ECA Update:
November 22, 2013

In this update:

Senate Panel to Take Up Nuclear Waste Question
Clare Foran, National Journal

Boxer slams nuke regulator's 'intimidation'
Ben Goad, The Hill

Top House Armed Services Members Remind Senate of Tight NDAA Schedule
Jordan Carney, National Journal

Hanford contractors to lay off 450 workers
Annette Cary, Tri-City Herald

EM's Los Alamos TRU Waste Campaign Heads Toward Completion
DOE

America's Fukushima?
Alexander Nazaryan, Newsweek

Senate Panel to Take Up Nuclear Waste Question

Clare Foran, National Journal
November 22, 2013
LINK

After Thanksgiving, the Senate Energy and Natural Resources Committee plans to mark up legislation that would propose a way forward on stalled action in Congress to determine a nuclear-waste repository, E&E reports (subscription required).

Committee Chairman Sen. Ron Wyden, D-Ore., and ranking member Lisa Murkowski, R-Alaska, plan to consider a bill they introduced in June which proposes an independent panel charged with identifying possible nuclear-waste storage sites.

Without a long-term plan for disposal, nuclear waste is currently building up in temporary storage facilities at plants throughout the country, a situation that could endanger public health if any of the facilities were damaged by an extreme-weather event or a direct attack.

Murkowski said she hoped senators on the committee would take the time to review the bill during the Thanksgiving recess and return ready to consider the legislation.

"This is an extraordinarily important bill and a measure that I hope our colleagues will devote a level of time and attention to," she said. "You've got a few days to take a look at it, and we're going to move forward with a markup."

In the House of Representatives, however, Rep. John Shimkus, R-Ill.,

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has said he will oppose any proposal that does not call for the use of the Yucca Mountain site as the nation's nuclear waste repository.

Boxer slams nuke regulator's 'intimidation'

Ben Goad, The Hill
November 21, 2013
LINK

The chairman of a key Senate panel on Thursday lambasted members of the Nuclear Regulatory Commission, arguing that the agency's new information-sharing policy exceeds the scope of its power and is impeding congressional investigations.

The commission's chief quickly chocked up the accusation as a misunderstanding and pledged that the NRC would comply with lawmakers' requests for information.

Sen. Barbara Boxer, chairman of the Committee on Environment and Public Works, raised the issue during a hearing intended to gauge progress toward implementation of a host of safety regulations being crafted in response to the 2011 meltdown at Japan's Fukushima power plant.

"With out notifying our committee and, I believe, acting outside the NRC's authority, the commission issued a new policy with substantial hurdles and delays that could even be used to withhold information entirely from the chairs and the ranking members of oversight committees," Boxer said.
The California Democrat acknowledged that the NRC is an agency independent from the executive branch but charged that, "it is not independent from congressional oversight."

Boxer said the policy was evidenced earlier this week when NRC personnel sought to restrict her staff's review of records related to an ongoing probe of safety issues at the San Onofre plant in Southern California.

Boxer's staffers were told that they could be physically searched for stolen documents after they had finished reviewing them, she said.
"Let me be clear -- no form of agency intimidation or obstruction will be tolerated in this committee's investigation or its Constitutional oversight responsibilities.," Boxer said. "Action will be taken if you do not reverse your policy."

All five NRC commissioners appeared as witnesses at the hearing. But none uttered a word, as Boxer abruptly adjourned the hearing after less than 30 minute so that the panel's members could rush to the Capitol Building for a major debate over the Senate's voting rules.

NRC Chairman Allison Macfarlane, however, downplayed the significance of the policy change.

"We've heard the concerns of the chairman and I think there's, in

general, a misunderstanding," Macfarlane told reporters afterward.

She described the new protocol as a revision of past procedures. Among the changes is a requirement that all lawmaker requests for sensitive documents be made through the chairman or ranking minority member of applicable congressional oversight committees.

She denied that the new policies involve the searches of any legislative staffers.

"We would never say such a thing," she said, adding that the NRC would work with Boxer to ensure she had the materials she was looking for.

The commission also took fire from Republicans on the panel, who criticized the post-Fukushima effort as regulatory overreach.

Sen. James Inhofe (R-Okla.) said the influx of new rules is placing unnecessary burdens on an industry responsible for generating of the nation's electricity.

"Over the past few years, the commission has been developing sweeping new regulations that impose draconian cuts on the industry without producing sufficient benefits," he said.

Top House Armed Services Members Remind Senate of Tight NDAA Schedule

Jordan Carney, National Journal
November 21, 2013
LINK

The top members of the House Armed Services Committee on Thursday warned that "time is running short" to finish the National Defense Authorization Act, as the Senate failed to overcome a procedural roadblock.

But Committee Chairman Buck McKeon, R-Calif., and ranking member Adam Smith, D-Wash., said that even if the upper chamber does kick the passage of the bill into December, it could still get finished.

"Time is running short to reach an agreement this year, but it has not yet run out," the two said in a statement. "There are still pathways to passage for this vital bill. We urge the Senate to resume NDAA consideration as soon as they return from their Thanksgiving recess."

Senate Armed Services Committee Chairman Carl Levin, D-Mich., has previously suggested that if the Senate doesn't pass the bill until after the Thanksgiving recess it will be difficult for the conference committee to agree to a bill by the end of the year.

The House passed its version of the bill in mid-June.

Hanford contractors to lay off 450 workers

Annette Cary, Tri-City Herald
November 21, 2013
LINK

Richland -- Three Hanford contractors told employees Thursday that they plan to lay off up to 450 workers, with most of the layoffs planned in December and January.

Union and nonunion workers are expected to lose their jobs.

The contractors are reacting to an uncertain Hanford budget for the fiscal year that started Oct. 1. With no federal budget passed by Congress for the year, the Department of Energy is operating under a continuing resolution that keeps funding at fiscal 2013 levels -- which included sequestration, or a mandatory federal budget reduction.

To deal with sequestration in the fiscal year that ended Sept. 30, contractors used some budgeted money saved from previous years, but that money has been spent. Some also cut costs by furloughing workers, or requiring them to take leave, to meet their reduced budgets.

