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An October 2018 News Roundup for the Idaho National Laboratory

The contractor for the Department of Energy Idaho Cleanup Project, Fluor Idaho, has resumed work that was suspended after the rupture of four drums of radioactive material in April. Fluor said it has "revised the waste exhumation and repackaging process with additional controls to mitigate the risk of a similar event," including raking and monitoring the temperature of exhumed sludge before repackaging it. [1]

Not treating radioactive liquid waste yet, but the Integrated Waste Treatment Unit (IWTU) completed a successful demonstration test run with non-radioactive "simulant" that brings the facility one step closer to treating radiation liquid waste that was to have been treated by 2012. [2] The steam-reforming technology has been plagued with numerous problems and has required extensive redesign.

The Idaho National Laboratories Transient Reactor Test Facility known as TREAT has been reactivated, for testing advanced nuclear fuels. The facility had not been active since 1994. [3]

The Naval Nuclear Laboratory has transferred its contract from Bechtel Marine Propulsion Corporation to Fluor Marine Propulsion, on October 1. The new spent fuel handling facility is slated to open in 2024 to enable handling spent aircraft carrier fuel. [4]

The Nuclear Energy Innovation Capabilities Act sponsored by Idaho Sen. Mike Crapo has been signed into law. [5] The bill opens Department of Energy research infrastructure to national laboratories, academia and the private sector. It supports testing and demonstration of reactor concepts and sets planning goals designed to speed up the development of advanced reactors. [6]

The Energy and Water, Legislative Branch, and Military Construction and Veterans Affairs Appropriations Act, 2019, became Public Law No: 115-224 on September 21, 2018, passing

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[1] Nathan Brown, *The Idaho Falls Post Register*, "INL cleanup contractor starts exhuming waste again." September 12, 2018.
[2] Nathan Brown, *The Idaho Falls Post Register*, "IWTU completes successful demo run," September 27, 2018.
[3] Nathan Brown, *The Idaho Falls Post Register*, "INL test reactor revived with first experiment in decades," September 20, 2018.
[4] Nathan Brown, *The Idaho Falls Post Register*, "Naval Nuclear Laboratory transitioning to a new contractor," October 2, 2018.
[5] S.97 – Nuclear Energy Innovation Capabilities Act of 2017, https://www.congress.gov/bill/115th-congress/senate-bill/97 becomes Public Law No: 115-248.
[6] Nathan Brown, *The Idaho Falls Post Register*, "Trump signs bill to boost reactor research," October 3, 2018.

with hundreds of millions for the programs including cleanup at the Idaho National Laboratory. [7] [8]

NuScale awarded engineering contract to Virginia-based BWX Technologies, Inc. (BWXT) to start the engineering work to manufacture NuScale's small modular reactor (SMR). [9]

Hurried and Unscheduled Repeat Vote on AMWTP by Idaho Cleanup Project Citizens Advisory Board

The Department of Energy website for the Idaho Cleanup Project Citizens Advisory Board (CAB) emphasizes the "recommendation" produced by the unscheduled vote to promote furthering the Advanced Mixed Waste Treatment Project (AMWTP) mission. The CAB chair was not satisfied with the previous vote that did not unconditionally endorse continuing missions at the AMWTP. The AMWTP at the Idaho National Laboratory is a trash compactor at the Radioactive Waste Management Complex and its mission to treat waste already at the INL is coming to an end.

The ICP CAB learned the day of the meeting on June 27, 2018, minutes before the unscheduled vote, that there would be another vote on the previously failed vote to unconditionally promote any and all new missions for the AMWTP. [10] The surprise vote was to support an endorsement that had not yet been written and it passed by 7 to 4 with the newly stacked board that includes a former INL public affairs person. The main narrative of the CAB website makes no mention of the dissenting opinion included in the CAB's recommendation letter. [11]

The protocols for the CAB are so loose that no one was sure whether or not the CAB could vote on the unscheduled items. But the Department of Energy took several minutes to confirm that the CAB, unlike the way most official meetings must be conducted, was allowed to vote on items not on the published agenda. And this isn't the only underhanded vote that took place at the meeting — the vague agenda item for a vote on DOE reclassification of waste with no presentation was called the "Report from EM SSAB Chairs Meeting" and no opportunity for public comment prior to vote also occurred at that meeting.

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[7] H.R.5895 – Energy and Water, Legislative Branch, and Military Construction and Veterans Affairs Appropriations Act, 2019, https://www.congress.gov became Public Law No: 115-244 on September 21, 2018.

[8] Nathan Brown, *The Idaho Falls Post Register*, "Energy and Water budget passes with hundreds of millions for INL – More fore reactor development, cybersecurity," September 15, 2018.

[9] Portland, Ore. (Business Wire), *The Idaho Falls Post Register*, "America's Fist SMR Makes Pivotal Advancement with Selection of Manufacturer." September 25, 2018.

[10] Idaho Cleanup Project Citizens Advisory Board (formerly the Idaho National Laboratory Citizens Advisory Board) meeting schedules and presentations at https://energy.gov/em/icpcab/idaho-cleanup-project-citizens-advisory-board-icp-cab Meeting held June 21, 2018.

[11] Idaho Cleanup Project Citizens Advisory Board webpage for Recommendations at https://www.energy.gov/em/icpcab/listings/recommendations

The ICP CAB majority letter written after the vote urges the Department of Energy to act on critical items in order to make it possible for AMWTP to continue to process waste from around the complex. [12] The CAB letter lists the issues but contains no recommendations concerning how the DOE should address the issues, stating only this single bullet item in the letter:

- Requirements of the 1995 Idaho Settlement Agreement
  - Temporary storage of waste (six months in/six months out) while awaiting shipment to the Waste Isolation Pilot Plant (WIPP)
  - Amounts and types of waste that could be processed at AMWTP
  - Packaging requirements for transporting waste from generating sites
  - Public involvement from potential stakeholders

The dissenting opinion is included at the end of the recommendation letter and states that the dissenters opposed the CAB's recommendation due to the following concerns:

(1) A backlog of shippable waste already exists. If more waste arrives at INL for treatment at AMWTP and is processed faster than waste is shipped to WIPP, the six-months-in/six-months-out requirement of the Idaho Settlement Agreement cannot be met and there will be a build-up of new waste at INL.

