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Aging U.S. nuclear arsenal slated for costly and long-delayed modernization

By Dana Priest,

The U.S. nuclear arsenal, the most powerful but indiscriminate class of weapons ever created, is set to undergo the costliest overhaul in its history, even as the military faces spending cuts to its conventional arms programs at a time of fiscal crisis.

For two decades, U.S. administrations have confronted the decrepit, neglected state of the aging nuclear weapons complex. Yet officials have repeatedly put off sinking huge sums into projects that receive little public recognition, driving up the costs even further.

Now, as the nation struggles to emerge from the worst recession of the postwar era and Congress faces an end-of-year deadline to avoid $1.2 trillion in automatic cuts to the federal budget over 10 years, the Obama administration is overseeing the gargantuan task of modernizing the nuclear arsenal to keep it safe and reliable.

There is no official price tag for the effort to upgrade and maintain the 5,113 warheads in the inventory, to replace old delivery systems and to renovate the aging facilities where nuclear work is performed. A study this summer by the nonpartisan Stimson Center, a Washington think tank, estimated costs would be at least $352 billion over the coming decade to operate and modernize the current arsenal. Others say the figure could be far higher, particularly if the work is delayed even longer.

The timing does not fit with the nation's evolving defense posture, either. Over the past decade, the U.S. military has moved away from nuclear deterrence and major military interventions in favor of more precise tactics rooted in Special Operations forces and quick tactical strikes deemed more effective against today's enemies.

Federal officials and many outside analysts are nonetheless convinced that, after years of delay, the government must invest huge sums if it is to maintain the air, sea and land nuclear triad on which the country has relied since the start of the Cold War. Failing to act before the end of next year, they say, is likely to mean that there won't be enough time to design and build the new systems that would be required if the old arsenal is no longer

safe or reliable.

“I’ve been doing this for 20 years, and I haven’t seen a moment like this,” Thomas P. D’Agostino, who leads the National Nuclear Security Administration (NNSA), the federal agency charged with managing the safety of the nuclear arsenal, said in an interview.

The debate over the future of the nation’s nuclear arsenal is playing out in Congress and within the administration. Public reports, interviews with government officials and outside experts and visits to nuclear facilities rarely seen by outsiders provided a portrait of the scope and cost of maintaining and refurbishing the nuclear stockpile underlying the debate.

Expense has loomed for years

At the heart of the overhaul are the weapons themselves. Renovating nuclear bombs and missiles to keep them safe and ready for use will cost tens of billions of dollars. Upgrading just one of the seven types of weapons in the stockpile, the B61 bomb, is likely to cost $10 billion over five years, according to the Pentagon. The next two types of bombs in line for modification are estimated to cost a total of at least $5 billion. By comparison, the operating budget for Fairfax County government next year will cost about $3.5 billion, including its vaunted school system.

Replacing the aircraft, submarines and ground-launch systems that carry nuclear payloads will be the most expensive budget item. The nonpartisan Congressional Budget Office estimated it would cost up to $110 billion to build 12 replacements for the aging Ohio-class submarines first launched in the 1980s. The Minuteman III ballistic missiles are undergoing a $7 billion upgrade even as a new generation of intercontinental ballistic missiles is under consideration. Meanwhile, a nuclear-capable fleet of F-35 strike aircraft is being built to replace existing aircraft at a cost of $162 million an airplane.

Finally, there are the buildings and laboratories where the refurbishment of weapons and development of new technologies take place. Modernizing those facilities is expected to cost at least $88 billion over 10 years, according to the NNSA, which is part of the Department of Energy.

The need to spend heavily to modernize the nation’s shrinking nuclear stockpile has been apparent for at least two decades. President George H.W. Bush reduced the stockpile by nearly 40 percent and imposed a ban on nuclear testing. President Bill Clinton extended the ban while reaffirming the importance of maintaining the arsenal’s safety and performance.

President George W. Bush came into office in 2001 planning to shrink and modernize the vast and deteriorating nuclear complex. Although he cut the stockpile by almost 50 percent and made some progress on renovating the complex, the effort was largely derailed by the

costs and complications of two wars. All the while, the backlog of urgent repairs accumulated, and the hidden costs increased steadily.

