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Texas Solution or Nuclear Nightmare?

**As a company in the Lone Star State moves to profit from America's
dilemma with spent nuclear fuel, others fear the worst.**

**APPROVED BY
SUPERVISING COMMITTEE:**

Supervisor:

George Sylvie

William D. Minutaglio

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Joseph Albert Baucum, B.A.

Report

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Abstract

Texas Solution or Nuclear Nightmare?

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dilemma with spent nuclear fuel, others fear the worst.**

Joseph Albert Baucum, M.A.

The University of Texas at Austin, 2015

Supervisor: George Sylvie

The United States government has sought a permanent disposal site for spent nuclear fuel since 1982. To date, no location for disposing of spent fuel exists. The situation is problematic, because spent nuclear fuel is a high-level radioactive waste. It is a byproduct of nuclear power plants' electricity production. It is also incredibly dangerous material. With the government set to continue relying on the nuclear industry for electricity, the amount of spent nuclear fuel in the United States will continue to grow. Waste Control Specialists, a company headquartered in Dallas, Texas that specializes in low-level nuclear waste disposal, is in the process of applying for a Nuclear Regulatory Commission license to temporarily store spent fuel in Andrews, Texas. If successful, WCS could earn millions of dollars. Company officials are promoting the plan as a solution for America, but opinions from industry experts and residents near Andrews conflict over the safety of transporting and storing spent fuel in Texas.

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In 2000, Rose Gardner, a florist from tiny Eunice, New Mexico, faced a health crisis. Her body unexpectedly shed 15 pounds. Recurring nightmares of drowning jolted her awake on numerous nights, because in reality, her lungs were gasping for air.

Consults with an endocrinologist in Lubbock, Texas, revealed the culprit: a goiter, an abnormal enlargement of Gardner's thyroid gland. Her doctor presented two treatment options: Surgery, or ingesting a radioactive iodine capsule. Fearing a permanent scar across her throat, Gardner chose the capsule.

The first dose failed, so a year later, she received another. Three years of misery ensued. Within months, bald patches grew along Gardner's scalp. High-blood pressure ransacked her five-foot frame. Fatigue killed aspirations to expand her business, Desert Rose, or enjoy time with husband Maurice and daughters Brigitte and Jessica.

Looking back, Gardner, now 56, vitality mostly restored, wavers on whether she'd make the same choice. But there's a silver lining. The hair loss, the anemia, the all-around torment, opened her eyes and taught her the pain of radiation exposure.

"I know if that much [radiation] can hurt me, it can hurt somebody else," she says.

Now, in early 2015, Gardner, sporting a white blouse and blue jeans, sits behind the work desk at her floristry. Her hair, mixed black and gray, almost extends to her shoulders. Jill Yarbrough, a friend for over half a century, sits across from her. Various flowers, stuffed animals, and balloons dot the room, a contradicting ambiance to the task at hand. The two women meet not to talk floristry, but to discuss an unfolding plot that surrounds their town of slightly more than 3,000 residents. It takes Gardner back to the anguish of her thyroid treatment.

In five years, unknown portions of America's [spent nuclear fuel](#) -- radioactive waste generated from nuclear power plants' production of electricity -- could be stored near their town. The extremely toxic fuel can kill someone exposed to it within minutes. It can decimate a city, according to nuclear industry experts, forcing residents to evacuate and never return. The amount of spent fuel in the United States totals more than [70,000 metric tons](#). If stacked end to end on a football field, it would measure over 30-feet high, and the proposed storage site is only five miles outside of Eunice, across the state border, in Andrews County, Texas.

The possibility concerns the women, to put it mildly, even if they're not surprised. The company behind the push to bring spent fuel to the edge of West Texas, [Waste Control Specialists](#), has made the communities of Eunice and Andrews the unofficial nuclear waste capital of the southwestern United States.

Right outside the Eunice city limits, just off the 37-mile stretch of Highway 176 to the slightly larger Andrews (pop. 13,000), WCS operates one of the country's largest low-level radioactive waste disposal sites. The company began accepting waste in 2012. Presently, the waste originates from Texas and 34 other states' nuclear plants, research centers, and hospitals. It [differs from spent fuel](#), a high-level waste, in that it is significantly less radioactive.

