful nuclear waste program will be a public process that begins with the development of standards for a technically suitable repository site(s). It will also calculate the amount of nuclear

## RECOMMENDATIONS

Congress should not:

- fund consolidated interim storage for commercial spent fuel, which is the responsibility of nuclear utility companies, thus avoiding transportation and handling risks and additional costs;
- fund the proposed Yucca Mountain repository, which is technically flawed and strongly opposed by Nevadans;
- fund a defense high-level waste only repository, which is unneeded and costly.

waste that will need to be stored and disposed of, including that yet to be generated.

Since DOE has proven itself incapable of carrying out a technically sound, publicly accepted program, provisions in the law should include the creation of a new nuclear waste agency to implement the new waste law.

This legislation should define state and federal regulatory roles. States should be given increased authority over waste sites and transportation.

The law must also assure adequate federal funding for defense waste storage, transportation, and disposal.

Using the “polluter pays” principle would assure nuclear utilities fund the transportation of commercial waste as well as its disposal. With a new law, Congress can resolve the current litigation related to the government’s failure to open a repository in 1998.

Finally, the new waste legislation will need to set out a process for siting nuclear waste facilities based on free, prior, and informed consent.

Not all highly radioactive waste belongs to commercial reactor operators. Some is owned by the government. It is known as defense HLW.

Defense HLW was created by the reprocessing of spent nuclear fuel at DOE sites in Washington State, South Carolina, and Idaho. DOE has also taken ownership of the HLW created at the failed commercial reprocessing plant at West Valley, New York. Those sites will retain the waste they have generated for decades; badly needed safety improvements should be adequately funded.

For more than 30 years, federal law and policy provided that commercial spent fuel and defense HLW waste would be disposed in the same reposi-

tories. In 2015, the Obama administration reversed that policy and proposed siting a defense-only repository.

In a January 31, 2017 report, the Government Accountability Office (GAO) found that DOE had failed to adequately justify the new policy. Among other things, GAO found that DOE had no accurate or credible costs, and schedules for repositories and regulations needed to site repositories were not in place. GAO warned repository costs could impact needed funding for continued waste storage.

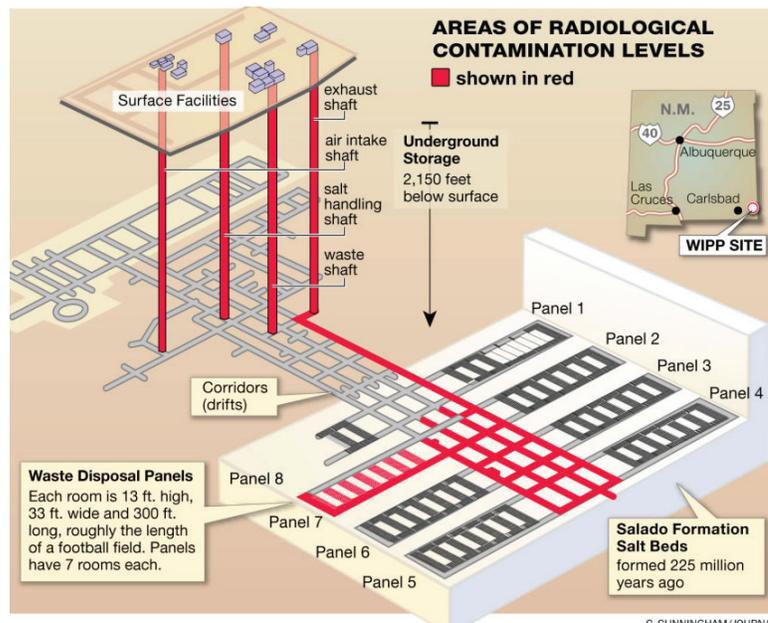
These concerns make it clear that Congress should not fund a defense-only repository.

There is a barely disguised reason some are advocating for a defense-only waste repository. Proponents want to put high-level weapons waste in or near the Waste Isolation Pilot Plant (WIPP) in southeastern New Mexico.

But WIPP is licensed for defense transuranic (plutonium-contaminated) waste only. The 1992 WIPP Land Withdrawal Act prohibits any high-level waste or spent fuel at the site. New Mexicans have been promised for 40 years that WIPP is only for defense transuranic waste. Breaking that promise and changing the law would show the unreliability of the federal government and would undermine obtaining “consent” for any other waste sites.

In addition, WIPP has failed to meet its oft stated determination to “start clean, stay clean.” In February 2014, the site was shut down because of a fire and a radiation release.

Because of the significant contamination in portions of the underground mine and inadequate ventilation, DOE does not expect to resume pre-2014 operations until at least 2021.



C. CLUNNINGHAM/JOURNAL



# Meeting the cleanup challenge

**T**HE DEPARTMENT of Energy's Environmental Management (EM) program addresses the nuclear waste legacy of contamination from the Cold War and manages thousands of contaminated facilities used in nuclear weapons production. The current lifetime estimates for cleanup of large quantities of radioactive waste, nuclear materials, and contaminated soil and water are approaching \$400 billion. Estimates for completion go out to at least 2070.

