

Tami Thatcher Public Comment for Defense Nuclear Facility Safety Board meeting to be held June 20, 2019. Submitted June 19, 2019, Public Hearing on Safety Management of Waste Storage and Processing in the Defense Nuclear Facilities Complex

This meeting, over a year after four waste drums exploded at the Idaho National Laboratory, has given the Department of Energy (DOE) time to respond to the event. Yet, the DOE has not adequately responded to the multiple deficiencies identified by the event. Importantly, I want to point out that so far, not enough emphasis has been given to the blatant way that DOE was ignoring regulations and laws that allowed the four drums to explode in April 2018.

After the four drums exploded in April 2018, we learned that the issue wasn't *just* the understating of the likelihood and consequence of transuranic waste accidents with indefensible assumptions. Here in Idaho, last fall we learned from Department of Energy cleanup contractor Fluor Idaho's report on the causes of the explosion of the four waste drums (Reference 1) that the DOE had **not conducted the required nuclear safety analysis**, required by 10 CFR 830 nor had it conducted the required chemical compatibility analysis. This affected multiple facilities and multiple hazardous waste RCRA permits granted by the Idaho Department of Environmental Quality, not just the "sludge repackaging" facility where the four drums exploded.

The DOE has yet to address the gas buildup issues in its waste drums, not even when the Defense Nuclear Facilities Safety Board (DNFSB) pointed out remaining deficiencies last December after the event, see Reference 2, Defense Nuclear Facilities Safety Board Staff Report – Idaho Waste Drums with Elevated Methane Concentrations, December 10, 2018. The DOE has yet to adequately respond to the safety analysis deficiencies identified by the DNFSB prior to the four drums exploding, see Deficiencies in DOE Standard 5506, Preparation of Safety Basis Documents for Transuranic (TRU) Waste Facilities, Reference 3.

The DNFSB has described some of the deficiencies that understate the transuranic waste accident severity – how the likelihood and/or the consequence of an accident involving transuranic waste is often understated in regard to DOE Standard 5506. But the DOE has long held a preference for using assumptions, even technically indefensible assumptions, that reduce the stated accident likelihood and/or consequences in order to avoid the expense or inconvenience of proper hazard mitigations. But, here again, regarding the four drums that exploded in Idaho, the DOE had not even conducted a safety analysis for the waste stream that exploded.

As we learned from the investigation of the single drum release at the Waste Isolation Pilot Plant (WIPP) accident in 2014, there were many essential DOE programs not functioning at WIPP. The extent that this is also true at the Idaho Cleanup Project where the four drums exploded is less widely known.

At the 2014 WIPP event and the April 2018 Idaho event, it was only due to good luck and not DOE safety programs that workers were not in the normally occupied facilities when the radiological release events occurred.

While the drum release at WIPP involved the addition of prohibited material being mixed in with a waste drum, the mixing of organic “kitty litter” with nitrate-laden waste despite being prohibited, the problem of waste characterization and preventing incompatible mixtures is more complicated in the April 2018 Idaho event.

After the four drums exploded in April 2018, the DOE gave many excuses for the explosion that pertained to the difficulty – even the inability – to understand what constituents were in the waste that had been exhumed from burial decades ago and from multiple waste generators. The DOE seemed to give the impression of not understanding its required role in adequately characterizing the waste so that it could be safely stored, processed and transported. The DOE Idaho Operations Office had decided it was acceptable for a broad waste category that contained any of dozens of constituents, SD-176, to be treated without the required safety analysis and without even the simplistic chemical compatibility analysis required by state and federal RCRA laws.

The problem of the DOE creating a category of waste that was a large collection of various chemicals and metals from multiple waste generators and various waste generating processes, a “catch-all” category including various hydrocarbons, halogens, and metals, and DOE’s weaknesses in characterizing the contents of individual drums basically precluded proper understanding of fire and explosive hazards and the needed fire suppression systems and emergency responses. This is true for waste repackaging and also for drum storage and transportation. The problem also is relevant to buried waste exhumation.

The chemical compatibility analysis required by state and federal hazardous waste laws is simplistic and assumes the material is at ambient temperature. This simplistic chemical compatibility analysis was not even conducted by the DOE. Secondary reactions after heating up the material would not necessarily have been predicted, not even by related chemical compatibility analysis for transuranic waste. The effect of radiolysis during decades of waste storage would not have been factored in and can allow chemical reactions at lower temperatures. Other changes of drum contents over time such as the buildup of uranium hydrides does not appear to have been considered. The inadequacy of chemical compatibility analysis is not only the failure to conduct a chemical compatibility analysis but also the technical deficiencies of currently accepted simplistic approaches. The problem may be exacerbated by the regulatory divisions between hazardous waste constituents regulated by the state and federal laws and the radiological constituents considered to be under DOE regulation.

In May, DOE submitted for state approval a hazardous waste permit modification for the Advanced Mixed Waste Treatment Project to prohibit the use of automatic fire suppression when exceeding specific quantities of unroasted uranium. In addition, a fire suppressant was proposed for pyrophoric uranium-laden wastes, without providing a chemical compatibility analysis for the fire suppressant for a waste stream of potentially dozens of chemical constituents that may include materials such as halogens and hydrocarbons. The permit modification was subsequently retracted for unstated reasons.

Importantly, the various definitions of pyrophoric material or absence of a definition, made the prohibiting of processing pyrophoric material at the Idaho Cleanup Project ineffective and had the result of creating potentially inadequate fire protection response to metal fires.