(2) No stipulations have been made in the majority opinion letter concerning how new waste will be transported to Idaho. This is of particular concern for waste being transported across tribal lands, as well as through communities across America on the transportation corridors.

(3) Protection of the Eastern Snake River Plain Aquifer – which remains the ICP CAB's highest priority – and of Idaho's natural and cultural resources in not reflected in the recommendation.

See other Environmental Defense Institute newsletters regarding continuing missions at the AMWTP at our website. [13]

[12] Idaho Cleanup Project Citizens Advisory Board Recommendation #153, June 27, 2018 with headline "Authorize DOE-ID to act on critical items in order to make it possible for AMWTP to process waste from around the complex" at https://www.energy.gov/sites/prod/files/2018/06/f53/icpcab-rec-153-amwtp-future-mission.pdf

[13] Environmental Defense Institute newsletter article for March, "LINE Commission and Department of Energy Work to Preserve Radioactive Trash Compactor Facility Jobs," at http://www.environmental-defense-institute.org/publications/News.18.March.pdf and for April, "Idaho Cleanup Project Citizens Advisory Board Votes to Request More Information from the Department of Energy Work Regarding Details of Possible Continued Missions of the AMWTP," at http://www.environmental-defense-institute.org/publications/News.18.April.pdf

Department of Energy Promoting Dangerous Fictions and Omissions to ICP Citizens Advisory Board Regarding Waste Reclassification and "Waste Incidental to Reprocessing"

The Idaho Cleanup Project Citizens Advisory Board was given a document by the Energy Communities Alliance (ECA). [14] **The DOE's target regarding Idaho is to reclassify the sodium bearing waste and the calcine high-level wastes.** However, the CAB was not told of either of these objectives when it voted its support for DOE's review of waste classification nor are either of these two objectives mentioned in the handout titled PEM SSAB Chairs Recommendation to the Department of Energy Recommendation Regarding the Energy Community Alliance Report on Waste Disposition" given to the CAB members. The handout does not include any mention of high level waste, sodium bearing waste or caline.

However, the ECA document that the Department of Energy gave the CAB members but which most CAB members had not had time to read prior to the June meeting is anything but straight talk on the reclassification of nuclear waste. [15]

There was no presentation given to the CAB on waste reclassification prior to a previously unannounced vote on the topic that was given a vague title on the meeting agenda. The CAB chair briefly described DOE's efforts to reclassify radioactive waste but didn't even mention high level waste or the Idaho National Laboratory's calcine waste and sodium-bearing waste.

The Energy Communities Alliance document however, does clarify that DOE's intent for the waste reclassification is to reclassify the high-level waste (HLW) sodium bearing waste and HLW calcine waste — something not discussed prior to a surprise vote on the issue of DOE radiative waste reclassification at the June Idaho Cleanup Project Citizens Advisory Board meeting.

The ECA document claims that it is all about avoiding unnecessary and costly treatment facilities and what it claims are overly-conservative waste management strategies. We can understand that the treatment is costly. But the ECA report gives no explanation and no references as to why the treatment is unnecessary for the protection of human health and the environment over the millennia that the waste is radioactive and radiotoxic.

The possibility of reclassifying the sodium bearing waste (SBW) and calcine waste to transuranic waste with hopes of having the TRU waste accepted by the Waste Isolation Pilot

[14] Energy Communities Alliance, "Waste Disposition: A New Approach to DOE's Waste Management Must Be Pursued," September 2017. https://static1.squarespace.com/static/55c4c892e4b0d1ec35bc5efb/t/59ce7384cd39c3b12b97f988/1506702214356/ECA+Waste+Disposition+Report.pdf

[15] Idaho Cleanup Project Citizens Advisory Board (formerly the Idaho National Laboratory Citizens Advisory Board) meeting schedules and presentations at https://energy.gov/em/icpcab/idaho-cleanup-project-citizens-advisory-board-icp-cab Meeting held June 21, 2018 and are filed in my stack of papers as the "Oh My God" meeting of June 2018.

Plant (WIPP) in New Mexico could be quite acceptable to most of us in Idaho. But what if WIPP does not accept the waste?

The ECA document states: "However, the SBW, which was derived primarily from the flushing of lines and vessels in the new calcine processing facility and related facilities, is currently considered a HLW form even though less than 5% of its liquid volume originated from the reprocessing of spent fuel. Should the SBW require disposition as HLW, additional waste processing could be required to meet a yet-to-be-approved future waste form acceptable at the yet-to-be-developed permanent geologic repository."

Yet, the CAB has been told by the DOE and the Idaho Department of Environmental Quality that the method of dispositioning the treated sodium-bearing waste had been selected and that the waste would be shipped to a geologic repository which they have all along indicated would be the Yucca Mountain repository. It had been treated as simply a political issue that would be resolved by proper election results — but we now have a Republican president and Republican majority in both houses of Congress, yet we still don't have a path forward for the Yucca Mountain spent fuel and high-level waste repository.

If high-level waste is reclassified, there are basically two choices: TRU waste or Low-Level Waste. Low-level waste is such a broad category from class A waste that decays away within a hundred years to greater-than-class-C waste that is extremely long-lived and radiotoxic. Existing low-level radiative waste facilities may not be able to accept this highly radiotoxic but re-classified long-lived "low-level" radioactive waste. The Department of Energy treats its Greater-Than-Class-Waste the same way it treats class A low level radioactive waste — shallow burial over the Snake River Plain Aquifer.

None of the radionuclides in the waste were discussed. None of the half-lives nor the radiotoxicity of the radionuclides in the waste were discussed. And the ECA document wrongly asserts that the Department of Energy's previous efforts to deal with the radioactive waste have failed because of "artificial standards."

