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What About Nuclear Power Isn't Good?
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Over the last fifty years, nuclear energy has proven to be the safest and most efficient of all energy sources, from both the human health and environmental perspectives. In total, to produce a trillion kWh of electricity, nuclear takes less land, uses less steel and concrete, has less emissions, kills fewer people, and has lower life-cycle costs than any other energy source.

America has 62 nuclear power plants with 99 operating reactors comprising over 100 thousand MW of installed capacity that produces 800 billion kWhs of electricity each year – about a fifth of America's power.

So what about nuclear power isn't good?

Apparently not much. A new report came out today analyzing the

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contributions of nuclear energy to our nation's economy. "The Nuclear Industry's Contribution to the U.S. Economy" by economists Dr. Mark Berkman, Dr. Dean Murphy and Mr. Stephen Lagos at The Brattle Group, shows that nuclear energy plants contribute about \$60 billion annually to America's gross domestic product (GDP) and over \$100 billion in gross output.

In addition, the study discusses the other economic and societal benefits of nuclear power, especially in comparison to coal and natural gas, such as

- nuclear avoids 573 million tons of greenhouse gas emissions each year (worth \$25 billion if priced)
- nuclear supports 475,000 full-time jobs
- in energy markets having nuclear power, nuclear helps keep retail electricity prices about 6% lower compared to markets having no nuclear power
- annually nuclear provides \$10 billion in federal revenues, and \$2.2 billion in state tax revenues
- annually, nuclear avoids emitting 650,000 tons of nitrogen oxide and over one million tons of sulfur dioxide emissions which, according to National Academy of Science estimates, is worth about \$8.4 billion
- nuclear provides over two-thirds of our low-carbon energy and has prevented America from putting about 20 billion tons more of CO₂ into the atmosphere over the last 40 years.

Nuclear is also the energy source that is most immune to climatic changes and severe weather events.

The report, commissioned by Nuclear Matters, estimated the value of nuclear power with a widely-used dynamic input-output model of the U.S. economy developed by Regional Economic Models Inc., together with the Brattle model of the U.S. electricity sector. By linking these models, the authors were able to measure the overall value of the U.S. economy with and without the nuclear industry, providing the most accurate picture to date of this power source's contribution to the overall economy.

This approach explicitly subtracts off the economic value of any alternative generation that would be necessary in the absence of

nuclear power, to find the incremental contribution of the nuclear industry.

“The economic and environmental benefits of nuclear energy are often undervalued in national and state energy policy discussions,” said Berkman, co-author and Principal at The Brattle Group.

These figures are even more important in light of potential attempts to close nuclear plants prematurely, as is being attempted on many single merchant nuclear plants.

“Reducing carbon emissions is one of our country’s top priorities,” admitted former Senator Evan Bayh (D-IN), co-founder, along with former Senator Judd Gregg (R-NH), of the bipartisan Nuclear Matters. “And yet, in this carbon-constrained world, existing nuclear energy plants receive no value for their ability to generate an astounding amount of carbon-free, reliable energy. Without nuclear power, it would be impossible to achieve our carbon reduction objectives.”

Fortunately, the way America values our energy sources is beginning to evolve into a more holistic approach. It’s not just about overnight costs anymore.

Battle heats up over U.S. plutonium cleanup program

Reuters

July 7, 2015

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The battle over a project to convert excess U.S. weapons-grade plutonium into fuel for commercial nuclear reactors - part of a 2000 treaty with Russia - is heating up amid concerns the program's multibillion-dollar costs could balloon further.

Critics are calling for an end to the project, citing years of delays and cost increases, while proponents say the program is now on track and any changes could jeopardize one of the few agreements with Russia that is still running smoothly.

Both sides have commissioned independent studies about the program, and the government, eager to save money to pay for other nuclear weapons priorities, is preparing to carry out its own assessment.

Reuters this week obtained an independent review commissioned by

the company in charge of the program, which sharply rebuts a report completed in April by privately held Aerospace Corp for the Department of Energy. The Aerospace report said the project could cost \$30 billion to complete, nearly ten times the estimate of the company, CBI-Areva MOX Services.

