

The “Forever” Contamination Sites at the Idaho National Laboratory

On Earth Day, it is fitting to understand the “forever” contamination sites the Idaho National Laboratory’s cleanup is leaving behind. Ignoring the spent nuclear fuel and calcine that will supposedly be shipped out of state some day, there are roughly 55 “forever” radioactively contaminated sites of various sizes, and about 30 “forever” asbestos, mercury or military ordnance sites.^{1 2}

The areas contaminated with long-lived radioisotopes that are not being cleaned up will require institutional controls in order to claim that the “remediation” is protective of human health. People must be prevented from coming into contact with subsurface soil or drinking water near some of these sites — forever.

The Department of Energy downplays the mess and usually doesn’t specify how long the controls are required when the time frame is over thousands of years: they just say “indefinite.” In some cases, the DOE earlier had claimed that these sites would be available for human contact in a hundred or so years.^{3 4} You can find a summary that includes the “forever” sites at https://cleanup.icp.doe.gov/ics/ic_report.pdf

Institutional control of “forever” contamination means they put up a sign, maybe a fence or a soil cap — and assume it will be maintained for millennia. “Don’t worry about the cost. And besides,” they always add, “you and I won’t be here.”

DOE continues to find more contaminated sites and expectations are not always met by remediation.⁵ But no matter: DOE wants to bury more waste at INL as well as make more nuclear waste.⁶

Frequently cited stringent EPA standards such as 4 rem/yr in drinking water are emphasized. But cleanup efforts often won’t come close to achieving the advertised standards.

DOE argued against digging up meaningful amounts of transuranic and other long-lived radioactive waste at the Radioactive Waste Management Complex. Only the most egregious chemically laden waste is being removed.^{7 8} Denying that exorbitant cost to dig up waste and

¹ INL Waste Area Group Institutional Controls Report. Dated March 25, 2016.

https://cleanup.icp.doe.gov/ics/ic_report.pdf from the EPA page: <https://cleanup.icp.doe.gov/ics/>

² *ibid.* INL Waste Area Group Institutional Controls Report. I counted the “forever” radioactive sites as those with termination date for institutional controls stated as “indefinite” or as “not specified.” I counted the chemical sites for asbestos, PCPs, mercury or ordnance similarly. The size of the mess actually ranges from some small number of curies to the huge waste inventory at the RWMC.

³ Department of Energy Idaho Operations Office, *Five-Year Review of CERCLA Response Actions at the Idaho National Laboratory Site*, Fiscal Years 2010-2014, DOE/ID-11513, December 2015.

⁴ 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 by the Department of Energy in August of 2015. See Idaho National Laboratory Federal CERCLA Cleanup documents at www.ar.icp.doe.gov

⁵ US Department of Energy, “Environmental Assessment for the Replacement Capability for Disposal of Remote-Handled Low-Level Radioactive Waste Generated at the Department of Energy’s Idaho Site,” Final, DOE/EA-1793, December 2011. <http://energy.gov/sites/prod/files/EA-1793-FEA-2011.pdf>

⁶ Idaho Falls Post Register: “Small reactors were a big focus on D.C. lobbying trip,” March 24, 2016.

⁷ 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.

lack of another place to put it may have played a role, DOE argued that the incremental risk to a worker was too high given the small incremental benefit to the public.⁹

The analysis of the “worker” didn’t come down to concern over radiation workers monitored under DOE programs — which they argued were by definition effective. They argued that a state worker inspecting radioactive shipments would get an excessive radiation dose if working 30 years at the job, unmonitored for radiation. Then the benefit to the public was minimized by ignoring post-10,000 year contamination. Despite “remediation” radionuclides trickle into the aquifer at RWMC over the next millennia creating 30 to 100 mrem/yr doses, depending on the soil cap. And no attempt is made to estimate the total number of people ultimately exposed to water contaminated by wastes trickling into the aquifer at RWMC over the next millennia.

Now efforts are being made to extend the mission for repackaging waste near RWMC for other DOE sites,¹⁰ conveniently forgetting all about the contrived concern over that unmonitored state worker inspecting shipments — an argument, that was restated just last year at an INL Citizens Advisory Board meeting, justifying the limited RWMC cleanup.

