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Nuclear accident in New Mexico ranks among the costliest in U.S. history

[Los Angeles Times](#)

August 22, 2016

When a drum containing radioactive waste blew up in an underground nuclear dump in New Mexico two years ago, the Energy Department rushed to quell concerns in the Carlsbad desert community and quickly reported progress on resuming operations.

The early federal statements gave no hint that the blast had caused massive long-term damage to the dump, a facility crucial to the nuclear weapons cleanup program that spans the nation, or that it would jeopardize the Energy Department's credibility in dealing with the tricky problem of radioactive waste.

But the explosion ranks among the costliest nuclear accidents in U.S. history, according to a Los Angeles Times analysis. The long-term cost of the accident could top \$2 billion, an amount roughly in the range of the cleanup after the 1979 partial meltdown at the Three Mile Island nuclear power plant in Pennsylvania.

The Feb. 14, 2014, incident is also complicating cleanup programs at about a dozen current and former nuclear weapons sites across the U.S. Thousands of tons of radioactive waste that were headed for the dump are

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backed up in Idaho, Washington, New Mexico and elsewhere, state officials said in interviews.

Washington state officials were recently forced to accept delays in moving the equivalent of 24,000 drums of nuclear waste from their Hanford site to the New Mexico dump. The deal has further antagonized the relationship between the state and federal regulators.

“The federal government has an obligation to clean up the nuclear waste at Hanford,” Democratic Gov. Jay Inslee said in a statement. “I will continue to press them to honor their commitments to protect Washingtonians’ public health and our natural resources.”

Other states are no less insistent. The Energy Department has agreed to move the equivalent of nearly 200,000 drums from Idaho National Laboratory by 2018.

“Our expectation is that they will continue to meet the settlement agreement,” said Susan Burke, an oversight coordinator at the state’s Department of Environmental Quality.

The dump, officially known as the Waste Isolation Pilot Plant, was designed to place waste from nuclear weapons production since World War II into ancient salt beds, which engineers say will collapse around the waste and permanently seal it.

The equivalent of 277,000 drums of radioactive waste is headed to the dump, according to federal documents.

The dump was dug much like a conventional mine, with vertical shafts and a maze of horizontal drifts. It had operated problem-free for 15 years and was touted by the Energy Department as a major success until the explosion, which involved a drum of plutonium and americium waste that had been packaged at the Los Alamos National Laboratory.

The problem was traced to material — actual kitty litter — used to blot up liquids in sealed drums. Lab officials had decided to substitute an organic material for a mineral one. But the new material caused a complex chemical reaction that blew the lid off a drum, sending mounds of white, radioactive foam into the air and contaminating 35 percent of the underground area.

“There is no question the Energy Department has downplayed the significance of the accident,” said Don Hancock, who monitors the dump for the watchdog group Southwest Research and Information Center.

Though the error at the Los Alamos lab caused the explosion, a federal investigation found more than two dozen safety lapses at the dump. The dump’s filtration system was supposed to prevent any radioactive releases, but it malfunctioned.

Twenty-one workers on the surface received low doses of radiation that federal officials said were well within safety limits. No workers were in the mine when the drum blew.

Energy Department officials declined to be interviewed about the incident but agreed to respond to written questions. The dump is operated by Nuclear Waste Partnership, which is led by the Los Angeles-based engineering firm AECOM. The company declined to comment.

Federal officials have set an ambitious goal to reopen the site for at least limited waste processing by the end of this year, but full operations cannot resume until a new ventilation system is completed in about 2021.

The direct cost of the cleanup is now \$640 million, based on a contract modification made last month with Nuclear Waste Partnership that increased the cost from \$1.3 billion to nearly \$2 billion.

The cost-plus contract leaves open the possibility of even higher costs as repairs continue. And it does not include the complete replacement of the contaminated ventilation system or any future costs of operating the mine longer than originally planned.

An Energy Department spokeswoman declined to address the cost issue but acknowledged that the dump would either have to stay open longer or find a way to handle more waste each year to make up for the shutdown. She said the contract modification gave the government the option to cut short the agreement with Nuclear Waste Partnership.

