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**Late-Breaking News: One of Two SNF Shipments
Will Not Come to Idaho**

Late Friday October 23, it was reported that the Department of Energy has decided that the first shipment of spent nuclear fuel not come to Idaho. This shipment is for the study of high-burnup fuel used in commercial nuclear reactors and will most likely go to Oak Ridge National Laboratory in Oak Ridge, Tennessee.

This news follows a breakdown in negotiation between Idaho Attorney General Lawrence and the Department of Energy.

A decision on the second shipment tentatively scheduled for January 2016 involving pyroprocessing research has not yet been made.¹

**Idaho Attorney General Wasden's Thankless Role
in Upholding the 1995 Idaho Settlement Agreement**

Idaho Attorney General Lawrence Wasden spoke October 8 at the Idaho Falls City Club luncheon explaining why he had not yet signed a waiver to allow the two proposed shipments of spent nuclear fuel for research into Idaho.² Only two signatures are needed in order to grant waivers to the 1995 Idaho Settlement Agreement: current Gov. Otter and Idaho Attorney General Lawrence Wasden.

A 2011 waiver to the 1995 Settlement Agreement had been granted that allowed research quantities of spent nuclear fuel to come to the INL as long as DOE was meeting the milestones in

¹ Idaho Falls Post Register, Luke Ramseth reporting "Spent fuel shipment not coming to INL," print copy October 24, 2015.

² Idaho Mountain Express, "Hailey gets assurances on nuke waste shipments" This describes Wasden's discussion to Hailey City Council on May 20, 2015, also using the prom analogy.
http://www.mtexpress.com/news/hailey/hailey-gets-assurances-on-nuke-waste-shipments/article_d247adc2-fe81-11e4-8c9c-4f471ac294dc.html

the Settlement Agreement.³ However, DOE has missed the milestone for treating liquid sodium-bearing waste with the Integrated Waste Treatment Unit (IWTU) and also is missing milestones for not shipping transuranic waste to the closed New Mexico underground salt mine, WIPP.

Wasden's insistence on some tangible proof that the problem-prone Integrated Waste Treatment Unit will treat the sodium-bearing waste isn't sitting well with the side of the DOE house that makes the messes.

Wasden gave this analogy: it's like getting a teenager who wants to go to the dance to first clean up their room as they had promised.

Wasden said one approach is to say, "You didn't cleanup your room, but I'll let you go to the dance anyway." Another way is to say "you didn't cleanup your room, so I'm never going to let you go to the dance." Wasden made it clear that he's looking for middle ground — some way to ensure that the teen will cleanup his room if allowed to go to the dance.

Well, it seems to me a more realistic analogy is of a teenager who didn't cleanup up his room as promised and the teen is an addict and pusher who has been brewing crack in his room. "Cleanup" means consolidating much of the mess by shoveling some of it under the bed and sweeping some of it under the rug. And the mess puts not only his family at risk but the entire community and future generations. But the teen insists that the rug will permanently protect everyone from the mess.

The teen is paying a few nice kids in the neighborhood to do the hazardous shoveling while obscuring the truth about the health risks involved.

The teen is making everybody else pay for all this cleanup and he's years behind in keeping his promises. He emphasizes that he only has to cleanup a tiny fraction of the mess, and that he has cleaned up "about 80 or 90 percent" of this small fraction. He promises that ultimately much of the mess he does clean up will be stored in someone else's backyard. The teen also has selected an unproven process to make a small but nasty portion of this mess easier to store in his room until he finds a backyard to send it to.

The teen emphasizes that the mess is not nearly as bad as some of the teen's other addict/pusher friends have in their rooms. A local PhD friend of the teen tells everyone that the mess is like steer manure. And the teen is hoping to make a lot more messes.

An outlandish analogy?