At issue is a plant under construction at the DOE's Savannah River site in South Carolina that would take 34 metric tons of U.S. plutonium and mix it with uranium to form safer mix-oxide (MOX) fuel pellets for use in commercial nuclear reactors.

Russia has its own program to eliminate 34 metric tons of surplus plutonium. Together, the total amounts to the equivalent of about 17,000 nuclear weapons.

CBI-Areva MOX Services, a joint venture of U.S.-based Chicago Bridge & Iron NV and Areva SA, a French state-owned nuclear group, argues that the U.S. project is already 65 percent complete, and it will be done in 5 to 9 years.

The company estimates it will take \$3.3 billion to complete work on the facility, on top of \$4.5 billion already spent.

The Aerospace report came up with a higher estimate because it overstated costs and risks of the so-called MOX program and downplayed those of an alternate approach called "downblending," according to the review funded by CBI and conducted by High Bridge Associates, a project management firm.

The report also did not factor in factors such as revenue from selling the fuel pellets to power plants, the review said.

Edwin Lyman, senior scientist at the Union of Concerned Scientists, said the U.S. government should stop wasting money on what he called a "pork barrel" project kept alive by parochial interests in Congress.

Lyman said it remained unclear which power plants would even buy the pellets, and it made sense to halt the project after years of mismanagement, cost overruns and schedule delays.

One source familiar with the program, who asked not to be named, said halting work on the project could prompt Russia to withdraw from the 2000 treaty as it has done with others, reversing nuclear non-proliferation efforts at a time of growing tensions with Moscow.

Weinstein: Allow private facilities to store used nuclear fuel

Houston

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Since 1982, electric utilities (which is to say, ratepayers) have paid sizable sums into a Nuclear Waste Fund, an account administered by the U.S. Department of Energy, to cover the costs of permanent disposal of used nuclear fuel. Even after spending \$10 billion at Yucca Mountain in Nevada, which is supposed to be the permanent repository for used nuclear fuel, the fund balance is currently in excess of \$20 billion.

In 2000, the DOE was required by law to take title to the used fuel, which remains in temporary storage at 75 operating and decommissioned reactor sites in 33 states. Nationally, about 75,000 metric tons of used fuel is being stored on site, including 2,430 tons in Texas. But because the federal agency is prohibited from operating any consolidated storage facility until Yucca Mountain becomes available, a logical alternative would be to turn over the development and operations of interim used fuel storage facilities to private companies.

To this end, the U.S. Senate Appropriations Committee has reported out such a bill with bipartisan support. The bill authorizes a pilot program to remove used fuel from permanently decommissioned nuclear sites as a first step toward eventually designating interim storage sites for all used fuel currently being held at active power plants. Already, several companies have announced their interest in accepting this used fuel.

Reprocessing banned for decades

Frequently mistaken for nuclear waste, used fuel contains valuable materials, such as plutonium and uranium, that can be reprocessed to produce more electricity. Reprocessing was once done in the United States, but President Jimmy Carter banned the practice in the mid-1970s on grounds it could lead to nuclear proliferation. Other countries, such as France and Great Britain, did not follow the U.S. example and continue to reprocess used fuel. Here in the U.S., the DOE is currently conducting research on reprocessing, hoping to find a safe and economical way to provide future fuel for America's - and the world's - nuclear power industry.

Waste Control Specialists (WCS), which currently operates a

14,000-acre facility in Andrews County that processes low-level radioactive waste, intends to file a license application with the Nuclear Regulatory Commission to build and operate a project that would transport and store used nuclear fuel from multiple locations in the U.S. and be in operation by 2020. AREVA Inc. and NAC International, companies with extensive experience in used fuel transportation and storage, will work with WCS in the design, construction and operation of the proposed project. The Andrews County site is already fully characterized for radioactive waste storage with the Texas Commission on Environmental Quality.

A call for action

At the same time, just across the state line in New Mexico, the rural counties of Eddy and Lea have formed the Eddy-Lea Energy Alliance partnership to make a pitch for receiving nuclear waste. Used nuclear fuel management company Holtec International has signed a letter of intent with the Eddy-Lea Energy Alliance to build a facility that would utilize its underground storage canister technology.

