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## Protecting Whistleblowers at the Department of Energy

[DOE](#)

August 4, 2016

*Steven Croley, DOE General Counsel*

At the Department of Energy, our employees -- as well as workers who are employed by our contractor companies -- work with some of the most complex machinery and dangerous materials on Earth. From nuclear waste to lasers to particle accelerators, our workers' activities require vigilant safety and communication.

That's why the Department has gone to great lengths to ensure that employees can raise concerns about health, safety and management issues without fear of retaliation. Because we believe our mission is best served by a culture where employees are confident their concerns will be heard and that they will not be punished for raising them.

In fact, we have established an Employee Concerns Program for both federal and contractor employees, so they can address their concerns in a comfortable forum. And employees are of course protected by laws, regulations and even contracts that we sign explicitly prohibiting retaliation against whistleblowers.

Today, I am announcing two additional steps that will build upon our ongoing efforts.

The first is detailed guidance to our personnel responsible for entering into and administering contracts that makes it clear if and when the Department will reimburse legal costs in whistleblower cases. The guidance instructs that a primary consideration for whether one of our

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contracting companies can be reimbursed in such a case is whether the company in fact retaliated against a whistleblower. Just because a company prevails in their defense does not necessarily mean they will be entitled to reimbursement costs.

Second, the Department is publishing a proposed rule clarifying that the Department can assess civil penalties against contractors and subcontractors for retaliating against any employee who raises concerns relating to nuclear safety.

Going forward, if a contractor employee calls attention to a radiation hazard that is in violation of a nuclear safety requirement and the contractor retaliates against the employee for raising the issue, the contractor may be subject to a civil penalty for creating the radiation hazard and the contractor may have to compensate the employee for the retaliation. With this new proposed rulemaking, the Department would be empowered to impose an additional civil penalty against the contractor for the retaliation itself.

These two steps add to others the Department has already taken in recent years to strengthen protections for employees that raise concerns.

Along with our existing regulations and specific prohibitions against retaliation in contracts, we have robust procedures in place for the investigation of whistleblower claims when employees believe they have been mistreated for raising issues. In cases where an employer can be shown to have retaliated against whistleblowers, Department regulations allow for reinstatement, backpay and reimbursement of reasonable costs such as attorneys' fees.

And we have committed to strengthening further our Employee Concerns Program, with the aim of providing an alternative for employees to be heard when they are unable to talk to their supervisors or otherwise find

that traditional methods won't work. We will ensure that the Employee Concerns Program is independent and free from conflicts of interest.

Secretary Moniz has repeatedly emphasized the importance of fostering a strong and inclusive safety culture. Under his leadership and direction, the Department has redoubled our efforts to implement the Whistleblower Protection Pilot Program by modifying major contracts to make that Program applicable to more contractors.

An open and inclusive culture that prioritizes safety and management excellence is essential to protect our workers and taxpayers alike. Today's actions will further institutionalize our considerable efforts to ensure that all employees can raise safety and management concerns without fear of retaliation.

### **Editorial: Solutions needed in MOX funding debate**

[The Aiken Standard](#)

August 8, 2016

It's a shame more people weren't on hand Thursday to hear an important legislative update from U.S. Sen. Tim Scott, R-South Carolina. But for the approximately 30 people attending the town hall organized by the North Augusta Chamber of Commerce, the affable senator from the Lowcountry delivered a lot of important news.

Scott addressed a wide variety of topics, including roads, education and issues affecting small-business owners. But the bulk of Scott's visit centered on the Mixed Oxide Fuel Fabrication Facility, or MOX, at the Savannah River Site.

Scott echoed the sentiments of most Republican lawmakers that the approximately \$7.7 billion project must move forward.

“One of the economic engines of the area, certainly without any question, is the Savannah River Site,” Scott said. Alternatives to MOX include, but are not limited to, downblending, shipping waste out of state or glassification.