WCS, whose corporate offices are headquartered in Dallas, Texas, doesn't disclose financial reports. Company spokesperson Chuck McDonald estimated revenues to exceed \$40 million annually for its low-level waste disposal fees according to a [Reporting Texas story](#) (McDonald declined to respond to repeated calls for this story).

Taking on the more dangerous spent fuel could earn the company substantially greater profits. It also could help solve, at least temporarily, a decades long American dilemma.

The federal government has sought a permanent home for spent fuel since the early 1980s. It's still searching, currently storing the waste across 72 nuclear plants, six completely decommissioned, in 33 states.

Enter WCS, a company that has never incurred a major accident disposing low-level waste. In an early February [press release](#), WCS officials announced their intent to apply for a Nuclear Regulatory Commission license to begin accepting spent nuclear fuel. The company says its first order of business will be to take fuel from those decommissioned sites in various neighborhoods around the nation and bring it to West Texas, according to [WCS' media documents](#).

“People in those communities really don't want that spent fuel sitting there with a decommissioned plant that nobody's around. The only ones there are [security guards],” says Richard Dolgener, Andrews County Commission Judge and a leading proponent of WCS' plans.

Company officials targeted 2020 as a date for finalizing the licensing, regulatory requirements, and construction for the storage facility. Unlike its disposal of low-level waste, which is buried permanently underground, the company plans to temporarily warehouse the spent fuel above ground. Storage would be for the next 60 to 100 years, after which it could be again relocated – but only if a permanent repository is agreed upon, according to statements made by WCS.

“It's not money driven,” Dolgener says. “It's a solution for America.”

Gardner and Yarbrough disagree with Dolgener, and they're not wrong, according to government documents and some industry experts.

Billions of dollars are potentially at stake according to a federal report, but more important, some experts believe WCS' plans won't fix America's mess. They say a central interim storage site for spent fuel will actually make the problem worse.

Relocating spent fuel to Texas won't eliminate most of the sites currently storing spent fuel, but it will create a new site, according to Arjun Makhijani, president of the Institute for Energy and Environmental Research, based in Maryland.

In the process, it intensifies the chance for disaster, he believes, not only for the people on the New Mexico-Texas border, but also for any community in the United States through which the waste travels.

"You're adding one more site to the sites that are already there, so you're actually increasing the risk," he says.

Gardner and Yarbrough say they are not against a company finding new ways to earn millions. They just don't think it should happen if it increases public safety risks, because in WCS' rush to profit from solving the spent fuel dilemma, an unforeseen accident has the potential to become a nuclear catastrophe.

"It shouldn't happen, chances are maybe it won't," Gardner says. "But just knowing that could happen because they moved [spent fuel] from one place to another is not good."

The debate over spent nuclear fuel is beyond complicated.

On one hand, the material is dangerous but also misunderstood.

The term *spent nuclear fuel* is a misnomer. The phrase suggests the fuel's toxicity has been dampened through its fission cycle in a nuclear reactor. A better term would be *irradiated fuel*. It's more radioactive after it's taken out of a reactor than it is before going in, and it essentially remains hazardous forever. A report from the [Massachusetts Institute of Technology](#) puts spent fuel's toxic lifespan at about a million years.

On the other hand, canceling its production has a price. Spent fuel is a vital byproduct of everyday life. Nuclear power plants produce electricity, and a lot of it. In 2012, the 65 U.S. operating nuclear plants generated 19 percent of the nation's electricity, according to the [U.S. Energy Information Administration](#). The [Nuclear Energy Institute](#) reports that since 2001, nuclear plants have achieved lower production costs than coal, natural gas, and oil power plants.

This translates into cheaper electricity rates. It makes home lighting, central air conditioning, hot showers, and cooked meals more affordable. If the federal government abandoned the nuclear industry in favor of alternatives such as wind or solar energy, chunks of modern life would get more expensive.

Steven Biegalski, director of the Nuclear Engineering Teaching Laboratory at the University of Texas at Austin, compares the situation to a stock portfolio. He says maintaining cost effective electricity rates demands diversification of energy sources, and the nuclear industry plays a key role.