Hardest-hit this year is Washington River Protection Solutions, the Hanford tank farm contractor managing 56 million gallons of radioactive waste held in underground tanks.

The waste is left from the past production of plutonium for the nation's nuclear weapons program.

Last year, $48 million was shifted from the Hanford vitrification plant project to the tank farms, but a similar shift of money is not expected this year. That drops its budget to $409 million under the consent decree. The Obama administration had proposed a budget of $520 million for the tank farms this fiscal year.

Because of the lower budget, Washington River Protection Solutions plans to reduce its work force of about 1,600 employees by up to 250 employees by Jan. 30.

The DOE contractor will ask for volunteers for layoffs, with applications accepted Dec. 2 to Dec. 13. Changes in the Hanford pension system that reduce the benefits accrued by nonunion workers starting in January could make the voluntary layoffs attractive to some workers eligible for retirement.
Those approved for voluntary layoffs, which carry the same severance packages as other layoffs, would leave employment by Dec. 19.

More layoffs are expected to be needed to reach the tentative target of 250 fewer workers, and those employees would leave the job no later than Jan. 30.

Up to 100 more layoffs are expected at CH2M Hill Plateau Remediation Co., the DOE contractor for much of the environmental cleanup work in

central Hanford and for groundwater cleanup. It employs about 1,350 people.

About 80 positions are expected to be cut in December and January. It will seek volunteers for layoffs on the same schedule as the tank farm contractor, with those leaving voluntarily gone by Dec. 19 and other layoffs completed by the end of January.

About 20 more jobs are expected to be cut between April and the end of September.

DOE budget issues are leading to less work by CH2M Hill to treat contaminated groundwater and to make progress toward treating radioactive sludge now stored in underwater containers at the K West Reactor basin. CH2M Hill also expects some changes in the mix of work skills needed as some work is completed.

Mission Support Alliance also plans to reduce its work force of 1,580 employees by up to 100 workers through September, the end of the fiscal year. It provides support services across Hanford, such as information technology and utilities, and demand for its services decreases as work by other contractors decreases.

At least 55 positions are expected to be cut by the end of January, with the remainder of the excess jobs cut from April through September, the last half of fiscal 2014. It plans to follow the same schedule as CH2M Hill and the tank farm contractors for the initial layoffs.

Firefighters and union security officers will not be considered for voluntary layoffs at Mission Support Alliance.

Washington Closure Hanford plans no layoffs tied to the uncertainty of the fiscal 2014 budget, but continues to reduce staff as needed as it approaches the end of its contract in fall 2015. It is responsible for cleanup of Hanford along the Columbia River and most of that work is planned to be completed in 2015.

Bechtel National, which is building the vitrification plant, also announced no layoffs.

The continuing resolution lasts until mid-January and Congress is expected to act by then, possibly extending the continuing resolution. Another government shutdown also is possible. However, lobbyist Tim Peckinpaugh said he does not expect Congress to allow that to happen again. Peckinpaugh, the Tri-City Development Council's lobbyist with K and L Gates in Washington, D.C., spoke Thursday at a TRIDEC community lunch in Richland.

Sen. Patty Murray, D-Wash., and Rep. Paul Ryan, R- Wis., are in talks now to set a top federal budget number, Peckinpaugh said. If successful, that would allow appropriation bills, like the one that sets a budget for Hanford, to be passed.

EM's Los Alamos TRU Waste Campaign Heads Toward Completion

DOE
November 20, 2013
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LOS ALAMOS, N.M. - The safe and steady progress in repackaging and shipping legacy waste has resulted in another record-setting year for the EM program at Los Alamos National Laboratory.

With less than eight months to go in an accelerated campaign to remove 3,706 cubic meters of transuranic (TRU) waste from Area G, the laboratory's waste management site, EM's TRU Waste Program surpassed its fiscal year 2013 goal of 2,600 cubic meters, removing 2,745 cubic meters and shipping twice as much waste in fiscal year 2013 as it did in fiscal year 2012.

A combination of advanced decontamination techniques, use of a federal disposal contract and key partnerships contributed to the project's success in fiscal year 2013, according to Pete Maggiore, assistant manager for the National Nuclear Security Administration's Los Alamos Field Office Environmental Projects Office.

"Los Alamos was able to decontaminate large boxes of waste so they were able to be managed as mixed low-level waste instead of transuranic waste," Maggiore said. "We then used a federal contract to ship this waste to an offsite commercial disposal facility. It was an efficient and cost-effective way to remove waste."

Under this optimized approach, Los Alamos was able to ship large boxes of mixed low-level waste containing pieces of equipment such as gloveboxes, avoiding the risky and time-consuming process of cutting up that equipment to fit within small containers.

After the massive Las Conchas Fire came to within 3-1/2 miles of Area G in 2011, New Mexico Governor Susana Martinez asked DOE to make removing the waste stored above ground at Area G its highest environmental priority. The state and DOE formed a Framework Agreement that requires removal of 3,706 cubic meters of waste from Area G by June 30, 2014.

"Our employees and our partners -- such as the New Mexico Environment Department, the Department of Energy and the National TRU Waste Program -- have made this success possible," said Jeff Mousseau, associate director of environmental programs at the laboratory. "As we complete this campaign and move forward, we will focus on new initiatives at Los Alamos and further reduce environmental risk in northern New Mexico."

America's Fukushima?

Alexander Nazaryan, Newsweek
November 20, 2013

LINK

At Atomic Ale Brewpub & Eatery in Richland, Wash., you can feast on a "Reactor Core" pizza, made with "spicy nuclear butter," wash it down with a Half-Life Hefeweizen or an Atomic Amber, and finish your meal with Plutonium Porter Chocolate Containment Cake. Later you might have at some pins at Atomic Bowl, the "Home of Nuclear Bowling," or catch a Richland High School football game, the team's name - Bombers - looming over the field, a mushroom cloud logo on the scoreboard.

