

Environmental Defense Institute

News on Environmental Health and Safety Issues

April 2015

Volume 26 Number 3

Sugar-coated Statements and Significant Omissions from the Department of Energy and the Idaho LINE Commission

The Idaho Office of the Department of Energy has yet to mention the recent finding of new seismic vulnerabilities at the Idaho National Laboratory's Advanced Test Reactor. The experiment loop piping seismic vulnerabilities were discovered in December 2014 during repair of recent piping leakage.^{1 2 3}

The late timing of this seismic analysis is of particular interest to me. I had authored an INL report in 2005 documenting the need for updated seismic analysis of the experiment loops.⁴ In 2013 I submitted a Freedom of Information Act Request along with the Post Register requesting documentation that it had been performed but received only smoke.⁵

The safety significance of a seismic event involving damage to one or several ATR experiment loops is a serious safety matter. The protective action distance for a severe radiological release from the ATR is 65 miles.⁶ The release is limited to a single core despite multiple cores of releasable fresh "used" fuel in the storage canal. Economic effects from a severe accident, to agriculture for example, remain unevaluated.

¹ DOE-Idaho Operations Summaries at <http://www.id.doe.gov/news/OperationsSummaries.htm> are behind more than 6 months given that as of April 12, 2015, these summaries cover up to the end of September 2014.

² DOE occurrence reports, NE-ID-BEA-ATR-2014-0036 and -0024 at the DOE "dashboard" for "Public Final Occurrence Reports" at <http://energy.gov/ehss/policy-guidance-reports/dashboards>

³ DOE Occurrence Report, Idaho National Laboratory, Advanced Test Reactor, NE-ID—BEA-ATR-2014-0036, "Declaration of Positive Unreviewed Safety Question (USQ) Concerning ATR Experiment Loop Pressurizer Seismic Vulnerability," Notification date 12/16/2014, Final 03/17/2015.

⁴ Idaho National Laboratory, *TRA NPH Assessment Plan*, PLN-588, Revision 1, 2005. p. 16 recommends seismic performance assessment of experiment loops. (Note that later revisions excuse DOE from timely reporting of seismic safety issues.)

⁵ Post Register Freedom of Information Act Request, July 2013 (ID-2013-00814-F)(OM-PA-13-032) This FOIA requested, among other things, experiment loop seismic performance assessment documentation. DOE provided a seismic risk assessment for ATR stating that the risk was low. No specific documentation concerning the status of seismic performance assessment was provided. Therefore, the risk assessment basis was not adequately supported and it likely underestimated the core damage risk.

⁶ INL, Emergency Management Hazards Assessment for Reactor Technology Complex, HAD-3, Revision 7, 2003. INL hazard assessment documents which describe potential radiological releases and EPA "protective action distances" are not available to the public and are not consistently available by Freedom of Information Act request.

The LINE report issued in 2013 discusses seismic issues and states that “The Nuclear Regulatory Commission (NRC) continues to monitor the impact of earthquakes and the potential risk it creates for the safety of nuclear energy facilities.⁷ As a general matter, the NRC has evaluated seismic risks and found that all operating nuclear power plants in the US ‘remain safe and require no immediate action.’”

The problem with the LINE report statement is that it is largely irrelevant to the INL. None of the reactors, none of the calcine bin sets and very few nuclear facilities at INL are licensed by the NRC.⁸ The DOE, with legendary laxity, self-regulates its nuclear facilities at INL.

Do glaring omissions and inaccuracies matter when the final LINE report is so professionally edited and graphically elegant?

The LINE report also states that INL is “on target to remove all transuranic waste” which is also false. INL is removing all above-ground stored transuranic waste but only a portion of the buried transuranic waste despite a legal determination that “all means all.”^{9 10}

The only thing on track is the state of Idaho becoming a mouthpiece for the nuclear industry and removing any meaningful pressure on the DOE to complete sodium-bearing liquid waste treatment or to meet deadlines for shipping transuranic waste.¹¹

⁷ Idaho’s Leadership in Nuclear Energy Commission (LINE) website <http://line.idaho.gov/publications/index.html> and LINE Commission Full Report, January 2013 at <http://line.idaho.gov/pdf/LINE%20Full%20Report.pdf>. See p. 16-17 regarding seismic analysis. See p. 8 regarding removal of transuranic waste.