Not if you understand that most of the waste buried at INL will remain buried at INL despite the spin. Waste migration from the buried waste for the first 10,000 years was described to the

³ See more about Idaho's Settlement Agreement at <https://www.deq.idaho.gov/inl-oversight/oversight-agreements/1995-settlement-agreement.aspx>

public. The public was never told that the migration of contaminants was modeled using assumptions that artificially kept the aquifer contamination low during the first 10,000 years and the public was never told about the rapidly escalation of contaminants in the aquifer after 10,000 and continuing basically for millennia. In order to cut the predicted doses down from 100 mrem/yr to 30 mrem/yr, DOE has made the impossible assumption that its soil cap over the waste will perform perfectly for millennia. And this soil cap, unlike others that analysts have prudently not taken credit for, actually has to perform for waste that is actually mounded up many feet above grade.^{4 5}

The problems at the facility designed to treat INL's remaining liquid sodium-bearing waste, the Integrated Waste Treatment Unit (IWTU) could result in DOE giving up on the process with no contingency plan on the horizon. And making stored radioactive calcine road ready isn't slated to happen until after the liquid sodium bearing waste is treated by the IWTU because the project is to be conducted in the same building. More about the risks to the environment in the next article.

DOE has not begun to build the needed facility to repackage the fuel already at INL in order to make it road ready to ship to a facility that may not exist when the Settlement Agreement milestone date of 2035 is reached.

According to then-INL director John Grossenbacher on September 24, Idaho shouldn't worry about cleanup because the waste problems at Hanford and Savannah River are much, much worse. He also emphasized his view that cleanup should be decoupled from research. But this "cleanup tomorrow — not today" attitude is completely irresponsible.

Cleanup is already decoupled: the INL contracts are basically split up between those who cleanup legacy messes and those (INL BEA) who are keen to make future legacy messes. The INL Citizens Advisory Board only reviews cleanup issues on DOE's Environmental Management side of the house and cannot weigh in and rarely discusses Nuclear Energy's decisions to make more radioactive messes.

The issue at the forefront is of finding a way to ensure that DOE keeps its commitments on cleaning up the materials stored over the aquifer that resulted from spent nuclear fuel reprocessing (the liquid sodium-bearing waste and the calcine waste). Much of environmental contamination from DOE's spent nuclear fuel processing can never be cleaned up: releases to the aquifer and sky were enormous. If the public understood the contamination created by spent

⁴ U.S. Department of Energy, 2008. Composite Analysis for the RWMC Active Low-Level Waste Disposal Facility at the Idaho National Laboratory Site. DOE/NE-ID-11244. Idaho National Laboratory, Idaho Falls, ID and U.S. Department of Energy, 2007. Performance Assessment for the RWMC Active Low-Level Waste Disposal Facility at the Idaho National Laboratory Site. DOE/NE-ID-11243. Idaho National Laboratory, Idaho Falls, ID. Available at INL's DOE-ID Public Reading room electronic collection. (Newly released because of Environmental Defense Institute's Freedom of Information Act request.) See <https://www.inl.gov/about-inl/general-information/doe-public-reading-room/>

⁵ See EDI's September newsletter for more information about the inadequate cleanup of buried waste at the Idaho National Laboratory.

nuclear fuel reprocessing, they would boo speakers off the stage when they spoke of hopes to again reprocess spent nuclear fuel.

Wasden has voiced that he is less concerned about the missed milestones regarding the eventual resumption of transuranic waste shipments to the WIPP facility that is struggling to reopen. The transuranic waste is largely from DOE's weapon production. But while the post-1970 transuranic waste from Rocky Flats weapons facility stored at INL was being shipped to WIPP, the public does not understand that less than 90 percent of the transuranic waste buried at INL's RWMC will remain buried along with an enormous amount of other long-lived radioactive waste.

But the elephant in the room remains the lack of a repository for the spent nuclear fuel and high-level waste from reprocessing already at the INL. Another elephant is the DOE's mounting liability payouts to utilities for not taking their spent nuclear fuel and DOE's desire to find an interim storage site to ship to. The Settlement Agreement says it will ship these radioactive materials out of Idaho in 2035 but DOE now says it won't have a repository before 2048 and LOL.

Last December 31, 2014 when DOE sent the request for a waiver to allow research quantities of spent nuclear fuel despite DOE's failure to meet its milestones, DOE Secretary E. Moniz said he was not making promises but he was **confident** that the IWTU would soon be treating the liquid waste. But another year has passed and the DOE negotiated a new hazardous waste cleanup schedule with the state saying they would be finished processing the sodium-bearing waste by the end of 2018 or pay a \$ 2 million fine.^{6 7}

The news says that Wasden and the DOE are having discussions. But will Wasden be able to obtain meaningful assurance that the sodium-bearing waste will be cleaned up soon? Unfortunately, the waste that will remain buried and the lack of a repackaging facility at INL are probably not going to be discussed.