It costs about \$200 million a year to operate the dump, so keeping it open an additional seven years could cost \$1.4 billion. A top scientific expert on the dump concurred with that assessment.

In addition, the federal government faces expenses — known as “hotel costs” — to temporarily store the waste before it is shipped to New Mexico, said Ellis Eberlein of Washington’s Department of Ecology.

The Hanford site stores the equivalent of 24,000 drums of waste that must be inspected every week. “You have to make sure nothing leaks,” he said.

The cleanup of the Three Mile Island plant took 12 years and was estimated to cost \$1 billion by 1993, or \$1.7 billion adjusted for inflation today. The estimate did not include the cost of replacing the power the plant was no longer generating.

Other radioactive contamination at nuclear weapons sites is costing tens of billions of dollars to clean up, but it is generally the result of deliberate practices such as dumping radioactive waste into the ground.

James Conca, a consultant who has advised the Energy Department on nuclear waste issues, described the blast as a comedy of errors and said

that federal officials are being “overly cautious” about the cleanup. “It got contaminated, but a new exhaust shaft is kind of ridiculous,” he said.

For now, workers entering contaminated areas must wear protective gear, including respirators, the Energy Department spokeswoman said.

She noted that the size of the restricted area had been significantly reduced this year.

Mr. Hancock suggested that the dump might never resume full operations.

“The facility was never designed to operate in a contaminated state,” he said. “It was supposed to open clean and stay clean, but now it will have to operate dirty. Nobody at the Energy Department wants to consider the potential that it isn’t fixable.”

Giving up on the New Mexico dump would have huge environmental, legal and political ramifications. This year the Energy Department decided to dilute 6 metric tons of surplus plutonium in South Carolina and send it to the dump, potentially setting a precedent for disposing of bomb-grade materials. The U.S. has agreements with Russia on mutual reductions of plutonium.

The decision means operations at the dump must resume, said Edwin Lyman, a physicist and nuclear expert at the Union of Concerned Scientists.

“They have no choice,” he said. “No matter what it costs.”

Pantex Plant to store more nuclear materials produced at Los Alamos lab

[Amarillo Globe-News](#)

August 16, 2016

The Pantex Plant located 17 miles northeast of Amarillo will store nuclear materials produced at Los Alamos National Laboratory in New Mexico after plans to build a 31,000-square-foot storage vault were scrapped in an effort to cut costs, according to a report from the Government Accountability Office released earlier this month.

The GAO report called into question the savings stated in the National Nuclear Security Administration's report on the proposed Chemistry and Metallurgy Research Replacement facility.

The facility, which would provide analysis in support of plutonium pit production at Los Alamos, was intended to include underground vaults to store the nuclear material. A plutonium pit, or core, is "the heart" of a nuclear weapon, according to the Pantex website.

Within the report, a Los Alamos contractor representative stated the planned nuclear material storage vault was eliminated and existing storage at the Pantex Plant would be used as a "long-term vault for storing material used and generated at Los Alamos."

"The big vault they were planning was to give them freedom to do a lot of different things," said Greg Mello, executive director of the Los Alamos Study Group. "It would have handled overflow from both (manufacturing and analytical chemistry) facilities, but Los Alamos' plans, which are NNSA's plans, are in flux."

Los Alamos has an anticipated production capacity of up to 80 plutonium pits a year, as defined by the 2015 National Defense Authorization Act.

Pantex had been authorized as "interim" storage for up to 20,000 pits until the now-scrapped Mixed Oxide Fuel Fabrication Facility, or MOX, facility at the NNSA's Savannah River site was finished, according to documentation explaining plutonium pit storage on the Pantex website,

The authorization for increased storage capacity of up to 20,000 pits was agreed to in 1997 by then-Energy Secretary Hazel O'Leary.

In February, the Obama Administration announced plans to scrap the multibillion dollar MOX facility near Aiken, S.C., which would have converted plutonium from dismantled nuclear bombs into fuel.

With increased production of plutonium pits at Los Alamos and the uncertainty behind their disposal, the impact on the Pantex Plant's storage capacity is unclear.

