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Idaho National Laboratory Evades the Facts of the Chernobyl Nuclear Disaster in its Public Relations Sessions to Downplay the Consequences on Human Health and the Environment

It is no small thing to downplay the devastating human health and environmental consequences to many countries from the April 26, 1986 Chernobyl nuclear disaster, but that is exactly what the Idaho National Laboratory did during its highly publicized chats with the public about the disaster. [1] A four-member panel successfully downplayed the consequences of "Chernobyl" and met the two apparent objectives of (1) downplay the radiological consequences and (2) assert that such a nuclear disaster could never happen here in the U.S.

While long known and well documented information [2] [3] about the causes of the explosions and fires caused by the uncontrolled nuclear reactor were discussed, the important aspects of the consequences to human health and the environment were deliberately incomplete and often inaccurate.

The assertion that because of U.S. Nuclear Regulatory Commission policies being more stringent, that such an accident couldn't happen in the U.S. is lacking in factual support. The Chernobyl accident led to review of plutonium production reactors in the U.S. overseen by the Department of Energy, not the U.S. NRC. Furthermore, this review led to shutting down the unsafe and aging military reactors in the U.S. An excellent description of this is provided in Michael D'Antonio's *Atomic Harvest*. [4]

But omitting factual information wasn't all — the INL expert lied about the radiological impact of Chernobyl being undetectable in Idaho. In reality, the airborne gross beta levels were monitored and were off the charts and this is documented in publicly available Department of Energy reports for 1986 annual site environmental monitoring as seen in the shown 1986 and 1987 environmental monitoring of gross beta concentration in air. [5] Of course, many other countries were affected far more than the U.S.

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[1] Idaho National Laboratory, Chernobyl Talks – Just the Facts, four public talks held in October 2019.
[2] Grigori Medvedev, *The Truth About Chernobyl*, 1989, Basic Books, ISBN 2-226-04031-5.
[3] Zhores A. Medvedev, The Legacy of Chernobyl, 1990, W. W. Norton and Company, ISBN 0-393-30814-6.
[4] Michael D'Antonio, *Atomic Harvest Hanford and the Lethal Toll of America's Nuclear Arsenal*, 1993, Crown Publishers, Inc. New York. ISBN 0-517-58981-8.
[5] Department of Energy, *1987 Environmental Monitoring Progress Report for the Idaho National Engineering Laboratory Site*, DOE/ID-12082(87), May 1988. Report available at https://ar.icp.doe.gov The cropped figure 6 is fuzzy in the original, but shows 1985, 1986 and 1987. The Chernobyl accident is attributed in the figure to the

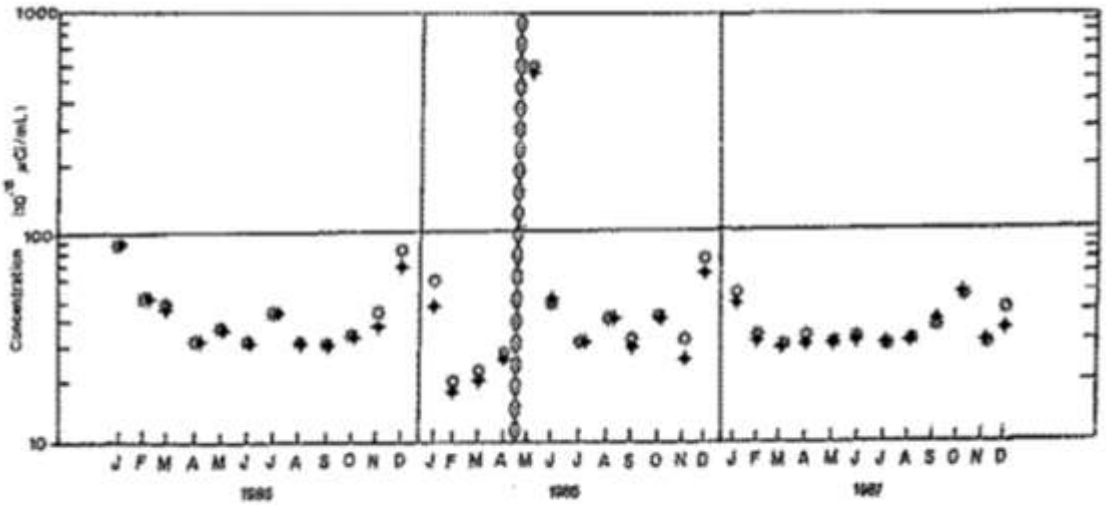

Figure 6. Boundary and distant particulate beta concentrations in air.

Figure 1. A portion of Figure 6 from DOE/ID-12082(87) gross beta airborne monitoring showing the dramatic rise in gross beta in Idaho caused by the April 1986 Chernobyl accident.

The INL stated that the only health effect was a modest increase in thyroid cancers. For anyone interested in understanding more about the extensive adverse health effects, I highly recommend reading information by someone not funded by and tasked with promoting nuclear energy. I suggest reading *Chernobyl Consequences of the Catastrophe for People and the Environment*. [6] The numbers of increased cancer deaths that will be caused by the Chernobyl disaster are disputed, but downplaying the suffering and death caused by the Chernobyl disaster is to me a crime far greater than the perceived overstatement of drama in the HBO miniseries *Chernobyl* that prompted the INL to actively downplay the effects of the Chernobyl disaster. The *Chernobyl* 5-part drama miniseries was created based on the book by Svetlana Alexievich Voices from *Chernobyl – The Oral History of a Nuclear Disaster* that presents personal accounts of the tragedy. [7]

The Idaho National Laboratory Chernobyl Talks facilitator joked about growing potatoes near the Chernobyl reactor and making "Atomic Vodka" and taking vacations to the Chernobyl exclusion zone.

1986 off-the-charts increase in airborne gross beta. Gross alpha was not monitored. The INL panel speaker told the session I attended in Idaho Falls that despite trying, nothing from the Chernobyl accident could be detected at the INL.

[6] Alexey V. Yablokov et all, Chernobyl Consequences of the Catastrophe for People and the Environment, Annals of the New York Academy of Sciences, Volume 1181, 2009. https://web.archive.org/web/20110419144513/http://www.strahlentelex.de/Yablokov%20Chernobyl%20book.pdf

[7] Svetlana Alexievich, *Chernobyl – The Oral History of a Nuclear Disaster*, 1997, Picador, ISBN 0-312-42584-8.

Some emergency responders who died of acute radiation poisoning are documented as having to be buried in lead-lined casks and as giving funeral workers burns. So, the INL experts that stated that family could not be harmed by visiting dying emergency responders at Chernobyl was untrue.

The Chernobyl disaster required millions of dollars of agricultural products to be destroyed. It affected the use of millions of acres of agricultural land. Reindeer many miles from the accident had to be fed imported food so as to not be so radioactively contaminated as to poison people eating them. [8] And the effects of "chronic low-dose contamination has resulted in morphologic, physiologic, and genetic disorders in every animal species that has been studied" according to the 2009 report by Yablokov. The disorders in wildlife are not due to "radiophobia," the excuse for human heath problems given by nuclear promotors.

