



Comments submitted by email to: M-091@rl.gov

June 22, 2021

U.S. Department of Energy
Attn: Jennifer Colborn
P.O. Box 450, H6-60
Richland, WA 99352

Dear Ms. Colborn,

Thank you for the opportunity to submit comments on the *M-091 Milestone Change Package*. Thank you, also, for holding a public meeting and extending the comment period. We appreciated the public meeting you held on May 13, 2021 and thought that your presenters and subject matter experts did a great job answering questions.

Hanford Challenge is a non-profit, public interest, environmental and worker advocacy organization located at 2719 East Madison Street, Suite 304, Seattle, WA 98112. Hanford Challenge is an independent 501(c)(3) membership organization incorporated in the State of Washington with a mission to create a future for the Hanford Nuclear Site that secures human health and safety, advances accountability, and promotes a sustainable environmental legacy. Hanford Challenge has members who work at the Hanford Site. Other members of Hanford Challenge work and/or recreate near Hanford, where they may also be affected by hazardous materials emitted into the environment by Hanford. All members have a strong interest in ensuring the safe and effective cleanup of the nation's most toxic nuclear site for themselves and for current and future generations, and who are therefore affected by conditions that endanger human health and the environment.

Background

On April 26, 2021, the Tri-Party Agencies issued a notice seeking public comment on the Tentative Agreement on the M-091 Series Negotiations, which pertain to mixed low level waste and transuranic mixed waste. The Tentative Agreement states:

“The Washington State Department of Ecology (Ecology) and the U.S. Department of Energy, Richland Operations Office (DOE-RL) initiated M-091-53 negotiations on March 15, 2018, as they agreed there was a need to establish revisions to the milestone M-091 series.

This change control form establishes the due date of major milestone M-091-00, for completing the treatment to Land Disposal Restriction (LDR) treatment standards for all Hanford Site

Resource Conservation and Recovery Act of 1976 (RCRA) mixed low-level waste (MLLW) and RCRA transuranic mixed (TRUM) waste.

TPA Change Control Form M-91-09-01 (approved September 15, 2010) stipulated that the due date for the M-091-00 major milestone read “date to be established pursuant to milestone M-091-44T.” This change control form proposes a new due date of September 30, 2050.

This change control form also modifies the milestone scope to include “...and RCRA transuranic (TRUM) waste (in above ground storage as of June 30, 2009 and in retrievable storage).”

The new/revised milestones require 10 additional mixed waste containers per year to be shipped to “a TSDF” (Treatment, Storage, and Disposal Facility) for repack or disposal, from 2021 to 2025. Even though the proposed modification does not identify the specific TSDF to be used, it is clear from other correspondence¹ that the facility in question is Perma-Fix Northwest.

Generally, Hanford Challenge does not like the trend of kicking the cleanup can down the road through delayed milestones, however, we are not opposing these new deadlines. We do have concerns about transparency and the lack of information provided about the new facility that needs to be designed and built to handle large contaminated equipment and remote handled transuranic mixed waste. We also want the Department of Energy to revitalize onsite treatment capacity at Hanford so that Hanford’s waste is treated and packaged on the Hanford site, not offsite at the commercial facility Perma-Fix Northwest².

Thank you for considering our comments.

Comments

- **Increase Public Involvement and Transparency:** Keep the public informed on progress related to the work scope that is part of this comment period. Keep the issues related to removal of plutonium contaminated waste in the public eye so we can push for adequate funding to make sure this work happens safely and on schedule.
- **Provide Information about Large Contaminated Equipment, Remote Handled TRUM Inventory, and the to be Designed Onsite Treatment Facility:** Share information about DOE’s inventory of large contaminated equipment that needs to be removed, how it will be decontaminated, and the capabilities a new facility will need to treat and package large contaminated equipment and remote handled Transuranic Mixed Waste so that this facility is successfully designed, built and ready to go in ten years.

¹ Letter, 20-PFD-0054, DOE to Ecology, *M-091 TRANSURANIC MIXED/MIXED LOW-LEVEL WASTE PROJECT MANAGEMENT PLAN, HNE-19169, REVISION 22*, September 30, 2020. Located at the TPA Administrative Record.

²For more information about our concerns with Perma-Fix Northwest [read Hanford Challenge investigative report on Perma-Fix Northwest and watch our video summarizing the report.](#)

- **Make Sure this Work Happens:** Don't kick the cleanup can so far down the road that you never get to it. Ensure that work continues to meet the new deadlines and keep this critical cleanup work in view so that funding is appropriated. It is important to get this work done safely and not forgotten through further delays and competing priorities.
- **Treat Hanford Waste Onsite:** Build out capacity on the Hanford site to treat and package Hanford's waste including the MLLW and TRUM, instead of using Perma-Fix Northwest's offsite commercial facility.