According to Globe-News files, Pantex was said to have more than 14,000 pits in sealed drums in 2007. Pantex began increasing its plutonium storage after safety and environmental concerns halted plutonium production in 1989 at the former Rocky Flats plant in Colorado. The federal government began secretly shipping thousands of plutonium pits here and later conducted an environmental impact statement to expand storage here.

Normally, the NNSA evaluates the impact of operations at Pantex, including plutonium pit storage in what is called a site-wide environmental impact statement. There has not been an environmental impact statement issued at the Pantex Plant since 1996.

"Here you have the NNSA site with the most weapons-grade plutonium, a dramatically increasing mission in weapons production, yet the old site-wide environmental impact statement dates back to 1996," said Jay Coghlan, director of Nuclear Watch New Mexico. "I would assert that an environmental statement is long overdue, whether we are approaching the cap on storage at Pantex or not."

The last Supplemental Analysis, which evaluates every five years whether a site-wide environmental impact statement is needed, was issued by the NNSA in November 2012. At that time, the report concluded that "... those few impacts that exceed the bounds of the (impact statement) do not result

in substantial changes... nor do they present significant new circumstances or information relative to environmental concerns.”

Committee considers nuclear waste storage

[Casper Journal](#)

August 16, 2016

In response to a renewed effort by the federal government to find a national nuclear waste repository site, a Wyoming legislative committee has voted to update the state’s laws allowing nuclear storage.

The legislature’s Joint Minerals, Business and Economic Development Interim Committee last week reviewed the state’s radioactive waste siting statute, with an eye toward adjusting it to meet new U.S. Department of Energy guidelines.

The state’s statute was passed in 1995 and only allows for “temporary” storage facilities – up to 40 years; and while the DOE is primarily seeking a permanent repository, it has considered using temporary facilities as an interim solution.

The DOE has been under pressure to find a permanent high-level nuclear waste repository location since the failure of the Yucca Mountain project in Nevada in 2009. One of the repercussions of that project’s shutdown was a lawsuit by the nuclear power industry seeking compensation for having to continue to store nuclear waste at local sites – primarily at nuclear power plants.

The utilities have been paying surcharges to go toward building the repository, which currently total some \$40 billion. Because the DOE missed its original mandated 1998 deadline for opening a national site, the court awarded industry damages that could reach \$20 billion or more, depending

on how long it takes to find a permanent location. The court also halted the surcharge assessment.

The committee was told the nation has 140,000 metric tons of spent nuclear fuel and 90 million gallons of high-level radioactive waste at sites around the country destined for a permanent repository.

In reviewing the state statute, the committee considered several issues, including the 40-year time limit, application fees and which state agencies should now be involved in the permitting process, given the law has not been updated since it was passed over 20 years ago.

While staff members were uncertain why 40 years was chosen as the time limit, the committee was told the statute specifically refers to a temporary facility.

The committee was also told the \$500,000 application fee intended to cover environmental, economic and other review costs would likely be closer to \$1.5-\$2 million dollars today.

The primary reviewing agency under the law is the DEQ, but the committee was told the Industrial Siting Council might be better suited to doing economic and public impact assessments.

The statute gives final approval of an application to the legislature, with a specific provision that the decision cannot be appealed to the Environmental Quality Council, meaning any appeal would likely go directly to the courts.

In its discussion of possibly hosting a national waste repository, some of the questions raised by committee members concerned safety and the transportation of radioactive waste, security of the facility and whether a temporary site might become permanent if the DOE continues to have problems finding a repository location.

Because the Yucca Mountain project was rejected largely due to public and political opposition, and not on scientific grounds, the DOE is looking at developing a “consent-based” approach for site selection. The process will include more public involvement and is being modeled after what France, Sweden, Finland and Canada are doing in getting their repositories accepted.

Over the past year, the DOE has held nine public hearings across the country to gather comments on the repository and opinions on the consent-based approach.

In May, Wyoming officials attended a hearing in Denver, where former Gov. Mike Sullivan was an invited panelist. Sullivan was a pivotal player in the repository debate in the early 1990s, when Fremont County applied for and received a \$100,000 DOE grant to conduct exploratory studies on siting a temporary facility for the nation’s nuclear waste.