Department of Energy Issues Sham Environmental Assessment for Test Range Expansion – Plans to Release Long-Lived Radionuclides into the Air and Neighboring Communities for 15 Years

Vital information was left out of the U.S. Department of Energy's brief descriptions and the Post Register's coverage of the selling points about its proposed expansion of test range activities at the Idaho National Laboratory. Citizens were not told that the expansion of the Idaho National Laboratory's National Security Test Range and Radiological Response Training Range proposed test range expansion, for at least the next 15 years, will be releasing to the winds various long-lived radionuclides to further the contaminate the INL and to blow to nearby communities.

The DOE knows that few Idaho citizens will bother to look at the draft Environmental Assessment (EA). [9] See Environmental Defense Institute comments on the radiological test range expansion on our website. [10]

The draft EA says that hazardous chemicals and radiological materials may disperse outside the detonation site. "Boundaries (e.g., ropes, signs, and barricades) are then installed to control access to these areas until the activity returns to normal (i.e., background) levels.

For long-lived radionuclides, returning to normal levels means blowing around until further dispersed or simply raising the "normal background level" to a new high. [11] [12]

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[8] Zhores A. Medvedev, The Legacy of Chernobyl, 1990, W. W. Norton and Company, ISBN 0-393-30814-6.

[9] U.S. Department of Energy Draft Environmental Assessment for Expanding Capabilities at the National Security Test Range and the Radiological Response Training Range at Idaho National Laboratory (DOE/EA-2063) at https://www.energy.gov/sites/prod/files/2019/09/f66/draft-ea-2063-expanding-capabilities-nstr-rrtr-inl-2019-09.pdf Send comments by October 12, 2019 to nsrrea@id.doe.gov

[10] Public Comment Submittals on the U.S. Department of Energy Draft Environmental Assessment for Expanding Capabilities at the National Security Test Range and the Radiological Response Training Range at Idaho National Laboratory (DOE/EA-2063), October 2019, by Tami Thatcher at https://www.environmental-defense-institute.org/publications/CommentDOETestRange.pdf and by Chuck Broscious at https://www.environmental-defense-institute.org/publications/EDINSTR.pdf

"Normal background levels" are already elevated above what was naturally occurring and continue to rise. By selecting a contaminated area to determine "normal background," it appears to me that this is how some radiological facilities can claim to operate within "normal expected background" no matter what radiological release incident just occurred.

The draft EA implies meticulous radiation dose estimation, but is coupled with stating that **DOE may decide to release additional radionuclides that are not listed in the draft EA**. The draft EA states that the additional but as of yet unidentified radiological releases will be "based on ALARA." But for the DOE, ALARA, which means "As Low as Reasonably Achievable" can mean anything DOE wants it to mean.

The DOE claims that predicted radiological doses from the expansion of the radiological training range will be low, lower than the releases expected from current and new operations. But the loose commitments made in the draft EA about how rarely efforts will be made to ensure that what is released is within what the EA has assumed, signals to me that the DOE fully intends to release additional radionuclides in whatever amounts DOE chooses.

The draft EA claims that "most of the INL's CERCLA contamination areas can be released in 2095." But the lion's share of the mess by curie and over 55 of INL's CERCLA contamination areas are "forever" contamination sites already where DOE had to argue that people cannot live there or drink the water, in to perpetuity, in order to claim the lack of cleanup was not harmful to human health. [13] Various INL sites that DOE had previously claimed could be released in 100 years were later discovered to required long-term institutional controls far longer.

In 2016, the DOE admitted that for the ATR Complex, its revised date of 2310 needed to have thousands of years added to the length of long-term institutional controls. [14]

The DOE and the draft Environmental Assessment blow off the issue of the buildup of long-lived radionuclides in Idaho communities from historical and ongoing releases. But long-lived radionuclides are building up and our public water drinking supplies are one indicator of increasing radionuclides, when the levels from historical nuclear weapons testing had been tapering off.

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[11] T. M. Beasley et. al, Environmental Measurements Laboratory, *Heavy Element Radionuclides (Pu, Np, U) and Cs-137 in Soils Collected From the Idaho National Engineering and Environmental Laboratory and Other Sites in Idaho, Montana, and Wyoming*, EML-599, October 1998.

[12] See EML-599, page 37 and Figure 14 on page 46 describing the way SDA windblown radionuclides could be distinguished from global weapons testing fallout, Nevada Test Site fallout and stack releases from INTEC. See page 45 describing how elevated Americium-241 to 239+240 Plutonium ratios observed near the SDA differ from weapons testing.

[13] INL Waste Area Group Institutional Controls Report. Dated February 16, 2016. https://cleanup.icp.doe.gov/ics/ic_report.pdf from the EPA page: https://cleanup.icp.doe.gov/ics/

[14] Federal Facility Agreement and Consent Order New Site Identification (NSI), "TRA-04: TRA-712 Warm Waste Retention Basin System (TRA-712 and TRA-612). NSI-26002, signed August 2015. See the CERCLA Administrative Record at www.ar.icp.doe.gov See page 7 of Rev. 1. showing americium-241 contamination at 3210 pCi/g yet the unrestricted use concentration is 187 pCi/g.

Airborne radiological contamination is breathed into water wells and water tanks, where it tends to dissolve and stay in the water, but the DOE and other radiological polluters ignore this.

If DOE is allowed to continue to assume, especially based on its loose environmental monitoring, that it can dose every man, woman and child up to its DOE limit of 100 mrem/yr from all sources (and that excludes exposures from transporting radiological waste), the rates of illness, premature death and unhealthy children will significantly increase. [15]

Department of Energy "regulatory radiological dose limits for member of the public" (see draft EA Table 34 on page 76, is 100 mrem/yr for onsite controlled areas and offsite or onsite outsider of controlled areas, no matter the age and gender of the member of the public. By no means is the DOE's 100 mrem/yr dose limit protective of human health. DOE ignores the epidemiology that shows that a few years of an average 400 mrem/yr to adult radiation workers increases cancer risk. Exposure of pregnant women to DOE's allowed 100 mrem/yr dose would greatly harm fetal health.

The public as well as radiation workers need to keep in mind that, despite what they may have been taught:

- The cancer risk is not reduced when radiation doses are received in small increments, as the nuclear industry has long assumed. [16]
- Despite the repeated refrain that the harm from doses below 10 rem cannot be discerned, multiple and diverse studies from human epidemiology continue to find elevated cancer risks below 10 rem and from low-dose-rate exposure. [17]
- The adverse health effects of ionizing radiation are not limited to the increased risk of cancer and leukemia. Ionizing radiation is also a contributor to a wide range of chronic illnesses including heart disease and brain or neurological diseases.

