



Submitted via E-mail

September 1, 2021

NEPA Document Manager
Test Bed Initiative Draft Environmental Assessment
U.S. Department of Energy P.O. Box 550
Mailstop H5-20
Richland, Washington 99352
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Subject: Comments on Draft Environmental Assessment for the Test Bed Initiative

NEPA Document Manager,

On August 17, 2021, DOE issued a request to agencies and tribes for comment on the draft Environmental Assessment for the Hanford Tank Waste Test Bed Initiative (TBI) DOE/EA-2086.¹

It is the position of Hanford Challenge that this draft Environmental Assessment (EA) is of public concern and that the public should have an opportunity to learn about this project and to submit comments. The DOE has set a review period lasting for only 14 days, from August 21, 2021 to September 3, 2021, and only available to certain agencies and tribes. This is unacceptable.

We therefore request that the DOE –

1. Consider our preliminary comments on the completeness, factual accuracy, and additional information for consideration in the draft EA.
2. Establish a public comment period of at least 60 days on the draft Phase 2 TBI EA.
3. Hold a public hearing on the draft Phase 2 TBI draft EA.
4. Conduct a full Environmental Impact Statement (EIS).

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,

¹ Letter 21-ECD-002148, “NOTICE OF AGENCY REVIEW PERIOD,” DOE Hanford Site to Addressees, August 17, 2021.

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.

Phase 2 of the Test Bed Initiative is planned to use in-tank filters and ion-exchange to remove cesium-137 from about 2,000 gallons of tank waste from Tank SY-101. The pretreated tank liquids would be transported in special containers called "totes" to an offsite commercial treatment facility; either Perma-Fix Northwest in Richland; Perma-Fix DSSI in Kingston, TN; or directly transported to Waste Control Specialists in TX, or EnergySolutions in Clive, UT. The commercial facility would mix the pre-treated liquids with cement, resulting in approximately 65 drums of grouted waste to be disposed at either Waste Control Specialists (WCS) in Andrews County, TX or EnergySolutions in Clive, UT. Phase 3 would scale-up to 300,000-500,000 gallons of tank waste liquid treatment.

According to DOE draft EA, grouting the 2,000 gallons would multiply the volume of Hanford's soluble tank wastes by 1.7 times.²

Hanford Challenge is concerned about implications these tests could have on the future of tank waste treatment and disposal at Hanford. The research and information we have access to suggests that a grouted waste form is ultimately less protective of human and environmental health than glass.³ DOE itself has reached this conclusion in past reports, as documented in Hanford Challenge's recent report, *Why Grout Failed at Hanford*⁴, which we incorporate into this comment. While we understand that the Test Bed Initiative is focused on offsite treatment, the information from the tests could prove to be a foundation for future disposal of grouted waste at Hanford. The 2,000 gallon test needs more public involvement to ensure it is not fast-tracked in ways that negatively impact the future of tank waste treatment and disposal and the mission to immobilize tank waste in glass. We are also concerned that the Phase 2 draft EA may be used as a blueprint for the Phase 3 Test Bed Initiative EA, and therefore needs to be updated with consideration for the scale-up.

Our preliminary comments on the completeness, factual accuracy, and additional information that should be considered in the draft EA are listed below.

1. Hold a 60-day public comment period on the Phase 2 TBI Draft EA.

The request for comments should go beyond seeking comments from agencies and tribes. The public should be given the opportunity to comment with adequate review time and a public hearing. Treating 2,000 gallons of tank waste and sending it offsite to be grouted and disposed sets precedent for the planned scale-up in Phase 3 to 500,000 gallons, and may be in play in future decisions about supplemental low-activity tank waste treatment. The public should have a chance to review the options under consideration and share formal comments for agency consideration.

The public hearing should include information about the Phase 2 TBI draft EA including the entire Test Bed Initiative Plan scale up to Phase 3 and how it fits into plans for Supplemental Low Activity Waste

² U.S. Department of Energy, Draft Environmental Assessment of the Test Bed Initiative Demonstration, at 2-1, fn. 9, available at <https://pdw.hanford.gov/document/AR-15241>.

³ Hanford Challenge, *Why Grout Failed at Hanford, Chronology of the Failed Grout Program*, June 2021, available at <https://static1.squarespace.com/static/568adf4125981deb769d96b2/t/60f9b2bdb9480b7aeb6cbe15/1626976958173/2021+06.15+Why+Grout+Failed+at+Hanford.pdf>

⁴ Id.

decisions. Allow participants to make formal comments at the meeting.