The town's pervasive dark humor alludes to a darker past - and a troubling, radioactive present. The plutonium for the atomic bomb dropped on Nagasaki came from what's known today as the Hanford Nuclear Reservation, around which Richland grew and thrived. During the Cold War, Hanford churned out plutonium for our nuclear arsenal. Then the Soviet threat ended, and the residents in this corner of eastern Washington were left with what is routinely called the most toxic place in the Western Hemisphere.

Today, it is not a Soviet missile that threatens this once-pristine high desert. If disaster strikes Richland, it will be because the federal government (namely, the Department of Energy) allowed 56 million gallons of radioactive waste to fester in this sandy soil, where some say it is rife for an explosion. And, critics charge, the DOE has watched its prime contractor on the site, Bechtel, grossly overcharge the American public for a waste-treatment plant so poorly built that, once it's finished (if it ever gets finished), feeding nuclear material through it could cause a catastrophe.

A poster from the recent Occupy Portland protests called Hanford "North America's Fukushima." That isn't just left-wing, anti-corporate fear mongering - a catastrophic accident involving radioactive waste scares the two most prominent Hanford whistle-blowers, nuclear engineer Walter L. Tamosaitis, fired from the site last month, and Donna Busche, a nuclear safety compliance officer who remains employed by URS, a Hanford subcontractor, even as her legal complaints - which include allegations of everything from pressure to downplay safety concerns to sexual harassment - proceed. Unprompted, Busche told Newsweek she is worried about "when 'Fukushima Day' hits."

Last year, nuclear scientist Donald H. Alexander, formerly of the DOE, likened Hanford to the doomed 1986 Challenger mission, a disaster arising from an excess of confidence.

Speaking of the cosmos: Some have suggested we launch our nuclear waste into space, to be swallowed by the sun. That may sound insane, but spend a little time sorting through the Hanford morass, and just about anything other than the status quo will seem appealing.

Taking Out the Manhattan Project Trash

Tamosaitis began working at Hanford on April Fools' Day in 2003. Back in 1989, he had started another job on April Fools' Day - at the Savannah River Site in South Carolina, a Manhattan Project legacy whose waste

had to be safely secured. He says that job was better, though. The New Jersey-born engineer with a Ph.D. from the University of Alabama at Huntsville still speaks fondly of life in Columbia, S.C., where his family - wife and two daughters - remained while he started work at Hanford as an employee of URS, which is a Bechtel subcontractor on the site.

It was a lonely existence, with Tamosaitis ensconced in temporary quarters at the Washington Square Apartments, a row of gray polygons on the town's meager main strip. He points these out as we drive toward the Hanford site, which sits at the northern edge of town, just past a severe turn of the Columbia River. "I considered work my calling, I really enjoyed it," he says in the booming voice of a general who has no need or patience for affectation. "Many times, work came before the family."

Bechtel had taken over the site three years prior to Tamosaitis's arrival, promising to clean up what had become a confounding problem for the DOE. It was here, in 1943, on the tumbleweed-covered banks of the Columbia, that the federal government confiscated 586 square miles of land in the name of the Manhattan Project, effectively leveling two towns - White Bluffs and Hanford. Remote and close to a large supply of water, Hanford became - along with plants in Savannah River, S.C.; Rocky Flats, Colo.; and Oak Ridge, Tenn. - a secretive node where the musings of Los Alamos physicists took bellicose shape.

The reactor on these desiccated steppes converted uranium-238 into plutonium-239, the fissionable stuff inside the Fat Man bomb dropped on Nagasaki on August 9, 1945. The ensuing Cold War escalation was a boon for the engineers and workers at Hanford, with eight more reactors built throughout the subsequent two decades. Only one of them - completed in 1963 and visited by John F. Kennedy two months before his assassination - was ever harnessed to produce energy. The rest worked solely to enrich nuclear materiel for rockets intended to fend off a Soviet assault that never materialized.

The last of those nine reactors was decommissioned in 1987, inaugurating an era that would prove even more lucrative for those who sought to make Hanford their livelihood: cleaning up the waste left behind from four decades of making nuclear weapons. The Atomic Energy Commission had by now become the Department of Energy, and it presented a daunting challenge to contractors: 177 underground storage tanks (the bucolically named "Tank Farms") holding 56 million gallons of waste that included radionuclides like strontium-90 and cesium-137.

Private firms quickly realized how profitable a contract here could be, yet little actual cleaning up was done for years, with The Economist noting, "most of the 1990s [were] frittered away, along with billions of dollars." A potential savior arrived when British Nuclear Fuels Limited (BNFL) contracted with the DOE to build a waste-treatment plant in 1998 that was going to turn the radioactive refuse into glass, thus allowing it to decay in a form that would be largely impervious to outside shocks, whether from earthquakes or terrorists. Two years later, with costs having risen to a projected $15.2 billion from the original $6.9 billion estimate, Energy Secretary Bill Richardson booted BNFL. An executive for the company said he was "sorry to lose the Hanford contract" but noted, prophetically, that it "promised too little reward and left us with a

high level of financial risk."

That risk is indeed great. Vast and vastly radioactive, Hanford has some 1,000 separate waste sites of varying size, according to John M. Zachara, senior chief scientist for environmental chemistry at Pacific Northwest National Laboratory. These include a plume of hexavalent chromium - the carcinogenic villain in Erin Brockovich - moving towards the Columbia, the Northwest's largest river, as well as technetium-99, which has also seeped into the groundwater, in addition to uranium, beryllium, and other wastes, both radioactive and not. The technetium has a half-life (the length of time it will take for half of the element to decay) of 212,000 years, meaning it's pretty much around until the proverbial end of time.

Yet risk didn't deter Bechtel, the nation's largest construction firm, one which has been responsible for projects as varied as the Hoover Dam and Boston's Big Dig. It built the 1,068-mile Trans-Arabian Pipeline and has upgraded the London Underground. In late 2000, Bechtel promised the DOE that for only $4.3 billion, it could finish the job BNFL had started. Its motto back then: "Glass in 2008."