[15] "Health Risks from Exposure to Low Levels of Ionizing Radiation BEIR VII – Phase 2, The National Academies Press, 2006, http://www.nap.edu/catalog.php?record_id=11340 The BEIR VII report reaffirmed the conclusion of the prior report that every exposure to radiation produces a corresponding increase in cancer risk. The BEIR VII report found increased sensitivity to radiation in children and women. Cancer risk incidence figures for solid tumors for women are about double those for men. And the same radiation in the first year of life for boys produces three to four times the cancer risk as exposure between the ages of 20 and 50. Female infants have almost double the risk as male infants.

[16] Richardson, David B., et al., "Risk of cancer from occupational exposure to ionizing radiation: retrospective cohort study of workers in France, the United Kingdom, and the United States (INWORKS), BMJ, v. 351 (October 15, 2015), at http://www.bmj.com/content/351/bmj.h5359 Richardson et al 2015 This cohort study included 308,297 workers in the nuclear industry.

[17] US EPA 2015 http://www.regulations.gov/#!documentDetail;D=NRC-2015-0057-0436 . For important low-dose radiation epidemiology see also John W. Gofman M.D., Ph.D. book and online summary of low dose human epidemiology in "Radiation-Induced Cancer from Low-Dose Exposure: An Independent Analysis," Committee for Nuclear Responsibility, Inc., 1990, http://www.ratical.org/radiation/CNR/RIC/chp21.txt And see EDI's April 2016 newsletter for Ian Goddard's summary and listing of important human epidemiology concerning low dose radiation exposure.

Failure to address the buildup of long-lived radionuclides shows the disregard for human health and the environment now and long into the future.

As I study historical and current INL radiological emissions, I find that radiological emissions continue to be inadequately monitored. And reported monitoring rarely attributes INL's releases to the INL even when there is no other reasonable explanation. The environmental monitoring seems to be centered on monitoring in such a way that the results are ambiguous.

I find that current INL radiological airborne monitoring is already inadequate because (1) emissions reporting from various INL facilities are usually based on estimates and not measurements, (2) extensive time-averaging rather than instantaneous monitoring, and (3) increasingly tardy quarterly and annual environmental monitoring reports that are prone to "air monitor malfunctioning" or other excuses to avoid revealing the peak levels of contamination.

Idaho citizens are encouraged to worship science but not question the studies that support increasing the radionuclide emissions to our state, emissions that contribute to illness, cancer and birth defects.

On top of this, the State of Idaho weakened laws for radiological releases this year, removing clean air law protections in place since 1995.

People might eventually catch on that Idaho is getting more and more radiologically polluted — but with all the dis-information, probably not before it's too late.

Department of Energy Unraveling the Idaho Settlement Agreement, Misusing Idaho Cleanup Project Citizens Advisory Board for Propaganda

With deceptive public relations efforts ramping up, the Department of Energy is planning to renege on its commitment to ship spent nuclear fuel and high-level waste out of Idaho. At the Idaho Cleanup Project Citizens Advisory Board meeting held October 24 in Teton Village, Wyoming, [18] the Department of Energy listed the "accomplishment" of beginning to re-evaluate National Environmental Program Act (NEPA) for high level calcine waste and continuing work on "Performance Assessment" of calcine bin sets in order to argue that the waste doesn't need to leave Idaho, ever.

The Department of Energy has tired of pretending that obtaining a deep geologic repository will ever happen, let alone happen in time to meet the Idaho Settlement Agreement, which requires spent fuel and high-level waste to be shipped out of Idaho to the repository.

[18] Idaho Cleanup Project Citizens Advisory Board (ICP CAB), October 24, 2019 meeting at Teton Village, Wyoming, see presentations at https://www.energy.gov/em/icpcab/idaho-cleanup-project-citizens-advisory-board-icp-cab

So, the DOE issued its High-Level Waste Re-interpretation to magically declare all of its HLW to be low-level waste. On June 5, 2019, the U.S. Department of Energy, announced the **"new"** interpretation of its radioactive High-Level Waste that it has decided to grant itself.

After more than five decades of **mismanagement** of its many radioactive waste streams, the Department of Energy will decide when its High-Level Radioactive waste would be declared to be, almost as if by magic, Low-Level waste, on the basis of cost or any other criteria of its choosing. [19] [20] [21]

The reality is that allowing the DOE to reclassify its HLW to "non-HLW" will mean that vast amounts of the DOE's HLW becomes low-level waste (LLW). What this means is that the DOE has far fewer regulatory requirements about how it chooses to dispose of the LLW on its DOE sites.

The DOE can and will bury this reclassified "low-level waste" shallowly on DOE sites, arguing that the risk the human health and the environment is acceptable, based on its decision that the risk is acceptable because of the desire to save money based on biased and unrealistic "performance assessments."

The "performance assessments" estimate the rate at which radionuclides will leach out of the waste burial site into groundwater, soil and air. But there is no requirement that the performance assessments be accurate or actually protective of human health and the environment. There is no requirement for the DOE to heed bad news indicated from any risk or performance assessment. While conducting a performance assessment can be useful for comparing options for radioactive waste disposal, the state-of-the-art performance assessments can't predict waste migration performance over a few decades, let alone over the hundreds of thousands of years that the radioactive waste needs to be isolated.

The spent nuclear fuel and high-level waste in Idaho are listed in Table 1.

[19] U.S. Department of Energy, "Department of Energy Publishes Interpretation on High-level Radioactive Waste," June 5, 2019. https://www.energy.gov/articles/department-energy-publishes-interpretation-high-level-radioactive-waste

[20] U.S. Department of Energy, "DOE's New Interpretation of High Level Waste," and Fact Sheets at https://www.energy.gov/em/program-scope/high-level-radioactive-waste-hlw-interpretation

[21] Audrey McNamara, Reporter, *Daily Beast*, "Energy Department Plans to Reclassify High-Level Toxic Waste as Low-Level, Angering Environmental Advocates," June 5, 2019. https://www.thedailybeast.com/energy-department-plans-to-reclassify-high-level-toxic-waste-as-low-level-angering-environmental-advocates

Table 1. Spent nuclear fuel and high-level waste at the Idaho National Laboratory.

Waste Type	Origin	Volume	Ultimate Destination	Applicable Agreements
Spent Nuclear Fuel	INL site, research and commercial reactors *increases from reactor operation, Decreases at DOE packages waste from RSWF.	243.57 MTHM (EM only)	Geologic repository	Idaho Settlement Agreement *Possible increase in SNF from Advanced Test Reactor operations of accounting differences for Radioactive Scrap and Waste Facility (RSWF) SNF in DOE's 243.57 MTHM figure.
Spent Nuclear Fuel	Naval *increases as SNF shipped to Naval Reactors Facilities	28 MTHM High enrichment	Geologic repository	Idaho Settlement Agreement
High Level Waste - calcine	Reprocessing of spent nuclear fuel	4,300 m^3	Geologic repository	Idaho Settlement Agreement, Site Treatment Plan
High Level Waste – sodium bearing waste	De-Con of spent fuel reprocessing facilities	900,000 gallons	Geologic repository	Idaho Settlement Agreement, Site Treatment Plan, Notice of Non-Compliance/Consent Order

Table notes: Department of Energy, Environmental Management (EM); spent nuclear fuel (SNF); cubic meters (m^3); Metric Tons Heavy Metal (MTHM); most information adapted from handout and presentation at the Idaho Cleanup Project Citizens Advisory Board meeting held October 24, 2019 and the U.S. Nuclear Waste Technical Review Board 2017 report. [22]

[22] U.S. Nuclear Waste Technical Review Board, "Management and Disposal of U.S. Department of Energy Spent Nuclear Fuel – Report to the United States Congress and the Secretary of Energy," December 2017. http://www.nwtrb.gov/our-work/reports/management-and-disposal-of-u.s.-department-of-energy-spent-nuclear-fuel-(december-2017) See spent nuclear fuel inventories and descriptions of the Radioactive Scrap and Waste Facility.

