Sharon and Ace Hoffman

To whom it may concern:

Please consider this document as a public comment on the "Proposed amendments to Tri-Party Agreement and Consent Decree". We would expect the response to public comments to address the questions raised, including where more complete and accurate data about the Hanford tanks can be found, why the timetable for tank cleanup remains subject to revision, and how the parties can agree to something that relies on technology that doesn't exist and may never work.

Sharon and Ace Hoffman

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Hanford Tank degradation information is not easily accessible to the public:
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Hanford in the state of Washington is an Environmental Protection Agency (EPA) Superfund site, and is widely recognized to be among the most contaminated places on Earth. The witch's brew at Hanford includes 177 enormous tanks filled with more than 1,800 different chemicals. 68 of the tanks (nearly 40%) "are assumed to have leaked." (See link 1 below)
There is a 90-Day Comment Period on the Future of Tank Waste Cleanup at the Hanford Site which ends September 1, 2024. (See link 2 below)

The first tanks at Hanford were built during World War II to hold highly radioactive liquid waste from plutonium production during the Manhattan Project. (The Trinity and Nagasaki bombs both used plutonium and uranium, while the Hiroshima bomb was made with just uranium.)

To produce plutonium for nuclear weapons, uranium fuel rods were bombarded with neutrons in Hanford's reactors. For every two tons of uranium, about one pound of plutonium was created. After the fuel rods were removed from the reactor, they were left in a pool of water to cool (thermally and radioactively) for 2-3 months. Finally, the plutonium was chemically separated using an extremely toxic process. According to the National Park Service, "Once the plutonium was extracted, the chemically separated uranium, unwanted radionuclides, and chemicals used in the process became liquid waste and were put into underground waste storage tanks...".

There are 149 single-shell tanks at Hanford, constructed between 1943 and 1964 and designed to be used for about 20 years. In addition, there are 28 double-shell tanks built between 1968 and 1986. At least one of the double-shell tanks is assumed to be leaking, and the leak has been characterized as "contained" between the inner and outer shell. The word "contained" is not very reassuring, considering how many single-wall tanks have already leaked!

Plutonium extraction at Hanford continued through the late 1980s with several interruptions. Like much of the information about Hanford, the exact dates and changes to the process are unclear. However, according to the Department of Energy, "The Plutonium Uranium Extraction Plant (PUREX) was the fifth and final chemical processing facility built at Hanford. The plant operated from 1956 to 1972, and again from 1983 to 1988." (See link 3 below)

In addition to waste from plutonium production, Hanford tanks contain waste from other activities at the site and waste created by the ongoing Hanford clean-up. According to contractor Washington River Protection Solutions (WRPS), "Hanford's tanks contain 56 million gallons [about 7.5 million cubic feet] of high-level radioactive and chemical wastes." (See link 4 below)

Officials have acknowledged tank leaks since at least 2012, but most likely some tanks began leaking much earlier. For example, according to the Washington State Department of Ecology: "Single-shell Tank T-111 was most recently declared leaking in 2013, after earlier leak concerns in the 1970s." As of July 2024, none of the 177 tanks have been dismantled, 57 are "assumed leakers," and "retrieval" has been completed for 21 tanks. After retrieval, the tanks still contain some waste (usually in the form of heavy sludge), and the tanks themselves are also highly toxic waste (like many structures at Hanford).

There is plenty of general information about the tanks, including several official sources. What is missing is a comprehensive official site that provides readily accessible information about each tank, its contents, and how much waste is presumed or known to be leaking from each tank. The official government site with the most detailed information about the Hanford tanks is called Phoenix. (See link 5 below)

Overall, the Phoenix site and its access tool have a wealth of information. For example, it's possible to see how full each tank is, and the portions of liquid, solid, and sludge waste. It's even possible to find some information about the isotopes in each tank. Unfortunately, there doesn't seem to be any data concerning what has already leaked from each tank or how much is leaking each year. (If this data is available, the government should make it accessible for researchers using modern data-analysis tools.)

In addition, Phoenix is difficult to use, data is inconsistent, and many referenced documents are not available online. Even when a document is available, it's not clear exactly what's in the waste. For example, a pdf of the 2015 report for Tank 241-C-101 describes a cleanup operation that began in December 2012 and took approximately 9 months. The cleanup included "modified sluicing and high-pressure water technologies." Tank 241-C-101 was cleaned to the point where: "A practicability evaluation determined that further waste retrieval action was impractical." After cleanup, 241-C-101 still contained 5,620 gallons (752 cubic feet) of waste.