But a February 2017 Government Accountability Office (GAO) report states that this estimate does not reflect all the future cleanup responsibilities DOE may face due to the lack of complete information. In January 2017, the DOE Inspector General (IG) reported a significant deficiency in the department's environmental liabilities accounting. Both the GAO and the DOE IG have made recommendations for actions that have not been adopted by DOE.

We may not know now the ultimate cost of cleanup, but we do know that it's a huge problem. The Trump Administration's preliminary FY18 "skinny" budget only gave Environmental Management a 7% increase up to \$6.5 billion to address cleanup challenges across the weapons complex this year. The increase is accompanied by some troubling language though. It specifies that funding for addressing high-risk excess facilities will be used

"to support modernization of the nuclear weapons complex." If this means cleanup decisions will be driven by factors other than risk, it represents a fundamental shift in EM programming.

For the last thirty years, the EM program has competed with weapons production activities for funding. And it has consistently lost that competition. The Trump skinny budget continues that formula; it would grant an even larger budget increase for the program that created the mess—nuclear weapons. In stark terms, the mess-making programs would be funded at a higher level than the mess



Exhuming buried plutonium-contaminated waste at the Idaho National Laboratory.

cleanup programs. The price of that investment can be measured in harm to the environment and risk to workers and the public.

Hundreds of Cold War sites await final cleanup. There is buried plutonium at Los Alamos National Lab, radioactive waste dumps in Oak Ridge that still await characterization after fifty years, groundwater contamination at almost every DOE current and former weapons site, and high-level waste treatment problems at several sites. Even relatively small sites like the Santa Susana Field Laboratory (SSFL) in California pose ongoing threats to nearby communities.

The long-delayed cleanup of the Santa Susana Field Laboratory (SSFL) in California is a familiar story. SSFL housed ten nuclear reactors, one of which had a partial meltdown in 1959, and two others also had accidents. SSFL's contamination has migrated off-site, which places nearby communities at risk. DOE failed to keep cleanup agreements that it signed with the State of California. The site remains contaminated.

Cleanup of the nuclear weapons complex should be a top priority. The cost of comprehensive cleanup would be less than half the cost of the planned 30-year, trillion-dollar nuclear weapons modernization plan. Deferring cleanup will only increase the eventual cost. Funding cleanup would be a real win-win for the US, permanently protecting the public and the environment while potentially creating thousands of high paying jobs.

## RECOMMENDATIONS

Congress should:

- provide funding adequate to meet milestones in agreements with states;
- prioritize protecting communities and cleaning up the environment over spending on nuclear weapons.



# High-level waste—an urgent threat

**M**ORE THAN FORTY PERCENT of the Department of Energy’s Environmental Management (cleanup) budget goes to one waste stream: high-level waste (HLW) stored in buried tanks at the Hanford Reservation in Washington, the Savannah River Site in South Carolina, and the Idaho National Laboratory.

The Department of Energy has spent tens of billions of dollars trying to safely store and stabilize this single waste stream, and it will spend tens of billions more in the coming decades. In a program fraught with project failures and cost

overruns, DOE has been able to consistently accomplish only one thing: it regularly misses legally enforceable deadlines for emptying the buried waste tanks at all three sites.

High-level waste is the end product of “reprocessing”—bomb-makers dissolved nuclear reactor fuel to extract plutonium to use in bombs. When uranium is irradiated in a reactor, plutonium and a host of other radioactive materials are created and trapped in the fuel rods. Reprocessing claimed the plutonium from this brew and left behind a sludge that is chemically toxic and intensely radioactive.

The Hanford site, bordering the Columbia River in Washington State, stores fifty-six million gallons of HLW in 177 old, buried waste tanks. A third of the tanks have leaked. DOE’s goal has been to extract the waste from the tanks and immobilize it in glass at the Waste Treatment Plant (WTP) so it can be disposed of permanently.

But the WTP, estimated at \$13 billion only two years ago, is now expected to cost \$30 billion if the current rate of spending continues. The WTP won’t be fully operational until 2036, if ever, since it’s not



Some of the deadliest nuclear waste in the world is leaking from underground tanks at the Hanford Reservation.

## RECOMMENDATIONS

Worker safety and health protection must be the DOE’s first priority.

Construction of new waste tanks at the Hanford Reservation should begin immediately.

Work on the Waste Treatment Plant at Hanford should be halted, and an independent entity established to develop a new path forward for treating all 56 million gallons of tank waste.

Whistleblower protections for both DOE and contractor personnel at nuclear facilities should be strengthened, with criminal penalties for retaliation against whistleblowers.

Congress should enact legislation stipulating that contractors guilty of retaliation against whistleblowers are subject to punitive damages and are at risk of losing their contracts.

clear it will ever meet licensing requirements. An independent investigation is needed of the persistent failure to follow nuclear safety and quality rules at WTP. In the meantime, new, safer, double-walled tanks are urgently needed now.

Protection of workers who are dealing with HLW must be a non-negotiable priority. Workers who raise safety concerns—whistleblowers—provide a valuable service to the government; they can save money and avoid unnecessary risks for other workers. They can do this only in an atmosphere that protects them from reprisals—whistleblower protection is part and parcel of any effective worker safety effort.