Integrated Waste Treatment Unit (IWTU) Redesigning Air Filters, But If All Goes Well, Expected Air Emissions Are 7 Times Current INL Air Emissions

The Integrated Waste Treatment Unit (IWTU) project continues to struggle toward treating the 900,000 gallons of liquid sodium bearing waste that resulted from processing spent nuclear fuel and other transuranic separations processes.

The latest problem involves redesign of the process gas filters. Small scale testing is indicating that the redesigned process gas filters will meet performance requirements. The Idaho Cleanup Project Citizens Advisory Board presentation on October 24 also stated that "blowback system design and analysis are in progress."

There is still no projected date for commencing operation, and once running, the length of time it will take to treat the waste has expanded to several years.

The computer estimates of the radioactive air emissions that will blow come from the IWTU are based on assumptions that can only be tested when radioactive treatment commences. The computer estimates of the IWTU air emissions predict that the IWTU will increase the Idaho National Laboratory's radiation dose more than 7-fold above current radiological air emissions. However, the Department of Energy noted that no one knows where the computer estimates assumed the dose receptor to be located. Really. See the Department of Energy's footnote in its Test Range expansion Environmental Assessment, DOE/EA-2063. [23]

The sodium bearing waste has been managed as High-Level Waste but the Department of Energy, without officially reclassifying the waste has claimed it was Low-Level Waste that could met the definition of Defense-generated transuranic waste. So far, the Waste Isolation Pilot Plant (WIPP) prohibits accepting tank waste from nuclear fuel reprocessing.

The IWTU was supposed to have treated the sodium bearing waste in 2012 and allowed the tanks to be closed. The Idaho Department of Environmental Quality is continuing to fine the Department of Energy for missing the tank closure dates. The IWTU has suffered from extensive design flaws and has required extensive re-design.

[23] Draft Environmental Assessment for Expanding Capabilities at the National Security Test Range and the Radiological Response Training Range at Idaho National Laboratory (DOE/EA-2063) prepared for National Environmental Policy Act (NEPA) is posted at https://www.id.energy.gov/insideNEID/PDF/NSRR%20Draft%20EA.pdf. DOE/EA-20263 references ICP/EXT-05-01116 and states that dose "receptor location unknown."

Department of Energy Remains Deceptive About How Much Buried Waste Will Remain Buried After "Cleanup" is Done at RWMC; And About 50,000 Drums Remain to Ship Out of Idaho

From 1952 to the present, the Idaho National Laboratory's Radioactive Waste Management Complex (RWMC) burial grounds accepted radioactive waste for shallow, unlined burial over the Snake River Plain Aquifer. For years, the burial grounds at the RWMC accepted radioactive waste from the Idaho National Laboratory and from around the country, including the nuclear weapons production plant called the Rocky Flats Plant.

Most of the radioactive waste buried at the RWMC will remain buried when the planned soil cap is put over the waste. Of the 97-acre burial ground, waste was buried in pits and trenches in 35 acres. Of the 35 acres of buried waste, only 5.69 acres are designated to be sifted through to exhume only "targeted" waste and return non-targeted waste for reburial. The "targeted" waste was the most chemically laden waste that was already exceeding federal drinking water standards in the aquifer because of the buried waste.

Over 90 percent of the buried transuranic waste is remaining buried according to the Department of Energy's waste composite analysis calculations. [24] [25] [26] And the Performance Assessment of the waste doesn't comply with federal drinking water standards, even with a functioning soil cap as it allows 30 mrem/yr from drinking the contaminated water from the RWMC burial ground. [27]

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[24] See the July 2017 EDI newsletter for a timeline for the burial ground at the Radioactive Waste Management Complex and other cleanup information at http://www.environmental-defense-institute.org/publications/News.17.July.pdf

[25] 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/

[26] See the CERCLA administrative record at www.ar.icp.doe.gov (previously at ar.inel.gov) and see also Parsons, Alva M., James M. McCarthy, M. Kay Adler Flitton, Renee Y. Bowser, and Dale A. Cresap, Annual Performance Assessment and Composite Analysis Review for the Active Low-Level Waste Disposal Facility at the RWMC FY 2013, RPT-1267, 2014, Idaho Cleanup Project. And see Prepared for Department of Energy Idaho Operations Office, Phase 1 Interim Remedial Action Report for Operable Unit 7-13/14 Targeted Waste Retrievals, DOE/ID-11396, Revision 3, October 2014 https://ar.inl.gov/images/pdf/201411/20141103009 60BRU.pdf

[27] The U.S. Environmental Protection Agency limit radionuclides in drinking water to a combined radium 226 and radium-228 of 5 picocurie/liter (pCi/L); a gross alpha standard of 15 pCi/L (not including radon and uranium); a combined standard of 4 mrem/yr for beta/photon emitters, and uranium limit of 30 micrograms/L (roughly 20 pCi/L). For uranium in naturally-occurring composition, convert uranium mass to activity by multiplying by 0.67 pCi/ug. https://www.epa.gov/dwreginfo/radionuclides-rule and https://www.epa.gov/sites/production/files/2015-09/documents/radionuclide_rule_overview.pdf

For simplicity and due to the significance of the americium-241 to the estimated migration of radionuclides from the burial ground, last summer I asked the DOE what amount of americium-241 would remain buried after "cleanup" was completed at the burial grounds. [28] The buried americium-241 is not the only radionuclide that contributes to contaminant migration, but it was the dominant contributor according to the buried waste performance assessment.

> ***Question submitted to ICP CAB***: Now that the Idaho Cleanup (Project) is on the last Accelerated Retrieval Project (ARP IX) to exhume buried waste, how many curies of Americium-241 are remaining buried at the Subsurface Disposal Area (SDA)?
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> ***Answer from the Department of Energy****: The performance objective for targeted waste retrieval was established in a record of decision agreed to by the regulators that states: "Completion of targeted waste retrieval will be measured by the volume of targeted waste retrieved. A minimum volume of targeted waste of 6,238 m^3 will be retrieved from a minimum of 5.69 acres…, with the need for additional retrievals, if necessary, determined pursuant to CERCLA." Therefore, the performance objective is based on the volume of targeted waste removed, not the removal of Am-241 curies from the SDA. (*DOE's response are posted on the CAB website: https://www.energy.gov/em/icpcab/recently-asked-questions)

The actual answer to my question is, according to DOE's own documents, of an estimated 250,000 curies of americium-241 buried, 215,000 curies of americium-241 will remain buried over the Snake River Plain Aquifer. This would take 6 Snake River Plain aquifers to dilute to drinking water standards, assuming 2.44E15 liters in the aquifer and the federal drinking water standard of 15 picocuries/liter.