Status of INL's Liquid Waste and Calcine and Other Cleanup Operations

While the 1995 Idaho Settlement Agreement milestone has been missed for treating the sodium-bearing waste with the INL's IWTU, the schedule negotiated under the Hazardous Waste Management Act slates completion of treatment by the end of 2018. However, if the Department

⁶ See the Idaho Cleanup Project and the June 10, 2015 New Release "Last 10 years have seen significant cleanup progress at Idaho Site.

https://idahocleanupproject.com/Portals/0/Documents/Press%20Releases/2015/PressRelease_061015.pdf

⁷ <http://deq.idaho.gov/news-archives/2015/march/waste-inl-doe-deq-negotiated-agreement-resolve-notice-of-violation-030415/>

of Energy gives up on the IWTU, the fine will only be \$ 2 million. And there's been no discussion of replacing the aging tanks or alternate plans to treat the sodium-bearing waste.

Liquid sodium-bearing waste tanks, over 50 years old, are vulnerable to seismic events and corrosion and eventual leakage of the tanks. Remediation of tank leakage may be impossible. There has been no remediation of longstanding Hanford high-level tank leakage, and citizens are calling for tank replacements at Hanford.

Calcine is also stored over the aquifer. There is over 1000 kg of plutonium as well as other radionuclides in the calcine waste.⁸ Remember, it takes little more than 6 kg of plutonium to make a nuclear weapon. Calcine is highly soluble and may be vulnerable to flooding events and seismic risks. If the containers were breached and brought to the surface by flooding, it would be impossible to remediate. And the accident person-rem prediction from the 2002 environmental impact statement, while very high at 530,000 person rem, really does not convey the story of the deaths, illness and devastation such a release would have on southeast Idaho.

The Idaho Line Commission report glosses over the huge environmental and economic hazard posed by continued calcine storage saying: “. . . calcine and spent nuclear fuel by contrast are far more stable and better contained in their current storage configuration and pose little to no risk to the environment.” Well, the hazard level is high and there is considerable uncertainty in the risk estimates. Nothing about the consequences of an accident involving the calcine are presented in the LINE report. The Idaho Line Commission report lobbies for delay on treatment of calcine stating: “. . . the state should be open to alternative approaches for the calcine; this could include the possibility of keeping the calcine in its current, safe storage configuration so long as any change in plans brought commensurate value to the State of Idaho, such as redirecting the funds saved to other INL projects.”⁹

It is irresponsible to put off indefinitely cleanup of the stored calcine waste at INL. But that is exactly what DOE had the INL director, John Grossenbacher advocating.

While significant cleanup progress has been made, a 2011 presentation by the Department of Energy to the LINE Commission gave a list of cleanup actions DOE still had to do.¹⁰ It is notable that the cost and difficulty of the remaining items is very high and all of them are in the ditch.

⁸ Idaho High-Level Waste & Facilities Disposition Final Environmental Impact Statement, DOE/EIS-0287, September 2002. <http://energy.gov/nepa/downloads/eis-0287-final-environmental-impact-statement> See. Section 5.2 and Appendix C.4. Calcine Bin Set number 1 is seismically vulnerable and the off-site accident dose is 57,000 person-rem accident. There are more than a 1000 kg of plutonium in the bin sets (see table C.7-2) A calcine seismic or flooding event would be an economically disruptive catastrophe not to mention a 530,000 person-rem offsite dose producing 270 latent cancer fatalities (see table C.4-2).

⁹ Idaho Leadership in Nuclear Energy Commission, LINE 1.0 Full Report, January 2013. <http://line.idaho.gov/pdf/LINE%20Full%20Report.pdf> p. 14, 33

¹⁰ Presentation to the LINE Commission by Rick Provencher, Manager, DOE Idaho Operations Office, “Status of DOE Cleanup in Idaho,” April 7, 2012. <http://line.idaho.gov/minutes/PROVENCHER.pdf>

Table 1. INL cleanup laundry list.