At the Savannah River Site, the HLW program has converted enough liquid HLW into intensely radioactive glass to fill 4,500 canisters. Forty-three buried tanks of liquid remain to be stabilized, which will take decades of steady funding. DOE should increase the rate of canister production at Savannah River.

There are 900,000 gallons of high-level waste in buried tanks at the Idaho National Laboratory. But startup of the facility to treat it is five years late and its price tag has grown from \$571 million to \$1 billion.

The challenge facing DOE is not limited to the dangers posed by the waste itself. It is exacerbated by DOE’s propensity to build one-of-a-kind facilities, never learning from past mistakes.



# MOX: A case study in waste

**O**NE OF THE MOST mismanaged DOE construction projects ever undertaken is a decade old and still there is no validated cost estimate or schedule for the partially constructed facility. That badly bungled project is called “MOX”—the Mixed Oxide Fuel Fabrication Facility at the Savannah River Site in South Carolina.

The problem-plagued MOX project, originally designed to dispose of 34 metric tons of surplus weapons plutonium as experimental nuclear reactor fuel, is unlikely to ever accomplish its mission.

In addition, it poses grave proliferation risks by making plutonium a commercial commodity. In 2017, DOE unofficially estimates the construction cost of the MOX plant begun in 2007 to be a staggering \$17 billion, with completion not expected until 2048.

The decision to start construction long before the design was fully mature doomed the MOX project’s 2000 cost estimate of \$1 billion. Coupled with chronic construction problems by contractor CB&I AREVA MOX Services, the project has become a stunningly expensive jobs program for the Savannah River Site.

With \$5 billion already wasted on construction, NNSA estimated in mid-2016 that construction was only 28% complete. DOE’s annual performance award fee for MOX Services for FY 2016 reflected the abysmal performance of the company, which received only 8.9% of the available award.

The FY 2017 budget request stated: “MOX...will require approximately \$800 million to \$1 billion annually for decades.” The simple fact is Congress will not appropriate those amounts of money for the failed MOX project. In the



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Aerial photo of the MOX facility under construction, November 2016.

## RECOMMENDATIONS

Congress should:

- halt funding for the MOX facility;
- require an environmental study of non-MOX plutonium disposition alternatives and new uses of the MOX plant;
- hold DOE and contractor CB&I AREVA MOX Services accountable for massive cost overruns and project management failures.

A new plutonium agreement should be negotiated with Russia. It should include International Atomic Energy Agency verification of plutonium disposition activities.

budget agreement reached in April 2017, MOX funding was reduced by \$5 million to \$335 million, keeping it on a shut-down track. Even with a budget increase to \$500 million a year, DOE estimates construction would cost \$14 billion.

The Government Accountability Office has long-maintained the MOX program is subject to fraud, waste, abuse, and mismanagement. DOE and MOX Services must be held accountable for cost overruns, design flaws, construction errors, and for persisting despite a lack of MOX customers.

Meanwhile, DOE is pursuing a separate option at Savannah River to blend six metric tons of plutonium with an inert material (called “stardust”) for disposal in the Waste Isolation Pilot Plant. The stardust scheme represents a new approach to plutonium treatment that requires a full Environmental Impact Statement. That EIS should also include an analysis of the cheaper and safer alternative DOE terminated in 2002: immobilization of plutonium in high-level nuclear waste.

Russia’s withdrawal in October 2016 from the Plutonium Management and Disposition Agreement opens the door for the United States to negotiate a new agreement. That agreement should include provisions for verification of plutonium disposition activities by the International Atomic Energy Agency.

## Acronyms

CMRR	Chemistry and Metallurgy Research Replacement Project
DoD	Department of Defense
DOE	Department of Energy
EM	Environmental Management
FY	Fiscal Year
GAO	Government Accountability Office
HLW	High-Level Waste
ICBM	Intercontinental Ballistic Missile
INL	Idaho National Laboratory
IW	Interoperable Warhead
LANL	Los Alamos 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 Fabrication Facility)
SLBM	Submarine-launched Ballistic Missile
SRS	Savannah River Site
TRU	Transuranic
UN	United Nations
UPF	Uranium Processing Facility
WIPP	Waste Isolation Pilot Plant
WTP	Waste Treatment and Immobilization Plant



## ALLIANCE FOR NUCLEAR ACCOUNTABILITY

Beyond Nuclear  
Colorado Coalition for the Prevention of Nuclear War  
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)  
JustPeace  
Lawyers Committee on Nuclear Policy  
Miamisburg Environmental Safety and Health  
Movement for Nuclear Safety  
Nuclear Age Peace Foundation  
Nuclear Watch South  
Nuclear Watch New Mexico  
Oak Ridge Environmental Peace Alliance  
Peace Action  
Peace Farm  
PeaceWorks Kansas City  
Physicians for Social Responsibility  
Portsmouth/Piketon Residents for Environmental Safety and Security  
PSR Kansas City  
Psychologists for Social Responsibility  
Rocky Mountain Peace and Justice Center  
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.

This report can be downloaded at [bit.ly/accountability-audit](http://bit.ly/accountability-audit)  
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