The ECA document discusses the HLW calcine at the INL stating: "Also at Idaho, there are 4,400 cubic meters of calcined waste resulting from the reprocessing of spent nuclear navy fuel. This material was derived from the calcination of liquid HLW and converted to a powdery form and placed in the HLW binsets prior to the shutdown of the calciner facility. **Today, this waste is considered orphaned because it is not in a borosilicate glass waste form required for disposal at the designated (or at least reference) deep geologic repository at Yucca Mountain.** Also, it is currently not considered acceptable for WIPP under the WIPP Land Withdrawal Act (LWA) because it has been managed as HLW. However, as a waste form, it is well suited for WIPP. Current baseline plans call for the adjacent IWTU to be modified to package the waste for transportation to the yet-to-be-developed HLW repository. Development of a WIPP option for these two wastes would eliminate the need for future capital construction activities, regulatory and licensing changes related to the non-glass waste form and indefinite storage at Idaho."

The Department of Energy and the Idaho DEQ have not told the CAB previously that the calcine waste was orphaned — nor did they tell the CAB this except via the ECA document. If fact, the DOE and Idaho DEQ have long stated that the method of treatment for the calcine was Hot Isostatic Pressing and that the waste would be shipped to the Yucca Mountain repository.

An example of the Department of Energy's reclassification efforts includes its technically indefensible creation of "low activity waste" or LAW. Not even nuclear industry friendly U.S. Nuclear Regulatory Commission would endorse DOE's "low activity waste" waste scheme which has resulted in high level waste staying onsite site at Hanford and the Savannah River Site. That is the concern I have — that reclassified waste will stay at the INL precariously over the Snake River Plain aquifer.

Public Comment Period Until November 13 on Idaho DEQ's Partial Permit for Hazardous Waste at the AMWTP

A public hearing has been scheduled for November 7 for the Idaho Department of Environmental Quality's "Intent to Approve a Hazardous Waste Renewal Request" for the Advanced Mixed Waste Treatment Project (AMWTP) at the Idaho National Laboratory. The draft permit is at the Idaho DEQ website. [16] at http://www.deq.idaho.gov/news-archives/waste-idaho-national-laboratory-permit-renewal-comment-092818/

The AMWTP treats radioactive and chemically-laden waste by compacting the waste. Much of the waste treated at the facility was shipped to Idaho from the Rocky Flats Weapons facility which produced nuclear weapons.

Will this be like the meeting held for the permit for storing waste at the Materials and Fuels Complex that omitted key details and gave erroneous information in several instances? Don't count on complete or factually accurate information in the permit or at the meeting. But you can count on the Idaho DEQ to rubber stamp the Department of Energy's request. In fact, the draft permit does not concern itself with obtaining the DOE's report concerning why the four waste drums exploded in April. It is as though the drum explosion and the inadequate safety mitigations never crossed the Idaho DEQs mind.

Given the draft permit, the Idaho DEQ intends to issue this permit without understanding the reasons for the explosion of several transuranic waste drums last April. While the drum lids popped off, releasing powdery radioactive material throughout the Accelerated Retrieval Project tent enclosure, the waste originated from the AMWTP and the newly repackaged drums that

[16] Idaho Department of Environmental Quality, draft Partial Permit for the AMWTP at http://www.deq.idaho.gov/news-archives/waste-idaho-national-laboratory-permit-renewal-comment-092818/ and see Attachment 2 at http://www.deq.idaho.gov/media/60182097/inl-amwtp-permit-attachment-2-0918.pdf revision as of June 2018 which would not include report findings about the April 2018 transuranic waste drum explosions and why the Idaho DEQ permit for that operation did not include adequate precautions.

exploded were to be returned to the AMWTP. See the Environmental Defense Institute newsletter articles regarding the transuranic waste drum explosions at our website. [17]

The partial permit request documentation for the AMWTP does not address the April transuranic waste drum explosions and does not address the inadequate assumptions made that allowed those explosions. See the draft permit Attachment 2 for Waste Characterization, which whether or not the waste contents are designated as unknown, the hazard mitigations were inadequate to prevent or mitigate exploding waste drums. The DOE's report is not yet available and may not even be released to the public. So, the current comment period is completely inadequate because the draft permit has not considered the findings of why no one had recognized that unsealing waste containers could lead to explosive levels of hydrogen gas buildup. This could happen when repackaging the waste, or it could happen if a drum were punctured. The Idaho DEQ has ignored all of this in issuing this inadequate draft permit for public comment!

Experts Worry That Trump's U.S. EPA is Moving to Loosen Radiation Protection Standards

Changes to the U.S. EPA's website describing radiation health consequences are causing some experts to worry that the EPA is moving to loosen radiation protection standards. The EPA's proposed rule for transparency in science doesn't talk specifically about radiation regulations, but the agency quoted a toxicologist at the University of Massachusetts, Edward Calabrese, as saying that weakening limits on radiation exposure would save billions of dollars and have a positive impact on human health. [18]

Experts found that the EPA website was being changed to emphasize low risk of cancer from radiation.

The AP article pointed out that The National Council on Radiation Protection and Measurements reviewed 29 public health studies on cancer rates among people exposed to low-dose radiation, and accepted 20 of the studies that support the principle that even low-dose exposures cause a significant increase in cancer rates. See our September newsletter article "Proposed EPA Rule," Strengthening Transparency in Regulatory Science" Actually Seeks to Protect Polluters," and report by Chuck Broscious. [19] [20]

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[17] Environmental Defense Institute newsletter article for May, "Several Barrels of Waste Overpressurize Within Hours After Being Repackaged at the Idaho Cleanup Project ARP V," and for August, "Potential Unreviewed Safety Question Affecting Department of Energy Complex Concerning Hydrogen Generation in TRU Waste Drums."

[18] Ellen Knickmeyer, AP, *The Idaho Falls Post Register*, "Radiation Rollback Experts say Trump's EPA is moving to loosen radiation limits," October 3, 2018.