With the future of Yucca Mountain in doubt, providing interim storage for used fuel currently in repose at both decommissioned and active power plants has become an imperative. Though no new reactors have come on line in almost two decades, America's 100 operating nuclear plants currently provide almost 20 percent of the nation's electricity.

What's more, nuclear energy is the most environmentally benign of all base load power sources, emitting no greenhouse gases, mercury, particulates or other pollutants. Nuclear plants operate around the clock safely and reliably, thereby providing stability to the power grid, and are not subject to the price volatility associated with gas-fired plants.

Though opposed by most environmental groups despite a zero carbon foot print, nuclear power isn't going away. Five new plants will come on line by 2018, while 14 other applications are pending before the Nuclear Regulatory Commission.

Still, without adequate storage for nuclear waste, the long-run viability of America's and Texas' commercial nuclear power industry will remain problematic. To prevent such an outcome, Congress should approve, and President Barack Obama should sign, the Senate Appropriations Committee bill that will allow private facilities to accept and store the nation's large and growing quantity

of used fuel.

Weinstein is associate director of the Maguire Energy Institute and an adjunct professor of business economics in the Cox School of Business at Southern Methodist University.

INL Report: Spent Nuclear Fuel Controversy Flares Again
Magic Valley
July 12, 2015
[LINK](#)

IDAHO FALLS • A plan to bring two shipments of commercial spent nuclear fuel to Idaho National Laboratory touched off a statewide firestorm in January.

Former governors Phil Batt and Cecil Andrus blasted the shipment plan in joint news conferences and Attorney General Lawrence Wasden said he wouldn't allow in the fuel rods until a troubled radioactive waste treatment plant is up and running.

Now, the stakes have grown exponentially.

Nuclear watchdog group Snake River Alliance last month pointed out one of the shipments was tethered to a much larger future project — one that involved conducting research on a massive amount of commercial spent fuel.

It was, at first, the idea of importing 200 pounds of spent fuel to Idaho; now it is the possibility of 20 metric tons.

It was the idea of lucrative research. Now it raises questions for some about the 1995 Settlement Agreement and the idea of Idaho as the nation's de facto spent nuclear fuel repository.

No commercial spent fuel shipments appear headed Idaho's way for at least several months. Yet the battle isn't finished for the former governors and others who say they want to ensure Idaho doesn't become a destination for the nation's growing stockpile of commercial nuclear waste. DOE and INL officials, meanwhile, continue planning for the shipments, while gathering public input on whether an in-depth environmental impact study is necessary.

“Right now there is no permanent repository for commercial spent nuclear fuel. So anything that comes to Idaho, it's highly unlikely it leaves in the foreseeable future,” said Laird Lucas, a Boise

environmental attorney representing Batt and Andrus.

Larger Research Project on the Table

In a September 2013 meeting of Gov. C.L. “Butch” Otter’s Leadership in Nuclear Energy Commission 2.0, officials discussed the two shipments of commercial spent fuel they hoped to bring to INL.

Officials then turned to the possibility of a larger, related spent fuel project at the lab, one that would require bringing in some 20 metric tons of high-burnup spent fuel.

INL Nuclear Engineer Shannon Bragg-Sitton explained that one of the initial 25-rod shipments of “high-burnup” fuel rods, from North Anna Nuclear Power Station in Virginia, would be used to “develop the tools, capabilities and procedures” to perform research on the larger future shipment of “sister rods” from the same facility.

High-burnup fuel has been left longer in the harsh environment of a commercial reactor — a popular technique allowing utilities to eke out more power before installing new uranium fuel rods. High-burnup fuel is hotter and more radioactive than regular spent fuel.

Such fuel is rapidly accumulating at nuclear power plants around the country. Yet little is known about what will happen to the fuel as it sits in storage for years, perhaps decades.

So the plan, Bragg-Sitton said at the 2013 meeting, is to eventually load the 20 metric tons of high-burnup fuel from North Anna and send it to a national laboratory for an extended period of time. At the laboratory, temperatures and gases inside the cask could be monitored remotely. Every few years researchers would crack the cask open for a visual inspection, and perform further research on individual fuel rods.