Sullivan nixed the proposal, however, when it reached the state level, saying the issue had become highly divisive in the state, citing an unprecedented number of letters from residents – on both sides of the issue – coming to the governor’s office.

Another of Sullivan’s major concerns, even then, was the potential for the temporary site to become permanent if the Yucca Mountain repository wasn’t built.

Whatever the outcome of the DOE’s current plans, the process is expected to take years. The committee was told the DOE at this time is focused on developing the consent-based process, and not even considering potential sites or related funding.

The Director of the Wyoming Department of Environmental Quality, Todd Parfitt, suggested holding off on updating the temporary storage statute until the DOE was further along.

“It may be a bit premature to make this happen ... if we were to write something this year,” Parfitt said. “So it may be more prudent to wait to see, and to track the process of the Department of Energy.”

The committee also heard from a number of public and private organizations.

The committee was told the Wyoming Business Council has been looking for “value added” industries related to the state’s raw mineral resources, and exploring what it would take to attract a uranium conversion facility to locate here. Conversion is an early step in the uranium enrichment process, and there are only four facilities in the world doing conversion – with only one in the United States. Currently the market is not robust, but the idea is to position the state to attract such a facility should things turn around.

While Wyoming is the leading uranium producer in the United States, Brent Berg, president of Casper-based Cameco, said competition from low-cost uranium in Kazakhstan, and depressed market conditions following the Fukushima incident, have resulted in a reduction in their North American operations.

“We’ve cut one third of our workforce combined, at the mines and our office here in Casper,” Berg said. “We’ll continue to produce here, but it will be at declining levels, with no new wells built, and expansion projects that were planned in Converse County and the Gas Hills – those are on hold.”

Meanwhile, other comments included Jason Baldes of the Wind River Native Advocacy Center, who spoke of the history of uranium mill tailings on the reservation.

“With the uranium mill tailing sites, we have high rates of cancer. There’s been groundwater contamination,” Baldes said. “The Department of Energy has been tasked with coming in and cleaning up the uranium mill tailing sites, unsuccessfully.

“It is very unlikely the Eastern Shoshone or the Northern Arapaho tribes will ever be supportive of a temporary storage facility anywhere in proximity to the reservation.”

Jill Morrison of the Powder River Basin Resource Council also noted the tailings issue on the reservation and elsewhere in the state.

“The concern with the Department of Energy is a trust issue in terms of clean up, and in terms of addressing contamination from uranium mining and milling, or spent nuclear fuels,” Morrison said.

“(A 2015 Governmental Accountability Office study said) the Department of Energy does not have clear legislative authority for either consolidated interim storage or for a permanent disposal site, other than Yucca Mountain,” Morrison commented. “In some regards then, it is a moot point until it is dealt with in Congress.”

Stephanie Kessler of the Wyoming Outdoor Council noted the organization had not taken a position against a permanent facility but echoed concerns about the future of a temporary site.

“I think if this committee or the legislature wants to move forward with this, be honest with the public of Wyoming: in all likelihood it will be a permanent facility,” Kessler said.

Committee Co-Chairman Rep. Tom Lockhart, R-Natrona, took exception to Kessler’s wording.

“I think the legislature is honest and open ... just to straighten that out,” Lockhart said.

At the conclusion of the discussion, the decision to go forward with updating the temporary siting law drew a split 8-5 vote on the committee, with opponents saying it was a waste of staff time until the new DOE guidelines are known.

Some other considerations at the hearing included the progress of Wyoming’s application to become what is called an “agreement state” with the Nuclear Regulatory Commission. Under the designation, the state would assume the regulation of certain nuclear activities in the state.

As an agreement state, Wyoming would develop its own nuclear regulatory program under NRC direction and assume all staffing and operating costs, as well as all financial liability for any violations that have occurred, whether in the past or future.

Wyoming is not seeking oversight of all NRC-regulated areas, but rather limiting it to the mining and milling of radioactive materials, such as uranium and thorium.