While we’re not prepared to take sides in the MOX versus alternative disposal method debate, it would be a mistake to place MOX indefinitely on cold standby. Bringing MOX to a screeching halt without a Plan B in place would be economically damaging to the CSRA, which made Scott’s talk very timely.

At present, the MOX facility faces an uncertain future, with the facility facing construction delays and running billions of dollars over budget. As of 2014, the project price tag stood at about \$7.7 billion and was only about 68 percent complete. About \$4 billion has been spent so far, according to a 2014 report by the U.S. Department of Energy, or DOE.

Despite cost overruns and perpetual delays, turning our backs on MOX would be a mistake, Scott said.

The South Carolina Senator said pursuing other options, such as downblending or other plans, runs afoul of an agreement with the Russians to convert weapons-grade plutonium into fuel for commercial nuclear reactors.

A deadline to process 34 metric tons of plutonium by Jan. 1, 2019 remains in place.

“We’ve been working diligently with [DOE] Dr. [Ernest] Moniz on ways to re-evaluate what’s here, how to continue to expand it,” Scott said. “Salvaging and making sure we keep the MOX facility off cold standby is a very important part of the equation.”

Unfortunately, the MOX project doesn’t appear as if it will meet the 2019 deadline. The facility was supposed to be completed in January 2014. In the

absence of a MOX facility, the agreement requires the federal government to transfer 1 metric ton of plutonium per year out of SRS or pay a \$1 million per day fine — capped at \$100 million a year — to South Carolina. That hasn't happened either as a federal suit over the MOX project worms its way through the legal system.

MOX faces further funding hurdles in Congress. The U.S. House of Representatives has appropriated \$340 million while the Senate version allocates only \$270 million. Scott remained confident a deal could be reached to bridge the gap.

“The budget for (fiscal year 2017) contains \$270 million for the MOX facility to go forward. We're trying to secure the other \$70 million for it to continue to go forward,” Scott said. “I think we're going to be successful.”

During a recent tour of the Savannah River Site, there were clear signs that the MOX facility was deep into the construction process. Towering cranes arched over the monolithic MOX structure as workers in hard hats continued with construction efforts.

For security reasons we were unable to photograph these efforts, though it was clear from a visual inspection of the MOX project that a substantial investment had been made into the facility. It's one of the most ambitious construction projects we've seen at the Savannah River Site, and we have reservations about shifting gears this deep into construction without a reliable alternative in place.

That said, we're certainly not pleased that construction has ballooned billions over budget. Taxpayers shouldn't be pleased either. If cost overruns become persistent, Plan B may become necessary.

“The opposition to MOX is, in my opinion, nonsense. There is no other way to dispose of this weapons-grade plutonium other than the MOX facility,” Scott said. “According to the agreement we have with the Russians,

glassification, downblending, all the other iterations of solutions aren't solutions, they are problems. They are problems because they do not meet the letter of the agreement."

We appreciate Scott's candor, and we hope he's correct that lawmakers can bridge the MOX funding gap. Much has been invested in MOX, and we'd hate to see that investment go to waste.

### **Court orders feds to turn over Idaho nuclear waste documents**

[The Bellingham Herald](#)

August 9, 2016

A federal judge has ordered the U.S. Department of Energy to make available to the court documents sought by former Idaho Gov. Cecil Andrus involving nuclear waste shipments to eastern Idaho.

U.S. District Court Judge B. Lynn Winmill on Monday ordered the agency to produce the documents within a week so Winmill can determine whether to make them public.

Andrus filed a lawsuit in September after Energy Department officials responded to Andrus' Freedom of Information Act request with pages of blacked out documents.

Andrus wants information about several hundred pounds of proposed research shipments of spent commercial nuclear fuel to the Idaho National Laboratory that require a waiver to a nuclear waste agreement the Energy Department and Idaho signed in 1995.

Andrus said signing the waiver could open the door to tons more radioactive waste from the Energy Department and turn the state into a nuclear waste repository.