To catch up, the Obama administration's budget for refurbishing the nuclear stockpile went from $6.4 billion in 2010 to a $7.5 billion request for next year — a 17 percent increase at a time of budget constraints. To help pay the bills, this year the Defense Department agreed for the first time to contribute $8 billion over five years.

"We came in thinking it had been taken care of and were shocked to hear how poorly it had been treated," said Jon Wolfsthal, who worked on nuclear weapons issues for the Obama White House until March.

While the administration was surprised by the state of the stockpile, the decision to spend heavily on modernization was also driven by a deal cut with Senate Republicans in late 2010. As part of negotiations to win ratification of the New START accord and reduce the nuclear weapons maintained by the United States and Russia, the administration agreed to increase money for modernizing the nuclear-weapons complex. Some Republicans say the administration isn't spending enough.

Los Alamos in disrepair

Situated on a remote mesa in the Jemez Mountains of northern New Mexico, Los Alamos National Laboratory was built secretly in early 1943 for the sole purpose of designing and building America's first atomic bomb. In the decades since, the lab has emerged as one of the nation's premier nuclear weapons design and research facilities, with 11,000 employees.

But parts of Los Alamos are in serious disrepair. Inside one critical building, pipes carrying dangerous wastewater are duct-taped together at the joints to plug leaks; plastic bags have been wrapped around the tape to trap seepage.

The building, called Wing 5, is part of the 50-year-old Chemistry and Metallurgy Research plant, which performs research on plutonium cores, the explosive "pits" for nuclear weapons. Sometimes liquid accidentally splashes under the ill-fitting doors and spills into the hallway, Bret Knapp, who heads the lab's weapons program, said during a rare visit by an outsider. When a spill occurs, the building must be evacuated until inspectors can make sure that the liquid is not radioactive.

On other occasions, when the lights in the dilapidated structure flicker, electricians struggling to restore power pry open dozens of fuse boxes and expose brittle wiring far out of compliance with modern building codes.

The aging facility was slated for replacement 20 years ago. But in 1998, designers identified a fault line beneath the structure. The discovery pushed the price of reconstruction so high that no administration was willing to sign off. The Obama

administration says safety requires its replacement — at a cost of $6 billion. Critics in Congress and among anti-nuclear groups, however, say the expensive new plant is unnecessary and would still present environmental dangers if built on the fault line.

The metallurgy facility at Los Alamos isn't even the most pressing example of neglect and deterioration among the 40 buildings nationwide that the NNSA says need repair. That dubious honor goes to Building 9212, a uranium-processing facility at the Y-12 National Security Complex near Oak Ridge, Tenn.

Known in its heyday as the "Secret City," Y-12 produced highly enriched uranium for "Little Boy," the atomic bomb dropped on Hiroshima on Aug. 6, 1945. Today, Y-12 is the primary facility for processing and storing weapons-grade uranium and developing related technologies.

The 150-acre complex was in the news in late July when three peace activists, including an 82-year-old nun, cut the outer security fence, slipped past the perimeter and reached a building where highly enriched uranium is stored. They splashed blood on the outer walls and carried banners denouncing nuclear weapons. Though they never got inside the facility, the incident sparked a two-week shutdown at the plant and a security review across the nuclear complex. Several officials have been fired or reassigned.

Nearby is Building 9212. Protected by layers of razor wire two stories high and monitored by surveillance cameras and motion sensors, technicians inside process enriched uranium for civilian and naval nuclear reactors. Armed guards greet the few authorized visitors allowed into the structure.

The operations inside Building 9212 are deemed so vital that an unplanned shutdown could cause critical problems across the nuclear supply chain. An extended stoppage would disrupt the weapons safety work and could force the closing of domestic and foreign civilian reactors that rely on low-enriched uranium from the facility, according to the NNSA.

No reporter had been allowed inside Building 9212 before The Washington Post's visit. Because of the radioactivity, visitors and workers must wear multiple pairs of yellow rubber gloves, socks and booties, an overcoat, goggles, a head covering and thermoluminescent dosimeters that measure possible radiation exposure.