DOE's To Do List	Milestone Date	Status	Comments
Complete processing of 900,000 gallons of waste in underground tanks	12/31/12 (missed)	Re-design and testing of IWTU ongoing and remains at high risk of failure	Tank liquid would not be remediable.
Continue to support the Calcine Disposition Project	Ready to ship by 12/31/2035	DOE pushing to delay calcine waste treatment.	Calcine treatment is held up by the tardy IWTU because it will use the same building. Calcine bin sets are vulnerable to flooding and seismic hazards and pose a huge radiological hazard in the event of an accident.
Complete removal of targeted buried waste	TRU waste to be removed from the state by 2018	Continuing by must be stored above ground at INL, at greater release risk, because shipments to WIPP are on hold.	The amount of buried radioactive waste that will leach into the aquifer will be 100 mrem/yr for millennia (or 30 mrem/yr if the soil cap works perfectly for millennia). The "targeted waste" will remove less than 10 percent of the buried TRU waste and none of the other long-lived and mobile contaminants poised to pollute the aquifer. The soil cap installation isn't due until 9/30/2027 to meet the Federal Facility Agreement and Compliance Order
Continue Shipping TRU waste to WIPP	Ship at least 2000 cubic meters/yr through 2018.	Stopped because shipments to WIPP are on hold.	The re-opening date for WIPP continues to be delayed.
Continue to receive domestic and foreign research spent nuclear fuel	Move spent nuclear fuel from pools to dry storage by 12/31/2023.	The 1995 Idaho Settlement Agreement stops shipments (except	No one is discussing when the facility for dry storage handling (also called a transshipment

DOE's To Do List	Milestone Date	Status	Comments
for placement in to dry storage and remove all spent fuel by 2035.	Remove spent nuclear fuel 1/1/2035	from the Navy) when milestones are not met.	facility) will be built at INL. ¹¹ If there is no repository, spent nuclear fuel will require re-packaging until a repository is available.

WIPP Status: Reopening. . .But Who Knows When?

According to the *Albuquerque Journal*, a Department of Energy Office of Enterprise Assessments internal memo, sent to employees last week (mid October) noted that in a review of WIPP recovery operations through May that "strong and unrealistic schedule pressures on the workforce contributed to poor safety performance."

The *Albuquerque Journal* states that "this summer, DOE backed off a March 2016 target reopening due to delays in the recovery as well as safety concerns. Then earlier this month, DOE Secretary Ernest Moniz said WIPP was still on track to reopen sometime next year. It may take more than the original estimate of \$500 million to fully recover the facility, and new cost estimates are expected this fall."¹²

The schedule for reopening the defense waste facility in New Mexico early in 2016 has been retracted and a new schedule is expected to be announced.¹³ DOE announced in July that

Key issues impacting the recovery schedule include the need to address the findings and recommendations from the Accident Investigation Boards, implement DOE's more rigorous standards for site specific Documented Safety Analyses, and resolve problems with the contractor's oversight of the procurement and quality assurance processes for the manufacture and delivery of the Interim Ventilation System. The Department is actively engaged with the contractor to address these issues.

I appreciate the *Albuquerque Journal* article discussing when WIPP reopening is expected because as of October 20 neither the government's [WIPP.Energy.gov](http://www.wipp.energy.gov) website nor the [energy.gov](http://www.energy.gov)

¹¹ This September 2004 Idaho Department of Environmental Quality newsletter discusses a transshipment facility design that is expected to take two years to construct and three years to operate to transfer remaining INL spent nuclear fuel from wet to dry storage. http://deq.idaho.gov/media/552776-newsletter_0904.pdf

¹² *Albuquerque Journal*, Lauren Villagran, "Safety top dog in new WIPP culture," October 19, 2015. <http://www.abqjournal.com/661954/news/safety-top-dog-in-new-wipp-culture.html>

¹³ KCBD News July 31, 2015 "WIPP Reopening Delayed." <http://www.kcbd.com/story/29682714/wipp-reopening-delayed>

Department of Energy website have updated this information. The unrealistic March 2016 schedules remain the latest information on both government website, despite the fact that they acknowledged months ago that the original schedule was unrealistic.