“If you were to come and suggest to me we should be 100 percent [of any energy source] in the United States, I would probably tell you that would be a mistake,” he says. “Same as your stock investment, you don't want all of your eggs in one basket.”

With nuclear energy production set to continue, the federal government needs a permanent solution for where to dispose spent fuel. Unfortunately, no answer has arrived. The government passed the [Nuclear Waste Policy Act](#) in 1982, intending to identify a location for a permanent geologic repository for high-level radioactive waste. In 1987, federal lawmakers amended the NWPA and designated Yucca Mountain, Nevada as the planned site. Controversy quickly followed.

State officials, led by U.S. Sen. Harry Reid, D-Nevada, opposed the site. They contended that the federal government lacked the right to impose a nuclear waste repository on a non-consenting community. After decades of gridlock, President Barack Obama followed through on a campaign promise and cut funding to Yucca Mountain in 2010, leaving spent fuel disposal in limbo.

It shouldn't have come as a surprise, according to UT's Biegalski.

"Everybody has the, 'Not in my backyard,' syndrome," he says.

In 2012, the [Blue Ribbon Commission on America's Nuclear Future](#), which included government officials and industry experts, developed a "consent-based strategy" for finding that permanent disposal site. The strategy also held true for interim storage facilities, the type WCS wants to build in West Texas.

"In practical terms, that means encouraging communities to come forward, volunteer if you would, to host a nuclear waste management facility," says former U.S. Rep. Lee H. Hamilton, D-Indiana, who served as co-chair on the Blue Commission Report.

While some experts like Makhijani believe an interim storage site would increase safety risks, others think the opposite. Biegalski considers it both practical and

technically feasible to move America's supply of spent fuel to a central interim storage site. He favors it, as long as it's part of an overall strategy that leads to a permanent repository, because he believes that failing to solve the issue now saddles future generations with an unfair burden.

"I don't think it's always responsible to kick our problems down to our kids and our grandkids," he says.

To assist a host community, the BCR report recommended using a nearly \$40 billion federal waste fund, money collected since 1982 from taxes paid by nuclear plants, to help pay for the storage. Presently, federal law allows for that waste fund to pay only for use at Yucca Mountain, according to a spokesperson from the NRC. Congress must amend the law to expand its use to other sites.

If that happens, Hamilton believes it would set many things in motion. "It creates a lot of jobs, brings a lot of money into a local community," Hamilton says.

Which leads straight back to the towns of Eunice and Andrews.

As part of WCS' licensing agreements with the Texas government, Andrews County receives five percent of the company's gross receipts from low-level waste disposal, a lucrative perk for serving as the host county, even though the site operates 30 miles away from Andrews' city limits. Because Eunice sits outside the county lines, it receives nothing. This doesn't sit well with some Eunice residents, especially Gardner and Yarbrough.

The women don't want high-level radioactive waste nearby, but if WCS receives a federal license to accept spent fuel and then also gets financing from the government's

nuclear waste fund to store it on the doorstep of their town, the women want Eunice to at least receive a piece of the fiscal pie.

“Texas is getting all the gravy, and we get all the waste,” Gardner says.

Like many West Texas cities that seem to suddenly rise on the horizon, Andrews appears seemingly out of nowhere. At one moment, there are wide-open skies, endless plains, with only lonely oil derricks drilling across the countryside. The emptiness seems all encompassing. Then *bam!* You’re in Andrews, a town where locals feel mostly positive about WCS’ presence.

Robert Hulen, a 66-year-old owner of Hulen’s Jewelry, is one of those supporters. His shop sits off Main Street, just past a 7-Eleven gas station and a hair south of the town’s Family Dollar. After attending to a customer, Hulen shares his thoughts on WCS. He believes it’s beneficial that the county hosts a nuclear waste site and for the most part, has zero apprehensions.

“The only concern I have,” Hulen says, “is what to do with all that money that Andrews is getting.”

Similar to most oil towns in the Permian Basin, Andrews largely is defined by the whims of fluctuating oil prices. Receiving a yearly WCS dowry is a godsend.