Support for the agreement state designation came from uranium companies operating in Wyoming, with hopes of lessening regulatory uncertainty and delays experienced under the current NRC permitting process. The state, meanwhile, views it as a possible way to increase mineral development, royalty income and jobs.

At Tuesday’s hearing, the committee was told the state recently passed a major milestone in the agreement state process.

“We have recently, on Aug. 3, received approval from the NRC to go forward with the limited agreement for the program,” said Kyle Wendtland, Administrator of the DEQ Land Quality Division. “This is a major milestone,

this is a big issue, to get through this first admission paper, and puts us in a position ... to move forward with this limited scope of authority for the recovering and milling.”

Wendtland emphasized, however, that the nuclear waste siting issue was outside the scope of the agreement state program, and Parfitt noted that under federal law the oversight of high-level nuclear waste, such as at the national repository, has to remain under the jurisdiction of the NRC, and would never be transferred to any state.

In another effort to spur economic growth, the legislature also recently passed a law that allows on-site storage of any radioactive waste a facility generates. Prior to its passage, there was no statutory provision for permitting on-location storage of high-level nuclear waste, which meant, for example, the state was unable to consider having a nuclear power plant or an advanced uranium enrichment facility.

ORNL collaborates with 6 small businesses on clean energy tech

[Science Magazine](#)

August 18, 2016

OAK RIDGE, Tenn., Aug. 18, 2016—Six small companies will tap the expertise of the Department of Energy’s Oak Ridge National Laboratory to move their manufacturing, fuel cell, geothermal and vehicle technologies closer to the marketplace.

The businesses are among 43 selected to participate in the second round of DOE’s Small Business Vouchers (SBV) pilot. With vouchers in hand, these businesses can better leverage the world-class capabilities of the department’s National Laboratory System and bring their next-generation clean energy technologies to the marketplace faster.

“We need to accelerate the pace of clean energy innovation to build stronger economy and a brighter, cleaner future for our nation,” said David Friedman, Acting Assistant Secretary for DOE’s Office of Energy Efficiency and Renewable Energy (EERE). “The Small Business Vouchers pilot breaks down barriers for some of our greatest entrepreneurial minds, allowing them to work with our national laboratories across sectors and industries to accelerate a clean energy revolution that’s been underway since 2008.”

The Department opened the first round of SBV, a Technology-to-Market Lab Impact pilot, in September 2015. In SBV’s first round, 33 small businesses received vouchers totaling \$6.7 million. Today’s 43 awards total more than \$8 million.

SBV is a collaborative, national effort that provides small and mid-size businesses access to national laboratory resources. Following open calls for “Requests for Assistance,” businesses are competitively selected to work with a national lab to address their needs, and provided vouchers, worth up to \$300,000 at a lab.

ORNL will collaborate on the following projects.

Anactisis, LLC, located in Pittsburgh, Pennsylvania, will work with ORNL to develop and commercialize new polymer-based materials for the recovery and concentration of critical materials such as rare earths from geothermal brines.

American Fuel Cell, located in Rochester, New York, will work with ORNL to optimize deposition techniques for roll-to-roll direct coating of electrodes on anode and cathode gas diffusion media leading to improved quality and lower-cost manufacturing of various fuel cell applications.

FWD:Energy, Inc., located in Zanesville, Ohio, will work with ORNL and Lawrence Berkeley National Laboratory using its VersaWave™ system to

optimize the process for producing economically viable carbon anodes for lithium-ion batteries made from recycled scrap tires.

Nano Elements Source, LLC, located in McDonald, Tennessee, will work with ORNL to further commercialize the production of low cost, cadmium free photoluminescent nanoparticles for applications in solid-state lighting.

Pinnacle Engines, located in San Carlos, California, will work with ORNL to develop opposed-piston variable compression ratio high-efficiency engine for use in light-duty transportation vehicles.

Saratoga Energy Research Partners, LLC, located in Berkeley, California, will work with ORNL to advance the development of an electrolysis process to manufacture low-cost high-performance graphite from carbon dioxide used in fast-charging lithium-ion batteries.