"We have to know what's going on," Andrus said Tuesday. "Their stonewalling and reluctance lends credence to my suspicion. That's all I have right now — a strong suspicion backed up by a history of an agency that has run roughshod over the public for way too many years."

Andrus, who has a long history of battles with the Energy Department over nuclear waste entering Idaho, contends in his lawsuit the agency failed to comply with Freedom of Information Act requirements by withholding information that should be public.

The Energy Department argues that the information can't be made public because it involves internal communications that fall under an exemption to the act. The agency also cited attorney work-product privilege, and attorney-client privilege.

Winmill in his 29-page ruling said the Energy Department's explanation for blacking out pages of documents didn't say whether the redactions "buried information relating to substantive policy about the transport and storage of large quantities of potentially dangerous nuclear waste, disclosure of which may very well be in the public's interest."

Energy Department officials didn't respond to inquiries from The Associated Press on Tuesday.

The Energy Department has said it wants to study two research shipments of spent fuel rods at the Idaho National Laboratory to better understand "high burnup" spent fuel that is accumulating at nuclear power plants in the U.S.

However, one shipment has been sent to another facility and the second shipment is on hold because Idaho Attorney General Lawrence Wasden has refused to sign a waiver to the 1995 agreement until the Energy Department proves it can turn 900,000 gallons of high-level radioactive

liquid waste already stored at the 890-square-mile federal facility in eastern Idaho into a solid form.

So far, a \$600 million plant built to accomplish that task has been plagued with glitches and failed to convert any of the liquid into a solid, violating the 1995 agreement and leading the Energy Department to seek the waiver.

The effort for the waiver that apparently had been going on for months became public in early 2015 when Andrus, a Democrat, and former Idaho Gov. Phil Batt, a Republican, held a news conference blasting the possible waiver and current Gov. C.L. "Butch" Otter for backing it.

Wasden, however, has said the 1995 agreement is the only leverage the state has in forcing the Energy Department to remove the liquid waste from the underground storage tanks and has refused to sign the waiver. Negotiations between Wasden and the Energy Department to find a solution collapsed last fall.

Andrus says that if the tanks leak they could contaminate a giant underground aquifer that supplies water for area cities and farmers who grow potatoes and other crops.

Backers of the research shipments say it will bring millions of research dollars to eastern Idaho. Nuclear scientists say the research on the "high burnup" spent fuel is needed because some 100 existing nuclear plants are producing and storing the spent fuel that comes out more radioactive and hotter.

It's not clear when Winmill will make a decision about whether to make the Energy Department documents public.

"We look forward to the judge's review and, we hope, the eventual release of information," said Laird Lucus of Advocates for the West, which is representing Andrus in the lawsuit.

## **State fines DOE \$50,000 for mishandling waste at Hanford plant**

[Tri-City Herald](#)

August 9, 2016

The Department of Energy and one of its contractors are being fined \$50,000 for mishandling waste at Hanford's T Plant, according to the Washington State Department of Ecology, which issued the penalty.

"For everyone's safety, dangerous waste at this nuclear facility must be properly managed and stored," said Alex Smith, Ecology's nuclear waste program manager, in a statement Tuesday.

The Department of Ecology also ordered DOE and its contractor, CH2M Hill Plateau Remediation Co., to obtain detailed analysis of waste before storing it and to properly maintain records.

The waste included five containers holding leaking batteries, paint chips and concrete pieces, or grease. All the waste was generated at T Plant, and some of it came from floor scrapings that had the potential to include low levels of radioactive contamination.

T Plant was built during World War II to chemically separate plutonium for weapons use from uranium fuel irradiated at Hanford reactors. It now is used to store and treat Hanford waste during environmental cleanup of the nuclear reservation.

"Our records show the contractor did identify and designate all of the waste in the five containers by November 2015, and we will be inquiring about the possibility of a miscommunication on at least one of the violations," said DOE spokesman Mark Heeter.