The Department of Energy won't tell the truth about how little of the radioactive waste is being removed because it is working hard to fool the Citizens Advisory Board and the public about its "cleanup."

The "cleanup" is exhuming from buried waste only about 10,026 cubic meters from the burial ground at RWMC, but far more than 300,000 cubic meters of radioactive waste that was buried there. [29] [30]

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[28] Idaho Cleanup Project Citizens Advisory Board, June 2019, "Recently Asked Questions" at https://www.energy.gov/em/icpcab/recently-asked-questions

[29] Pacific Northwest Laboratories, Buried Waste Integrated Demonstration Program – DOE Complex Buried Waste Characterization Assessment, PNL-8390, January 1993. https://inis.iaea.org/collection/NCLCollectionStore/_Public/24/039/24039316.pdf See page 2.1, Table 2.1. As of 1991, there was 293,000 cubic meters of low-level, low-level mixed waste and transuranic waste, with 94,600 cubic meters being transuranic waste at RWMC.

[30] Raymond L. Murray, Understanding Radioactive Waste, Fourth Edition, Battelle Press, 1994. Table on page 63 based on DOE/RW-0006, Rev. 9, March 1994 stated Idaho National Laboratory had 125,700 cubic meters of buried TRU and 64,800 cubic meters stored. Note that sometimes, as here, "stored" meant above-ground and "buried" meant buried. Later, DOE would maintain that "stored" meant either stored above ground or buried.

Only 10,026 cubic meters of radioactive waste is being removed from burial at the RWMC because the "targeted waste" is targeting chemical waste, not radioactive waste. As of the October 1, of the CERCLA cleanup burial ground exhumed waste, there remain 728 cubic meters still to exhume, 3,241 cubic meters of waste exhumed and waiting to be shipped and 6,057 cubic meters of exhumed waste already shipped.

Of the above-ground stored transuranic waste from Rocky Flats, some of this waste came directly from Rocky Flats and some of this waste was exhumed from RWMC burial prior to the CERCLA cleanup. This waste was estimated at roughly 65,000 cubic meters, when the Idaho Settlement Agreement was drafted, despite confusion over what DOE meant by "stored" waste, as the DOE had long claimed that the buried waste was simply being stored in Idaho temporarily.

Based on the Idaho Cleanup Project Citizens Advisory Board (ICP CAB) presentation on October 24 for ***waste disposition*** (this does not include the Accelerated Retrieval Project buried waste exhumation), the above-ground stored transuranic waste shipments out of Idaho have shipped 45,395 cubic meters TRU and 14,451 cubic meters mixed low-level waste (MLLW) shipped out of Idaho, and there remain 5,666 cubic meters CH-TRU and 597 cubic meters of MLLW waiting to be shipped. Then, there is also the buried waste exhumation waste to be shipped, which adds 3240 cubic meters plus an estimated 728 cubic meters left to exhume.

See Table 2 for a summary of the above-ground stored TRU waste and the Accelerated Retrieval Project CERCLA exhumation of buried waste. [31] **The above-ground stored waste waiting to ship and the exhumed buried waste add up to 10,232 cubic meters, or about 50,000 55-gallon drums remaining to ship.** [32] One 55-gal drum holds 0.208 cubic meters. And at the current 6 to 8 shipments per week to WIPP (assuming 4 drums per shipment), and shipments to LLW disposal facilities, the DOE has stated this is expected to take about 8 years, given the limited number of shipments that WIPP can currently handle.

In addition, there are remote-handled shipments, that have been put on hold since the 2014 accident at the Waste Isolation Pilot Plant (WIPP). Most of the remote-handled waste isn't from RWMC but apparently is from the Radioactive Scrap and Waste facility at INL's Materials and Fuels Complex.

[31] See Department of Energy presentations on transuranic waste and buried waste to the Idaho Cleanup Project Citizens Advisory Board on October 24, 2019, February 21, 2019, on June 20, 2019, and also to the Idaho Leadership in Nuclear Energy Commission meeting on May 16, 2019.

[32] Defense Nuclear Facilities Safety Board public hearing and related documents at https://www.dnfsb.gov/public-hearings-meetings/public-hearing-safety-management-waste-storage-and-processing-defense The May 2019 DNFSB presentation states about 40,000 drums awaiting shipment. This figure probably does not include MLLW shipments that don't go to WIPP and does not include the remaining exhumation of buried waste.

Table 2. CERCLA exhumed buried waste and the above-ground stored TRU waste remaining to be shipped out of Idaho.

Waste Type	Origin	Volume Remaining	Amount Already Shipped	Destination	Applicable Agreements
"Targeted" waste from RWMC buried waste	INL, Rocky Flats, other DOE facilities	3,241 m^3 (15,581 drums) awaiting shipment 728 m^3 (3500 drums) to exhume	6,057 m^3	WIPP	CERCLA, Agreement of Implement
"Stored" TRU and MLLW	INL, Rocky Flats, other DOE facilities	5,666 m^3 (27,240 drums) (CH-TRU) 597 m^3 (2870 drums) (MLLW)	45,396 m^3 (CH-TRU) 14,451 m^3 (MLLW)	WIPP Nevada site, and Clive, Utah	Idaho Settlement Agreement, Site Treatment Plan
MFC's nuclear fuel pyroprocessing waste	INL's RWMC and the Materials and Fuels Complex at the Radioactive Scrap and Waste Facility	1 m^3 RWMC (RH-TRU) 45 m^3 RSWF (RH-TRU and MLLW) *	?	WIPP Nevada site, and Clive, Utah	Not CERCLA or Idaho Settlement Agreement. New packaging requirements requiring repackaging of RH-TRU. WIPP currently not accepting RH-TRU

Table notes: Transuranic (TRU) and mixed low-level waste (MLLW) figures from October 24, 2019 Idaho Cleanup Project Citizens Advisory Board meeting presentations. Contact-handled TRU is CH-TRU. * Materials and Fuels Complex (MFC) remote-handled TRU (RH-TRU) figures based on February 23, 2017 ICP CAB presentation on waste shipments. Department of Energy information about RH-TRU shipments appears incomplete — this waste has been recorded as containing spent fuel and high-level waste in U.S. Nuclear Waste Technical Review board documents. Because the waste from the Radioactive Scrap and Waste facility was not known to be leaking into the environment, it was not part of CERCLA cleanup. Because the State of Idaho likely did not know the status of this waste, it wasn't put in the Idaho Settlement Agreement. For these reasons, the RH-TRU is not tracked the way CH-TRU is tracked at ICP CAB meetings.