Conditions inside belie the significance of the work and the danger of the radioactive material.

The building is made of clay tile and cinder blocks and looks its age. Darrel Kohlhorst, the general manager at the time, pointed out large patches of rust and corrosion on interior walls. He said the walls and roof leak when it rains.

"If water hits the floor, we treat it like a contaminated spill," he said, adding that workers

must mop the floors three times a day — and incinerate the mop heads afterward.

The floors themselves are stainless-steel panels bolted together at thick seams. With age, they have become uneven and warped. Control panels resemble props on a 1950s sci-fi movie set, with oversize black-and-white dials and big red “start” and “stop” buttons.

Plant officials said the outdated equipment has not caused a major safety problem only because they halt operations even when minor things go wrong. For instance, when one of the giant, half-century-old exhaust fans goes on the blink, the repair time idles 30 people “for a $15 part,” said Daniel Hoag, then deputy manager of Y-12. Two years ago, the vacuum system that keeps air flowing broke down, and the facility was closed for two weeks.

Nuclear experts say the building should have been replaced years ago. But successive administrations decided to fund less costly renovations and purely scientific endeavors instead. In the meantime, the replacement cost has risen from $600 million in 2004 to $6.5 billion today.

Explaining the huge increase, NNSA spokesman Joshua McConaha said that initial cost estimates are always “speculative” and that final figures can’t be determined until most of the design work is finished.

Other factors push up costs. These nuclear facilities are one-of-a-kind plants, and the expertise and equipment needed to build them often doesn’t exist anymore, so it has to be invented.

“We’re facing questions that have never been asked or answered, and we’re doing it 20 years after the urgency of the Cold War,” McConaha said. “We’re building rare, incredibly complex nuclear facilities that nobody has had to build in decades.”

Some 640 people are designing the new uranium processing plant at Y-12. It will use 10 experimental technologies still being invented. There will be elaborate air filtration systems, duplicative electrical and fire control systems, redundant security barriers, earthquake-proof concrete floors and impenetrable vaults — all required to maintain and work with highly radioactive material.

The construction requirements for new nuclear facilities can be seen not far from the 9212 site. The storage facility for highly enriched uranium where the July break-in occurred was completed in 2010 with 90,000 square feet of concrete. Its walls are 30 feet thick and two stories tall, with hidden gun ports. Inside the concrete box, every scrap of radioactive waste is carried to its eventual tomb by a series of mechanical arms and lifts requiring no human touch. Databases and computers track every trace of radioactive material continuously in this paperless, sterile world.

Chronic poor planning

Much of the blame for the soaring costs has fallen on the National Nuclear Security Administration, the division of the Department of Energy responsible for managing and modernizing the nuclear stockpile. For years, the Government Accountability Office, the Pentagon and some lawmakers have cited the NNSA for chronic poor planning and bad management. The GAO has had the NNSA on its "high-risk list" for fraud, waste and abuse in contracting and management since 1990.

Government reports show that the NNSA has blown budgets across the board. For instance, the projected cost of a new weapons conversion facility at the DOE's Savannah River Site in South Carolina rose to $5 billion from $1.4 billion. It was eventually scrapped — after $700 million in planning costs. The cost of building a new fuel fabrication facility at Savannah River also has tripled to $5 billion, and it is scheduled to open in 2016, a decade late.

The George W. Bush administration's solution to NNSA's chronic problems was to transfer management of the national laboratories to profit-making corporations in 2008. Privatization was supposed to cut costs and boost efficiency, but GAO investigators and lawmakers say it is not clear that either has happened.

One concern is unexplained increases in administrative costs, which have reached about 40 percent of the labs' budget, according to figures provided by NNSA. In fact, the annual contracts to run the facilities are among the largest in government — nearly $2.6 billion a year to operate Los Alamos and $2.4 billion for Sandia National Laboratories in Albuquerque.

The Defense Department became so alarmed by NNSA's construction record that it recently embedded a team at the agency to examine books and management practices and come up with more realistic cost figures for projects under consideration.

