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Foiled by FOIA

Editors' note: John Grossenbacher, INL Director, responded to Tami Thatcher's March 9, 2013 opinion editorial about lessons not learned from the Fukushima nuclear catastrophe with a letter to the editor, stating "INL has thoroughly analyzed seismic risks at the Advanced Test Reactor and prioritized upgrades. Numerous improvements have been completed, including installation (post-Fukushima) of a system enabling the reactor's used fuel canal to be filled from outside the building without reliance on ATR systems." The following opinion editorial was invited by the Post Register and published March 31, 2013, to describe the effort the find out more about these modifications and "prioritized upgrades."

Tami Thatcher, Guest Columnist, Idaho Falls *Post Register*, 3/31/13 reports: "Getting information out of a federal agency is not an easy or inexpensive process, writes Tami Thatcher.

I listened to Idaho Falls Power President Jackie Flowers speak at a recent City Club luncheon and she talked about how wonderful it was to be able to pick up the phone and talk to Idaho National Laboratory scientists and ask them questions.

I thought, "I'll try it." I started with names on INL brochures and called Lab Director John Grossenbacher's office and got his secretary. I was directed to public affairs, which sent me to the Department of Energy's Freedom Of Information Act Officer. He sent me a form that I filled out and returned. How soon before I get some documents? Twenty days.

The answer is always 20 days, because if you ask "how's the weather?" the clock is reset and it's now another 20 days.

How do you know what documents to ask for? If you don't know what documents to ask for, you have no business asking. No one at INL or DOE is going to give you a single clue as to what documents to ask for. So, I made a best guess at asking for relevant documents that might exist without trying to be so exhaustive that the search would be too cumbersome or my basement would become even more congested than it is already.

I got a prompt response. They had found plenty of documents. My request for fees to be waived had been denied and the cost for obtaining the documents was estimated at more than $8,000.

What documents were these, I asked.

No answer.

The documents initially identified get further scrutiny as to whether they can be released through FOIA [Freedom of Information Act]. If DOE-Idaho did not have control of the document, and it was only in Battelle Energy Alliance's possession, it is not releasable under FOIA. If it is still "in progress" and never signed as complete, it is not releasable under FOIA. Appropriately there are also security issues to ensure review of the material so information that should not be made public is not released.

Meanwhile, I'm getting a bit nervous wondering if the government is going to send me some monstrous bill for documents. And I'm getting frustrated: 20 days from the last question asked of the FOIA officer and no information about what documents they found; and certainly, no answers to my questions.

I asked the Post Register to sign on to the FOIA with me because fees are waived for the media and educational institutions. I waited and the paper agreed. But I was told by the FOIA officer that a new separate FOIA would be required.

That means another 20 days before any documents might be released that might or might not shed some light on INL operations."

Thatcher is a former nuclear safety analyst at INL.

Principles for Safeguarding Nuclear Waste at Reactors [1]

Editor's Note: DOE's Idaho National Laboratory (INL) is the only facility in Idaho with a Spent Nuclear Fuel (SNF) inventory. The 2012 Blue Ribbon Commission Report identified government-owned spent nuclear fuel in Idaho as being 305metric tons heavy metals. [2] *Nearly all INL SNF is in water canals that have been "re-racked," or consolidated (racked more closely) in a move to save space. So the risks articulated below also apply to INL.*

"The following principles are based on the urgent need to protect the public from the threats posed by the current vulnerable storage of commercial irradiated fuel. The United States does not currently have a national policy for the permanent storage of high-level nuclear waste. The Obama administration has determined that the Yucca Mountain site, which has been mired in bad science and mismanagement, is not an option for geologic storage of nuclear waste. Unfortunately, reprocessing proponents have used this opportunity to promote reprocessing as the solution for managing our nuclear waste. Contrary to their claims, however, reprocessing is extremely expensive, highly polluting, and a proliferation threat, and will actually complicate the management of irradiated fuel. Nor will reprocessing obviate the need for, or "save space" in, a geologic repository.

The United States has a unique opportunity to re-evaluate our nuclear waste management plan. We can make wise decisions about safeguarding radioactive waste or go down the risky, costly, and proliferation prone path towards reprocessing.

The undersigned organizations' support for improving the protection of radioactive waste stored at reactor sites is a matter of security and is in no way an indication that we support nuclear power and the generation of more nuclear waste.