The report states that "The C-101 waste that was retrieved was transferred to double-shell tank 241-AN-101." It is obvious that none of the contents of tank 241-C-101 had a "permanent" home as of 2013, but it's not clear how much additional waste was created during cleanup. How many tanks at Hanford only exist to hold the waste extracted from older tanks?

Despite the dearth of readily accessible data, it's abundantly clear that the Hanford tanks are an ongoing hazard to workers at Hanford, surrounding communities, and the Columbia River. Waste from the tanks is dispersed through air, water, soil, fish, mammals, reptiles, birds, insects, and plants. Perhaps the most frightening thing about the Hanford tanks is that the dangers have been known for more than half a century, and yet the solutions are still completely speculative.

The latest attempt to push tank waste cleanup even further into the indefinite future is an outrage.

The "Tri-Party Settlement Agreement" (the subject of the current public-comment period) leaves the door wide open for continued tank leaks and missed deadlines. (The three parties are: Washington State Department of Ecology (Ecology), US Department of Energy (DOE), and US Environmental Protection Agency (EPA).)

The settlement agreement frankly admits that the deadlines, which now extend to 2047, will need to be adjusted again, once more information has been obtained. This is because many of the waste cleanup processes for the Hanford tanks don't exist yet. For example, some tank waste will be incorporated into grout (nobody knows how) and the grout will be moved to someplace outside of Hanford (nobody knows where). According to the presentation at the public hearing, this unknown place must be outside Washington State, but the settlement agreement only specifies that the grout must be disposed of outside of the Hanford Nuclear Reservation.

Similarly, processes for separating and vitrifying high-level waste are not clearly defined, but are supposed to begin in 2033. Nobody knows if the planned facilities will be built by that deadline, or whether they will work, or how they will work. The presentation used during public meetings on the settlement agreement also includes a hint about future storage of tank waste: "Designing and constructing 1 million gallons of capacity for multipurpose storage of tank waste operating by 2040 in 200 West Area."

Does "multipurpose storage" imply a third generation of "temporary tank storage" at Hanford designed to hold less than 2% of the existing tank waste? Despite all the plans to turn tank waste into glass (vitrification) and grout, what are the chances that 1 million gallons will be sufficient for whatever is left?

The presentation also anticipates "Revising milestones for pretreatment and full operation of plant after starting treatment of high-level waste." High-level waste treatment is currently expected to BEGIN in 2033. Yet, the public is supposed to pretend that the deadline for closing the single-shell tank system (2043) will be met – 100 years after the the first

single-shell tank was built with an anticipated lifetime of 20 years! (The fine print in the settlement document makes it clear that the 2043 deadline for closing the single-shell tank system is fiction, just like the 2047 deadline for completion of Hanford Tank cleanup.)

The public does not even have an opportunity to comment on the content of the settlement agreement itself. Public comments only apply to the underlying "Consent Decree" and the Hanford Federal Facility Agreement and Consent Order (HFFACO, or Tri-Party Agreement). In addition, the settlement agreement assumes that all the proposed changes are already in force, even while public comments are collected and discussed.

During the Q&A at one of the recent public hearings on Hanford tank cleanup, somebody asked why leaking tanks are not being dealt with more quickly. The answer was that funding determines the pace of cleanup -- if we prioritize cleaning up leaking tanks, we have to defer something else (perhaps an investment in new cleanup technologies that will never work).

By voting for the ADVANCE Act (passed 88-2 in the Senate and 365-36 in the House), Congress just gave billions of dollars to the nuclear industry to create more nuclear waste (and for a fleeting moment, some electricity that other methods could produce more reliably and cheaply). All that money needs to be used for cleaning up the enormous messes that the nuclear industry (military and so-called civilian) has created at Hanford and elsewhere.

Instead of funding new nuclear projects and "requiring" the NRC to promote nuclear power, Congress should fund nuclear waste remediation (don't call it cleanup because it will never be clean)!

The link at the beginning of this newsletter includes links to recordings of the public meetings about the settlement agreement, a link to the pdf of the agreement text, and information about how to submit comments.