Thirteen years later, no waste has been vitrified at Hanford - there may be some glass in 2019, but even that is an optimistic projection. In the process, Bechtel has been accused of silencing and even firing those who've raised concerns about its Hanford project, which has been slow, expensive and full of evasions. It has nearly tripled in estimated cost (now at about $13 billion), and could hit $25 billion. The nuclear waste, all 56 million gallons of it, remains underground and will stay there for a while, because in 2012 the DOE - no longer able to ignore whistle-blowers, including those within its own ranks - stopped all but some marginal work on the waste-treatment plant, worried that Bechtel was rushing to meet benchmarks without thinking the project through, potentially exposing nuclear materials to conditions that could lead to an explosion.
Company chief Stephen Bechtel Sr. once boasted, "We can build anything, anytime, anywhere." That may be true, but at what cost?

Corporate Welfare and Radioactive Ketchup

Those proud predictions of "Glass in 2008" ended in 2005, recalls Tamosaitis. He had been part of the team that built a successful vitrification plant at the Savannah River site, but Hanford resisted easy solutions. Six different processes had been used there to enrich plutonium from uranium, which made for radically different waste signatures within the 177 canisters at the Tank Farms, where one container could hold up to a million gallons of waste. Sixty-seven of those tanks were single-shell carbon steel containers that had leaked at one time or another, which isn't much of a surprise, since they were supposed to last only 20 years. And each tank holds its own toxic cornucopia. As Scientific American noted last spring, "Overall, the tanks hold every element in the periodic table, including half a ton of plutonium, various uranium isotopes and at least 44 other radionuclides." While the Tank Farms were not Bechtel's responsibility - that is now managed by Washington River Protection Solutions - the creep of nuclear waste toward the Columbia River has made it imperative that the tanks be

drained, that their waste be turned into glass.

In late 2005, Tamosaitis was asked by his bosses to head a review team that identified the 28 most trenchant problems with the treatment plant, from the broad ("Inconsistent Long-Term Mission Focus") to the particular ("Instability of Baseline Ion Exchange"). That Tamosaitis was picked to lead the review seemed an endorsement by URS of his ability to solve complex problems. I don't know if Tamosaitis is a creative thinker, but he is obviously a meticulous one. This is obvious from the museum-quality antique cars in his basement, each of which he restored to its near-original condition. He is now working on a Chevy pickup with his 5-year-old granddaughter, who helps him paint each part.

The daunting challenges at Hanford, however, would not allow for a car hobbyist's leisurely pace. Part of the problem was the "design-build" approach Bechtel chose for the project, meaning that it moved ahead rapidly with construction before resolving some major technical challenges, hoping to solve problems as they arose, rather than testing exhaustively beforehand. Design-build is not uncommon, but perhaps not prudent for an engineering feat as complex as the waste-treatment plant. It is like trying to change a tire while flying down the highway.

By 2009, an issue coded M3 was the largest remaining problem: "Inadequate Design of Mixing Systems." The plant Bechtel was racing to complete called for a facility that would pull waste from the Tank Farms and send the contents to either to a High Level or Low Activity vitrification plant, where it would be turned into glass by 2,000-degree melters. The glass canisters bearing less dangerous elements could remain on site, while the rest would be shipped to a permanent storage facility - for example, the beleaguered Yucca Mountain 90 miles northwest of Las Vegas, a project President Obama halted in 2009.

The waste in the Tank Farms is not uniform: about 33 percent is liquid, according to a 2003 study, "a caustic brine containing sodium, nitrate, nitrite, hydroxide, fluoride, phosphate, and sulfate"; another 42 percent is "salt cake" precipitated from the liquid. What remains, the last 25 percent, has proven to be the trickiest - a radioactive sludge that has settled at the bottom of tanks. Laced with radioactive isotopes, it is viscous like an especially thick, pulpy ketchup, difficult to move through pipes because it does not follow the Newtonian properties of most fluids.

Before the waste becomes glass, it has to be properly separated and prepared for vitrification. That's to take place at the Pre-Treatment Plant, where it flows into tanks in which pulse-jet mixers - Tamosaitis describes them as giant turkey basters - are supposed to stir it into a homogenous mixture. But tests found that the heavier sludge may still settle at the bottom. At the Savannah River site, mechanical agitators - Tamosaitis likens these to the blades of a blender - whip this grainy goo back up; no such agitators have been installed at Hanford, meaning that the flow of the heaviest, most radioactive particles could be impeded by their settling at the bottom of the vessels or inside pipes.

Should that occur, there will be little chance to correct an accumulation of radioactive sludge, since the mixers are installed in "black cells" that will be so rife with radiation that workers won't be able to enter them,

meaning that the plant will have to operate with minimal human input, even if something goes amiss.

An incident at the Sellafield nuclear complex on England's northwest coast was an ominous warning: In 2004, a pipe feeding into a black cell burst, spilling what a British governmental investigation calls a "highly radioactive liquor" rich in uranium and plutonium. A report in The Oregonian on Hanford's problematic black cells noted of the Sellafield incident: "The cell contained the leak. But operators didn't discover it for three months, and the plant shut down for two years."

Even worse, the accumulation of nuclear material in Hanford's tanks could create highly combustible hydrogen gas pockets. "You get enough [hydrogen] and some spark source and you get an explosion," MIT nuclear engineer Michael Golay told Scientific American, explaining what had precipitated Fukushima and Three Mile Island, the worst nuclear accident in United States history.

An outright nuclear explosion is highly unlikely, but possible. The radioactive material at the bottom of the mixing tanks could cause the splitting of radioactive atoms known as fission, similar to what happens in a nuclear bomb (blessedly, on a much smaller scale). That would be an unspeakable disaster, one that would almost certainly endanger workers at the Pre-Treatment Plant, while also shutting down the site. It might not kill a lot of people, but it would cost hundreds of millions dollars and take years to clean up.