Why Hanford Waste Should Be Treated Onsite

In November 2020, Hanford Challenge released an extensive report³ on the Perma-Fix NW facility, which is currently being used by Hanford to treat Low Level and plutonium-bearing wastes, exporting risks to the local north Richland communities.

Nuclear wastes at the Hanford Nuclear Site should presumptively be treated onsite. The practice of treating Hanford's low-level and plutonium-containing wastes at Perma-Fix Northwest, a commercial facility in Richland, WA, should end.

The Perma-Fix NW facility is operating under an expired operating permit, and is awaiting a State Environmental Protection Act determination which was begun by the State of WA in 2018, but has yet to be completed. Perma-Fix NW has a documented history of fires, accidents and over-exposures to workers.

Perma-Fix Northwest is a commercial Low-Level Waste (LLW) and Mixed Low-Level Radioactive Waste (MLLW) treatment and storage facility approved, permitted or licensed for operation by the Environmental Protection Agency (EPA) Region 10, the Washington State Department of Ecology, and the Washington State Department of Health under their respective authorities.

Perma-Fix Northwest is located on 35 acres in an urban area in the City of Richland and near the Department of Energy's (DOE) Hanford Nuclear Site. It is one of the closest Hanford-related waste treatment facilities to a populated area.

Perma-Fix Northwest is currently incinerating, compacting, and transporting millions of cubic feet of radiochemical and mixed waste (waste that is both hazardous and radioactive) per year; much of that waste coming from the Hanford Nuclear Site. As of 2009, Hanford and other DOE facilities provided Perma-Fix Northwest with about 95% of all of its mixed low-level wastes and about 70% of its volume of low-level radioactive wastes.

³ [RISKY BUSINESS AT PERMA-FIX NORTHWEST](http://www.hanfordchallenge.org), *The Inside Story on Hanford's Off-Site Radioactive Treatment Facility*, Robert Alvarez and Hanford Challenge, Nov. 2020, available at <http://www.hanfordchallenge.org>.

As of 2009, Hanford and other DOE facilities provided Perma-Fix Northwest with about 95% of all of its mixed low-level wastes and about 70% of its volume of low-level radioactive wastes. For the past decade, these wastes have mostly been plutonium and americium-contaminated waste (referred to as transuranic or TRU) at levels that far exceed what Perma-Fix Northwest has handled in the past. For example, in October 2018, Perma-Fix Northwest informed the Washington State Department of Ecology, that “in the near future, Perma-Fix Northwest will be treating up to 1000 cubic meters of higher activity TRU waste containing greater than 200 grams of Plutonium and installing the ability to remotely handle these wastes.” This represents a significant increase in the level of potential hazard to workers and the public. Plutonium is known to cause cancer in microscopic doses.

Continued offsite shipping, storage and treatment of plutonium-containing nuclear wastes from Hanford to surrounding residential communities creates avoidable health, safety and security risks. According to the EPA, in 2010 over 32,000 people lived within 5 miles of Perma-Fix Northwest.

Richland residents are at risk from the radioactive and hazardous materials transported over public roads between Hanford and Perma-Fix Northwest. According to the State of Washington and federal regulators, Perma-Fix Northwest in Richland exceeded onsite soil contamination limits, improperly stored radioactive and other hazardous wastes, handled wastes resulting in leakage of plutonium and significant workplace contamination, failed to notify regulators of known violations, and exposed several employees to radiation. Perma-Fix Northwest was also fined a total of \$551,891 from 2008 to 2019 by the U.S. Environmental Protection Agency and the Washington Department of Ecology for hazardous waste violations.

Hanford Challenge’s investigation uncovered a disturbing history of accidents, violations, findings, and non-compliances that raise serious questions about whether Perma-Fix should be allowed to continue treating dangerous Hanford waste. Cost-savings is only one aspect to consider when deciding where and how to clean up Hanford’s dangerous waste, but cost savings should never be the sole consideration. Hanford Challenge has concluded that it would be safer to expand the treatment capacity at the Hanford Site instead of sending waste for treatment at Perma-Fix Northwest. Treatment of waste on the Hanford Site provides the best environment for compliance with safety standards, clear and coordinated regulatory oversight, transparency, and accountability.