[19] Environmental Defense Institute newsletter article for September, "Proposed EPA Rule, 'Strengthening Transparency in Regulatory Science' Actually Seeks to Protect Polluters," at http://www.environmental-defense-institute.org/publications/News.18.September.pdf

Idaho DEQ Reports Concerning the Elevated Radioactivity in Drinking Water in the Boise Area Don't Identify the Source of the Radioactivity

After contacting the Idaho Department of Environmental Quality to ask why the drinking water on the southwestern side of the state is so radioactive, the Idaho DEQ could not identify anyone at the agency who understood the issue. But the Idaho DEQ did say that there was a report on its website that looked at the issue. It was implied that the report solved the mystery.

The report "Isotopic and Geochemical Investigation into the Source of Elevated Uranium Concentrations in the Treasure Valley Aquifer, Idaho," in 2011 [21] does look at the issue — but does not identify the source of the elevated radioactivity. The report confirms the widespread occurrence of sometimes very high uranium concentrations, up to 100 micrograms/liter. The report does conclude that the source is not from agricultural fertilizer. The report suggests that the source is a near-surface source of contamination.

The mystery is not solved by the report and the report does not conclude that the source of the elevated uranium is natural. The report simply concluded that more work was needed — and there is no evidence that any work has continued since 2011.

There is another effort afoot to study the issue by Boise State University but so far it has not provided any answers. [22] It states that "The Treasure Valley Aquifer System (TVAS) in western Idaho contains documented uranium and arsenic concentrations, up to 110 microgram/liter and 120 micrograms/liter, respectively…" And "The contaminants historically show elevated concentrations with high spatial variability throughout the region."

See also our Environmental Defense Institute February newsletter article "What's Up With The Radionuclides in Drinking Water Around Boise, Idaho?" [23]

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[20] Environmental Defense Institute comment submittal to U.S. Environmental Protection Agency regarding proposed rule to strengthen science used in regulation, Docket ID EPA-J!-OA-2018-0259 by Chuck Broscious, August 2018 at http://environmental-defense-institute.org/publications/CommentEPAScienceRule.pdf

[21] Brian Hanson, Dr. Shawn Benner, Dr. Mark Schmitz, Dr. Spencer Wood, Department of Geosciences, Boise State University., "Isotopic and Geochemical Investigation into the Source of Elevated Uranium Concentrations in the Treasure Valley Aquifer, Idaho," Submitted to the Idaho Department of Environmental Quality, April 2011. http://www.deq.idaho.gov/media/563327-uranium_treasure_valley_0411.pdf listed at http://www.deq.idaho.gov/regional-offices-issues/boise/water-quality-plans-reports/

[22] Gus Womeldorph and Shawn Benner, Boise State University, "A Study of Uranium and Arsenic in the Treasure Valley Aquifer System, Southwestern Idaho, Year 1, 2017-2018," 2018 at https://www.idwr.idaho.gov/files/publications/201807-GWQ-GW-Study-of-Uranium-in-TV-Aquifer-System.pdf

[23] Environmental Defense Institute February 2018 newsletter article by Tami Thatcher "What's Up With The Radionuclides in Drinking Water Around Boise, Idaho?"at http://environmental-defense-institute.org/publications/News.18.Feb.pdf

Naval Reactors Facility Studies Their Bioassay Program, Concludes There Was One…At Least After 1980.

After several weeks of waiting for a response to my question to NRF officials at the Idaho Leadership in Nuclear Energy meeting in Arco on May 24, I called NRF Public Affairs. They responded that they would answer my question about whether the bioassay programs for all years of NRF operation were adequate to protect workers from alpha intakes. Then, after several weeks NRF responded that they had located the online reports that describe their radiation program and they said they would mail to me the latest report, but I have not received it. NRF employees are deemed ineligible for the illness compensation under the Energy Employee Occupational Illness Compensation Program Act (EEOICPA). [24]

So, after waiting since June, the answer to my question was that publicly available reports are the final word on the topic of why NRF workers with cancer are excluded from Energy worker compensation. [25] NRF asserts that bioassay programs were adequate but they offer no evidence, particularly for the years before 1980.

Special Exposure Cohorts for the INL have been added because of inadequate programs to monitor and control internal doses from transuranic radionuclides. Investigations conducted of historical INL operations for energy worker illness compensation during the last two years have found shattering revelations about inadequate worker protections at the INL especially regarding inhalation of alpha emitters such as americium and plutonium and the inability to estimate what doses these workers had received. The investigations partially include the early decades of INL operation until the 1980s but have not investigated all years of operation. [26] [27] [28] [29] [30] [31] [32] [33]

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[24] 42 USC 7384, The Act--Energy Employees Occupational Illness Compensation Program Act of 2000 (EEOICPA), as Amended and see the website for the Center for Disease Control, National Institute of Occupational Safety and Health, Division of Compensation Analysis and Support at http://www.cdc.gov/niosh/ocas/ and U.S. Department of Labor, Office of Workers' Compensation Programs, EEIOCPA Program Statistics, http://www.dol.gov/owcp/energy/regs/compliance/weeklystats.htm

[25] *Occupational Radiation Exposures from Naval Reactors' Department of Energy Facilities*, Report NT-18-3, May 2018. https://www.energy.gov/sites/prod/files/2018/07/f53/NT-18-3.pdf

[26] See the EDI September 2017 newsletter and the Advisory Board on Radiation and Worker health meetings webpage for August 2017 at https://www.cdc.gov/niosh/ocas/pubmtgs.html See the NIOSH/DCAS: Idaho Laboratory SEC Evaluation Report SEC-00238 from that page at https://www.cdc.gov/niosh/ocas/pdfs/abrwh/pres/2017/dc-inlsec238-082317.pdf

[27] See the July 20, 2017 presentation to the NIOSH radiation board (See August 14, 2017 board meeting) describing various problems at the Idaho National Laboratory's INTEC prior to 1981 at https://www.cdc.gov/niosh/ocas/pdfs/sec/inl/inler-238-r0.pdf

[28] INL May 2, 2016 NIOSH Radiation Advisory board recommended Special Exposure Cohort: https://www.cdc.gov/niosh/ocas/pdfs/abrwh/secrecs/bdrecinl-219.pdf