For remote-handled waste, apparently there is a need to establish "an alternative transport and disposal package." This is requiring 55-gallon drums of RH-TRU to be repackaged into 30-gallon drums for different remote handling packaging. The RH-TRU packaging takes place at INTEC.

A partial inventory of the radionuclides in the buried waste at the Radioactive Waste Management Complex, what will be buried at its replacement facility, in high-level calcine and liquid sodium-bearing waste from reprocessing stored at the INL is provided in Table 3.

Table 3. Calcine bin set and Sodium-Bearing waste radionuclide partial inventory comparison to the waste that will remain buried at RWMC and at the replacement for RWMC.

Radionuclide (half-life)	Calcine Inventory (curies)	Sodium-Bearing Waste Inventory (curies)	Buried (existing) RWMC Inventory (curies)	Buried (future) Replacement RH-LLW Inventory (curies)
Carbon-14 (5730 year)	0.038	5.7E-4	731	432
Chlorine-36 (301,000 year)	0	?	1.66	260
Iodine-129 (17,000,000 year)	**1.6**	0.01	0.188	0.133
Technetium-99 (213,000 year)	**4600**	94.6	42.3	16.7
Neptunium-237 (2,144,000 year)	**470**	1.74	0.141	0.003
Uranium-232 (68.9 year)	1.6	?	10.6	0.00036
Uranium-233 (159,000 year) Product bred from U-235 and thorium, also decay of Np-237	0.057	0.036	2.12	0.0001
Uranium-234 (245,500 year) Pu-238 decay product	**130**	5.33	63.9	0.0012
Uranium-235 (703,800,000 year)	**3.2**	0.127	4.92	0.005
Uranium-236 (23,400,000 year) Pu-240 decay product	**11**	2.23E-5	1.45	0.0001
Uranium-237 (0.0185 year to Np-237)	**1.5**		-	-
Uranium-238 (4,470,000,000 year)	3.1	0.125	148	16.2
Thorium-228 (1.92 year to radium-224) Natural thorium decay and Pu-240 decay product	1.6	?	10.5	-
Americium-241 (423 y decays to Np-237)	12,000	316	**215,000**	0.38
Plutonium-238 (87.7 year)	**110,000**	3900	2080	-
Plutonum-239 (24,000 year)	**48,000**	410	64,100	-
Curium-244	?	1.36	?	?

Table notes: * Calcine inventory from DOE/EIS-0287; RWMC buried waste inventory from DOE/NE-ID-11243/11244 (figures cited may not be the latest estimates) and RPT-1267; replacement remote-handled facility INL-EXT-11-23102.
****Bold** highlighting of calcine inventory indicates a similar or larger inventory than the buried RWMC waste. The RWMC buried waste is estimated by the DOE to yield 100 mrem/yr doses in drinking water for millennia unless a perfect soil cap limits the estimated doses to be 30 mrem/yr. Importantly, the inevitable spikes in contamination due to flooding have not been accounted for despite RWMC flooding in 1963 and 1969. The dose estimates are not conservative. The assumed dilution factors are not consistent with past INL aquifer contamination migration. Calcine migration Kd coefficients may be different than used for RWMC and may worsen the effect of calcine in the soil.
*** Sodium-Bearing Waste inventory decayed to 2012 from Sandia National Laboratories, "Evaluation of Options for Permanent Geologic Disposal of Used Nuclear Fuel and High-Level Radioactive Waste Inventory in Support of a Comprehensive National Nuclear Fuel Cycle Strategy," FCRD-UFD-2013-000371, SAND2014-0187P; SAND2014-0189P. Revision 1. 2014. For Sodium-Bearing Waste radionuclides not listed in FCRD-UFD-2013-000371, EDF-6495 values from 2007 are provided for C-14, Tc-99, and I-129. Other radionuclides in the Sodium-Bearing Waste, typically of shorter half-life, are not listed in this table.

In addition to the RWMC, other buried waste facilities at the INL include the Remote-handled Replacement for RWMC at the ATR Complex, the Radioactive Scrap and Waste Facility at the Materials and Fuels Complex, the SL-1 Burial Ground, the Idaho CERCLA Disposal Facility, and numerous buried waste areas such as the ATR Complex percolation ponds that were taken out of service.

Sloped Ten to Forty-foot Thick Soil Cap Designed for 1000 Years for the RWMC's Waste That is Toxic for Over 1,000,000 Years

The DOE repeatedly emphasized 1000 years in describing the evapotranspiration surface barrier, basically a soil cap, for the Radioactive Waste Management Complex (RWMC) Subsurface Disposal Area during the Idaho Cleanup Project Citizens Advisory Board meeting on October 24. [33] They carefully avoided mentioning what "long term" maintenance meant for the 1000-year design life soil cap. And many presentations have described the thickness of the soil cap in terms of half the height of buildings currently located there.

The waste buried at the Subsurface Disposal Area, formerly known as the "burial grounds" is radio-toxic for over 1 million years.

The thickness of the soil cap will range from a minimum of 10 feet to 40 feet. This height is driven by the above ground stack of barrels staying at Pad A. The location of Pad A was extracted from diagrams of the subsurface disposal area because DOE doesn't like to mention the above-grade disposal at Pad A at the "subsurface disposal area."

[33] Idaho Cleanup Project Citizens Advisory Board, Teton Village, Wyoming, held October 24, 2019, at https://www.energy.gov/em/icpcab/idaho-cleanup-project-citizens-advisory-board-icp-cab

For years, the DOE claimed to install a soil cover over Pad A, upon which they planted grass, and told the public everything was fine. The skimpy sprinkling of soil over Pad A involved a lot of pretending and false claims to the public.

The SDA soil cap needs to limit water infiltration to the waste for over a million years to less than 1 cm/yr for five-year average in order to limit the water ingestion dose to 100 mrem/yr according to the Department of Energy's waste composite analysis calculations.[34] [35] The Performance Assessment for the buried waste doesn't comply with federal drinking water standards, even with a functioning soil cap. The assumed geologic stability yields an assumed steady trickle out of contamination to the aquifer that escalates after 10,000 years to DOE's 100 mrem/yr limit — unless perfect soil cap performance is assumed, lowering the dose to 30 mrem/yr for hundreds of thousands of years. The dose will be 100 mrem/yr if the soil cap succeeds in limiting the infiltration rate to 1 cm/yr. The Department of Energy's 100 mrem/yr level is not protective of human health — in fact, it guarantees higher rates of cancer, illness, infant mortality, and birth defects.