Hanford Challenge recommends that the Department of Energy revitalize its internal capacity at Hanford to perform the waste treatment functions that it is currently sending to Perma-Fix Northwest. There are many reasons why Hanford should treat its own waste onsite rather than at Perma-Fix Northwest. Hanford is a more suitable location for treatment due to a higher level of transparency and accountability, remote location further away from populated areas, further from the groundwater, ability to avoid the risky practice of transporting thousands of cubic meters of dangerous waste on public roadways, and a workforce that is highly trained, qualified, and certified.

Perma-Fix Northwest continues to operate on a hazardous waste permit that expired more than a decade ago in 2009. Instead of a new permit, Perma-Fix Northwest operates on an “expired but continued” permit that is updated through permit modifications, similar to Hanford’s RCRA Site-Wide permit. The entire permit needs to be reissued to reflect significant changes in the operating environment around Perma-Fix Northwest. Old assumptions about Perma-Fix Northwest that informed the original permit no longer reflect reality, as our investigation uncovered. Perma-Fix Northwest has dramatically increased its throughput of plutonium and transuranic wastes and the permit needs to be updated to reflect that change. Hanford Challenge is concerned that out-of-date assumptions in the permit, put the nearby community at an even greater risk.

According to a March 10, 2019 Tri-City Herald article announcing a new environmental impact study of Perma-Fix Northwest by the WA State Department of Ecology: “Since the city of Richland did a similar environmental study in 1998, much has changed, said John Price, the Washington State Department of Ecology’s Tri-Party Agreement section manager.”⁴ The article also states that “the findings from the 1998 study used to issue this permit are now out of date. North Richland is more developed now, with new buildings at Pacific Northwest National Laboratory, new businesses and new apartments and townhouses in the area. The work done at Perma-Fix Northwest also has changed in 21 years.”

There were two fires at Perma-Fix Northwest in 2019; both went unreported in the press. One was deemed “a near catastrophe” by an Ecology inspector, partly because the fire alarm system was not working at the time of the fire, and the person supposed to be doing the hourly check-in of the area failed to do so. Another fire in December 2019 was a Depleted Uranium fire, involving 50 cubic feet of grout embedded with uranium metal scraps, which easily ignite upon exposure to air. Since the 1950s, there is a long and well-documented history at DOE sites of fires due to grouted uranium chips (including at Hanford), which raise uncomfortable questions about the conduct of the grouting operation at Perma-Fix, which allowed pyrophoric uranium to come in contact with combustible materials.

Why do fires and potential releases matter? According to the EPA, in 2010 over 32,000 people lived within 5 miles of Perma-Fix Northwest, with over 25% under the age of 18. In the past ten years, those numbers have likely increased and will continue to increase. For example, there is a new apartment complex with 288 units that will be completed next fall located less than 1.5 miles from Perma-Fix Northwest.⁵ A daycare center is located less than a mile away from Perma-Fix Northwest (Figure 3). Even as the community around the facility has grown and inched closer, Perma-Fix Northwest has continued to ramp up its waste treatment.

⁴ Cary, A., *Tri-City Herald*, “State is taking a new look at this Richland radioactive waste plant,” March 10, 2019, <https://www.tri-cityherald.com/news/local/hanford/article227254174.html>

⁵ Stormo, Allison, *Tri-City Herald*, “Sweeping \$48 million Richland apartment project aims to cut Hanford commute,” August 31, 2020, <https://www.tri-cityherald.com/homes/article245267760.html>

The most concerning increase in treatment of waste at Perma-Fix Northwest is the subject of the TPA change package at issue in this comment: the large amounts of plutonium and transuranic wastes, which are harmful in tiny quantities.

The handling of plutonium-239 (half-life of 24,000 years) and other transuranic elements at Perma-Fix Northwest is of high concern. Transuranic elements of concern include isotopes of plutonium, americium, curium, and neptunium. With a specific activity about 200,000 times greater than uranium-238 (half-life=4.4 billion years), plutonium-239 emits alpha particles as its principal form of radiation. Over time, americium-241 (half-life=432.2 years), a decay product of plutonium-241, builds up and increases the hazardous external penetrating gamma-ray radiation from TRU waste.