⁸ Department of Energy Environmental Impact Statement, “Idaho High-Level Waste And Facilities Disposition Final Environmental Impact Statement,” DOE/EIS-0287. See <http://energy.gov/sites/prod/files/EIS-0287-FEIS-Summary-2002.pdf> p. S-47 and see Appendix C.4, p. C.4-14 for discussion of seismic vulnerability for INL’s INTEC calcine bin sets and increased seismic vulnerability for bin set 1 due to its design.

⁹ See <http://www.deq.idaho.gov/inl-oversight/oversight-agreements/2008-implementation-agreement.aspx> The 2006 U.S. District Court Order that “all means all” meant that DOE’s contention that it only needed to remove the above-ground, stored transuranic waste was incorrect. Buried waste also needed to be removed. But, in 2008, the State of Idaho agreed to a very limited amount of buried TRU waste being removed. This agreement is based on largely contrived studies that rely on monitoring and maintenance of a protective soil cap over the waste, without being honest about the hundreds of thousands of years this entails. And a contrived, incorrectly summarized study that concluded erroneously that worker doses would be incrementally increased for every additional acre dug up at RWMC.

¹⁰ See the Idaho Settlement Agreement and related updates: <http://www.deq.idaho.gov/inl-oversight/oversight-agreements.aspx>

¹¹ INL EM Citizen’s Advisory Board web link with presentations at <http://inlcab.energy.gov/pages/meetings.php> See IWTU Update, April 8, 2015. Specifically, the IWTU update includes a new milestone date (Dec 21, 2018) and new penalties. DOE’s IWTU presentation stated: “Stipulated penalties will not accrue if the reason for DOE’s failure to meet the requirement was caused by a problem with the treatment process that required treatment to be stopped in order to protect human health and the environment.” [It would be very easy to argue it was unsafe and thus avoid fines.] Also “If DOE determines that operation of IWTU is not feasible or protective of human health and the environment, then DOE shall cease operation of the IWTU, terminate the project and be subject to a stipulated penalty of \$ 2 million.” [Back to square one, and no obvious forward-thinking state requirements.]

The message INL and the LINE Commission report authors intended to send was received: that INL is safe, risks have been carefully reviewed in a technically acceptable rigorous manner, and that the aquifer is being protected. But the truth is quite a bit different.

Sugar-coated and incomplete statements masquerading as scientific and factual truth lead to misunderstanding the accident risks and consequences of contamination that cannot be remediated, the problems of buried waste contamination of the aquifer,¹² and the risk of the stranded spent fuel in Idaho that may forever require repackaging.^{13 14} The misunderstandings allow nuclear boosters to smile as they continue to advocate for nuclear energy rather than energy sources that would be for the good of mankind.

Article by Tami Thatcher, former nuclear safety analyst at INL and a nuclear safety consultant. April 2015.

How “Waivering” on the Idaho Settlement Agreement relates to the INL’s Treatment of Sodium-Bearing Waste

With the recent flurry of editorials about the State of Idaho’s proposed latest waiver to the 1995 Idaho Settlement Agreement, it is important to understand that a previous waiver in 2011 had allowed INL to accept research quantities of nuclear spent fuel.¹⁵ The difference with the past waiver for research quantities of spent fuel and the most recent one requested by the Department of Energy is whether the new one eliminates the Idaho’s sole remedy for failure to meet cleanup deadlines: the cessation of DOE spent fuel shipments.

When a Memorandum of Agreement concerning shipments of research quantities of spent fuel was signed in January 2011, the Idaho Settlement Agreement retained the ability to stop all DOE spent fuel shipments, including the research quantities, if DOE failed to meet cleanup milestones specified in the Settlement Agreement.

When the Integrated Waste Treatment Unit (IWTU) had some success with a non-radioactive practice run, DOE stepped up efforts to persuade Idaho to grant a new waiver for research quantities of spent commercial fuel—for two shipments, at least, that would not be interrupted by DOE’s failure to meet cleanup milestones specified in the Idaho Settlement Agreement.