[29] ANL-West May 2, 2016 NIOSH Radiation Advisory board recommended Special Exposure Cohort: https://www.cdc.gov/niosh/ocas/pdfs/abrwh/secrecs/bdrecanlw-224.pdf

[30] See p. 19 of "INL SEC Proposed Class – Update SEC00219" at https://www.cdc.gov/niosh/ocas/pdfs/abrwh/pres/2015/dc-inlsec219-111015.pdf

[31] See EDI's June 2017 newsletter article "Why so wrong for so long?" at http://www.environmental-defense-institute.org/publications/News.17.June.pdf

Yet, as these studies for radiation dose reconstruction by NOISH have begun to allow more workers to obtain compensation, many more studies need to be completed for various INL facilities and various years of operation. See more in Environmental Defense Institute's April 2018 newsletter about the wrongful exclusion of NRF workers from Energy Employee Occupational Illness Compensation Program Act (EEOICPA).

The NRF report assertions about alpha contamination are not credible for any years of NRF operation. The NRF report issued in the 2018 states that "although alpha and beta radiation are present, they are generally well shielded." The report states that external exposure due to alpha radiation is not performed, and further ignores the internal contamination saying that the external risk from alpha is low. The report asserts that alpha-emitting radioisotopes are retained within the fuel elements and are not accessible to personnel operating or maintaining a naval nuclear propulsion prototype plant. This is not true for spent fuel end-cap chopping or for dissolving fuel in the hot cells. The report's Table 6 for internal monitoring only goes back to 1980, but operations at NRF started in the 1950s. All- in-all, the polite responses from the NRF personnel were nothing but a sham.

The extensive americium-241 groundwater contamination south of NRF attest to the alpha separations that the NRF report fails to discuss. Previous Center for Disease Control reviews of INL releases pertaining to the off-site public do include NRF and it was noted that NRF would fail to report air monitoring data when hot particles resulted in high readings. The NRF personnel did not appear to know that NRF was part of the INEL Historical Dose Assessment that is the DOE's historical dose evaluation of the airborne radiological releases from its operations from 1949 to 1989 [34] or that CERCLA cleanup investigations included NRF. If the authors of the NRF radiation exposures report actually read any of the superfund CERCLA cleanup investigations of radioactive contamination found in NRF pits and soil, they should not have been making the claims that they made about the alpha particles being bound up in the fuel. I highly recommend that NRF personnel read the NRF Waste Area Group (WAG) 8 Comprehensive Remedial Investigation/Feasibility Study and look at the americium-241, neptunium-239, plutonium-238 and -239, uranium-235, curium-244 and californium-252 among other radionuclide contaminants found in the CERCLA sampling conducted in 1993 and 1994.

The polite albeit slow responses from NRF personnel were also out-of-touch with recent DOE worker compensation investigations which have found huge inadequacies in alpha monitoring of workers. No doubt that recent epidemiology for radiation workers showing elevated cancer risk for radiation doses far less than the allowed 5 rem annual dose limit in the

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[32] SC&A, Inc., "Draft Review of NIOSH's Evaluation Report for Petition SEC-00219, Idaho National Laboratory: Burial Ground, 1952-1970," SCA-TR-2017-SEC007, May 2017.

[33] Department of Labor presentation August 2017 https://www.cdc.gov/niosh/ocas/pdfs/abrwh/pres/2017/dol-update-082317.pdf p. 10-12.

[34] US Department of Energy Idaho Operations Office, "Idaho National Engineering Laboratory Historical Dose Evaluation," DOE-ID-12119, August 1991. Volumes 1 and 2 can be found at https://www.iaea.org/inis/inis-collection/index.html

U.S. has also escaped NRF's attention. [35] Not only that, NRF personnel do not know their neutron dose. And beyond radiation-induced illness, the Energy Employee Illness Compensation program includes chemical sources of illness, but they are excluded from chemical illness compensation as well. NRF has used dozens of health hazardous chemicals and certainly had asbestos. NRF personnel are working hard to keep their heads in the sand and remain eager to pass along myth and hyperbole rather than tell the truth.

A Recent Report on Radiation-induced Inflammation and Autoimmune Diseases

A 2018 report by Rasoul Yahyapour and others describes how exposure to ionizing radiation can strongly affect immune system responses, leading to changes in the normal functions of the immune system. [36] This inflammation response is in addition to the typical concern of ionizing radiation causing solid cancers and leukemia and causing genomic instability.

The report describes how chronic inflammation and continuous free radical production are responsible for several diseases after radiotherapy or radiation accident. The report states that "Several studies have proposed that 25 percent to 50 percent of all cancers may be related to chronic inflammation." The report also discusses that chronic inflammation induced by ionizing radiation is responsible for disorders including cardiovascular diseases, diabetes, and damage to thyroid function.

Agency for Toxic Substances and Disease Registry (ATSDR) Concludes Radiological Contamination near Coldwater Creek *Could* Have Increased the Risk of Some Types of Cancer

In June 2018, the Agency for Toxic Substances and Disease Registry (ATSDR), the federal public health agency of the U.S. Department of Health and Human Services, published a report evaluating the exposures to people living near Coldwater Creek where uranium processing wastes were improperly stored and disposed of in St. Louis, Missouri. [37] The radioactive

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[35] 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 epidemiology study that included a cohort of over 300,000 nuclear industry workers has found clear evidence of solid cancer risk increases despite the average exposure to workers being about 2 rem and the median exposure was just 410 millirem. Also see December 2015 EDI newsletter.

[36] Rasoul Yahyapour et al., *Military Medical Research*, "Radiation-induced inflammation and autoimmune diseases," Published online March 2018. PMID: 29554942 or https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5859747/

[37] Agency for Toxic Substances and Disease Registry, Public Health Assessment for Evaluation of Community Exposures Related to Coldwater Creek St Louis Airport/Hazelwood Interim Storage Site (HISS)/Futura Coatings NPL Site North St Louis County Missouri, EPA Facility ID MOD980633176, June 18, 2018. https://www.atsdr.cdc.gov/sites/coldwater_creek/docs/ColdwaterCreek-508.pdf

contamination included uranium-238 and higher amounts of thorium-230 and its daughter product radium-226 than from unprocessed uranium ore because of the uranium extraction processing.