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[1] Institute for Energy and Environmental Research (IEER.org) and Kevin Kamps (beyondnuclear.org)

[2] Blue Ribbon Commission on America's Nuclear Future, January 2012, Updated Final Report, states government-owned spent nuclear fuel (SNF) in Idaho as being about 300 metric tons heavy metal (MTHM) . This would include Naval fuel, test reactor fuel, TMI, and fuel from other countries. Idaho's inventory includes 50 MTHM is defense, and 246 MTHM is non-defense SNF, or a total of 305 MTHM. DOE's Idaho National Laboratory is the only facility in Idaho with SNF.
http://cybercemetery.unt.edu/archive/brc/20120620220845/http://brc.gov/sites/default/files/documents/disposal_report_updated_final.pdf

An earlier 2005 DOE INL "Exhibit C.7 -INTEC EM-Owned SNF Inventories" [DE-AC07-05ID14516] states (pg. 4) "Total EM-Owned SNF is 165.456 MTHM But does not include 15.3 MTHM of EBR-II and Navy SNF in CPP-666 pool. This does not include post 2005 receipts." This shows significant increase in SNF at INL from 2005 to 2012.

Require a low-density, open-frame layout for fuel pools: Fuel pools were originally designed for temporary storage of a limited number of irradiated fuel assemblies in a low density, open frame configuration. As the amount of waste generated has increased beyond the designed capacity, the pools have been reorganized so that the concentration of fuel in the pools is nearly the same as that in operating reactor cores. If water is lost from a densely packed pool as the result of an attack or an accident, cooling by ambient air would likely be insufficient to prevent a fire, resulting in the release of large quantities of radioactivity to the environment. A low density, open-frame arrangement within fuel pools could allow enough air circulation to keep the fuel from catching fire. In order to achieve and maintain this arrangement within the pools, irradiated fuel must be transferred from the pools to dry storage within five years of being discharged from the reactor.

Establish hardened on-site storage (HOSS): Irradiated fuel must be stored as safely as possible as close to the site of generation as possible. Waste moved from fuel pools must be safeguarded in hardened, on-site storage (HOSS) facilities. Transporting waste to interim away-from-reactor storage should not be done unless the reactor site is unsuitable for a HOSS facility and the move increases the safety and security of the waste. HOSS facilities must not be regarded as a permanent waste solution, and thus should not be constructed deep underground. The waste must be retrievable, and real-time radiation and heat monitoring at the HOSS facility must be implemented for early detection of radiation releases and overheating. The overall objective of HOSS should be that the amount of releases projected in even severe attacks should be low enough that the storage system would be unattractive as a terrorist target. Design criteria that would correspond to the overall objective must include:

> Resistance to severe attacks, such as a direct hit by high-explosive or deeply penetrating weapons and munitions or a direct hit by a large aircraft loaded with fuel or a small aircraft loaded with fuel and/or explosives, without major releases. Placement of individual canisters that makes detection difficult from outside the site boundary.

Protect fuel pools: Irradiated fuel must be kept in pools for several years before it can be stored in a dry facility. The pools must be protected to withstand an attack by air, land, or water from a force at least equal in size and coordination to the 9/11 attacks. The security improvements must be approved by a panel of experts independent of the nuclear industry and the Nuclear Regulatory Commission.

Require periodic review of HOSS facilities and fuel pools: An annual report consisting of the review of each HOSS facility and fuel pool should be prepared with meaningful participation from public stakeholders, regulators, and utility managers at each site. The report must be made publicly available and may include recommendations for actions to be taken.

Dedicate funding to local and state governments to independently monitor the sites: Funding for monitoring the HOSS facilities at each site must be provided to affected local and state governments. The affected public must have the right to fully participate.

Prohibit reprocessing: The reprocessing of irradiated fuel has not solved the nuclear waste problem in any country, and actually exacerbates it by creating numerous additional waste streams that must be managed. In addition to being expensive and polluting, reprocessing also increases nuclear weapons proliferation threats." [3]

New Independent Study of Radiological Impact on Chernobyl and Fukushima Challenges UN Study

"**On** March 11,th 2013, Dr. Tim Mousseau, a professor at the University of South Carolina presented stunning findings from a 13-year accumulation of evidence of biological harm to wildlife in the radiologically contaminated exclusion zones near Chernobyl. [4] He also presented early evidence from the Fukushima nuclear accident. Several of his Japanese co-authors, fearful of losing their livelihoods, no longer have their names on the published papers. [5]

Mousseau and his colleagues found:

1) Most organisms studied show significantly increased rates of genetic damage in proportion to the level of exposure to radioactive contaminants,
2) Many organisms show increased rates of deformities and developmental abnormalities in direct proportion to contamination levels,
3) Many organisms show reduced fertility rates,
4) Many organisms show reduced life spans,
5) Many organisms show reduced population sizes, and
6) Biodiversity is significantly decreased and many species are locally extinct.