¹² See Environmental Defense Institute reports concerning Snake River Plain aquifer contamination at the Idaho National Laboratory at <http://www.environmental-defense-institute.org/cleanup.html>

¹³ Blue Ribbon Commission of America’s Nuclear Future. 2012. (2010 estimates for spent fuel quantities) www.brc.gov

¹⁴ GAO Report, Spent Nuclear Fuel Management, Outreach Needed to Help Gain Public Acceptance for Federal Activities That Address Liability, GAO-15-141, Oct 2014, <http://www.gao.gov/assets/670/666454.pdf>

¹⁵ See the Idaho Settlement Agreement and related updates: <http://www.deq.idaho.gov/inl-oversight/oversight-agreements.aspx>

The existing MOA allows limited quantities of commercial spent fuel (< 400 kg/yr) for research. The Idaho National Laboratory already has 300 metric tons, stored in various ways. The DOE has recently said of its proposed two shipments of commercial nuclear fuel, that it is preparing a Supplemental Analysis to determine whether existing NEPA documentation should be supplemented and that a total of only 100 kg heavy metal would be brought into INL.¹⁶

So, without a new waiver, DOE's missed milestone date of 2012 for treatment of sodium-bearing radioactive waste at the INL's INTEC using the new Integrated Waste Treatment Unit is holding up shipments of research quantities of spent fuel and so are the now interrupted shipments of retrieved buried waste sent to now-closed WIPP in New Mexico.

More design problems were discovered following the IWTU's practice runs last year. One of the most serious is that during the 5 week "simulant" run, the material was hardening into what they are calling "bark" because it looked like tree bark. They don't have an easy fix. There are other serious design problems. IWTU issues described to the INL EM Citizens Advisory Board in April described several continuing clogging up issues from "bark-like material," to auger's that would not rotate, to "material cohesiveness causing bridging effect in the cone of the filter vessel inhibiting transfer of material." There was no discussion of the product waste form suitability from processing.¹⁷

A new milestone for completion has been negotiated on the hazardous waste aspect: Dec 21, 2018, but this does not change the missed Idaho Settlement Agreement milestone.

The State has negotiated fines of \$648,000, plus possible additional fines. And two interesting points:

- a. "Stipulated penalties will not accrue if the reason for DOE's failure to meet the requirement **was caused by a problem with the treatment process that required treatment to be stopped in order to protect human health and the environment.**"
- b. "If DOE determines that operation of IWTU is not feasible or protective of human health and the environment, then DOE shall cease operation of the IWTU, terminate the project and be subject to a stipulated penalty of \$ 2 million."

With the safety issues at the IWTU, it wouldn't take much for DOE to avoid fines by saying it considered it unsafe to operate. And, it takes only two signatures to waiver the Idaho Settlement Agreement: the Governor's and State Attorney General's.

Statements in the Idaho Settlement Agreement that had no remedy were soon forgotten. Specifically, the Idaho Settlement agreement "established the INL as DOE's 'Lead site laboratory for management of the Department's spent nuclear fuel.'" Yet, the DOE National

¹⁶ U.S. Department of Energy, Document manager Jack Depperschmidt, phone 208-526-5053, email comnfsa@id.doe.gov. DOE will make the draft Supplemental Analysis available at <http://www.id.energy.gov>. Existing NEPA documents are at <http://www.id.energy.gov/insideNEID/PublicInvolvement.htm>

¹⁷ INL EM Citizen's Advisory Board web link with presentations at <http://inlcab.energy.gov/pages/meetings.php> See IWTU Update, April 8, 2015.

Spent Fuel Program was realigned out of Idaho and then was defunded in 2009 according to the National Spent Fuel Technical Review Board meeting last year.

Article by Tami Thatcher. April 2015.

Don't Hold Your Breath for a Consent-Based Spent Fuel Solution

Congress is currently working to create authority to establish an interim spent fuel storage facility, and Waste Control Specialists in Texas are eager to create such a facility. Based on past negotiations, DOE (and taxpayers) will likely have to take over the private dump if there are problems.

The bipartisan Nuclear Waste Administration Act of 2015¹⁸ was introduced March 24 with the intent “to safeguard and permanently dispose of the nation’s stockpiles of spent nuclear fuel, which are currently accumulating at separate sites across the country.”

Among the bill’s provisions are establishment of an independent “nuclear waste administration” to manage a national nuclear waste program in place of the Department of Energy. The legislation also would establish a pilot interim storage facility for used fuel from shutdown nuclear power plants on a priority basis and other facilities for “non-priority” used fuel.

It directs a consent-based siting process for those facilities and for a permanent repository, in line with the recommendations of the Blue Ribbon Commission on America’s Nuclear Future.¹⁹ Yet, NEI President and CEO Marvin Fertel said “The statutorily directed construction of the Yucca Mountain project is another key element that must be part of a comprehensive program.”