Since August 2012, when Andrews County received its first annual payment from WCS’ gross receipts (about \$620,000 according to a report in [The Texas Tribune](#)), county officials have used the money on an air ambulance helicopter, park improvements, city pool renovations, extra school buses and a new community building. To date, all

expenditures total more than \$2 million, according to Dolgener, the Andrews County judge.

In discussions with WCS officials on the company's plans to expand to spent nuclear fuel storage, Dolgener says they have estimated Andrews County could receive \$10 million annually for serving as the host county.

"With that money, it's kind of like the sky's the limit, because a lot of people are going to be telling me how to spend it," he says.

Studying the county's past use of WCS' payments, some Andrews residents only see good things in store. "I feel like our city managers are doing a damn good job," says Hulen.

Five blocks up Main Street, north of Hulen's Jewelry, Kassidy Mitchell, co-owner of furniture and clothing shop Twisted Turquoise, echoes his sentiments. Besides WCS sponsoring rodeos, and even monster truck rallies at the city's Andrews County Expo Arena, Mitchell credits the company with employment opportunities. On an "annualized basis," WCS generates more than 160 full-time jobs per the company's website.

"The oil field has been the big thing out here forever," she says. "It's good to have something besides oil field work for people, because the oil field goes up and down."

Despite her misgivings about WCS' expansion plans, Yarbrough also acknowledges the jobs the company creates. Several of her family members work for WCS. Other residents of Eunice say the same, which Yarbrough says makes it difficult to oppose WCS and spent nuclear fuel.

“How can you be against what supports you and gives you your income?” she asks. “So it’s hard to say you’re against something when it’s your livelihood. That’s just hard to do for anybody.”

But aside from the jobs that might come, Yarbrough insists her town of slightly more than 3,000 people deserves more. She estimates her house lies only two miles from the proposed spent fuel storage site. She says that it isn’t fair that, unlike Andrews, Eunice receives zero monetary compensation from WCS.

To illustrate her point, Yarbrough, a musician of multiple instruments and a longtime fan of Eric Clapton, Tom Petty, and Rush, cites the town’s lack of a high school music program. She says anytime she brings it up to the Eunice City Council, she hears the “scarce funds excuse” -- which perplexes her since she sees Eunice, because of its proximity, as the real host of WCS.

But that’s unlikely to happen, according to Judge Dolgener. It boils down to the law and state borders. WCS may be right outside Eunice, but the company remains in Texas.

“That’s state law. I can’t change that,” he says. “It’s not in the state of New Mexico. They will probably never get any money out of it.”

Should WCS receive a license from the NRC, Eunice Mayor Johnnie White assures that monetary requests will be made, but not necessarily to profit from WCS’ operations. White would ask for funds to bolster Eunice’s police and fire departments, because as the closest city, Eunice’s public servants serve as de facto first responders in the event of an accident.

“Would I just go to them and say, ‘Hey, you’re within five miles of my city. I want ‘X’ amount of dollars?’ No I wouldn’t,” he says. “That’s not the way we do business.”

WCS Chief Executive Officer William J. Lindquist predicts the company will submit its application for an NRC license by April 2016, per the WCS press release. The NRC then will initiate public hearings with surrounding communities to gauge local sentiment, according to David McIntyre, an NRC spokesperson.

Gardner and Yarbrough pledge to attend the meetings, which shocks neither Dolgener nor White, especially in the case of Gardner. She’s long been an adversary to the nuclear industry’s existence near her town, and regarding the plans to bring spent nuclear fuel to Andrews and Eunice, Gardner minces no words.

“I believe it’s going to be the biggest mistake this side of humanity has made,” she says.

As Eunice Mayor White discusses the prospects of spent nuclear fuel arriving near his town and his estimation of the public’s feelings on the topic, he erupts at the mention of Gardner’s name.

“Pardon me for laughing,” he says, “but Rose is our local anti-nuke anything person, which is fine. She’s a nice lady. Don’t get me wrong.”

Anti-nuke anything doesn’t come close.

She’s a member of the Alliance for Environmental Strategies, a grassroots contingent based out of Roswell that advocates against nuclear industrial expansion in New Mexico. She also meets with Citizens for Alternatives to Radioactive Dumping, an

Albuquerque nuclear watchdog. She hopes to start another anti-nuclear group in her hometown.