A 32-page draft supplement analysis document released by the DOE last month also confirmed the possibility of the 20 metric ton shipment, which it said would occur “sometime after 2027.”

“DOE has not yet proposed a facility for the post-2027 activities,” DOE officials wrote. “However, prior to shipment, DOE will identify candidate sites with facilities capable of performing the work and prepare an appropriate (environmental) analysis.”

At the 2013 meeting, INL Director John Grossenbacher said the

research would be important to maintaining the lab's lead nuclear status. Other labs would also want the job, worth about \$20 million, according to Bragg-Sitton's 2013 presentation. Officials say the smaller shipments are worth about \$10-20 million per year, in federal research funding, for the next decade. But Grossenbacher said there would be major hurdles to bringing in such a large shipment to Idaho, considering tight restrictions of the 1995 Settlement Agreement.

"This is a significant change from the Settlement Agreement," he told the LINE Commission members. "It would be a big deal. It would require the approval of state authorities. Obviously it would be an issue of significant public interest and appropriately so. So it's not too early, in my opinion, to start talking about this."

Former Governors, Environmental Group not Budgeting

Batt, Andrus and the Snake River Alliance have said allowing in even small amounts of commercial nuclear fuel — which INL has never received before — might open the door to more. And recently-discovered talks about the 20 metric ton commercial fuel shipment have seemingly reinforced their suspicions.

A national repository for high-level nuclear waste has yet to be found, they point out. Yucca Mountain in Nevada, thought for years to be an ideal location to send the waste, is stalled out.

"I have no sympathy for DOE whatsoever," Andrus said in a recent interview. "They got us into this with their refusal to provide storage at Yucca Mountain or any other place. I'm determined Idaho will not become the de facto Yucca Mountain."

Beatrice Brailsford, nuclear program director for Snake River Alliance, also has adamantly opposed the two smaller research shipments. She recently discovered the 2013 meeting recording about the proposed larger shipment.

"If we're the only place in the country that's said yes, then we're it," she said of commercial spent fuel.

Brailsford knows under current state regulations governing nuclear waste — the Settlement Agreement — such a large shipment of commercial fuel isn't allowed. But she said there "is a lot of talk about modifying" those regulations.

"I think and hope changing the Settlement Agreement would be

more difficult than supporters of bringing in spent fuel possibly believe,” she said.

INL and DOE officials have detailed the research to be done on the first two shipments. They have outlined how the waste would be handled until a permanent repository is found. Grossenbacher, at a May public address, said the Idaho site already safely stores roughly 300 tons of government-owned spent fuel, though none of it is from commercial reactors.

But Andrus said news of the possible 20 metric ton commercial shipment shows DOE hasn't told the public the entire story. Adding to his frustration, he sent DOE a list of policy questions and requests for public information about the two smaller research shipments in January. DOE officials have yet to provide the requested information, he said.

“I have been frustrated with the federal government and DOE ever since 1972,” said the 83-year-old Andrus. “It hasn't changed. Every time you turn over another rock, (they say), ‘Oops, well, we didn't tell you about that either.’”

Savannah River Remediation adds staff to emergency drill program to confront shortfalls at Savannah River Site

The Augusta Chronicle
July 7, 2015

[LINK](#)

Savannah River Site's liquid waste contractor nearly tripled the number of staff for its emergency drill program following an evaluation that revealed numerous shortfalls.

Savannah River Remediation increased staff dedicated to emergency drills from three full-time and one part-time employee to 10 full-time employees, according to a report from the Defense Nuclear Facilities Safety Board, a federal panel that oversees nuclear sites and provides recommendations to the U.S. Energy Department.

“SRR concluded that current staffing is not effective in ensuring drill program requirements are met, including the development, updating and refreshing of drills,” the June 5 report said.

Dean Campbell, SRR spokesman, said the emergency program has been fully staffed since the report. Prior staffing was adequate to conduct drills, and additional employees will support revising and

developing new drill scenarios, he said.