Elements of the Idaho Settlement Agreement could be waived upon the opening of an interim fuel storage facility, yet we have learned that facility’s waste acceptance can be interrupted, as happened at the Waste Isolation Pilot Plant (WIPP) in New Mexico that accepts defense waste.

Article by Tami Thatcher. April 2015.

¹⁸US Senate Committee on Energy and Natural Resources, March 24, 2015, “Bipartisan Senate Coalition Introduces Comprehensive Nuclear Waste Legislation. See

http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=6edbd163-d34a-41d4-997b-bc0d95387b53

¹⁹Blue Ribbon Commission of America’s Nuclear Future. 2012. (2010 estimates for spent fuel quantities)
www.brc.gov

DOE Nuclear Safety Analysis Deficiencies Downplayed And Lessons Apparently Not Learned

A recent presentation at the April INL Citizens Advisory Board meeting described the worker internal contamination last October at the converted New Waste Calcine Facility (NWCF), now used for handling remote-handled TRU waste.

The event was not documented as an official DOE Occurrence Report. Yet, many things pertaining to radiological hazard control were fixed, and operator miscommunication during a transfer was amiss. Radiological cleanup of the facility took many weeks. It certainly seems that designation as an occurrence would have been appropriate despite the relatively low contamination levels they cited.

“10(2) - An event, condition, or series of events that does not meet any of the other reporting criteria, but is determined by the Facility Manager or line management to be of safety significance or of concern for that facility or other facilities or activities in the DOE complex.”

The same facility had an occurrence report in January 14, 2014 that strongly indicates severe shortcomings in the safety analyses at the facility, both from the contractor and the DOE side. Not only did the contractor not make basic calculations for the actual source term in the facility, the Department of Energy who must review and approve the safety analysis never noted that the source term was incorrect for the converted function of the facility.²⁰

Determining and analyzing an appropriate radiological source term for the facility is rather fundamental to the safety analysis process. Yet, the contractor had not updated the source term from the facility's original source term, neither for safety analysis or determining protective action guidelines, which requires understanding of the specific radionuclides that may be involved. Apparently, the safety analysis deficiencies at the converted NWCF had been addressed, yet the lack of thoroughness of implementation of safety controls was demonstrated by the October incident.

²⁰ **Occurrence Report Number:** EM-ID--CWI-ICPWM-2014-0001 Positive Unreviewed Safety Question (USQ) - HEPA Filter Accident Analysis at the Idaho Cleanup Project. “The source term used for the NWCF HEPA filter failure event in the Safety Analysis Report, (SAR)-103 New Waste Calcining Facility and the Fluorinel Dissolution Process Area, is based on historic tank farm facility (TFF) waste operations. Current RH TRU waste processing in the NWCF has a different isotopic profile and specific activity from the source term analyzed for the NWCF HEPA filter failure accident. Some of the RH TRU waste has relatively high alpha activity and relatively low gamma activity. Adding the RH TRU waste source term to the accumulated TFF source term on the HEPA filters may result in a higher consequences from the HEPA filter degradation accident scenario than currently evaluated in the NWCF SAR.”

The Idaho Department of Environmental Quality has an emergency response role and should be interested that the source term for an accident had been underestimated or misrepresented. The facility's recent history of inadequate safety analysis (and safety analyst staff turnover) was not mentioned at the recent meeting and certainly would have helped to answer the CAB chairman's question as to whether lessons had been learned from MFC's ZPPR accident in 2011.

In the ZPPR accident, requests for additional worker protections in the facility were declined. The accident investigation report found that deficient safety analysis failed to protect workers and led to inadequate work planning and hazard controls. Later, then manager of the facility, Philip Breidenbach, in an interview blamed workers for the event despite the accident investigation conclusion to the contrary. Safety analysis deficiencies played an important part in the cause of the ZPPR accident.

Although downplayed, DOE allowed the significant degradation of the safety analysis at WIPP along with a multitude of other safety programs. Now WIPP has hired a manager experienced with allowing deficient safety programs to continue uncorrected, cause internal uptakes to workers and contaminate nuclear facilities—former INL Materials and Fuels Complex director Philip Breidenbach has been hired to manage WIPP for Nuclear Waste Partnership.

State regulators and citizens in Idaho and in New Mexico should retain a very questioning attitude about the accuracy and adequateness of Department of Energy nuclear safety documents and hazard controls. Because DOE does not appear to be learning from its mistakes concerning the short-cutting of safety analysis and hazard controls at its nuclear facilities.

Article by Tami Thatcher. April 2015.