In 2004, the national environmental and political nonprofit group Public Citizen petitioned the NRC on behalf of Gardner and 10 other Eunice residents. The [petition](#) sought to block the construction and operating licenses of Urenco, a Eunice uranium enrichment plant operating next door to WCS. Public Citizen lost that battle.

In legal action dating to 2007, the Texas chapter of the national nonprofit Sierra Club has sued WCS on behalf of Gardner -- challenging the company's operating licenses that were issued by the Texas Commission on Environmental Quality. The Sierra Club alleged the low-level waste site posed a health hazard and that Gardner's floristry could suffer from negative publicity according to Cyrus Reed, conservation director of the Texas chapter of the Sierra Club.

In 2014, the Texas Third District Court of Appeals rejected the group's suit. The court ruled that there was ample evidence that deemed the threats unlikely.

Despite her failed attempts, which she says resulted in the Andrews community ostracizing her, Gardner believes the effort was justified.

"I just felt like I needed to stand up and say something," she says.

Mayor White says the many residents have supported WCS in the past, but he declines to use that as a barometer to predict opinions on WCS' spent fuel plans. Gardner and Yarbrough say their friends in Eunice are concerned and that they are convinced WCS' moves are about money.

"The dollar's always the bottom line in any business. I'm not stupid," Yarbrough says.

Meanwhile, White vows to back his constituents' positions once the NRC conducts public hearings next year. "My job is to do whatever the people say, and my city council – I can guarantee you – would be the same way," he says. "We work for the people."

In Andrews County, Dolgener pledges to do the same, but if WCS' introductory briefing to the city on its spent fuel intentions is any predictor, most residents of Andrews won't have a problem with it. Last December, WCS officials hosted a barbecue at Andrews' James Roberts Center to brief the community on the company's plans. Company representatives included CEO Lindquist and President Rod Baltzer. Only one person in attendance opposed the WCS plan.

"Do you say, 'no' to one person or, do you put it forward a little bit more and see how that engages in the next round?" Dolgener asks.

The first public meetings the NRC conducts next year will explain the [licensing review process](#), according to NRC spokesman McIntyre. The NRC's appraisal will include ascertaining safeguards against natural phenomena, as well as man-induced events. Subsequent meetings will gather public sentiment. After the NRC publishes its conclusions, any person potentially affected by the proposed facility can challenge parts of the WCS application before the Atomic Safety and Licensing Board.

But McIntyre adds that despite the consent-based approach recommended by the BRC, local approval won't necessarily factor into the NRC's final decision. He cites a precedent from 2006 involving [Private Fuel Storage](#), a company from Skull Valley, Utah, which also had hoped to build an interim storage facility for spent fuel.

“They had some local support, but a lot of local opposition,” he says. “Ultimately we did grant the license, but the facility was never built in part because they did not get other permissions that they needed.”

To assuage fears about the spent fuel project, WCS officials have pointed to its own low-level waste studies -- as well as to the TCEQ that it says has confirmed the site as an ideal location. White says he will do his part: “We would try to get out the word if the science is there to show it wouldn’t hurt anything,” he says.

Dolgener’s already convinced the plan is sound. “We’re trying to give America a place to store this stuff that’s not in their backyard,” he says. “It’s in one place safely.”

But nuclear industry experts remain divided on the safety and merits of spent fuel storage. After removing economic benefits from the equation, some believe transporting spent nuclear fuel to an interim storage facility lacks not only consensus scientific justification, it also lacks sound reasoning.

A grainy, 1978 [video](#) from the U.S. Department of Energy opens with a man inspecting a 22-ton spent fuel transportation cask resting on the trailer of a 10-wheel truck. The vehicle smashes into a 690-ton concrete block at 60 miles per hour. The cask sustains so little damage that the test is then repeated with the same canister, this time at 84 mph.

“The cask also survives this more violent crash with only minor damage,” the video’s narrator says.

In a third impact test, a train loaded with a larger, 74-ton cask speeds into the concrete at 81 mph. It’s then subjected to a fire of more than 1,400 degrees Fahrenheit for

90 minutes. Scientists found no evidence from the tests to indicate the combination of the crash and fire would release substantial amounts of radiation, which the narrator attributes to the cask's ruggedness and durability at the film's conclusion.