The spin by the Department of Energy also continues to blame the Worker Bee culture when in fact, the workers reporting problems were being trampled by management and management refused to address documented issues. WIPP problems were 99 percent upper management problems and were due to cost cutting pressure. It was cost cutting that produced acceptance of safety analysis insanity to decide safety-related ventilation was not needed, equipment maintenance could be reduced, phones in the mine need not be operational, etc. Managers sticking to the story that Worker Bees are the real problem either don't understand the problems or they are not being honest.

There are not only many federal sites anxious to resume shipments to WIPP; there are numerous new missions for WIPP being considered. The Department of Energy, after making plutonium at astronomical cost to citizens and to the environment, is considering dumping its surplus weapons plutonium at WIPP because the costs of the Mixed Oxide Fuel (MOX) plant under construction at Savannah River keep escalating.

DOE's Plutonium Addiction Continues to be Expensive

The mixed oxide nuclear program, or MOX, was intended to convert 34 metric tons of plutonium from surplus nuclear weapons into commercial nuclear fuel. The MOX Fuel Fabrication Plant at the Savannah River Site was originally to cost \$1.6 billion and be operational by 2007. The costs of the program to mix uranium and plutonium to make MOX fuel have ballooned to \$47.5 billion, of which about \$4 billion has already been spent.¹⁴

Now the Department of Energy is looking at down-blending, packaging, and sending the surplus plutonium to WIPP. Unfortunately, WIPP is currently closed because of the explosion releasing plutonium and americium because drums from the Los Alamos National Laboratory had been packaging drums with a forbidden mixture of nitrates and organic kitty litter. The underground mine is contaminated with plutonium and every operations, health and safety program at WIPP was found by investigation following two accidents at WIPP last year to be ineffective, including safety analysis to protect workers, the public and the environment.

So far, US nuclear utilities don't want the MOX fuel even with DOE paying for various upgrades. The DOE now considers the project "unaffordable." Pork barrel-minded Congress and

¹⁴ See <http://nukewatch.org/MOX.html> and <http://www.scientificamerican.com/article/mox-fuel-nuclear/> and CB&I Areva MOX <http://www.moxproject.com/>

the state of South Carolina, however, have so far successfully kept the money flowing by compelling the DOE to continue construction of a facility that it no longer wants. The 34 metric tons of plutonium is of about 104 metric tons produced at enormous trillion dollar costs and environmental devastation to the US because of the unstoppable military spending by the Department of Energy.

Plutonium Health Issues and What DOE is not Telling Workers

Despite the often repeated dogma that internal and external radiation are equivalent and inhaling plutonium is like eating a banana or flying in an airplane, the Department of Energy does know that the plutonium does more damage to cells in the body than external gamma radiation. And this is proven by DOE funded research.

The damage is reproduced by the cells for a lifetime and can be passed on to children. And yes, there were "plutonium babies" at Hanford: babies with defects who did not live. The DOE does not track birth defects resulting from plutonium (or uranium) workers. The level of conservatism in estimating worker radiation dose is extremely variable and workers are not given access to the assumptions made in their dose estimation. The dose estimation process is all about rules to evaluate whether federal limits were exceeded. The dose estimates are not about assessing worker health and are recognized as not yielding realistic intake results for an individual due to many variations in a person's retention and distribution throughout the body of the plutonium.

By using multicolor banding fluorescence in situ hybridization (mBAND FISH), past exposure to high-LET radiation (such as alpha radiation from plutonium) can be detected by blood tests years after the intake. See the 2004 report that compared damage to chromosomes in Russian Mayak plant plutonium workers to workers with only gamma radiation exposure.¹⁵

To read the report it is useful to keep in mind these definitions:

- **Intrachromosomal aberrations** mean aberrations occurring within a single chromosome.
- **Interchromosomal aberrations** are chromosome breaks that are distributed relatively uniformly across many or all chromosomes.

¹⁵ C. R. Mitchell, T. V. Azizova, et al., "Stable Intrachromosomal Biomarkers of Past Exposure to Densely Ionizing Radiation in Several Chromosomes of Exposed Individuals," 2004.
<http://www.columbia.edu/~dj3/papers/radres10.pdf>

The 2004 report states, “a large yield of intrachromosomal aberrations was observed in both chromosomes of the individuals exposed to high doses of plutonium, whereas there was no significant increase over the (low) background control rate in the population who were exposed to high doses of gamma rays.”