The risks of a Fukushima-type disaster are incredibly slight, and those who make the comparison caution against a literal interpretation of their warnings. Yet the consequences of such a mishap would be so catastrophic that it cannot be allowed to happen. The Tokyo Electric Power Company was not worried about an earthquake causing a tsunami, and that tsunami in turn flooding and disabling a nuclear power plant on the eastern coast of the island of Honshu. Much later, a panel would find "collusion" between the Fukushima Daiichi plant operators and government regulators, as well as "ignorance and arrogance" and a "disregard for public safety."

Tamosaitis calls Hanford an example of "corporate welfare," in which Bechtel is stringing along the federal government as it moves completion dates further and further into the future, all for the supposed sake of the very safety issues it has repeatedly ignored. As long as nothing horrific happens, he says, the money will flow. Tamosaitis sums up Bechtel's strategy as "delay, delay, delay, deny."

Recall that Tamosaitis is a spurned and clearly bitter former employee, but plenty of evidence supports his claims. His first seven years at Hanford were challenging. The last three were close to unbearable, pitting him against his superiors, who actively conspired to marginalize and discredit his work.

In early 2010, as Tamosaitis and his team were still grappling with the mixing problem, Hanford got a new manager: Frank Russo, a Bechtel vice president who had spent his entire professional career with the

corporation, having worked just about everywhere from Iraq to Idaho. Russo's objectives were clear from emails during his first four months on the job: meet a mid-year DOE bonus, potentially worth $6 million, and secure another $50 million of annual funding from Congress. Tamosaitis, with his persistent nagging about the balky flow of nuclear sludge, stood in the way of that massive payday.

The Hanford Necklace and Other Scars

"They are so schizophrenic," Tom Carpenter, head of Hanford Challenge, a watchdog group based in Seattle, says of the people who live near Hanford. The 250,000 residents of these communities, he explains, see the plant as a source of jobs, a constant stream of money into a local economy that would otherwise have to fall back on the region's orchards and vineyards. Of course, money isn't the only thing that has wafted into Richland from the nuclear site. And they know that, too.

Carpenter alleges that Bechtel and the DOE have created a nuclear tinderbox at Hanford. As he talks, two dogs gambol through his sunny office - equipped with a treadmill desk - in Seattle's Pioneer Square, 200 miles from the semi-arid steppe upon which he is fixated with Ahab-like intensity. "Hanford is a long-term threat to humanity," Carpenter declares.

Not everybody in Richland agrees. Suspicion of the defense industry does not run especially high in this conservative corner of the United States. Sarah Palin came here in 2009, in the midst of her book tour for Going Rogue, to have Thanksgiving dinner with her aunt (Palin's grandfather came to Richland in 1943 to work as a labor relations manager at the Hanford plant).

On a day that is probably too windy for boating, I head out on the Columbia River with Neal, a native of Richland who has been navigating these waters for 52 years. He refers to having worked on projects associated with Hanford, though his association with the site is unclear. He says Bechtel is an "awesome company" and that Hanford has made the area rich: "We've always been in a bubble," immune to the most recent recession. Yes, his father had cancer four times and parts of the site are "screaming hot" with radiation. But these facts he takes in stride, much as he does the waves that yearn to capsize our boat.

On the eastern bank of the Columbia are orchards and vineyards. Cormorants alight on the water, a coyote searches for food. In 2000, President Bill Clinton designated this stretch of river, called the Hanford Reach, a national monument. And when that last reactor drops out of view, this still looks like the land Lewis & Clark traversed in 1805, a land still sacred to the Native American tribes who have lived here since the Ice Age glaciers receded.

Nobody really knows if Hanford has made people sick. Locals refer to the "Hanford necklace" - "a thyroidectomy scar that distinguishes many of the downwinders whose diseased thyroid glands were removed," as the Associated Press once described it. Yet the Hanford Thyroid Disease Study did not find an association between the release of iodine-131 during the 1940s and 1950s and an increase in cancers of the thyroid

gland, thus discounting a major illness related with radiation exposure.

That is only one cancer dismissed, however, and maladies from the past aren't the most pressing concern here anyway. It's what remains in the ground that worries the likes of Carpenter, the Seattle watchdog. He says of Hanford: "We've opened a Pandora's box that we can't put the lid back on." Behind him, the city settles comfortably into dusk.

'Don't Do What That Guy Did'

"We need to kill this BS now," reads an April 25, 2010, email from Russo to senior Bechtel and URS officials at Hanford.

Earlier that day, URS senior manager William Gay had noted in an email to Russo and other project managers that Tamosaitis and his team wanted more testing, which would prevent Bechtel from collecting its $6 million bonus. And that wasn't the worst news Gay had to deliver: "In the 2004 timeframe, [we] spent about $143 [million] on testing these tanks. We are essentially being told that we start over from scratch."

With Bechtel intent on declaring the mixing issue solved, Tamosaitis decided he needed more people echoing his grave concerns. Emails show him soliciting the opinions of outside consultants, who responded that Bechtel's approach to high-level waste is "a bit of smoke and mirrors" and "criminally negligent." Tamosaitis shared these opinions with managers at Bechtel and URS, who were plainly coming to feel that he was undermining their work.

"By the end of May I felt like I had a target on my back," Tamosaitis would later tell Congress. "I could sense that Bechtel management was not happy with my continual raising of issues."

Tamosaitis was acutely aware of the June 30 deadline, but he was increasingly convinced that declaring M3 solved was irresponsible and dishonest. If something were to happen, he would have to answer to his neighbors, to his government, to his God. And so he kept up the pressure, even as Russo was reminding his managers that "fee is in play in a big way," that nothing could jeopardize the bonus Bechtel stood to collect from the DOE for timely resolution of the mixing issue.

DOE signed off on the M3 issue just as Russo hoped - but the notion of Tamosaitis as a fifth column at the Waste Treatment Plant remained. On July 1, Russo wrote to URS's Gay: "Walt is killing us. Get him in your corporate office today." Gay responds: "He will be gone tomorrow."

And he was. On July 2, Tamosaitis was told that he was being transferred to URS headquarters in downtown Richland. URS tells Newsweek that his "reassignment had been discussed with him for several months prior to June 2010, as his work scope on the project was coming to an end," a position seconded by Bechtel, which says he had been offered a job at Sellafield in England.