The Sandia Corporation, a contractor for the DOE's National Nuclear Security Administration, conducted the tests.

"You can go on YouTube and search for some of these videos," says Biegalski, the UT-Austin nuclear researcher and professor.

The Sandia cask tests provide enough evidence that federal spent fuel transportation regulations adequately assured public safety, [according to the NRC](#). Subsequent tests in 1987 and 2000 further confirm the agency's conclusions. The agency's website boasts that the "2000 study used improved technology to analyze the ability of containers to withstand an accident."

But Marvin Resnikoff, a physicist working for Vermont-based consulting firm Radioactive Waste Management Associates, disagrees with the NRC's assertions. Resnikoff co-authored *The Next Nuclear Gamble: Transportation and Storage of Nuclear Waste*. He says current tests only prove the casks can survive certain hypothetical situations, but not all possible scenarios. In particular, he mentions rail fires involving oil.

He refers to a West Virginia rail fire in February to illustrate his point. In that accident, 14 oil tanker cars from railroad company CSX derailed and exploded. The fire started Feb. 17 and continued for hours into the next day.

Resnikoff says rail accidents involving oil are increasing. Following the West Virginia fire, [The Washington Post](#) reported that more than 141 "unintentional releases" of oil were reported from railroad tankers in 2014, nearly six times the average of 25

spills per year from 1975 to 2012. If a rail fire involving spent fuel casks were to also involve oil tanker cars, the fire could last for much longer than 10 hours according to Resnikoff.

“That’s a concern, whether the regulations are stringent enough to actually satisfy all the kinds of fires that could take place on rail,” he says.

He makes it clear that none of this means an accident will happen, but increasing the risk of one occurring must be looked at honestly because of the volatile nature of spent fuel. He plans to convey his concerns to the NRC.

“You just need a small amount to be released to be catastrophic,” Resnikoff says.

Increased risk from terrorism poses another concern of aggregating spent fuel at a central interim site. In the wake of the attacks on September 11, 2001, experts have worried about threats to our nuclear nerve centers.

“Your garden variety terrorist attack is unlikely to succeed,” says Makhijani, president of the Institute for Energy and Environmental Research. “There are some caveats to that, but it would be folly not to worry about it.”

It comes down to how much it makes sense, he says. After nuclear fuel exits the reactor, it’s placed within rods, which must then be submerged in pools on site, typically for [a minimum of five years](#), according to the NRC, to abate the waste’s heat level. Afterward, spent fuel can then be stored in those dry casks. Without pool storage, casks couldn’t withstand spent fuel’s radiation and heat, resulting in a radiation leak.

Decommissioning all nuclear reactors, Makhijani believes, gives the idea of consolidating spent fuel at a temporary site some merit. Inoperative plants would mean

that all spent fuel could eventually be placed in dry cask storage, which could then be moved. After transporting it all to one location, every other site where spent fuel was stored would be erased. Ideally, temporary storage would be near the permanent resting ground.

But with the majority of nuclear plants remaining open, most storage sites aren't eliminated via consolidation. Since it requires a cool-down period of at least five years on site, some of the fuel must stay at the plant. Only the waste that is cool enough for removal can be transported. Even with WCS' proposed site, most spent fuel sites will continue, which would mean that the spent fuel from the operating reactors will still have to be transported in the future.

“Needless transportation of waste is an unwise thing to do,” Makhijani says.

And then there is the danger of a manmade attack: Resnikoff agrees that terrorism isn't out of the realm of possibility. He notes that while a simple grenade alone couldn't breach a spent fuel transportation cask, the container is not impervious to all attacks. An anti-tank missile for instance, could do the trick.

“It would be like going through butter, so they can definitely be penetrated,” Resnikoff says.

It would take an incredibly well orchestrated plot to actually succeed says Biegalski, the professor at The University of Texas. “It is an issue, and I have full confidence that when those shipments would go, they would be heavily guarded and very well armed,” he says. “It would not be an easy target for a terrorist attack.”

On the whole, Biegalski is quite confident that whatever accident would arise, the government would be well prepared to handle it. He cites the 1979 Three Mile Island

incident in Pennsylvania, where a reactor suffered a core meltdown – he says the site averted calamity because of the plant’s containment safety measures.