The DNFSB has not emphasized the serious and continuing problem of inadequate waste stream and waste drum content characterization and the detrimental effect of that on adequate safety analysis.

The explosion hazard whether described as overpressurization, explosion, or deflagration from gas buildup in drums, can cause the unplanned expulsion of toxic radiological waste drum contents. The DOE continues to put workers and the environment at excessive risk of harm. The DOE continues to rely on technically inadequate assumptions and mitigations. And the DOE continues to ignore its own regulations and state and federal laws.

How does one have adequate worker protection and emergency response to explosive hazards when denying the hazards exist? How can proper fire barriers be put in place when the hazards are not characterized? How can fire responders understand the limitations of their fire suppressants if they don't know what materials are involved? How can proper fire suppressants be provided for automatic or manual use if the materials involved are not known? Is DOE planning to conduct a chemical compatibility analysis after the fire starts?

The DOE still has not resolved the inadequate waste characterization issues, the chemical incompatibility issues, the fire, explosion, and excessive gas buildup issues for its TRU waste despite the April 2018 four drums that exploded and nearly had breached the facility.

Along with failure of the DOE to conduct needed safety analysis required by 10 CFR 830, it appears that DOE is still failing to implement an adequate Unreviewed Safety Question process for the Idaho Site and the DOE Complex.

The DNFSB's staff report, Reference 3, Idaho Waste Drums with Elevated Methane Concentrations, points out that even months after the drums exploded, the DOE Idaho Operations Office (DOE-ID) still lacks effective controls to prevent or mitigate deflagrations in drums of repackaged waste. It does not appear that DOE-ID or Fluor Idaho, LLC have responded to the DNFSB report on the drum gas buildup problems remaining to be solved. The DNFSB stated that **"DOE-ID lacks effective controls to prevent or mitigate deflagrations in drums of repackaged waste."** The report details why the Department of Energy's response to understanding how to prevent future transuranic waste drum explosions remains inadequate, and why the new mitigations put in place are inadequate. The DNFSB found that Fluor Idaho's limited mitigations, which included the use of thermal monitoring during and immediately following repackaging and a 24 hour hold time after sorting the waste prior to repackaging, do not provide adequate hazard protection.

The DOE has not put in place technically defensible strategies even now, for drum repackaging. The DOE has not put in place technical defensible strategies for waste storage or handling either.

These excessive gas build up issues and chemical incompatibility issues are not limited to the sludge repackaging facility, the ARP V, where the four drums exploded – the issues pertain to all locations where such ill-defined “catch-all” categories of waste streams, such as the SD-176 waste stream, reside, including the AMWTP.

The waste involved in the April 2018 event was also being treated without identifying any specific waste acceptance criteria. The state of New Mexico should be concerned that waste was being prepared for shipment to New Mexico’s WIPP facility [Waste Isolation Pilot Plant] without approved characterization activities to support an approved WIPP Waste Acceptance Criteria.

The DOE’s willful decision to violate its own regulations and state regulations, which led to the four drums that exploded in 2018, came close to causing many lives being lost or vastly shortened. DOE chose to not conduct required chemical compatibility analysis and chose not to conduct required nuclear safety analysis – all to avoid the cost and inconvenience of conducting adequate studies, and the cost and schedule delays of putting proper mitigations in place.

The DOE is addressing its accidental environmental releases from the four drums that exploded or other accidental or intentional releases by denying or simply not disclosing the releases. This includes the Idaho National Laboratory’s long-standing practice of flushing radioactively-laden resin beads to an open-air pond. Refusing to estimate its releases is another way of underestimating annual radiological airborne releases under state and federal air permitting requirements. The release of long-lived radionuclides to the environment is continuing unabated.

Finally, the DNFSB has acknowledges that it has a role in addressing worker safety. The DOE is addressing worker radiological intakes by aggressively, at times indefensibly, underestimating the intakes, which may deny workers access to state Worker’s Compensation and federal Energy Employee Illness Compensation. Chemical intakes are notoriously ignored or inaccurate. Workers are denied access to their radiological dose information unless they conduct Freedom of Information Act (FOIA) requests, branding themselves as trouble-makers. The lack of independent scrutiny of worker dose assessments is a continuing problem, where DOE contractors have a conflict of interest and who want to avoid penalties for worker exposures.

Finally, this meeting which was postponed and then a date reset on short notice, is held in Washington DC rather than Idaho. It is being held the same day as one of the few Idaho Cleanup Project Citizens Advisory Board meetings. I am grateful for the opportunity to provide public comment in writing; however, the impression had been given that phone-in public comments would be accepted. I am not optimistic that enough public scrutiny of the DOE’s actions will be provided by the meeting. And I am wondering how many more accidents involving transuranic waste will happen before anything changes.

1. Idaho Cleanup Project Core, "Formal Cause Analysis for the ARP V (WFM-1617) Drum Event at the RWMC," October 2018. https://fluor-idaho.com/Portals/0/Documents/04_%20Community/8283498_RPT-1659.pdf
2. Defense Nuclear Facilities Safety Board Technical Report, Deficiencies in DOE Standards 5506-2007, Preparation of Safety Basis Documents for Transuranic (TRU) Waste Facilities," DNFSB/TECH-43, February 2018.
3. Defense Nuclear Facilities Safety Board, Letter to Secretary of Energy, March 12, 2019 with attached staff report "Idaho Waste Drums with Elevated Methane Concentrations," dated December 10, 2018 See dnfsb.org or <https://ehss.energy.gov/deprep/2019/FB19M12A.PDF>