The ATSDR agency found that the Army Corps of Engineers' Formerly Utilized Site Remedial Action Program (FUSRAP) has been characterizing and cleaning up contaminated area since 1998. But soil concentrations of radiological contaminants still remain higher than remedial goals. Background levels of thorium-230 should have been about 1 to 3 picocuries/gram (pCi/g) but were frequently detected above FUSRAP's remedial goal of 14-15 pCi/g. Thorium-230 levels have been as high as 54.5 pCi/g and recently as high as 27.3 pCi/g.

The ATSDR concluded that there was not enough sampling data to actually evaluate pathways of exposure.

The Missouri Department of Health (MDOH), now known as the Missouri Department of Health and Senior Services (MDHSS) had reviewed cancer incidence and mortality data from August 1984 to September 1988 around several sites, but at that time did not calculate the observed and expected cancer rates because about 15 percent of hospitals were not yet in compliance with new cancer reporting laws. Subsequently, in a later review, MDOH concluded that radiation induction could not be ruled out. Then in March 2013, MDHSS reviewed 1996-2004 cancer incidence data from six ZIP codes adjacent to Coldwater Creek and **they found statistically significantly elevated rates of incidence of several types of cancer** including female breast, colon, prostate, and kidney cancer, compared to the Missouri state rates. Then an updated analysis **found that childhood brain and other nervous system cancers were statistically significantly elevated** compared to the Missouri state rates. And they found that the incidence of leukemia, female breast, colon, kidney, and bladder cancer were statistically significantly elevated compared to the Missouri state rates.

It is interesting to note that the Center for Disease Control's National Program of Cancer Registries provide cancer statistics only on a state-wide basis since 1994 and not on a county basis, making contamination areas nearly impossible to trend by readily available cancer data in the U.S. available to the public. (See https://www.cdc.gov/cancer/npcr/public-use/index.htm).

In light of the elevated cancer rates, the ATSDR then applied radiation health models based on the International Commission of Radiological Protection (ICRP) that are known to underestimate the health risk. Combined with inadequate monitoring of the radiation levels, it is almost a miracle that ATSDR concluded that the elevated cancers *COULD* have been caused by the radioactive contamination.

The ATSDR folks don't seem to know that their radiation models are inadequate especially for inhaled and ingested radionuclides and underestimate the cancer risk by a factor of 100 or more. It is amazing that the ATSDR didn't state that the cancers could not have been caused by the radiation, as it so often case because of the understated harm from official radiation health modeling. For more about the inadequacy of radiation health harm estimates as

currently estimated in the U.S., see our Environmental Defense Institute newsletter article from September, "Just Two Problems with U.S. Radiation Protection: Radiation Dose Underestimated and the Harm Underestimated." [38]

The entire charade by the U.S. agencies from the Department of Energy, to the Environmental Protection Agency, to ATSDR would be hilarious if it were not so much illness and so many lives lost.

Let's recap the St Louis uranium waste debacle: The Department of Energy (known as the Atomic Energy Commission) processed uranium and the waste was improperly stored and disposed of and for decades. No federal or state agency saw to it that proper monitoring was conducted, even after citizens were begging them to address the issue. Elevated cancers are happening but denied for years. Elevated cancer rates are now recognized by the state of Missouri. And ATSDR applied their inadequate radiation model with inadequate data and actually says the elevated cancer rates *COULD* have been caused by the years of living with the radioactive contamination.

That's the best a community can hope for, it seems. And meanwhile, our U.S. Congress claims that nuclear power is clean and safe….

Neutron Doses from Spent Fuel Casks Increased by High Burnup Spent Nuclear Fuel

A 1987 report provides insight into the increase in neutron dose from high burnup fuel. [39] The report points out that curium-242 and curium-244 provide the bulk of spontaneous fission and the (alpha, n) neutron source. Pu-238 is also a large contributor to (alpha, n) reaction. It points out that in while not a problem in spent fuel pools, neutron shielding is an issue in casks or dry storage, and the neutron skyshine in casks or dry storage is heavily dependent on the spent fuel composition.

Doubling the burnup increased the neutron source 6-fold for 35 GWD/MTU to 60 GWD/MTU spent fuel.

Be careful of industry generalizations of low neutron dose whenever glove boxes, hot cells and casks are storing spent nuclear fuel, especially when neutron exposure is not being monitored or reported to workers. And do note that high enriched fuels have high burnup and higher amounts of Pu-238. Also note that californium-252 has a very high spontaneous fission yield.

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[38] Environmental Defense Institute September 2018 newsletter article by Tami Thatcher "Just Two Problems with U.S. Radiation Protection: Radiation Dose Underestimated and the Harm Underestimated" at http://environmental-defense-institute.org/publications/News.18.September.pdf

[39] C. V. Parks and J. V. Pace, III, "Characterization of Neutron Sources from Spent Fuel Casks," Computing and Telecommunications Division at Oak Ridge National Laboratory, Conference-870010—49, American Nuclear Society Annual Meeting, Los Angeles, California, November 15-19, 1987.

The health harm from the neutron exposure is likely being underestimated in the assumed conversion to whole body dose because the biological damage may be greater than assumed. See our Environmental Defense Institute July newsletter. [40]

Idaho applies to EPA for authorization of changes to increase its hazardous waste program

Article by Chuck Broscious

The Environmental Defense Institute (EDI) filed comments to EPA Region 10 Administrator Barbara McCullough last September on Idaho's application to the EPA for authorization of certain changes to its hazardous waste program under the Resource Conservation and Recovery Act (RCRA), as amended. [41] The EPA has inadequately reviewed Idaho's application and yet has determined that these changes satisfy all requirements needed to qualify for final authorization and is proposing to authorize the State's changes.