Tamosaitis says the transfer was retaliation. "They wanted to send a signal" to other potential whistle-blowers: "Don't do what that guy did."

Tamosaitis was buried in a basement office with two copiers, one of which was "used to compile large documents," he told Congress. "I brought in a pair of earmuffs to dampen the sound when it was running." One time, with a snowstorm approaching, everyone else left the building without bothering to tell him. He jokes that when he emerged from the basement into a silent office in the middle of the afternoon, he thought the rapture had come.

Two weeks into his banishment, Tamosaitis wrote to the Defense Nuclear Facilities Safety Board, a government organization whose concerns Russo had effectively minimized. He told it of Bechtel's desire to "suppress...safety concerns" and the "chilling effect" his removal from the project would have on others wishing to voice dissent.

The Defense Board notified URS, in a July 27 letter, that it was "conducting an investigation...of health and safety concerns" raised by Tamosaitis. The board, a presidentially appointed panel of scientists, does not have regulatory powers, but it can hold hearings and issue subpoenas. More important, its recommendations carry significant weight within the DOE.

The hearings took place over two days in Kennewick, Wash., in early October 2010. Russo and other senior managers heard Defense Board chairman Peter Winokur tell them his group was "deeply concerned that the plant may be commissioned before several key technical issues are fully resolved," singling out the black cells that worried Tamosaitis as both expensive and potentially dangerous.

Bechtel and DOE officials did their best to dismiss Winokur's worries. But then Donna Busche spoke. She told the board members she had concerns about the pulse-jet mixers in the black cells, the ones Tamosaitis said could cause a hydrogen explosion or even a criticality (i.e, an uncontrolled nuclear reaction). Busche later alleged in a legal complaint that, during a break, her superiors were furious and asked her to "provide a different answer" when the hearings resumed later that day. No such luck. In subsequent testimony, Busche told the Defense Board that Bechtel had not done a thorough enough job of evaluating risk at the plant. Hers was the lone cautionary voice that day amid a litany of sunny assurances. (Tamosaitis was not invited to testify.)

The next day's session featured a painfully prescient warning from a board member who realized that Busche had made enemies of her own bosses; he wondered if Busche was "up to working under this kind of pressure." She answered that she was. And she has been, for three years running.

The assault on Bechtel continued throughout 2011. That August, Don Alexander, the senior DOE scientist who had been among the first to sound warnings about safety issues, wrote in a letter to his superiors (including the department's chief nuclear safety officer) that Bechtel, Washington River Protection Solutions and on-site DOE staff had "deliberately conspired together to try to undermine the pursuit of legitimate technical issues." He added, "I have been under tremendous

stress for more than a year. It seems to me that this is beyond a purely technical issue and is a whistle-blower issue."

Nobody's whistle was louder than that of Tamosaitis. He appeared before a Senate subcommittee on contracting and oversight on December 6, 2011. There, he found a receptive audience in Senator Claire McCaskill, D-Missouri, who called his plight "unbelievable...I'm speechless about the reality of you still going there every day as a walking billboard to everyone about - to keep their mouth shut. Because that's essentially what you are."
A month later, URS moved Tamosaitis out of the basement, into a first-floor office with a window.

The DOE finally seemed to validate his concerns in the spring of 2012, when then-Secretary of Energy Steven Chu halted a good portion of the work at Hanford, citing concerns about how the radioactive waste was going to be pumped through the 100 miles of piping, mixed and turned into glass.

The pressure on Bechtel was growing. That summer, DOE scientist Gary Brunson, who at the time oversaw engineering work at the plant, sent an internal memo - subsequently leaked to the press - in which he documented 34 instances when Bechtel had "provided a design solution that was not technically defensible, technically viable, or was technically flawed." He said, also, that safety was widely ignored and that some of the conclusions Bechtel had reached about the Waste Treatment Plant were "factually incorrect."

Brunson was difficult to ignore because he was not a spurned employee; he was a senior engineering official putting his reputation on the line. He did it once again that December, sending Chu a memo detailing seven major technical and safety lapses on Bechtel's part. He recommended that all work at the Waste Treatment Plant be suspended. Then he resigned.

Six months later, in May of this year, MIT physicist Ernest Moniz was sworn in as Chu's successor at the Department of Energy. In June, he came to Richland, meeting with Busche and Tamosaitis, as well as three other Hanford employees concerned about the damage Bechtel had caused there.

In late September, Moniz wrote a memo to his departmental heads in which he vowed to enforce "a culture in which workers at all levels are empowered to bring forth problems" - a tacit endorsement of whistle-blowers that can be interpreted as extending to all DOE contractors and subcontractors.

Two weeks after that, URS fired Tamosaitis.

URS's high-end New York crisis-management firm, Sard Verbinnen & Co., told Newsweek what it has told every outlet seeking an explanation: "In recent months URS has reduced employment levels in its federal sector business due to budgetary constraints." Among the most dispensable, apparently, was an engineer with 44 years of experience,

one who had dedicated much of his professional life to the safe disposal of nuclear waste.

I visited Tamosaitis, who is 66, a month after he was fired. He lives in a subdivision in the hills high above Hanford. To get there, you drive past a wine bar called Three-Eyed Fish, with its radioactively deformed piscine logo. His house is at the end of a lane overlooking the parched hills. The decor is heavy on floral arrangements, Christian imagery (he and his wife are devout Presbyterians) and replicas of antique cars.

In the afternoons, Tamosaitis's wife Sandy plays tennis, and he is left in the house alone with his dog, a turgid black terrier named Maggie. "We've lost a lot of friends," he tells me. This is a small town, and while some support what he has done, enough people don't to make almost any outing uncomfortable.

Tamosaitis could have signed a severance agreement with URS that included a financial settlement, but that would have come with the promise to shut up, and he can't do that. "I want change," he says. He isn't seeking money or revenge, he says. He wants whistle-blowers protected from corporate bullies, and he wants the American people protected from nuclear waste, whether in Washington, New Mexico, or New Jersey. As for the Waste Treatment Plant, his message remains both frightening and simple: "The place will never run, and it will never run safely."