“If we can contain the melted fuel within Three Mile Island and minimize any releases and have basically zero environmental impact, I think that technologically speaking we can do the same thing with spent fuel,” Biegalski says.

Makhijani starkly disagrees. Although WCS has history of working with low-level waste, he says it should not be conflated with high-level waste. The two are not on the same playing field. “Low-level waste has quite a bit of radioactivity, but spent fuel is a completely different animal,” he says.

To hammer home his point, Makhijani points to some of spent fuel’s long-lasting toxic elements. He says one radioactive nucleotide of Strontium-90, an isotope present in the waste, would contaminate the water in Lake Michigan to more than the drinking radiation limit even 300 years hence. Contaminated plutonium, another spent fuel ingredient, would last more than 80,000 years.

Makhijani admits that at some point, spent fuel requires permanent disposal, but moving it to a temporary site, only to have to move it again down the road, makes little sense. “This stuff eventually has to be transported to a repository, but we should do it once,” he says.

On a quiet evening in Austin, Texas, Ivan and Chiaki Stout sit on the edge of their living room couch. They know little about Gardner and Yarbrough, even less about Dolgener and White, and next to nothing about the cities of Andrews and Eunice. But they know about nuclear disasters, understanding better than almost anyone the threats

that radiation leaks pose for communities if an unforeseen accident occurs. That nightmare was their reality.

After the [9.0 magnitude](#) earthquake that erupted off Japan on March 11, 2011, the Stouts believed their family had escaped the ordeal unharmed. At the time they lived in the Ibaraki Prefecture, about an hour's train ride northeast of Tokyo. Their house's grey, two-story-walls stood upright in the aftermath of the quake, as did the surrounding steel fence. The three bedrooms were intact. Some chairs, tables, and beds had shifted. Family pictures had crashed to the floor, but nothing seemed irreparable.

"You felt like you had dodged a bullet," Ivan says.

But the Stouts already knew it wasn't just a quake. There was also what the quake had unleashed. It created a tsunami with waves as high as 30 feet, which battered towns in the east, far away from Ibaraki.

Initially confident their lives would return to normalcy, Chiaki mentioned a passing thought to her husband: *I heard there might be something going on at the nuclear plants.*

Updates were hard to come by from the Japanese media. Emails and Skype calls with Ivan's father Max Stout and his sister Angela Bassett, were the two primary resources for information. Their conversations centered on a particular site, the Fukushima Daiichi Nuclear Power Plant, which had been hit hard by the tsunami.

There might be problems at Fukushima. Engineers are on site trying to assess the damage. A few of the reactors have exploded. I heard a report of airborne radiation dispersals. This is serious. You should consider leaving.

Ivan's employer, Citigroup, sent a company email declaring there was a zero risk of radiation contamination, Ivan said. The reality is that there was risk. The explosion of the Fukushima reactors released radioactive isotopes [Cesium-137](#) and [iodine-131](#) into the atmosphere, according to the [World Nuclear Association](#). Inhaled, they posed the threat of cancer.

In the days following the disaster, the Stouts began monitoring wind direction and speed. A wrong shift in the air spelled disaster. Thinking about the well being of their three-year-old son Noah, they decided they needed to flee.

"Fifty years from now, if I get cancer, that's fine. I've had a good life," Ivan says. "If it's my son, I'm going to be like, 'Well I want to make sure I've done everything possible,' so that if that's the case, well I can say I at least tried as much as I could."

They didn't pack much, only the essentials: Water, rice, some canned food, and a small, fireproof safe containing passports and other documents. For clothes, they brought only the jeans, sweaters, and jackets that they were wearing. Anything unnecessary was left behind.

At just past noon, under a sepia sky with billowing mist, they closed the door to their home. They loaded Noah and Chiaki's mother, Fukue Kasahara, into the family's small white Chevy. The four-door van backed down the driveway. Their house vanished in the rearview mirror, and the family left the life they knew.

After a brief stay in Osaka, the Stouts eventually moved back to Ivan's hometown Austin. They lived with Bassett for the first nine months before moving into their current residence. They now are paying two mortgages, one on their Texas home, and the other

on their house in Japan, which their insurance company did not cover following the Fukushima catastrophe.