EDI finds that the EPA's determination that Idaho's application to revise its authorized program meets the statutory and regulatory requirements established by RCRA is again misguided. EDI has previously submitted numerous objections to Department of Energy's (DOE) Idaho National Laboratory (INL) violations of RCRA, HSWA and other environmental statutes; and the Idaho Department of Environmental Quality (IDEQ) failure to take enforcement action on DOE's INL Radioactive Waste Management Complex/Subsurface Disposal Area disposal permits and numerous other oversight failures over decades.

EPA proposes that it "retains authority under RCRA sections 3007, 3008, 3013, and 7003, which includes, among others, the authority to:

- "Conduct inspections, which may include but is not limited to requiring monitoring, tests, analyses, and/or reports;
- "Enforce RCRA requirements, which may include but is not limited to suspending, terminating, modifying, and/or revoking permits; and
- "Take enforcement actions regardless of whether Idaho has taken its own actions. The action to approve these revisions will not impose additional requirements on the regulated community because the regulations for which Idaho is requesting authorization are already effective under State law and are not changed by the act of authorization." [42]

The above EPA statement sounds impressive, however for decades the agency has completely failed to implement these policies in Idaho at INL. Until such time EPA actualizes these policies Idaho will continue to allow DOE to contaminate and pollute our environment in

[40] Environmental Defense Institute July 2018 newsletter article by Tami Thatcher "Neutron Exposure During Glovebox Work and Other Handling of Fissile Material at the Idaho National Laboratory and Idaho Cleanup Project" at http://environmental-defense-institute.org/publications/News.18.July.pdf

[41] Docket ID No. EPA–R10–RCRA–2018–0298

[42] Federal Register / Vol. 83, No. 172 / Wednesday, September 5, 2018 / Proposed Rules

violation of RCRA/HSWA and other environmental laws. Clearly, EPA takes a different regulatory enforcement stance with respect with a sister federal agency, i.e., (DOE).

It's important to note (as an example) that DOE/INL requested from EPA concurrence to reduce aquifer monitoring frequency at the INL Radioactive Waste Management Complex (RWMC) beginning in Fiscal Year 2013. EPA responded by stating: that they "reviewed the request to reduce aquifer monitoring at the RWMC from semi-annual to yearly sampling. EPA approves of DOE's request." Daryl Koch IDEQ/FFA/CO Manager Waste Management & Remediation Division also concurred with limiting groundwater monitoring. DOE relies on hazardous/ radioactive contaminate "dispersion mixes with groundwater" that result in lower water testing to give a false impression of the contaminate problem. For DOE, "Dilution is the solution to pollution," that EPA (as demonstrated above) supports.

Groundwater monitoring is the only way groundwater contaminate migration can be tracked. It's unconscionable that these regulatory agencies – likely fearing public knowledge of the extent of this hazard – via Freedom of Information Act/Public Records Requests – would find out. "Don't monitor what your trying to hide" from the public that relies on this sole source aquifer under INL. Earlier DOE reports show both listed mixed hazardous/radioactive water and air contaminate migration. Despite this dump being an active CERCLA cleanup/remediation site EPA/IDEQ allows DOE to continue dumping more radioactive waste in it in violation of Land Disposal Regulations.

EDI's August 2018 "Review of the Mixed Hazardous Radioactive CERCLA Waste Cleanup Policy at the Radioactive Waste Management Complex Subsurface Disposal Area (RWMC/ SDA) Department of Energy's (DOE) Idaho National Laboratory (INL)" is exemplar of EPA/IDEQ's unwillingness to cite DOE's violation of basic RCRA and HSWA statutes. This report [43] lays out how the CERCLA cleanup process and the policy decisions that went into how DOE is compromising Idaho's water future. How did we get to where we are today and why DOE is leaving hazardous nuclear waste buried at the INL and calling it "clean enough"? DOE's decision — approved by EPA — to leave 90% of the buried waste in the dump and violate the 1995 Settlement Agreement and Federal Court Consent Order with the State of Idaho is a crucial threat to our states' safe water future by failing its commitment to clean up its nearly 70-year nuclear legacy waste. DOE's priority to spent >$1 trillion on building new nuclear weapons rather than spent only $ ~600 million to clean up the huge environmental disaster from the last nuclear production legacy. This represents the warped priority and values the federal government — including EPA — places on Idaho's water future that is unconscionable by any health and human rights standards.

In summary EDI opposes EPA reauthorization of Idaho and to grant Idaho final authorization to operate its hazardous waste management program with the changes described in the authorization application. Idaho must not continue to have responsibility for permitting

[43] http://www.environmental-defense-institute.org/publications/RWMCCERCLA4.pdf

Treatment, Storage, and Disposal Facilities (TSDFs) within its borders and for carrying out the aspects of the RCRA program described in its revised program application, subject to the limitations of the Hazardous and Solid Waste Amendments of 1984 (HSWA).

As discussed at length in this report there is a tragically long history of non-enforcement of all environmental laws at Department of Energy's INL site by the cognizant regulators. Moreover, EPA's continued failure to enforce its own statutes remains a fundamental public/environmental hazard that will only change with a change in both federal and state administrations. As a relatively poor state, Idaho is no match for the political/economic weight the federal government wields as the largest single employer in the state.

As discussed above, there was a brief period after the 1995 Settlement Agreement and Federal Court Consent Order that provided some balance to previous DOE lawless operations. Despite this significant and unprecedented judicial intervention, it was compromised by subsequent EPA/IDEQ unwillingness to take DOE back to court and show how the Settlement Agreement is being violated. EDI has no illusion that this discussion will have any impact on EPA discussion on Idaho's request for authorization of RCRA enforcement given the agency's long history with any enforcement of DOE operations. DOE will continue to use Idaho as its hazardous/radioactive waste dump without fear of any significant environmental statute enforcement.

EDI comment on the Washington State Department of Ecology proposed remediation change to the Hanford Plutonium Uranium Extraction (PUREX) Plant Storage Tunnels.