The Man Without Friends

Whistle-blowers are, by definition, shrill - they shout in our ears, telling us things we don't want to hear, but need to hear. Tamosaitis was not a federal worker, so he could not seek protection under the Whistleblower Protection Act. He filed a complaint with the Department of Labor on July 31, 2010, but was quickly disheartened by the federal bureaucracy. "Things seemed very dark," he said in his congressional testimony. "The more I learned, the more helpless I felt." Thus, that September, he filed lawsuits against Bechtel, in state court, and URS and the DOE, in federal court.

Tamosaitis does not like the term whistle-blower, which he thinks most people equate with troublemaker. Nevertheless, he says, "I've grown used to it." Tall and wide, he seems to diminish in size as he describes the challenges ahead, not to mention those of the past three years.

He may not have many friends in his town, but he has a few powerful ones in Washington, D.C., most notably senators Ron Wyden of Oregon and Edward Markey of Massachusetts, both of whom were infuriated by Tamosaitis's recent firing. Wyden told me Tamosaitis is "the most visible whistle-blower in the nation," one whose firing could have a "chilling effect." He calls Hanford "a very real safety, environmental and health concern" and urges Moniz to "turn this around."

On November 14, during nomination hearings for the DOE's general counsel, Wyden voiced his chagrin about the department reimbursing its contractors for legal fees incurred while fighting whistle-blower claims;

that essentially means taxpayers are funding the attempts to muzzle Tamosaitis.

Unlike Tamosaitis, Busche is garrulous and cheerful, though her position is arguably just as challenging as his, if not more so - she remains a URS employee, even as her prominence as a Hanford whistle-blower rises (she appeared, with Tamosaitis, on CBS Evening News in June).

I meet her in a small frame house renovated by her husband, who sits with us throughout the interview. Educated at Texas A&M, Busche is animated and confident, her hair a wild gray shock. As we sit in her airy studio, she describes with something approaching cheer the predictable hell of going to work at a place where you are loathed.

"They would do anything to have me not speak," Busche says. She filed her first discrimination complaint against URS in November 2011. Among the allegations is that William Gay - who had helped Russo expel Tamosaitis from the Waste Treatment Plant - told "Ms. Busche [that], as an attractive woman, she should use her 'feminine wiles' to better communicate with the men at URS. Mr. Gay also stated that if Ms. Busche were single, he would pursue a romantic relationship with her." That complaint was later turned into a federal lawsuit. Late last week, she also filed a discrimination complaint with the Department of Labor against both Bechtel and URS.

On the day after meeting with Busche, I went to Tamosaitis's hearing before the Ninth Circuit Court of Appeals in Seattle. A district court judge had thrown out Tamosaitis's complaint against the DOE and URS, almost fully on technical grounds, and Tamosaitis was hoping to have that decision overturned.

Essentially, the hearing involved lawyers for both URS and the DOE disavowing all responsibility for employing Tamosaitis - and hence for firing him. They tried to convince the judges it was all Bechtel's fault. (The chief Bechtel spokeswoman at Hanford, Suzanne Heaston, told me, "He has never been employed or paid by [us]," although the email trail appears to show that managers from all three entities had a hand in axing Tamosaitis.)

The three judges seemed to side with Tamosaitis. At hearing's end, the lawyers for the DOE and URS huddled at their table as if over a coffin.
Speed Over Safety

After the hearing, I got into my rental and drove back to Richland, through the sharply winding passes of the Cascade Mountains that essentially divide the state in two, sequestering the eastern counties from the center of power and influence that is Seattle, as well as the capital city of Olympia, which is also on the Pacific Coast. The following day, my last in Washington state, I would finally be allowed to set foot in the Hanford plant.
It is truly a strange place, with its mixture of the postapocalyptic - defunct reactors, men in full-body protective suits - and the pristine, the prairie and the tumbleweeds and the slow Columbia River. In the distance is the low, ugly hump of Rattlesnake Mountain, which a local tourism bureau

claims is "the tallest treeless mountain in the Western Hemisphere."

The concrete and steel of the Pre-Treatment Plant, the black cells over which so many battles have been waged - all looked impressive but also obviously incomplete. Lacking outside walls, the Pre-Treatment Plant seemed at once massive and vulnerable. From its higher floors, the sight lines receded into a beige infinity of hills. The laboratory building had the feel of a never-used chemistry classroom. "This is like Willy Wonka's chocolate factory," said a local NPR reporter.

The site was quiet that day - Friday is a day of rest for the roughly 2,300 Bechtel and URS employees there. But even if it weren't, the plant would not have been the hive of activity it was three years ago. That's because Secretary Moniz has not lifted the moratorium imposed by Secretary Chu. On September 24, he did release a framework that suggests, among other recommendations, pulling the least radioactive waste directly from the Tank Farms and bypassing the problematic Pre-Treatment Plant. This would dispose of perhaps as much as 80 percent of the waste, but it would leave behind the radioactive sludge that poses the greatest threat.
Chu's shutdown has probably been the most firm action taken by the federal government at Hanford. It didn't solve any problems, but it finally acknowledged that problems exist. Moniz's plan may be well-intentioned, but he will have to battle against an insular Bechtel culture that is averse to outsiders' orders.

Just a week after the framework was released, Department of Energy Inspector General Gregory H. Friedman accused Bechtel of favoring speed over safety. His report found "significant shortcomings" in how design changes had been made.

In response, Frank Russo's successor, Peggy McCullough, said what Bechtel always says: There is nothing new here, nothing to get worked up about. That's not to say its engineers aren't trying to get Hanford fixed: Russell Daniel, the technical director of the site, accompanied the press tour and has persuasive rebuttals for pretty much all of the concerns raised by Tamosaitis. He claims that the pipes of the Pre-Treatment Plant can easily contain a hydrogen gas accumulation of up to 20 feet in length, if not longer. The four feet of concrete around the black cells would absorb even the most serious incident, as would the eight feet of concrete along the cells' floors. The pulse-jet mixers will not corrode the mixing vessels, which have been outfitted with wear plates. And the waste will be adequately mixed, with no radioactive deposits, as the frequency of mixing will not allow for settling. Waste will move through the pipes. Waste will become glass.