DOE and its contractor are required to identify the waste before it was put into storage, rather than a few days after an inspection, and must have information available to inspectors. within 24 hours of a request.

The state asked for records several times and based the violations on the records it received.

DOE has had trouble following the rules at T Plant in four previous inspections before the most recent inspection on Nov. 18, 2015, according to state records.

“Our inspectors have repeatedly cited Energy and its contractors for the same violations at the T Plant,” Smith said. This is the first time the state has levied a penalty.

The state Department of Ecology has hired two more inspectors since a U.S. Environmental Protection Agency review in 2013 found the state needed more.

With four inspectors instead of two, it increased the number of inspections it conducted in 2015 to 61, up from the previous record of 39 inspections in a year. It plans to hire a fifth inspector.

The state is concerned that if Hanford officials are not following the rules on simple wastes, like batteries, it could have more serious issues when it handles more hazardous and complex wastes.

Waste is required to be analyzed and correctly labeled before it is stored — indicating if it is corrosive or can easily catch fire, for example — to keep workers safe from hazards and make sure the waste is stored correctly.

In past inspections, the state found problems that included drums of soil contaminated with chemicals and radioactive material stored at T Plant in

2000 without proper labeling or analysis to determine what they contained. Fluor Hanford was the contractor in charge of T Plant then.

In a January 2015 inspection at T Plant the state said it found missing and inconsistent inspection records and an incomplete training plan.

DOE and CH2M Hill have 30 days to appeal the fine stemming from the November 2015 inspection to the Washington State Pollution Control Hearings Board. DOE contractors may not use federal environmental cleanup money to pay fines, according to the Department of Ecology.

DOE is evaluating the notice from the state, Heeter said. It will be asking the Department of Ecology for clarification on a few items and discussing opportunities for improvement in how waste is handled.

### **Rocky Flats refuge opens its gates, but will people come?**

[E&E News](#)

August 8, 2016

ROCKY FLATS NATIONAL WILDLIFE REFUGE, Colo. — On a sunny morning in June, Dave Lucas sauntered among knee-high grasses with a machete in hand whacking down invasive musk thistles.

The manager of this 5,000-acre wildlife refuge is waging a two-front battle as he prepares to open these lands to the public.

The first is against the thistles, knapweed, toadflax, cheatgrass and goatgrass that have invaded this scenic expanse of rolling tallgrass prairie, shrub lands and wetlands about 16 miles northwest of Denver.

He plans to beat those back using prescribed fires, herbicides and grazing — plus a heavy dose of his machete.

His second fight is against public fear that his refuge is unsafe.

At the center of this refuge is the site of the former Rocky Flats weapons plant, where the United States government spent decades manufacturing plutonium detonators for nuclear bombs. The plant, which operated from 1952 to the early 1990s, leaked plutonium, uranium, volatile organic compounds and nitrate into the water and soil, earning it a spot on U.S. EPA's Superfund list.

After a \$7 billion, decadelong cleanup, EPA and state regulators in 2007 announced the refuge lands — a donut-shaped buffer encircling the former weapons site — were safe for the public. Exhaustive soil sampling has confirmed that residual plutonium at Rocky Flats would cause a negligible risk of cancer for refuge staff and visitors, state and federal regulators say. Plutonium levels in the creeks at Rocky Flats are kept 100 times lower than Colorado's limits for drinking water.

The Fish and Wildlife Service, which acquired the lands surrounding the former weapons site from the Department of Energy, plans by this winter to begin construction of a visitor center, parking lots, trails and interpretive signs and hopes to open the refuge to the public by early 2018.

Yet many residents along Colorado's Front Range aren't ready. Critics argue that too little is known about where and how much plutonium was left behind during the Cold War and whether underground "hot spots" are truly sequestered from the public. Some argue that any exposure to radioactivity could cause cancer.