Alpha particle emissions from plutonium and other transuranic elements are considered to be about 20 times more carcinogenic than x-rays.⁶ As they lodge in the respiratory system, especially the deep lung, plutonium emits energetic ionizing radiation (5 MeV) that can damage cells of sensitive internal tissues. Alpha particles lose energy quickly within living tissue and create a dense trail of broken molecules. Particles less than a few microns in diameter can penetrate deep in the lungs and lymph nodes, and also can be deposited from the bloodstream in the liver, bone surface, and other organs. High doses from inhalation of transuranic waste (TRU) can cause lung damage, fibrosis, and even death. Tens of micrograms if inhaled can lead to cancer.⁷ Over the past several years, a significantly raised incidence of cancer has been reported among workers following exposure to plutonium.⁸

According to the DOE Handbook of Airborne Release Fractions and Respirable for Non-Reactor Facilities (Table 7-1), if about 1 to 5 percent (11.3 grams to 56.3 grams) of the plutonium processed in 2019⁹ at Perma-Fix Northwest escaped into the air all at once, it could result in unmitigated doses to the public at the site boundary of 25 rems and 100 rems respectively.¹⁰

⁶ Recommendations of the International Commission on Radiological Protection. (1990) ICRP Publication 60. Ann. ICRP 21 (1-3). <http://icrp.org/publication.asp?id=icrp%20publication%2060>

⁷ National Research Council, *Management and Disposition of Excess Plutonium* (Washington, D.C: National Academy Press, 1995), 333, available at <https://www.nap.edu/read/2345/chapter/1>

⁸ Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, U.S. "Toxicological Profile for Plutonium," November 2010, available at <https://www.atsdr.cdc.gov/ToxProfiles/tp.asp?id=648&tid=119>

⁹ [Perma-Fix Northwest, Richland, Annual Monitoring Report for 2019, Table 2.1](#). (Sample Calculation: 71 curies/specific activity for Pu-239 (0.063 Ci/g) = 1,126.98 grams).

¹⁰ U.S. Department of Energy, Airborne Release Fractions and Respirable Fractions for Nonreactor Facilities, Volume I - DOE-HDBK-3010-94 December 1994 Reaffirmed 2013. Table 7-1. "The dose measures used in the calculation are as presented in Table 7-1 below. At 2 km, the values of \diamond_y and \diamond_z are ~ 63 and 19 respectively for limiting F at 1 m/sec windspeed 3 conditions, and a conservative breathing rate is 3.3E-4 m/sec. Using these values indicates, for example, that a source term of 0.9 Ci of Pu-239, or ~ 14.5 g, produces a dose of 25 rem to a maximally exposed person at the site boundary (i.e., individual there for duration of plume passage with no protection). Use of one of the Gaussian plume model computer codes currently in use in the DOE complex provided an estimate of 1 Ci release to obtain a dose of 25 rem, thus confirming the general appropriateness of the hand calculation. This code also indicated that if particulate deposition was accounted for, using a typical velocity of 1 m/sec, the release needed to achieve a 25 rem dose at the site boundary increased by a factor of 5." <https://www.standards.doe.gov/standards-documents/3000/3010-bhdbk-1994-v1/@@images/file>

These doses are 1,000 to 4,000 times greater than permitted annually at DOE waste disposal sites.¹¹

A major challenge for the Hanford Nuclear Site is dealing with its large inventory of transuranic waste or TRU. Most of this waste is destined for disposal in a deep, geological repository because of the long-lived nature of the radionuclides. The TRU waste must be properly repackaged for transportation and disposal purposes. The DOE built an onsite facility called the Waste Receiving and Processing Facility (the WRAP facility) in Hanford's 200 West Area to process drums and boxes of low-level waste and transuranic waste for permanent disposal.¹² In 2008, the DOE decided "that the least costly option was to send an estimated 9,000 cubic meters of transuranic waste (TRU) and other contaminated waste over a period of several years to Perma-Fix Northwest for processing. Perma-Fix Northwest began receiving Mixed Low-Level waste containing transuranics (i.e. Pu-239, Am-241) from facilities undergoing dismantlement at Hanford. This included contaminated glove boxes from the Plutonium Finishing Plant (PFP)."¹³

To summarize, Hanford Challenge believes Hanford waste should be treated on the Hanford site and that the capability to perform safe onsite treatment should be revitalized so that the waste that is a part of this comment period is treated at the Hanford site and not at Perma-Fix Northwest.

Thank you for considering our comments,



Tom Carpenter, Executive Director

¹¹ U.S. Department of Energy, Office of Environmental Management, Performance Objectives and Public Dose Limits for Radioactive Waste Disposal Facilities, June 2019. <https://www.energy.gov/sites/prod/files/2019/06/f63/Performance-Objectives-and-Public-Dose-Limits-for-Radioactive-Waste-Disposal-Facilities-June-2019.pdf>

¹² <https://www.hanford.gov/page.cfm/WRAP>

¹³ U.S. Department of Energy, *The Successful Utilization of Commercial Treatment Capabilities to Disposition Hanford's No-Path-Forward, Suspect Transuranic Wastes*, CH2MHILL Plateau Remediation Company, January 2012, p.1. <https://www.osti.gov/servlets/purl/1034779>