Kasahara, Chiaki's mother, returned to Japan shortly after the family's evacuation, ultimately deciding she couldn't desert her home country. The Stouts, again thinking of their son's wellbeing, have no visions of doing the same.

"We don't have plans to take Noah back," Ivan says. "When he's an adult, he can decide."

The Stouts weren't the only family affected. In 2014, [The Guardian](#) reported more than 120,000 people from the region still were in limbo. The report says that, based on a government survey, almost half of the local households had family members living in multiple locations -- and almost 60 percent of relatives who once lived together were now separated across three or more sites. Finally, almost two out of every three people had relatives who were showing signs of physical or psychological distress.

The Fukushima fallout also stunned the Japanese economy. The government responded by shuttering its 48 nuclear reactors amid safety inspections. The last, owned by Kansai Electric Power Company, closed in 2013.

The departure from nuclear energy propelled reliance on imported fossil fuels, increasing electricity costs from 7.5 trillion yen in 2010 to 10.6 trillion yen in 2012 according to the [Institute for Energy Economics in Japan](#). To alleviate the situation, Japanese Prime Minister Shinzo Abe has [pushed](#) for a return to atomic energy despite public disapproval.

Ivan admits that before they lost their home in Japan, the inner workings of the nuclear industry barely registered on his radar. He believes that, for most others, it's the

same. When he hears about Gardner's opposition to WCS and the company's desire to transport spent nuclear fuel across America to Texas, Ivan applauds her.

"I think Rose is not only addressing the risks in her area," he says, "but by the nature of what's being planned, she's really looking out for everyone."

Fukushima is obviously not West Texas. The former involved a nuclear reactor meltdown. The latter pertains to high-level nuclear waste transportation and storage. But the core of both situations centers on public and environmental safety.

Ivan's worst fear about WCS' plans is that history might repeat itself.

"You cannot ensure that you can make people whole after the worst scenario," Ivan says.

Looking back on their town's past and where Eunice may be going, a somber tone reverberates in Gardner and Yarbrough's chat. The women acknowledge the inevitability of growth, but can't help but feel their city lost something in the process.

"I used to look out the back door and see the glorious sunrise and windmills," Yarbrough says. "Now I see utilities and lights."

In addition to various shipments of nuclear materials passing through Eunice headed for Urenco and WCS, there's also test sirens that echo through Eunice's streets once a month. The alarm system emits four tones: Warnings for tornados, severe weather, accidents at the nuclear and oil companies, and an all-clear notice.

"You never get that sense of peace that this town used to have," Gardner says.

"Our sleepy little town," Yarbrough adds. "We loved it."

To the outsider, Eunice may appear to only be a desolate blip motorists pass through but never plant roots in. But she says her town, dotted by the tufted hair-grass of the New Mexico southern high plains, is special.

“I love my desert, and it’s full of life,” Yarbrough says. “It’s our home.”

At Gardner’s floral shop, Yarbrough can see that her friend must attend to customer orders – and ceases the discussion about nuclear waste.

But before they go their separate ways, the two women discuss other ways they can get the word out about WCS’ plans and their opposition to them.

“Do we need to petition?” Gardner asks.

“Human chain,” Yarbrough responds.

The women hope the forthcoming NRC meetings will bring clarity to the situation. More than anything else, they simply long for assurances that storing spent nuclear fuel in their community won’t spell disaster.

“There’s nothing wrong with making money, but we sure don’t need to just take advantage of people just for the bottom line,” Yarbrough says.

Gardner boils it all down to posterity. Each weekday morning, she drives down Main Street to Mettie Jordan Elementary to drop off her granddaughter, Aubri, for kindergarten. The building is quite new. It’s located on the same land as its predecessor, a school of the same name that Gardner attended when she was a child and which was torn down last year.

Having lived in Eunice since 1958, Gardner looks at Aubri and simply desires that her granddaughter have the same opportunity to enjoy life in tiny Eunice, just as she did.

“If she’s to inherit what we’ve worked so hard for,” Gardner says, “I don’t want her to inherit what’s been contaminated.”

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