"A single particle of plutonium taken into the body can possibly be destructive to one's health," said LeRoy Moore, who founded the Rocky Mountain Peace and Justice Center in Boulder and believes Rocky Flats should remain off-limits for centuries. "It's better not to take the risk."

Stigmas around Rocky Flats are hard to break. The plant was shrouded in secrecy during its early years, when employees were forbidden to tell even their spouses what they did. In the late 1950s, barrels leaked radioactive oil and solvents into the soil, and plant workers later reported finding "highly plutonium-contaminated" rabbits. In 1989, scores of FBI and EPA agents raided the plant to investigate alleged environmental crimes, which a government contractor later pleaded guilty to in federal court.

"Secrecy and the government creates skepticism that has to be overcome," Lucas said.

Yet the public relations battle is worth it, Lucas said.

The refuge was established under a 2001 bill by former Rep. Mark Udall (D-Colo.) and former Sen. Wayne Allard (R-Colo.) to preserve open space that was fast disappearing along Colorado's Front Range.

The refuge contains a rare xeric tallgrass prairie, one of the largest remaining in Colorado — and possibly the continent — FWS said. It hosts abundant wildlife including an elk herd, mule deer, black bears, mountain lions and a moose, as well as 632 plant species. In creek bottoms among towering cottonwood trees, visitors lose sight of the Denver skyline. As a federally owned buffer to a weapons site, the refuge has been closed to humans for roughly a half-century.

"You get a feeling for what this landscape was like 100 years ago," Udall said in an interview.

Fish and Wildlife plans to designate nearly 20 miles of trails for hikers, mountain bikers, horseback riders, bird watchers and photographers, much of which will follow historical dirt roads. Lucas said he envisions honeybees as a focal point of the refuge's interpretive programs; the pollinators, which are suffering declines elsewhere, are doing well here.

Another interpretive theme, he said, could be "Nature heals."

*Is it safe?*

Fish and Wildlife needs no additional regulatory clearances to open Rocky Flats, but it does need basic visitor amenities. It has about \$10 million on hand for that, and it's hoping a consortium of local governments wins a \$5 million grant from the Transportation Department to run a regional trail system known as the Rocky Mountain Greenway through the refuge, said FWS spokesman Ryan Moehring.

The Federal Lands Access Program (FLAP) grant, which FWS and several local governments applied for this May, would facilitate construction of key pedestrian and wildlife crossings into the refuge from the east and north and extend the greenway closer to its proposed terminus at Rocky Mountain National Park.

But FWS needs the public's trust before its grand opening.

"The challenge that we face is breaking through that historic, sort of, specter that hangs over the property," Moehring said. "Our job is to engage with local communities to hear what they have to say and listen to their concerns, provide them opportunities to ask questions. With time, some of that will go away."

FWS has promised to perform additional soil sampling prior to construction of the new greenway infrastructure, Moehring said.

The agency is also paying Boulder-based communications firm Root House Studio roughly \$76,000 to develop and implement a public engagement strategy for the refuge, he said.

Public skepticism is not surprising given the site's checkered past.

Rocky Flats — its name comes from the 20-foot layer of surface gravel known as the Rocky Flats alluvium — was primarily used for grazing cattle and small-scale clay and coal mining before being purchased through eminent domain in 1951 by the Atomic Energy Commission.

Plutonium created in nuclear reactors in Hanford, Wash., and the Savannah River Site in South Carolina was shipped to Rocky Flats, where thousands of workers machined or shaped it into grapefruit-size "pits" or triggers that were shipped to Texas for assembly into nuclear bombs.

Plutonium, which was nearly nonexistent before 1945, is a silvery-gray radioactive element named after the planet Pluto.

Yet an unknown quantity of it escaped Rocky Flats.

Plutonium spontaneously combusted in 1957 and 1969, causing major fires that sent plutonium-laced smoke downwind toward Denver, where many assume it was inhaled by residents.