Republicans say they support increased spending on the nuclear arsenal, but last year they were unable to muster the votes to fund the president's entire budget request. Some worry, though, that costs are out of hand. Sen. Jeff Sessions (R-Ala.), ranking member of the Armed Services Committee's subcommittee on strategic forces, said the NNSA management approach "perpetuates the status quo mentality that everything nuclear has to be expensive."

Nuclear Posture Review

In an April 2009 speech, President Obama outlined his vision of a world free of nuclear weapons. Acknowledging that his goal might not be accomplished in his lifetime, Obama laid out an agenda for forging new partnerships to stop the spread of nuclear weapons, ending production of fissile material for weapons and ratifying new treaties to reduce their numbers.

Since then, though, the president has taken few steps to implement his objective. On the contrary, his 2010 Nuclear Posture Review, which lays out the role of nuclear weapons in U.S. security strategy, promised to maintain the triad of nuclear weapons favored by every president since Dwight Eisenhower.

In December 2010, the Senate approved ratification of the New START accord with Russia, which limits both sides to 1,550 warheads. But no progress has been made on the Comprehensive Test Ban Treaty, which would curb development of new nuclear weapons and impose a permanent ban on nuclear tests by signatories.

Over the past year, the president has been calculating his next nuclear step. Civilian and military advisers have presented him with countless options as he sets more precise guidelines that military planners will translate into intricate targeting plans.

The White House declined to comment on the president's strategic direction, but some government officials and outside experts said they believe he favors renewed talks with the Russians to drop the warhead total from 1,550 to 1,100. Few, however, expect any announcement until after the presidential election in November.

All of the president's decisions, from the broad nuclear structure to the number of warheads and the top-secret target list, cascade through the nuclear establishment, affecting the types of weapons and delivery systems that must be available to meet the objectives.

For their part, many anti-nuclear activists favor disarmament by atrophy, which would mean not repairing or extending the life span of the current arsenal. For now, the administration and its supporters argue that the country must maintain its nuclear assets as long as other nations are nuclear-armed.

Still, a growing number of former senior administration officials from both parties argue that more substantial cuts would encourage nonnuclear states to abandon their nuclear ambitions, making the world safer from political miscalculations and saving money for defense items that are actually used.

Among the members of this eclectic group are former Reagan administration officials George Shultz, Robert "Bud" McFarlane and Frank Carlucci; Clinton's former defense secretary William Perry and ambassador to Russia Thomas Pickering; and retired Marine Gen. James Cartwright, former vice chairman of the Joint Chiefs of Staff under Obama and a former commander of U.S. nuclear forces.

"There are a growing number of my peers on the uniformed military side, and especially among civilian analysts and those on the policy side," who believe a smaller and more modern force is appropriate, Cartwright said in an interview. "What we have is way more than what we need."

Spending limits

The nuclear arsenal has not entirely escaped cuts. To comply with the new Budget Control Act spending limits, the NNSA decided this year that it could not afford to replace both the crumbling plutonium testing facility at Los Alamos for $6 billion and the deteriorating uranium processing facility in Building 9212 at Oak Ridge for $6.5 billion.

The NNSA chose to rehab Building 9212 because there was no alternative site where the critical work carried out there could be performed.

So, after 250 contractors moved into Los Alamos last year and tractors dug out 160,000 cubic feet of volcanic tuff rock from the side of a hill, NNSA and the administration decided that building a new plutonium-testing site would be delayed five years. The crews stopped work. The tractors were idled. A new reality sank in.

That new reality means some of the plutonium will be shipped to other facilities. Every couple of days, a UPS truck will deliver a dime-size slice of plutonium to Lawrence Livermore National Laboratory, 45 miles east of San Francisco. Larger quantities of plutonium will be carried by secure vans to the Nevada National Security Site northwest of Las Vegas. Plutonium remaining at Los Alamos will be hand-delivered via an underground tunnel from one building to another.

The tunnel is being upgraded, and renovations are underway at Livermore and the Nevada site to handle the plutonium. Officials estimate the changes in the three locations will cost an additional $650 million over the next five years.

Julie Tate contributed to this report.