The above independent health study radically contrasts the UN Chernobyl Forum Report published by the International Atomic Energy Agency that States:

1) "…the populations of many plants and animals have expanded, and the present environmental conditions have had a positive impact on the biota in the Chernobyl Exclusion Zone."
2) "Human morbidities primarily the result of psychological stress…" [6]

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[3] Institute for Energy and Environmental Research (IEER.org) and Kevin Kamps (beyondnuclear.org)

[4] Chernobyl, Fukushima, and other Hot Places, Timotht A. Mousseau and Anders P. Moller, Andrea Bonisoli- Alquati. Gennadi Milinevski; University of South Carolina, CNRS, France, Taras Shevchenko Universiy of Kyliv; March 2013.

[5] Robert Alvarez posted this report to EDI. See full report on EDI's website; www.environmental-defense-institute.org

[6] The UN Chernobyl Forum Report (IAEA, 2006: p 137)

No quantitative data in support of the UN position is offered and it avoids the primary question of whether or not there are injuries to populations and the ecosystem as a result of radioactive contaminates. The International Nuclear Energy Agency like the U.S. Nuclear Regulatory Commission primary mission is to promote nuclear power.

New Tanks, Not New Mexico!

Environmental Groups say Department of Energy's "preferred alternative" to send Hanford tank wastes to the Waste Isolation Pilot Plant a costly, unwise, and illegal red herring. Hanford Challenge, the Natural Resources Defense Council, and the Southwest Research and Information Center sent a letter to Secretary of Energy, Steven Chu calling on the Secretary to ensure DOE complies with the law and to focus on real solutions for leaking radioactive waste tanks and a flawed Waste Treatment Plant.

In coalition with the Natural Resources Defense Council and the Southwest Research and Information Center, Hanford Challenge sent a letter on March 26, 2013 to Secretary of Energy, Steven Chu regarding the Department of Energy's costly, unwise and illegal "preferred alternative" to send high-level radioactive waste (HLW) from Hanford's waste tanks to the Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico.

Current leaks from Hanford's HLW tanks drive existing soil and groundwater contamination closer to the Columbia River. This is an urgent problem, and Hanford Challenge applauds the State of Washington and the Department of Energy for their renewed commitment to address this crisis. However, as detailed in our letter to Secretary Chu, DOE's proposed course of action fails to resolve or meaningfully address potential threats to the Columbia River from leaking HLW tanks at Hanford.

The HLW from several Hanford tanks proposed for treatment and transfer to WIPP is too small a fraction of the total inventory of Hanford tank waste to make the investment worthwhile, and the DOE proposal does not prioritize the leaking single-shell tanks. Even if some of the waste in Hanford's HLW tanks can be characterized as transuranic (TRU) waste suitable for WIPP, DOE cannot simply redefine the waste without violating the Nuclear Waste Policy Act (42 U.S.C. § 10101, *et seq*.). Furthermore, the WIPP Land Withdrawal Act (LWA, PL 102-579, Section 12, 106 Stat. 4791 (1992)) bans transportation to or disposal of HLW or commercially generated spent nuclear fuel at WIPP. Not abiding by limitations included in the state's consent would not only undermine DOE's credibility and Congressional action for New Mexico, but also set an extraordinary and dangerous precedent.

It is also not worth the time and money to build a TRU treatment facility at Hanford for such a small amount of waste. DOE must instead act to build new tanks and get the Waste Treatment Plant on track with an independent assessment and realistic plan for how to address the cost-overruns, delays, and most importantly the design and quality assurance problems plaguing the WTP. We cannot let the false solution of unlawfully shipping a fraction of HLW to WIPP distract us from long-term solutions to real nd immediate problems. Visit HanfordChallenge.org for a copy of our Letter.

What Were They Thinking?

" Every so often we hear something in the news about nuclear reactors fueled with highly enriched uranium (HEU); usually with regards to nuclear weapons proliferation. Back in the good old days both the US and USSR constructed over a hundred small HEU-fueled reactors and shipped them all over the world – Uruguay had one, there were some in the Balkans, the Ohio State University reactor was fueled with weapons-grade uranium, and there were plenty more. Given today's concerns about locking up and accounting for every gram of weapons-grade uranium it's only natural to wonder "What were they thinking?"