ORNL continues collaborations with nine small businesses selected in the first round of SBV.

INL chooses leader for nuclear innovation program

[Post Register](#)

August 16, 2016

Idaho National Laboratory has selected a veteran nuclear executive to lead its new Gateway for Accelerated Innovation in Nuclear program.

Rita Baranwal, an executive at Westinghouse Electric Corporation in Pennsylvania, will take the top spot at GAIN next week, the lab announced Tuesday. Founded late last year, the INL-led initiative was set up to assist private companies hoping to develop new types of nuclear energy technologies.

Baranwal starts the job Monday, taking over for Kemal Pasamehmetoglu, an INL associate lab director who has been pulling double duty leading GAIN since last year.

“Rita brings a wealth of industry experience and nuclear fuels and materials science expertise to her new role,” Pasamehmetoglu said in a statement. “I’m confident that she will provide strong leadership for the GAIN program as it continues to grow as a catalyst for innovation in advanced nuclear technologies.”

GAIN was set up to give companies involved in developing nuclear reactors a single point of access when they need help. The program will help companies find federal experts and facilities needed to answer a question or solve a problem, whether those resources are located at INL or another laboratory or university.

Nuclear energy proponents say new types of reactors need to be developed swiftly because a wave of older reactors are set to close prematurely, and more will reach the end of their lifespan around 2030.

Two recently announced GAIN partnerships at INL include Creare, a company developing metallic nuclear fuels, and Oklo, a company hoping to develop a 2-megawatt micro reactor. Several other companies were awarded federal vouchers in June to work with other national laboratories on their nuclear energy ideas.

The lab is also partnering with a Maryland company, X-energy, to develop a next-generation reactor that relies on tennis ball-sized uranium pebbles as its fuel source.

Baranwal most recently served as director of technology development in the Engineering Center of Excellence at Westinghouse, and has held previous roles in nuclear fuel design and engineering, and in academia.

Westinghouse is a leading nuclear manufacturing company, having developed many of the world's water reactors.

Baranwal received her bachelor's degree in materials science from the Massachusetts Institute of Technology and her master's and Ph.D. in the same subject from the University of Michigan.

National Nuclear Security Administration's Management of the B61-12 Life Extension Program

[DOE Office of Inspector General](#)

August 18, 2016

The primary mission of the National Nuclear Security Administration's (NNSA) Defense Programs is to ensure the safety, reliability, and performance of the Nation's nuclear weapons stockpile. One of the oldest nuclear weapon systems in the stockpile is the B61. NNSA has raised serious concerns regarding its future reliability. To address these concerns, in 2012, the Nuclear Weapons Council approved the refurbishment of the B61 through a life extension program (LEP), which extends the bomb's life 20 years and consolidates several existing modifications of the B61 into one modification. The current total estimated cost for the B61-12 LEP is \$8.1 billion, with a First Production Unit by March 2020.

To help ensure delivery of the updated weapon within cost and schedule, NNSA Defense Programs identified the B61-12 LEP as a pilot program through which it sought to change its approach to LEP management. This added several enhanced project management tools to the suite of tools already required for the management of nuclear weapon refurbishments, and the B61-12 LEP has overcome significant challenges in implementing several of these tools. While these accomplishments are noteworthy, we also identified issues within the tools that, in our view, if not corrected, could make it more difficult for the B61-12 LEP to proactively ensure that

its mission and functions are properly executed. Specifically, we found program management issues in the following significant areas: master and site schedules, risk management, quality assurance, and technically justifiable management reserves.

We believe without further improvement to its project management tools, it will be difficult for the program to proactively manage the costs, schedule, and risks of the B61-12 LEP to ensure it can deliver the First Production Unit within cost and meet its critical national security schedule. In addition, there is uncertainty whether the original cost estimate for the B61-12 LEP contains sufficient management reserve to allow the program to respond to the numerous risks identified in the program. Finally, not having documented assurance that unresolved significant finding investigations are a part of weapons design input significantly reduces management's ability to ensure that redesigned nuclear weapon components have addressed prior safety and reliability concerns.

The full report can be found [here](#).