Interchromosome aberration yields were similar in both the high plutonium and the high gamma-ray groups.

... “**Intrachromosomal** aberrations represent a potential biomarker for past exposure to high-LET radiations . . .” Not only is there more chromosome damage from high-LET radiation within the chromosomes, “all of these aberrations are potentially stable (heritable). It may be possible to examine intrachromosome aberration yields in lymphocytes from a previously exposed individual and to use the result to estimate whether, and to what high-LET radiation dose, the individual had been exposed.”

Barriers Against Solar Energy in Idaho

On Aug. 17, the state’s energy office, several state officials and several of its regulated utilities began discussing, among other things, how Idaho will comply with the sweeping EPA Clean Power Plan to reduce climate-changing greenhouse gas emissions from coal plants. But no one told the public about the meeting.

The Idaho Strategic Energy Alliance (ISEA)¹⁶ housed in the state’s Office of Energy Resources, was created by Gov. C.L. “Butch” Otter in 2007 as “Idaho’s primary mechanism to engage in seeking options for and enabling advanced energy production, energy efficiency, and energy business in the State of Idaho.” It is charged with providing policy direction and planning aimed at increasing the state of Idaho’s production of renewable and sustainable energy, and identifying “new and innovative means to increase production of energy in Idaho.”

The OER or ISEA were not created by state statute and are not bound by Idaho’s open meeting requirements. However, OER and ISEA have been told by some lawmakers that transparency and the public involvement process was inadequate. Despite that, the only 2015 meetings were unannounced.

Company profits and rate payer costs are affected by the decisions they make and the public has the right to know and the need to know what plans are being made to comply with the EPA Clean Power Plan.

In mid August, the Idaho Public Utilities Commission gave the state’s three major electric utilities what they asked for in limiting the length of contracts for renewable energy from independent developers.

¹⁶ <http://energy.idaho.gov/energyalliance/index.htm>

The commission reduced the contracts to two years from 20 years, nearly ensuring that no new contracts under the Public Utility Regulatory Policies Act of 1978 will be signed any time soon. It's the latest in a series of tests before Idaho's energy regulatory body over how far the state's utilities must go to accommodate the developers of wind, solar and other alternative energy.¹⁷

Covering Up the Escalating Cost of Nuclear Energy Isn't Easy for Nuclear Boosters

The nuclear industry can block meaningful epidemiology around nuclear power plants from being performed, it can gut regulatory laws for disposal, it can obscure plant accident and routine emissions, and it can continue to pretend that passing the spent fuel disposal problem to future generations doesn't matter. But the industry can't hide the massive cost overruns plaguing the building and operating of nuclear plants.

Nuclear power plant construction costs have always hidden the backend costs of decommissioning and storage and disposal of waste including spent nuclear fuel. Neither are accident cleanup and compensation costs accounted for. But the construction cost estimates made when the nuclear renaissance was forecast between 2001 and 2004 were low-balled by a factor of 3 or 4 by 2008.¹⁸ And the high cost of repairing existing plants is putting about three dozen the 99 operating US nuclear reactors at risk of early closure.

The four AP1000 nuclear plants being built in the US have already experienced serious construction cost overruns and are years behind schedule.^{19 20} A fifth reactor under construction in the US is a pressurized water reactor that began construction in the 1970s and restarted construction in 2007 at Tennessee Valley Authority's Watts Bar 2. The TVAs rate payers have

¹⁷ Read more here: <http://www.idahostatesman.com/2015/08/24/3952921/idaho-puc-limits-purpa-renewable.html#storylink=cpy>

¹⁸ WISE Nuclear Monitor, "The past as prologue, the persistent upward spiral of nuclear reactor costs," August 25, 2009. <http://www.wiseinternational.org/nuclear-monitor/692-693/past-prologue-persistent-upward-spiral-nuclear-reactor-costs>

¹⁹ *Top Utility News*, Herman K. Trabish, "Nuclear industry darkened by delay, cost overruns at Vogtle & Summer facilities," Aug 24, 2015. Four Westinghouse AP1000 nuclear reactors are under construction in the US: two in Georgia at Vogtle and two in South Carolina at V.C. Summer. See <http://www.utilitydive.com/news/nuclear-industry-darkened-by-delays-cost-overruns-at-vogtle-summer-facil/404418/> The AP1000 modular design was supposed to streamline construction and reduce cost but that hasn't been the case. Four AP1000 reactors under construction in China are also over budget and behind schedule.