Article by Chuck Broscious

The Environmental Defense Institute (EDI) filed comments to the Washington State Department of Ecology (Ecology) proposed change to the Hanford Facility Resource Conservation and Recovery Act (RCRA) Permit. [44] This change affects the Dangerous Waste Portion for the Treatment, Storage, and Disposal of Dangerous Waste for the Plutonium Uranium Extraction (PUREX) Plant Storage Tunnels. The proposed changes are located in Part III, Operating Unit 2.

In EDI's view, Ecology has inadequately reviewed Hanford's RCRA permit application and yet has determined that these changes satisfy all requirements needed to qualify for the proposed changes are located in Part III, Operating Unit 2 that resulted in filling PUREX Tunnel One with

[44] Proposed Class 3 Permit Modification 8C.2018.4D, to the *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8C, for the Treatment, Storage, and Disposal of Dangerous Waste,* Part V, Closure Unit Group 25, Plutonium Uranium Extraction (PUREX) Plant Storage Tunnels, WA 7890008967.

grout to stabilize it, and a plan that is already in action to fill PUREX Tunnel Number Two with grout.

Following the collapse of PUREX Tunnel 1 the Department of Energy and Ecology inappropriately agreed to a response action to stabilize Tunnel 1 by filling the void space in the tunnel with grout. The agencies are proposing to stabilize Tunnel 2 with grout as well. Ecology is updating its Resource Conservation and Recovery Act (RCRA) Permit with a proposed permit modification that reflects actions taken to grout Tunnel 1 and the proposed interim closure action to grout Tunnel 2. RCRA gives Washington State the authority it needs to regulate the Hanford Site, for all cleanup sites that have both radioactive and chemical wastes. The draft changes include a proposal to fill Tunnel 2 with engineered grout to protect human health and the environment from a future collapse. Ecology has stated that grouting Tunnel 2 will not prevent the removal of the grouted waste when a final closure decision is made. Because the tunnels will no longer accept waste, this proposed permit modification will add the PUREX Storage Tunnels as a closing unit to the Hanford Facility RCRA Permit, Revision 8c.

EDI considers these PUREX Tunnel permits to be a violation of RCRA.

DOE continues to demonstrate a consistent pattern of violations of environmental laws, hazardous waste regulations and the Hanford Site-wide Permit. The following are examples:

1. Offers no independent data confirming what waste left in the "PUREX Tunnels," (i.e. core sampling to accurately characterize waste in/on rail cars. The historical unreliability of DOE waste data speaks for itself;
2. Violates Land Disposal Regulations (LDR) in: IDAPA 58.01.05.009 and 58.01.05.011; 40 CFR 265.13 and 268.7; and NRC under 10 CFR part 61 to include:
    a. Leaving waste in tunnels in place;
    b. Once a tunnel waste dump is remediated, all the contaminated material –including soil – is considered a new waste and thus must be managed according to RCRA/NRC Land Disposal Regulations;
3. Continues Tunnel 1 burial in the "Active LLW" in a flood zone in violation of Land Disposal Regulations;
4. There is not a good inventory of the radioactive and chemical materials stored in the PUREX Tunnels. If the tunnels contain materials that qualify as high-level radioactive waste, then certain legal requirements must be followed for appropriate disposal, which do not include leaving such waste in shallow land burial;
5. Long-lived radionuclides such as plutonium could be buried in the tunnels in amounts that exceed the legal disposal limits at Hanford;
6. The agreed-upon remedy for these kinds of waste is removal, treatment and disposal in licensed repositories and landfills;
7. Hanford Challenge and other organizations have expressed a deep concern that the tunnels will be filled with grout and then abandoned in place, rather than removed. Cement is not an acceptable long-term disposal medium for nuclear waste;
8. Any permit that the State of Washington issues should include with it a deadline requiring the federal government to cut up and remove the grouted tunnel waste within a certain number of years.

9. Documents indicate that there may be explosive and ignitable chemicals stored in the PUREX tunnels.

Clearly, Hanford is not unique, because at every DOE facility throughout this country (including Idaho National Laboratory) a similar scenario exists. For example, a citizen suit against DOE's Los Alamos National Laboratory convinced the Federal District Court for New Mexico that DOE was falsifying radiation release reports required under the Clean Air Act. Subsequently, the Court issued a Consent Decree that imposed a court supervised independent monitoring program to ensure compliance with the law. [45]

A 1998 lawsuit brought by Keep Yellowstone Nuclear Free; the Environmental Defense Institute; the Snake River Alliance Education Fund; the Sierra Club and the Jackson Hole Alliance contended that "DOE made its critical decisions about the Plutonium Incinerator behind closed doors and out of the public view, in violation of federal law." The minutes clearly demonstrate that as early as 1996 the DOE and Idaho Department of Environmental Quality had secret discussions underway for what later became a highly controversial project for nuclear waste incineration, the Advanced Mixed Waste Treatment Facility (AMWTF). The April 10, 1996 minutes recited "... DOE's current plans for INL the Advanced Mixed Waste Treatment Facility (AMWTF)." [46] [47]

Hanford's permit poses an immediate and long-term threat to Columbia River region's environment, public health and safety in apparent violation of the Nuclear Waste Policy Act (NWPA), [48] Resource Conservation Recovery Act (RCRA) [49] and other relevant federal statutes applicable to mixed hazardous high-level (HLW) and transuranic (TRU) radioactive waste treatment, storage and disposal. [50]

Articles by Tami Thatcher and Chuck Broscious as noted for October 2018.

[45] See Concerned Citizens for Nuclear Safety v. DOE, Consent Decree, Civ. No. 94-1039 M, filed March 25, 1997.
[46] See Federal District Court for Idaho, Civil No. 91-0035-S-EJL
[47] Also see 1995 Settlement Agreement and Federal Court Consent Order against DOE's Idaho National Laboratory.
[48] 42 USC ss 10101 et seq.
[49] 42 USC ss 6901 et seq.
[50] The Nuclear Waste Policy Act, Resource Conservation Recovery Act, and the Clean Air Act are cited in the Hanford Cleanup Agreement as salutatory compliance standards.