Cleanup decisions need to protect workers and the public. But studies continue to find that US radiation protection standards aren’t protective for either. A study of a large population of radiation workers getting an average 200 mrem/yr found elevated cancer risk.¹¹ ¹²I queried

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/>

⁸ 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 CleanupProject. 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/201411/2014110300960BRU.pdf>

⁹ An often repeated contrived excuse for limiting RWMC cleanup comes from the Record of Decision fuzzy artwork of “worker” risk per acre of waste dug up. It references administrative record report RPT-188 at ar.inel.gov. or ar.icp.doe.gov. It is used to defend digging around in only about 6 acres and not the entire 35 acres of buried waste at RWMC. Radiation worker risks are higher than DOE acknowledges, but they claim that radiation protections for DOE contractor radiation workers limit health risks. But the case was not actually based on a monitored radiation worker. It was based on an unmonitored state employee who receives an unmonitored 47 rem dose throughout his career if the cleanup extends from 6 years to 25 years. This argument, however, is immediately forgotten when discussing extending operations at the AMWTP to outside waste. There is no estimate of the number of people who will be dosed from the polluted aquifer. The gross conservatism of this unmonitored “worker” dose estimate was used to argue that cleaning up the entire mess would yield incrementally high worker doses for each additional acre cleaned up.

¹⁰ Idaho Falls Post Register: “Small reactors were a big focus on D.C. lobbying trip,” March 24, 2016. There were talks of extending the mission of the Advanced Mixed Waste Treatment Project, a waste treatment facility after its current mission by accepting waste from other states.

¹¹ 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>

¹² As just one example of the additional health issues associated with plutonium inhalation see: Hande, M. Prakasht al., “Complex Chromosome Aberrations Persist in Individuals Many Years After Occupational Exposure to

INL's director Mark Peters about whether INL was training workers about the recent radiation worker epidemiology results or other studies of adverse health effects. Apparently not. He refused to answer.

A prominent National Academy of Sciences study called the BEIR-VII report found radiation health risk for women double that of men, and female infants seven times more vulnerable than adult men.^{13 14} Past and current decisions are based on ignoring the health risk to the most vulnerable. Current industry pressure is on loosening radiation standards to allow more emissions and to make waste burial easier.

Technical estimates of the rate of radionuclide migration to Idaho's Snake River Plain Aquifer from the Idaho National Laboratory are biased to minimize the migration in the short term, avoid discussing the migration of contaminants in the long term and to ignore the spikes of contaminant migration during times of higher water infiltration. Experts have not been right very often about predicting contamination migration over the last several decades; they continue to be surprised by contamination migration now and in no way are their estimates of future contamination reliable or conservative. Naturally, the INL is planning to dump more radioactive waste over the aquifer.^{15 16}

What folks downstream of the INL from Rupert to Hagerman don't understand about the aquifer — is a lot. And if they continue to rely on the nuclear boosters for information they will continue to be misinformed.

Densely Ionizing Radiation: An MFISH Study,” Genes, Chromosomes & Cancer 44:1-9, Wiley-Liss, Inc., 2005.

<http://onlinelibrary.wiley.com/doi/10.1002/gcc.20217/abstract;jsessionid=5E362E0AAA8D098B341D801A296640CA.d03t04>

¹³ 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.

¹⁴ International Commission on Radiological Protection, “Compendium of Dose Coefficients Based on ICRP Publication 60,” ICRP Publication 119, Volume 41 Supplement 1 2012. The ICRP model continues to be very out of date regarding BEIR-VII and other more recent studies showing that the ICRP model underestimates health risk.
<http://www.icrp.org/docs/P%20119%20AICRP%2041%28s%29%20Compendium%20of%20Dose%20Coefficients%20based%20on%20ICRP%20Publication%2060.pdf>

¹⁵ US Department of Energy, “Environmental Assessment for the Replacement Capability for Disposal of Remote-Handled Low-Level Radioactive Waste Generated at the Department of Energy's Idaho Site,” Final, DOE/EA-1793, December 2011. <http://energy.gov/sites/prod/files/EA-1793-FEA-2011.pdf>

¹⁶ US Department of Energy's Greater Than Class C waste Final EIS-0375 that names WIPP in New Mexico the preferred alternative but the Idaho site remains an option. See EDI's April 2016 newsletter and see <http://energy.gov/nepa/eis-0375-disposal-greater-class-c-low-level-radioactive-waste-and-department-energy-gtcc-waste>

If the Department of Energy has its way, all we will need is just one large electronic sign placed on planet Earth, readable to potential visitors orbiting in space: “High radiation, don’t linger here and don’t drink the water.”

Report written by Tami Thatcher in April 2016. Shorter versions were published in Idaho newspapers including the Idaho Falls Post Register.