Even today there are a number of reactors fueled with uranium that could be turned into nuclear weapons. One category is military reactors – the nuclear reactor on my submarine was fueled with HEU. But outside of the military, the biggest reason to use high enrichments is for research and to produce radioactive materials for research and medicine. Here's why.

First a little bit of background. Two kinds of radionuclides are produced in nuclear reactors – in one, stable atoms that capture a neutron can become radioactive by a process called neutron activation and the products are called neutron activation products (activation products for short). Cobalt-60 is a neutron activation product, formed when stable cobalt-59 captures a neutron to become radioactive cobalt-60. In the other process, a uranium atoms splits (fissions) and the fission products are radioactive; these include the nuclides we saw in Fukushima (radioactive isotopes of iodine and cesium mainly) as well as molydebenum-99 (the parent nuclide of technetium-99 that is the workhorse of nuclear medicine) and others.

So – to create a neutron activation product you need two things – target atoms (such as cobalt-59) and neutrons; the neutrons come from uranium fission. All things being equal, a larger number of neutrons means a larger amount of radioactive product; a higher flux of neutrons means more rapid production. The way to get a lot of neutrons is to have a lot of fissions – the more fissionable atoms that are crammed into a volume, the more neutrons. A higher uranium enrichment is the best way to cram the highest number of fissionable atoms into a volume and, thus, to increase the neutron flux.

With fission products this rule works double – a larger number of fissionable atoms not only boosts the neutron flux but it also gives a larger number of target atoms to fission. So, again, using more highly enriched uranium produces a higher yield of the desired nuclides. And with nuclides that have a low probability of being produced the only way to make useful quantities is to use more-enriched uranium.

In both cases we end up with the same choice – do we choose the greater profits from HEU or the lower risks of LEU? An LEU-fueled reactor can do everything that an HEU-fueled one can – just more slowly.

At the moment it looks as though the nation is moving towards security rather than production. Unfortunately for the nuclear medicine industry this coincides with the shutdown of some Canadian reactors that produced medical isotopes, causing some shortages in our supplies of medical nuclides.

With medical science using radionuclides in ever-increasing amounts, this places a strain on our nuclear medicine system (with the exception of PET nuclides, which are produced on-site in a type of particle accelerator called a cyclotron). Our only real options are to cut back on nuclear medicine procedures or to build more isotope production reactors.

There is more to HEU-fueled reactors than producing medical nuclides – they're also used to produce nuclides for industry, for basic research (bombarding rocks with neutrons, for example, can tell us what the rocks are made of), developing and testing nuclear instruments, and more. All of these things go more quickly with a higher neutron flux, but they can also be done in a less neutron-rich environment. When we put it all together we pretty much have to conclude that HEU-fueled reactors are nice, but they're not essential. If our priority is to make the largest amounts of nuclides possible then we need the HEU-fueled reactors; if security is more important then we have to shut them all down and replace them with the slower (but more proliferation-resistant) LEU-fueled devices.

There is one development that might help to resolve this issue to some degree – using high-density LEU fuel. In this case, the uranium is kept at 20% enrichment (which is unsuitable for making a bomb), but it's packed into the fuel more tightly than in a standard reactor. The higher density of U-235 atoms can produce both a higher neutron flux and the dense packing of fission products (more or less) that will help to produce both activation and fission products. Although this type of fuel has been under development for over 30 years it never really caught on. It could be that it's time has finally arrived." [7]

How Much Risk is OK ?

Dr. Yon reports 3/14/13 in Federation of American Scientists that; "I was lucky enough to be asked to join a 1-day workshop on some legal aspects of responding to a radiological emergency, hosted by the National Association of County and City Health Officials (NACCHO – pronounced "natch-o" in case you're wondering). There were a number of questions we discussed but much of it came down to if or when the government has the authority to detain people who are contaminated or to decontaminate them against their wishes. There were a number of aspects to this discussion – enough for a couple postings. But an over-arching question concerned some of the terms that were used – in particular, what does the law mean when it uses terms like "risk," "danger," or "significant?"

Let's take one example – there was general agreement that it could be acceptable to hold a person (or a group of people) for decontamination if they were to pose a substantial risk to public health. But who makes this determination and what do they base it on?