In the late 1950s, hydrochloric acid ate through barrels stored outside on what was known as the 903 pad, causing them to leak plutonium- and uranium-laced oil and solvents into the soil. By 1968, the barrels, sludges and remaining liquids were shipped to the Idaho National Engineering Laboratory for burial, the Colorado Department of Public Health and Environment (CDPHE) said.

Even after the cleanup, soil in the 1,300-acre central operable unit, which is still managed by DOE and off-limits to the public, and the roughly 4,000 acres of FWS-managed buffer lands still contain elevated levels of plutonium.

*Understanding the risk*

Yet there is "essentially no plutonium" below the surface in the refuge lands, CDPHE said.

Those lands, in fact, were never developed for bomb making and were clean enough that regulators said they required no remediation.

"This area was pretty much untouched," Lucas said last June, pointing to a bucolic field of big bluestem and blue grama grass, coneflowers, and prickly poppies. "There was no building, there were no maneuvers, there was no nothing going on."

He was leading a small group of reporters on a tour of the refuge, one of the many public and private outings FWS has led through the refuge in the past several months. A reporter asked Lucas how he knows the refuge is safe — a question he's been asked many times before.

"OK, let's do it!" Lucas said with a grin and the enthusiasm of a hockey player dropping his gloves for a fight.

"Put down the machete, David," Moehring said in jest.

The plutonium levels, while elevated, are not dangerous, federal and state regulators insist.

Plutonium decays by releasing fast-moving alpha particles, which emit small amounts of energy that can damage human tissues. While these particles cannot penetrate skin, breathing them in — and, to a lesser extent, ingesting them — can cause cancer of the lungs, liver, bones and bone marrow, CDPHE said.

Cleanup officials set an action level of plutonium in the refuge's top 3 feet of soil at 50 picocuries per gram, a level that could potentially increase the lifetime cancer risk for a full-time refuge worker by an

additional 5 in 1 million, according to the cleanup decision signed by EPA, DOE and CDPHE in 2006.

To put that into context, the average risk that any American will develop cancer in his or her lifetime is 1 in 2 for men and 1 in 3 for women, according to a fact sheet from the American Cancer Society. So a male refuge worker who is exposed to the highest level of allowable plutonium on the refuge would see his risk of cancer rise from 1 in 2 to 1.000005 in 2.

Yet plutonium levels, on average, are nowhere near 50 picocuries per gram at Rocky Flats. They hover around 1.1 picocuries per gram within the refuge and 2.3 picocuries per gram in the DOE site. The highest levels ever recorded out of thousands of soil samples were 20 picocuries per gram and 49 picocuries per gram, respectively.

Yet critics remain wary.

The Rocky Mountain Peace and Justice Center a month ago started an online petition urging school officials to ban field trips to Rocky Flats. The town of Superior, which borders the refuge to the northeast, in April unanimously voted against running the greenway through Rocky Flats, breaking with a coalition of supportive local governments and potentially jeopardizing the federal grant.

"There's radioactive material still buried out there," said Trustee Chris Hanson, according to the Boulder Daily Camera. "Why would we ever want to put a trail out there? Why would we take that chance?"

*'Unconscionable'*

In total, 21 tons of weapons-grade nuclear material — plutonium and enriched uranium — was removed from Rocky Flats; tens of millions of gallons of contaminated groundwater was treated to remove uranium, nitrate and VOCs; and 800 structures were torn down.

Today, all that's left at the former industrial site is several dozen groundwater sampling wells, 18 surface water sampling sites, four water treatment facilities, solar panels, a couple of small storage sheds, two landfills and the occasional deer or elk herd.

In contrast to the refuge, the industrial site is still on the Superfund list.

The site is safe for humans, but it remains off-limits to prevent people from tampering with the pollution controls, regulators say. The barbed-wire, waist-high fence guarding the DOE site would keep out a cow, but not much else.

Yet the landscape is not "clean" by any measure, said Niels Schonbeck, a professor of biochemistry at Regis University.