Savannah River Remediation manages underground, highly radioactive liquid waste storage tanks, the Defense Waste Processing Facility and saltstone processing.

SRR and the site's primary management contractor, Savannah River Nuclear Solutions, have been reviewing emergency scenarios since last fall when DNFSB reports called attention to inadequacies in site drills. Also, the U.S. Energy Department issued a plan in late April to overhaul emergency preparedness at nuclear materials facilities across the nation.

The final report on SRR's drill program called for immediate attention to several issues to ensure drills are effectively planned, scheduled and performed to maintain facility readiness for emergencies, according to a summary provided by Campbell.

DOE's Oak Ridge cleanup target may reach 2067

Knoxville News Sentinel
July 13, 2015

[LINK](#)

OAK RIDGE — The Department of Energy's negotiated schedule with environmental regulators calls for completion of Oak Ridge cleanup projects by 2047, but a state official acknowledged there's a chance it could be extended for another 20 years.

The cleanup program has been an evolving effort since the early 1980s, when the legacy of pollution from the World War II and Cold War nuclear weapons work came to the public's attention in a big way.

Since then, billions of dollars have been spent on cleanup projects in Oak Ridge, and DOE remains under pressure from the U.S. Environmental Protection Agency and the Tennessee Department of Environment and Conservation to comply with the nation's environmental laws and commit to the needed — and extremely expensive — projects.

When will it all be completed?

That is a question that's been asked and debated for few decades, and the date of completion keeps getting pushed further into the future. During the early days of cleanup, there was a lack of

understanding of how much cleanup would actually be required to comply with terms of the Comprehensive Environmental Response, Compensation, and Liability Act — the so-called Superfund Act.

There also was a long learning curve in estimating how much it would cost to remove hundreds of contaminated buildings, decommission old reactors, and deal with leaking waste burial sites and tainted groundwater.

Congress has to appropriate the money for the massive cleanup tasks at Oak Ridge and other DOE sites, and there is a continuing competition for that funding, especially as budget pressures grow.

For the past several years, the planned date of completion for the Oak Ridge environmental work has been set at 2046 or thereabouts.

Recently, however, there have been indications that the completion date is going to get extended again.

When asked recently about plans for cleaning up White Oak Lake, a 25-acre lake that received some of the worst radioactive discharges from the early nuclear work at Oak Ridge, a state official said the Department of Energy is supposed to provide a range of alternatives by 2036.

That's the date contained in Federal Facility Agreement, which was negotiated by TDEC, EPA and DOE.

But Chris Thompson, the state official who oversees the DOE-sponsored Ridge cleanup activities in Oak Ridge, said recent projections of future cleanup funding from DOE indicate that the decision on White Oak Lake may be delayed until 2048.

If that proves to be the case, it would the overall deadline for Oak Ridge cleanup activities may be delayed as well.

Thompson noted that an appendix to the legally binding Federal Facility Agreement has the completion date for Oak Ridge cleanup set at 2047.

However, the state official said a DOE modeling system based on future budget reductions proposes an overall cleanup date around 2067.

“As you can see, end dates change significantly based on DOE's budget projections,” she said.

At this point, TDEC still expects the Department of Energy to finish its environmental cleanup commitments by 2047, Thompson said.

“Regardless, our office will continue to work with DOE and EPA to develop cleanup priorities on the Oak Ridge Reservation to ensure the protection of the environment until CERCLA remediation is complete in Oak Ridge.”

David Adler of DOE’s Office of Environmental Management in Oak Ridge said the federal agency is intent on getting the work done by 2047 if possible.

“That is our goal,” Adler said. “That is the goal that presumes we receive roughly level funding — around \$400-420 million (annually). It’s gone up and down over time, but if we can keep it around \$400 million we can come in around that date.”

Adler said DOE’s environmental cleanup program continues to receive strong support in Washington.

“It is a tight national fiscal climate,” he said, “but in terms of the Oak Ridge cleanup primary projects, we seem to be getting sufficient funding to keep them moving along.”

He added: “We could always get the work done more quickly if we had more money.”

But, in terms of meeting regulatory commitments and supporting the Oak Ridge workforce, DOE is in good shape, he said.