²⁰ The Georgia utility is asking the state to certify \$1.4 billion in Vogtle cost overruns and push the completion date back 18 months. The state Public Service Commission to decide who will pay for the overruns. See <http://atlantaprogressivenews.com/2015/08/01/vogtle-nuclear-expansion-total-cost-is-65-billion-dollars-former-commissioner-says/> and <http://www.power-eng.com/articles/2015/03/plant-vogtle-nuclear-reactors-expected-to-cost-7-5bn.html>

been paying for Watts Bar 2 since the early 1970s but have yet to receive power from it. It is scheduled to begin operation in late 2015.^{21 22}

Areva's huge cost overruns in building reactors outside the US, more than tripling original cost estimates, have resulted in the need for huge bailouts.^{23 24} Areva is effectively out of the reactor building business now that Electricite de France (EDF) has had to bail Areva out. And China General Nuclear Power (CGN) has now partnered with EDF to build the UK's Hinkley Point reactor, which will be the most expensive power plant ever built.²⁵

Hopes that Areva would build a uranium enrichment plant in Idaho Falls have been put on hold indefinitely given Areva's financial condition and a weak uranium market.

While the nuclear catastrophe at Fukushima continues, and it led several countries to back away from nuclear energy including Germany and Italy, it is the ever escalating construction and operating costs of nuclear energy that have virtually ended nuclear construction in the US that was not underway before Fukushima.

Perhaps a single NuScale small reactor will someday be built in the US and the INL hopes it will be built in Idaho. But it is at least 5 years away from obtaining a construction license. Likewise, TerraPower's traveling wave reactor, with Bill Gates and now backing from China, appears to be years from submitting documentation for NRC approval. Neither small modular reactor is likely to be available in time to address climate change.

The US Environmental Protection Agency's treatment of nuclear in its clean power rule was right: nuclear energy is too expensive and will take too long to deploy to make a difference in the effort to address climate change.

The nuclear industry is increasingly looking to DOE loan guarantees to put taxpayers and ratepayers on the hook for nuclear plant cost overruns. Taxpayers are on the hook for spent nuclear storage, transportation and repository costs not covered by rate payer fees. And have a bad day and it will be taxpayers who are on the hook for paying damage compensation following

²¹ *The Tennessean*, "TVA makes \$4.5 billion bet on nuclear resurgence." September 3, 2014, <http://www.tennessean.com/story/news/environment/2014/08/29/tva-makes-billion-bet-nuclear-resurgence/14811565/>

²² Construction of the TVA's Watts Bar unit 2 70's vintage Westinghouse pressurized water reactor had been halted after a variety of material, design, and programmatic deficiencies were found in Unit 1. Unit 1 received from the US Nuclear Regulatory Commission its full power operating license in 1996. <http://www.nrc.gov/info-finder/reactor/wb/watts-bar/history.html>

²³ Severe difficulties of cost overruns and missed schedules for Finland's Olkiluoto nuclear reactor being built by Areva SA, the French state-owned nuclear construction firm have contributed to Areva's financial meltdown.

²⁴ yle UUTISET, "French auditors slam Areva for Olkiluoto nuclear project in Finland," July 15, 2014, http://yle.fi/uutiset/french_auditors_slam_areva_for_olkiluoto_nuclear_project_in_finland/7358244 "It is a bottomless pit of financial losses. . ."

²⁵ *theguardian*, "Work to begin on Hinkley Point reactor within weeks after China deal signed." October 21, 2015. http://www.theguardian.com/environment/2015/oct/21/hinkley-point-reactor-costs-rise-by-2bn-as-deal-confirmed?CMP=tw_t_gu This obscene deal commits British ratepayers to pay more than double current energy prices at a time when prices for renewable are dropping.

an accident — which will never adequately remediate the damage or compensate for disruption and health consequences.

The decreasing cost of renewables and the technical advances in energy storage are good news for humankind but bad news for the nuclear industry. If truth prevails, the planet and rate payers and tax payers win. That is why citizens should demand transparency in Idaho's energy planning meetings.

Articles by Tami Thatcher, November 2015.