Hanford's rivals for the title of most-contaminated place on Earth include Chernobyl in Ukraine, Fukushima in Japan, Windscale (aka Sellafield) in Great Britain, and Maiak in Russia (aka Mayak, Kyshtym, or Ozyorsk). Windscale was the site of Great Britain's plutonium production reactor, and Maiak was the Soviet Union's equivalent of Hanford. Both Windscale and Maiak had major accidents in 1957. (Kate Brown's book "Plutopia" offers a compelling discussion of the parallel histories of Hanford and Maiak.)

Chalk River in Canada also deserves a place in this list. Beginning in September 1945, Chalk River produced some of the plutonium for US and British nuclear weapons. Plutonium production at Chalk River continued intermittently until 1964. In 1952, Chalk River experienced the world's first nuclear reactor meltdown. The waste at Chalk River continues to contaminate the surrounding area and anything that lives there.

This article is the result of a public hearing concerning Hanford Cleanup Priorities that took place on March 6, 2024. (See link 6 below) During that hearing, one of the authors asked how the public could find data about the contents of the Hanford tanks. No answer was forthcoming either during the hearing or in response to a follow-up written comment which was submitted as requested (see below).

In researching this article, the authors found answers to some (but not all) of the questions we had asked in our previous public comment. It's worth noting that the DOE, which asked for those comments, did not reply to our request for data resources. We will continue to ask.

Sharon and Ace Hoffman
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(1) Source: Washington State Department of Ecology:
https://ecology.wa.gov/waste-toxics/nuclear-waste/hanford-cleanup/tank-waste-management/tank-monitoring-closure

(2) https://www.hanford.gov/pageAction.cfm/calendar/rl?&IndEventID=17119

(3) Source: https://www.hanford.gov/files.cfm/PUREX_Fact_Sheet.pdf

(4) Source: https://hanfordvapors.com/

(5) https://phoenix.pnnl.gov/phoenix/apps/gallery/index.html

(6) https://www.youtube.com/watch?v=5l_kDxhXOLg

(7) This document will be posted online at Ace Hoffman's blogspot

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Previous comment as submitted April 5, 2024:

US Dept of Energy, Richland, WA

Attn: Jennifer Colborn
Dear Ms Colborn:

During the public hearing on March 6, 2024 I asked a question that the presenter did not have sufficient information to answer, and she requested that the question be submitted as a public comment so that she could research the question and provide a response. The specific question I asked during the public hearing was:

Part one: How much new contamination of groundwater, soil, and/or buildings has been found in the previous year?

Part two: In a typical year is the contamination getting worse, and if so, is it due to new leaks or new discoveries of already-occurring leaks?

I have several additional related questions:

1. On a yearly basis, how much "new" contamination of soil, groundwater, and structures is discovered at Hanford? How is the contamination measured? For example, for radioactivity is there a record of the number of Curies (or Becquerels) that are discovered each year? Are there measurements of the volume of "newly contaminated" soil, groundwater, and structures?

2. For each category (soil, groundwater, structures) how does the amount of "new" contamination compare to the amount of contamination cleaned up each year? (In other words, is the volume and/or radioactivity of known contaminated areas growing or not?)

3. Is there a URL where I can find historical records and current data indicating which radioactive isotopes are found in each tank, what type of waste (e.g., sludge versus liquid) contains the radioactive material, and the number of Curies of each isotope in each tank?

4. Is there a URL where I can find historical records and current data for the amount of different types of waste in each tank (e.g. sludge versus liquid)?

5. Is there a URL where I can find historical records of radioactivity released by each tank on a yearly basis? I am specifically looking for the isotopes released (in both Curies and volume), and the type of each release (e.g., vapor, liquid, sludge).

6. Is there a URL where I can find historical records concerning the materials (e.g., contaminated water, contaminated dirt, contaminated clothing, etc.) that were put into each tank at Hanford and when additional materials were added to existing tanks?

7. Is there a URL where I can find historical records and current data concerning non-radioactive chemicals stored in and/or released from each tank? For example, heavy metals, PFAs (Per- and Polyfluorinated Substances), DDT (Dichlorodiphenyltrichloroethane), and plastics would all be part of this data set.

8. What proportion of the total waste (in Curies and by volume) is expected to be vitrified eventually?

9. As vitrification begins, what URL will allow citizens to track the vitrification process including Curies and volume of waste that have been successfully vitrified?

10. What types of waste streams are not eligible for vitrification and why is certain waste ineligible? For example, is some waste ineligible due to the isotopic concentrations in the waste and/or is some waste ineligible due to being liquid?

--- end of comments submitted in response to March 6, 2024 public hearing ---