Consider the possibility of a health physicist being asked to give testimony to a judge in favor of detaining a person (or people) covered with radioactive contamination. One way to approach this would be to point out that, according to the Linear No Threshold hypothesis of radiation dose-response, every added bit of radiation exposure adds risk. Thus, letting a contaminated person walk the streets adds to the risk of every person encountered, even if only a little bit. But given that there is incremental risk, why not err on the side of caution and simply hold all of those who are contaminated until they're cleaned off? After all, who could object to a shower and a change of clothes? On the other hand, who

[7] Federation of American Scientists, Science Wonk, Posted by Dr. Y on Mar 7, 2013 in Featured, Fissionable Material, Health, Nuclear energy ; www.FAS.gov

has the right to force someone to disrobe (and throw away their clothing) and shower before heading home? The bottom line is that we have to balance the risk to society versus individual rights – in a society that already accepts the risks of driving, eating fast food, and so forth.

On the other hand, I can also argue that the Nuclear Regulatory Commission has already answered this question, although somewhat indirectly. Consider nuclear medicine patients who, after being injected with radioactivity, are often sent home. The NRC seems to have decided that nuclear medicine patients do not pose a substantial risk to public health – if so, then how can we justify detaining someone who has less radioactivity on their clothing and skin than a nuclear medicine patient carries within their body?

The problem is the fuzziness of the operative words. Take risk for example – I'm sitting in a chair right now typing away and I'm at risk. The people in the apartment above mine could fall through the floor, a truck could careen into my apartment, we could have a fire in my building – any of a number of things could happen to me as I sit here typing away and all of them are pretty unlikely. So I'm at risk – the question is how substantial that risk is. In my case the risk of sitting in front of a computer is pretty low – maybe a single chance in many millions that ill will befall me. So do we need to take protective measures to protect me against the chance that a truck might drive into my living room? Actually, we have to some extent. Building codes help to protect me against the risk of structural collapse and traffic laws help to protect me from stray trucks – not perfectly, of course, because buildings still collapse and trucks still run off-course. But the residual risks are low enough that I'm not too concerned. So yes – I am at risk from any number of things, but those risks are not substantial enough for me (or most people) to worry about. Similarly, the NRC has decided that the risk posed by nuclear medicine patients is not substantial enough to worry about.

I guess that brings up the question of what constitutes a substantial risk. Probably most of us would agree that a 10% risk of death would be far too high, and even a 1% risk would also be a bit on the high side for most of us (even though that's about the risk we face from driving). Similarly, I'm guessing that most of us would agree that it doesn't make much sense to spend money to mitigate a risk of one in a billion. And many would even consider one chance in a million to be too skimpy to warrant a huge investment to prevent. So somewhere between one chance in a million and one chance in a thousand is where society starts to consider a risk to be "substantial" enough to warrant taking preventative measures.

So – do we confine people who are contaminated after a radiological accident or not? Do they pose a substantial threat to public health?

From my perspective as a scientist it's hard to give a unique and unambiguous answer to this question because what I consider to be "substantial" might horrify some and leave others blasé. But give me a solid target to aim at – a number that can be calculated or measured – and I'm on much firmer ground. For example, the NRC guidance on nuclear medicine patients is based on keeping radiation dose to members of the public lower than 100 mrem – give me a number like that and I can tell you what level of contamination will produce that dose; anything lower than that level would be acceptable and anyone with higher levels of contamination would need to be held for decon. But lacking a number – giving me fuzzy words like "substantial" and "danger" – takes away my tools as a scientist and makes it harder to answer objectively.

So let's recap a little bit. The fundamental question is whether or not the government can (or should) detain contaminated people after a radiological event. But before we can make that decision we have to decide when it's acceptable to deprive someone – even briefly – of their liberty. This would seem acceptable only if the risk to society (in this case, public health) is high enough to warrant the detention. But since so many people have different subjective views of what constitutes a "substantial risk" it might be better to develop a numerical standard – such as the NRC's standard for releasing nuclear medicine patients.

So – to wrap this up, I should also note that there are no existing standards to help address this problem. So the first step might be to ask an advisory body to develop a numerical recommendation: In the aftermath of a radiological emergency, at what point – at what dose to the public – do we restrict people for the overall good of society? Once we have a recommended standard to hang our hat on the rest could fairly easily fall into place." [8]

[8] Dr Yon, Federation of American Scientists, Health Public Safety Radiation Risk, 3/14/13, www.FAS.org