Bechtel also sent me a memorandum from atomic physicist Nils Diaz explaining why "a Fukushima-like event is impossible." Diaz, a former chairman of the Nuclear Regulatory Commission, headed a task force to study the disaster and whatever lessons it held. Diaz - previously a paid consultant for Bechtel - noted that Hanford's radioactive waste was neither hot nor pressurized enough for a "Fukushima-like" event. Tamosaitis, and others, disagree with that assessment.

At the same time, Bechtel subtly deflects blame toward the Tank Farms,

managed by Washington River Protection Solutions and overseen, like almost everything else here, by the DOE. The suggestion seemed to be that the true danger lay in these enormous vats, whose exact contents remain unknown and possibly seeping into the ground. Bechtel couldn't fairly do its job unless it knew "what's coming through the front door," explains Heaston.

Tamosaitis says this deft evasion of responsibility is part of what he calls "the Bechtel approach" - keep the project going while managing to neither complete it nor fall entirely out of favor. That way, Tamosaitis explains, it can keep collecting federal money (congressional funding is back down to $690 million per year) while claiming progress.

Bechtel's record elsewhere supports his accusation. In 2003, The Boston Globe ran an investigative series called, "Easy Pass: Why Bechtel never paid for its Big Dig mistakes." The first article of the series describes what might generously be called an error of omission: in its designs for fixing Boston's knotted highways, Bechtel overlooked the sports arena known today as the TD Bank Garden. The mistake would cost $991,000, all of it borne by the public.

"[Even] as Bechtel's errors helped drive up the Big Dig's cost, the company never paid for any of its mistakes," the Globe said. "Instead, it profited... in part because Bechtel received additional money to fix its errors."

Of course, Bechtel's primary job as a corporation is to make money - which is why many believe the DOE deserves blame for leakages and oversights and whatever other horrors may yet materialize at Hanford. The Defense Board's technical director, Steven Stokes, says the DOE "continues to be slow" in resolving safety issues. Tom Carpenter, an acerbic critic of Bechtel, nevertheless says the corporation "is capable of doing the job" - except that it knew it could get away with what he calls its "C-team," always shuffling managers, never taking the project quite seriously enough because, with the DOE in charge, it didn't really have to.

The most problematic captain of that C-team was Russo, who oversaw the plant during the three most contentious years of its recent history. He was variously described to me as a villain, a ruthless money-maker, a liar, a bully, an above-the-law renegade, and a slick salesman who will say anything to close the deal.

I liked him from the start. Friendly and plain-spoken, Russo deployed a gimme-a-break tone to dismiss the technical issues Tamosaitis raised - as well as accusations that he ordered the engineer fired, even if emails convincingly show Russo doing precisely that. Ditto for allegations that he was rushing to meet deadlines to the detriment of safety. Of course he wanted the Pre-Treatment Plant done; who in his right mind wouldn't? He was doing what he had been asked to do, what he had been doing for the 40 years he'd spent with Bechtel: "building stuff."

Russo says that ultimate authority resides with the DOE, and on this, if little else, he and Carpenter agree, the latter calling the department

"incompetent" and "systematically unwilling...to accomplish this mission." Senator Wyden says much the same thing: "The clock is running out on the Department of Energy," he told me.

Busche told me that when she met with Secretary Moniz this past summer, he had only paid lip service to her concerns.

After many off-the-record conversations, the DOE finally gave me a statement for attribution. It is "absolutely committed to completing the important work at the Hanford Site."

His Last Great Challenge

As Tamosaitis drove around Richland or talked for hours at his living room table, we returned frequently to the recent book Toms River by the environmental journalist Dan Fagin, about a cancer cluster in coastal New Jersey. We had both been deeply touched by the book, which details one of the most tragic lapses in environmental safety in modern American history - the ongoing pollution of drinking water by Ciba Geigy, a Swiss firm that ran a dye plant in town that later made industrial solvents. The childhood cancers that resulted - of the blood and central nervous system, mostly - could have been prevented by the right questions posed at the right time.

Someone told Tamosaitis to read the book after he gave a talk at Portland State University. He grew up about 50 miles inland from Toms River and vacationed at Ortley Beach, a part of the town that fronts the Atlantic Ocean.
There were no whistle-blowers in Toms River; it took the relentless mother of a child born deformed by cancer to finally shame the state and federal authorities into action.

In 1984, when Toms River residents become alarmed about the safety of their water supply, an official from Ciba Geigy assured them that the chemical plant's effluent was "99 percent water and a little salt." This was criminally untrue - the wastewater was teeming with carcinogens. But human beings are trusting creatures; we do not want to be suspicious of those in power. And so the people of Toms River believed what they were told.

Today, the people of Richland are getting restless. Other parts of Washington State are celebrated for their vineyards and their mountains; Richland is known for nuclear waste. Recently, efforts have started to re-brand the region and make it friendly to tourists. It is today possible to schedule a tour of the reactor where the plutonium for Fat Man was enriched, but officials want to use the supposedly cleaner outer edges of the site for "outdoor recreation," according to a recent AP report. Local tribes hope to use the land for growing traditional foods and hunting, arguing that their claims to Hanford are at least as valid as those of weekend warriors looking for caloric catharsis.

Not everyone thinks that's realistic. Zachara, the Pacific Northwest National Laboratory scientist, is hesitant when I ask him about recent plans for recreation at Hanford. "I am not sure about that, to be honest

with you," Zachara tells me over the phone. When he says the word "remediation" - that is, cleanup - he prefaces it with the word "quote."

In the middle of this toxic maelstrom resides Tamosaitis - a man of God but also a company man, a believer in nuclear energy who fears nuclear waste, a maligned employee who became a principled whistle-blower, a fixer of things who was powerless to fix the last great challenge placed before him. Because of what he saw at Hanford, he started talking. Nothing can make him stop.