"We did not 'clean up' Rocky Flats. We remediated it," Schonbeck said. "That's one of those euphemisms — double speak — that is used, in my opinion, in an unconscionable way."

Schonbeck and others argue there are too many unknowns about where plutonium was buried at Rocky Flats and how radiation affects the body. While the action level for plutonium in soil down to 3 feet was set at 50 picocuries per gram, from 3 to 6 feet, allowable levels were 1,000 to 7,000 picocuries per gram, he said.

Schonbeck said burrowing animals like prairie dogs could dig into radioactive hot spots and carry the dirt to the surface. He said Colorado's extreme weather — winter chinook winds reach 90 mph on the refuge, and a major flood in September 2013 was so powerful it changed the courses of many Front Range rivers — could mobilize dangerously contaminated soils.

"There is a finite risk — it is low, we admit," he said. "But the consequences are extreme."

Schonbeck has joined other scientists, residents and an FBI agent who worked the 1989 raid in urging local governments to oppose running the Rocky Mountain Greenway through Rocky Flats.

"The quantitation of the health consequences of plutonium inhalation is fraught with enormous uncertainties (there is a whole literature that documents this fact)," Schonbeck wrote in a letter to the Boulder City Council, which later voted 7-1 in favor of moving forward with the greenway grant under the condition that more soil testing would be conducted first.

"What is deemed 'safe' by state authorities today could well end up being considered harmful in the future," Schonbeck said.

The counties of Boulder and Jefferson and the cities of Boulder, Westminster, Broomfield and Arvada have all backed the proposed grant to route the greenway through the refuge. Superior is the lone dissenter.

Moore of the Rocky Mountain Peace and Justice Center agreed that plutonium standards have been met at Rocky Flats, but "meeting them doesn't mean you're really safe."

"If you breathe in as little as one particle [of plutonium], it could wreck your health," said Moore, who said he also opposes nuclear power.

David Abelson, executive director of the Rocky Flats Stewardship Council, which consists of 10 local governments, three community groups and one individual and provides oversight of Rocky Flats, said critics are fearmongering.

"I think it's misleading," he said. "It's scare tactics."

Abelson, an environmentalist who previously advised the Boulder-based Western Resource Advocates, said the risk of visiting Rocky Flats needs to be put into context.

According to the council, a refuge worker's annual dose of radiation would be less than 1 millirem per year. But the average American already receives an average of 620 millirem per year, according to the Nuclear Regulatory Commission. Half this dose comes from natural background radiation, such as from radon in the air and smaller amounts from cosmic rays and the Earth itself, with the rest coming from man-made sources like X-rays.

"In general, a yearly dose of 620 millirem from all radiation sources has not been shown to cause humans any harm," NRC's website says.

Abelson said visitors to Rocky Flats face far greater risk to their health by crossing Highway 128 to access it than they do by actually setting foot on the refuge. The FLAP grant, if awarded, would help fund a \$775,000 pedestrian underpass, among other pedestrian and wildlife crossings, to connect the refuge to bordering parklands.

"What makes Rocky Flats hard is it is easy to scare people," Abelson said. "There are a lot of people out there who are misrepresenting the facts. As a result, in some quarters, there's genuine fear. I come from the environmental community, and I'm a fan of this."

FWS is not underestimating the public relations challenge ahead.

The agency this fall plans to hold four public "sharing sessions" to solicit input on how the refuge should be managed and to gauge local residents' concerns. Root House, the agency's public engagement contractor, is producing a "coming soon" refuge sign, a sheet of frequently asked questions, website updates and invitations for monthly refuge walks, and is working with FWS and partners to plug the refuge on social media. The

firm was on site a couple of weeks ago to shoot a short video promoting the refuge's scenic prairie landscapes, views most local residents have never seen. Animations will highlight the refuge's industrial history and transformation.

Mimi Mather, the firm's principal, said the landscape's radioactive past carries unique challenges.