It was explained that the soil cap is U.S. Environmental Protection Agency and Idaho Department of Environmental Quality approved. But this doesn't provide much basis for confidence because of the poor track record for the CERCLA process. The EPA and State of Missouri approved the disposal cover for the West Lake landfill in 2008. Even though there are significant differences between the RWMC's SDA and the West Lake landfill, both have buried chemically laden and radioactive waste. The West Lake landfill in Missouri failed within a couple years of installation, and has had underground fires burning since December 2010 that no one knows how to extinguish. [36] [37] The EPA has told residents near to West Lake Landfill, to stay indoors and close the windows…

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[34] 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/

[35] See the CERCLA administrative record at www.ar.icp.doe.gov (previously at ar.inel.gov) and see also Parsons, Alva M., James M. McCarthy, M. Kay Adler Flitton, Renee Y. Bowser, and Dale A. Cresap, Annual Performance Assessment and Composite Analysis Review for the Active Low-Level Waste Disposal Facility at the RWMC FY 2013, RPT-1267, 2014, Idaho Cleanup Project. And see Prepared for Department of Energy Idaho Operations Office, Phase 1 Interim Remedial Action Report for Operable Unit 7-13/14 Targeted Waste Retrievals, DOE/ID-11396, Revision 3, October 2014 https://ar.inl.gov/images/pdf/201411/20141103009 60BRU.pdf

[36] Robert Alvarez, Bulletin of the Atomic Scientists, "West Lake story: An underground fire, radioactive waste, and governmental failure," February 11, 2016. https://thebulletin.org/2016/02/west-lake-story-an-underground-fire-radioactive-waste-and-governmental-failure/

[37] Veronique Lacapra, St. Louis Public Radio, "Confused about Bridgeton, West Lake landfills? Here's what you should know," October 20, 2015. https://news.stlpublicradio.org/post/confused-about-bridgeton-west-lake-landfills-heres-what-you-should-know

AMWTP Removed Prohibition on Treating Pyrophoric Waste and Treated Uranium Deemed Pyrophoric

Without using federal hazardous waste law requirements for selecting the proper facility design or proper level of review for the large change in hazardous waste operations and without improving waste characterization via sampling of waste when known waste constituents were present in significant amounts, the Idaho Department of Environmental Quality signed on to unsafe and inadequately reviewed changes for processing waste at the Advanced Mixed Waste Treatment Project (AMWTP).

The treatment facility at the AMWTP was not designed to treat pyrophoric materials and learned that it needed to disengage the water sprinkler system that would have worsened any uranium reactions. Many fire reactions occurred during treating the waste which Fluor Idaho has assumed will be adequate to oxidize the uranium for its shipment to the Waste Isolation Pilot Plant (WIPP) or mixed low-level radioactive waste facilities such as the one in Clive, Utah.

Thankfully, there were no explosions or overpressurizations with waste ejection. But, according to the Idaho Cleanup Project Citizens Advisory Board meeting on October 24. [38] the new processes were pulling the bolts out of the AMWTP Supercompactor and extruding "play-doo like substance" from the compacted drums. With the addition of magnesium oxide to the drums, no adjustment had been made to account for the far reduced compaction of debris drums, which were allowed to contain 49 percent solid non-debris waste.

Idaho Department of Environmental Quality Refusing to Conduct Enforcement Actions Against Fluor Idaho's April 2018 Drum Event

As the Idaho Department of Environmental Quality continues to rubber-stamp any hazardous waste RCRA permit that Fluor issues for the Idaho Cleanup Project, and even approves the changes prior to public comment being received, the Idaho DEQ is signaling that the political decision has been made that it will not conduct enforcement action against Fluor Idaho for its many lapses that caused the April 2018 drum event.

The Idaho DEQ isn't demanding comprehensive corrective action and many of the problems that allows the April 2018 Accelerated Retrieval Project (ARP) V drum event involving the rapid overpressurization of four drums which ejected waste contents have not been fixed. There appears to be no corrective action plan to address the causes of the ARP V drum event. [39]

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[38] Idaho Cleanup Project Citizens Advisory Board, Teton Village, Wyoming, held October 24, 2019, at https://www.energy.gov/em/icpcab/idaho-cleanup-project-citizens-advisory-board-icp-cab

[39] 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

Fluor has been changing the hazardous waste RCRA permit for exhuming waste and more recently for additional treatment of above-ground stored "legacy" waste. [40] [41] [42] The changes include using ARP VII instead of ARP V for treating waste, including the uranium-laden SD-176 waste stream. The Idaho Department of Environmental Quality has once again already approved, prior to the public comment period barely beginning, another Permit Modification Request that reflects that the causes of the April 2018 Drum Event have not been understood and corrected.

The four drums that exploded April 2018 at Accelerated Retrieval Project (ARP) V drum event due to rapid overpressurization leading to four drums popping their lids off and ejecting most of their waste into a room normally occupied by workers, would have had tragic health consequences for the workers, even if they managed to find their way to an exit with basically zero visibility as the powdery chemically and radiologically contaminated waste made a blizzard in the room. A large environmental release could easily have occurred as one ejected drum lid penetrated the inner fabric lining of the enclosure. In the response that followed, fire fighters responded to a fire alarm and there was no indication of a radiological contamination event. And when Fluor's staff for the waste facility were finally available, no staff had training on self-contained breathing apparatus, which forced the use of improper and inadequately protective breathing protection.

The ARP V, where the four drums exploded, was prohibited from treating pyrophoric material by its Idaho State approved hazardous waste permit. Yet that was exactly what the facility was doing. The RCRA permit required a chemical compatibility analysis but there was none for the SD-176 waste that was being treated. ARP V was treating waste that contained known large amounts of unreacted, unroasted pyrophoric uranium as well as zirconium. Now, Fluor Idaho intends to treat this waste in ARP VII.

Before and after the ARP V drum event, Fluor Idaho can't be relied on to conduct Chemical Compatibility Evaluations based on the 1980 EPA method EPA-600/2-80-076, "A Method for Determining the Compatibility of Hazardous Waste." [43] H**azardous waste law requirements for conducting chemical compatibility evaluations and preventing fires, explosions or any**

[40] Fluor Idaho, Notification of a Class 2 Permit Modification Request and Request for Temporary Authorization for the Idaho Nuclear Technology and Engineering Center and Radioactive Waste Management Complex located on the Idaho National Laboratory, EPA ID No. ID4890008952, September 23, 2019. At https://inldigitallibrary.inl.gov/PRR/169438.pdf

[41] Idaho Cleanup Project Core, Chemical Compatibility Evaluation of Wastes for Advanced Mixed Waste Treatment Project, RPT-ESH-014, Revision 10, September 2019. At https://inldigitallibrary.inl.gov/PRR/169440.pdf This document proports to have in it chemical compatibility evaluations, but largely it does not provide any chemical compatibility evaluation, instead providing N/A and TBD and in no way an adequate exercise to determine chemical compatibility.

[42] Evaluation of the Safety of the Situation for the Drum Event at ARP V (WMF-1617), ESS-137, Effective Date: TBD, At https://inldigitallibrary.inl.gov/PRR/169441.pdf T

[43] Alison Moon et al., *U.S. Department of Energy Implementation of Chemical Evaluation Requirements for Transuranic Waste Disposal at the Waste Isolation Pilot Plant*, DOE-EM-4.21-01, July 2017. https://www.osti.gov/servlets/purl/1373361

unplanned releases of hazardous waste are ignored if the constituents of the waste are unknown.