"The science is clear that the refuge is safe for public use, but the science is complicated and difficult for the layperson to understand," Mather said in an email.

"The service has every intention of acknowledging the wrongdoings of the past and telling that story," she added. "They will also explain the extensive remediation effort, and then try to build trust in their agency — a government entity that is committed to providing a safe, wildlife-dependent recreation experience while conserving prairie habitat and its suite of wildlife."

#### *A 'silver lining'*

Fish and Wildlife hopes Rocky Flats can follow the success of Rocky Mountain Arsenal, a Manhattan-sized refuge just north of Denver that suffered its own onslaught of historical contamination but is now one of the most popular refuges in the country. Arsenal, Rocky Flats and Two Lakes national wildlife refuges are part of one complex under Lucas' management.

After the attack on Pearl Harbor, the U.S. Army used Arsenal's meadows, wetlands and woodlands to manufacture explosives and chemical weapons, including mustard gas. The government also leased the lands to private corporations including Shell Chemical Co., which produced agricultural pesticides for decades until the early 1980s.

The area was designated in 1987 as an EPA Superfund site, setting in motion a multibillion-dollar effort to clean up contaminated soil and groundwater.

The cleanup and restoration of native prairie habitats has been hailed as a resounding success. Today, the refuge hosts about 85 bison, hundreds of mule deer, coyotes, jack rabbits, birds of prey and burrowing owls and receives close to a million annual visitors.

Arsenal once produced thousands of tons of napalm and sarin nerve gas, but "school buses pull up every day," said Carl Spreng, Rocky Flats coordinator for CDPHE.

"We just don't have the same perceptions there that we have at Rocky Flats," he said.

Like Arsenal, Rocky Flats is a key bulwark against urban growth, Lucas said.

In the year ending July 15, 2015, Denver had the fastest growth rate among big cities in the United States, according to The Denver Post. By midcentury, the Denver-Boulder regional population is projected to grow from 3 million to 4.6 million, according to the state demographer.

Lucas' tour concluded on the refuge's southern fence line, where homes from a new, master-planned community called Candelas are sprouting over the dust and hum of bulldozers. The 1,500-acre development envisions 1,450 single-family homes, 785 multifamily condos and townhomes, and several million square feet of retail and commercial space.

It's a major impediment to migrating wildlife, Lucas warned.

Yet residents and developers of Candelas are among the refuge's strongest allies, because they have a vested interest in improving perceptions of Rocky Flats — and local property values.

FWS will need public buy-in if it hopes to accomplish its management goals at the refuge — namely, to beat back those invasive weeds. A key tool is prescribed burns.

Since 1972, wildfires have been quickly extinguished on the refuge and only one controlled burn has been set, according to FWS's refuge management plan.

"As a result, a fuel load of dead vegetation has been building up in the grasslands of Rocky Flats for at least 30 years," the plan states. "This buildup of dead vegetation has contributed to an invasion of noxious weeds on the site, particularly in the last 10 years."

While mechanical removal and chemical spraying are other tools to battle invasive species, prescribed fire is more effective and efficient, Moehring said.

Yet FWS's last proposed prescribed burn was loudly shot down by local officials over fears it would mobilize plutonium, according to a report in *The Denver Post*.

Spreng said air monitors showed past fires did not cause elevated plutonium levels.

With public buy-in, FWS also envisions leading environmental education programs for high school and college students as well as a limited hunting program for youth and the disabled.

Udall, the co-author of the refuge bill, said open, unspoiled landscapes like Rocky Flats are a "silver lining" of America's Cold War past. He's confident Rocky Flats is safe for humans.

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"Look, radiation concerns should be taken seriously," he said. "Of course, we're exposed to natural radiation every day."

Udall lives in Eldorado Springs, about a 10-minute drive from the refuge.

"I live just about 3 miles northwest of Rocky Flats," he said. "I have children. I have neighbors. I had a big investment in having the place cleaned up properly."

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