The Fluor Idaho and Idaho Department of Environmental Quality approach appears to be that the waste doesn't need a chemical compatibility evaluation if you don't know what's in the waste.

Acceptable knowledge documentation for each waste stream are supposed to identify the chemical processes used in creating the waste and to identify what chemicals are or could be in the waste. The problem is that for a waste stream, the so-called "Acceptable Knowledge" documentation for the waste streams is not necessarily adequate. Remember the Department of Energy's excuses for the ARP V drum event was that they really didn't know what was in the long-ago exhumed waste drums?

RCRA hazardous waste laws do not include radionuclides which are present in the waste. Radionuclides are regulated under the Atomic Energy Act rather than the RCRA hazardous waste laws. **But despite that, a chemical compatibility evaluation has to include all of the waste constituents, even radionuclides regulated under the Atomic Energy Act. The basic groundrules for chemical compatibility evaluations are that the waste must be kept at ambient temperatures. In other words, allowing the waste to heat up invalidates the chemical compatibility evaluation.**

In most transuranic waste, radionuclides present in less than one percent by weight have typically been called "trace" amounts and were assumed to be negligible. [44] The 1990 version of the safety analysis report for WIPP described the radionuclide inventory in a drum as having an average of 10 grams of uranium-238 compared with an average 14 grams per drum of plutonium-239. The waste drums have varying weights ranging from perhaps about 300 lbs to almost 600 lbs. But while a parent drum containing an enormous amount of uranium, 11,700 grams of uranium, was treated at ARP V, one of the four drums that blew off its lid April 2018 had less than 1 percent by weight of the unreacted depleted uranium, confirming the inadequacy of the 1 percent by mass guide.

The July 5, 2016 version of the WIPP Waste Acceptance Criteria allows radioactive pyrophoric materials when less than 1 percent by weight in a container. It required radioactive pyrophorics in concentrations above 1 percent by weight as well as all nonradioactive pyrophorics to be reacted or oxidized. But there are no criteria for how this is to be accomplished.

For the April 2018 ARP V drum event with four drum overpressurizations, only after the drums exploded was the waste sampled. Nitrates were found present, excessive beryllium in a

[44] Matthew Silva, Environmental Evaluation Group, *An Assessment of the Flammability and Explosion Potential of Transuranic Waste*, ML031910324 EEG-48, June 1991. https://www.nrc.gov/docs/ML0319/ML031910324.pdf This report includes a discussion of the allowance of up to 1 percent by weight of pyrophoric radionuclides in a container and how this is not necessarily safe.

methane-generating form of beryllium carbide, and zirconium — yet, inexplicably and inexcusably, no corrective actions were discussed regarding the many ways that the waste characterization had been inadequate, which caused the four drums to eject their waste contents April 2018.

The Idaho Department of Environmental Quality has granted to Fluor Idaho numerous hazardous waste permit renewals or modifications since the April 2018 four-drum breaches without ensuring that all causes of that event have been addressed and without concern over the Defense Nuclear Facilities Safety Board's documented concerns about Fluor's inadequate investigation of longstanding explosive gas buildup in waste drums. [45] [46]

Idaho DEQ has stated that no harm came from the four-drum breaches because the Department of Energy does not admit that any workers were harmed and says that there was no environmental release. I suspect both claims are false. See my August newsletter article on Respiratory Protection Basics that points out that Fluor's cause report [47] states that the emergency responders' nasal smears were lost. Nasal smears are used to determine whether lung counts were needed to estimate radiological material inhalation. There was no chemical vapor or fume monitoring and at least one responder was wearing inadequate respiratory protection because Fluor Idaho had no radiological control technical support or any other technical support staff qualified to wear self-contained breathing apparatus that is worn by fire department responders.

Also see my July newsletter article "Elevated Levels of Plutonium and Americium Detected in the Second Quarter of 2018, Several Potential INL Sources" that discusses 2018 second quarter radiological air monitoring that found elevated and unusual levels of plutonium and americium that appeared to be from the Radioactive Waste Management Complex. [48]

But many, in fact, most of the needed corrective actions from the April 2018 drum event identified in Fluor's causal report (RPT-1659) have not been implemented. There is apparently no documentation of what has not been implemented and why. This is in contrast to the more systematic treatment of accident causes from the 2014 accidents at the Waste Isolation Pilot Plant (WIPP). It appears that many of the causal report recommendations have simply been rejected as too costly or inconvenient — and by the same management who allowed the April 2018 drum event at ARP V.

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[45] 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

[46] Defense Nuclear Facilities Safety Board public hearing and related documents at https://www.dnfsb.gov/public-hearings-meetings/public-hearing-safety-management-waste-storage-and-processing-defense

[47] 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

[48] INL Environmental Surveillance, Education and Research Program, Managed by Veolia Nuclear Solutions – Federal Services, www.idahoeser.com, Second Quarter 2018 INL Quarterly Site Environmental Report, VNS-ID-ESER-SURV-058, http://www.idahoeser.com/Quarterlies/2018Q2/air.html

There hasn't been a publicly available corrective action plan [49] to explain how each recommendation or judgement of need, etc. from RPT-1659 has been addressed. It appears that if such a document exists or were created, it would show that many of the identified issues have not been adequately addressed. And unfortunately, the Idaho DEQ is doing nothing to remedy this situation.

Department of Energy criteria for the public allow radiological doses that are so high, in tens of rem, that are derived for a member of the public located miles from the release that a release yielding even a low dose to the public would be environmentally catastrophic to southeast Idaho. A "low" impact to the public as deemed by the Department of Energy criteria would have a lasting impact, forever basically, and would release 100 or 1000-fold or more than is typically being released annually by the Idaho National Laboratory.

That is why additional mitigations are typically put in place to limit the risk of a large release, even if the Department of Energy risk matrix doesn't demand it. The Idaho DEQ doesn't understand or doesn't care about attempting to put adequate mitigations in place, as it stands behind the excuse that it does not regulate radioactive and hazardous waste, as it once again rubber stamps the inadequate hazardous waste permit (PMR) from Fluor Idaho and the Department of Energy, putting workers, the public and the environment as risk of the release of airborne contamination that could never be remediated.

See my public comment submittal on Fluor Idaho's permit modification request for the Radioactive Waste Management Complex September Permit Modification Request on our website. [50]

Articles by Tami Thatcher for November 2019.

[49] For an example, see the Corrective Action Plans developed for the 2014 accidents at the Waste Isolation Pilot Plant (WIPP) at https://wipp.energy.gov/wipprecovery-plans_reports.asp

[50] Public Comment Submittal on the Class 2 Permit Modification Request and Request for Temporary Authorization for the Idaho Nuclear Technology and Engineering Center and Radioactive Waste Management Complex (Hazardous Waste Management Act/Resource Conservation and Recovery Act Permit) Located on the Idaho National Laboratory, EPA ID No. ID4780008952, November 2019, by Tami Thatcher at https://www.environmental-defense-institute.org/publications/CommentARP7PMR.pdf