The draft Environmental Assessment (EA) proposes the use of a local facility called Perma-Fix NW as a treatment location for the tank waste in Alternative 1. Perma-Fix NW has off-gas stacks and groundwater within the Richland city limits, where residential communities are potentially impacted from releases. Public comment opportunity was invited in an EA for transport and treatment of wastewater from Savannah River (See Federal Register Vol.84, No. 111, June 10, 2019, page 26847.) A public comment period, along with a public hearing, should be a part of this EA, and the period for comment should be at least 60 days.

2. Perma-Fix NW is not a facility that should be under consideration for the Test Bed Initiative.

Perma-Fix Northwest is at the center of the Department of Energy’s “Test Bed Initiative,” a proposal launched in 2016 to explore the feasibility of treating liquids from Hanford’s underground high-level waste (HLW) tanks by removing cesium and mixing the liquid tank waste with grout for offsite disposal. After initial in-tank pretreatment (cesium-ion exchange and filtration) the liquids would be classified by DOE as Mixed Low Level Wastes (MLLW) which the U.S. Nuclear Regulatory Commission (NRC) says may be highly radioactive and contain long-lived radionuclides. According to the NRC, this waste (LAW feed), which constitutes about 80% of the total volume in Hanford’s HLW tanks:

“has high radiation levels requiring handling within shielded structures. Three envelopes of LAW have been defined: Envelope A is standard, Envelope B contains higher levels of cesium, and Envelope C contains higher levels of strontium and TRU LAW would come from the liquid phases of the DSTs and from solids washing operations... LAW is still HLW and DOE identifies the solid phases as HLW, defined as Envelope D Envelope D contains cesium, strontium, and TRUs as the radionuclides. Metal oxides, hydroxides, nitrates, phosphates, and aluminates constitute the bulk of the chemical species.”⁵

The Test Bed Initiative operates on a three phase plan to pretreat liquid tank wastes, known as supernate, from Hanford’s double-shell waste tanks, send the pre-treated liquid waste to an offsite treatment facility to be mixed with cement (grout) and dispose the grouted waste offsite at a commercial low-level radioactive waste disposal site. In 2017, Phase 1 of this initiative was demonstrated using Perma-Fix Northwest as its offsite treatment facility.⁶ It involved a composite of approximately 3 gallons of wastes from six of Hanford’s high-level waste tanks. The waste was pretreated, mixed with grout at the Perma-Fix Northwest facility and then shipped to the Waste Control Specialists (WCS) disposal site in Andrews, Texas. WCS has less restrictive waste acceptance criteria as compared to what is expected for onsite landfill disposal at other sites. Neither Waste Control Specialists, nor Hanford has analyzed whether grouted waste from pretreated high-level waste tanks meets the Waste Acceptance Criteria for disposal at Waste Control Specialists.

The practice of treating Hanford’s low-level and plutonium-containing wastes at Perma-Fix Northwest, a commercial facility in Richland, WA, should end.

⁵ U.S. Nuclear Regulatory Commission, *Overview and Summary of NRC Involvement with DOE in the Tank Waste Remediation System-Privatization (TWRS-P) Program* June 29, 2001 NUREG 1747, p. 1. Table 2, pp. 1–3, <https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1747/>.

⁶ U.S. Department of Energy, Office of River Protection, Hanford Tank Waste Strategy, Test Bed Initiative-Phase II, For the Hanford Advisory Board, Tank Waste Committee, January 9, 2019.

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.

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 [November 2020 investigation](#), *Risky Business at Perma-Fix Northwest*⁷, 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.

3. Revitalize treatment capacity on the Hanford site to perform waste treatment functions currently performed by Perma-Fix Northwest

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.

⁷ Hanford Challenge, *Risky Business at Perma-Fix Northwest*, Nov 2020, available at <https://static1.squarespace.com/static/568adf4125981deb769d96b2/t/5fce533274a40730fbc928bf/1607357241336/2020+12.04+PermaFix+Report+updated.pdf>. This report and the documents referenced to in the report are incorporated as part of this Hanford Challenge comment.

4. Revise the draft EA to include on-site treatment as an alternative.

By only considering treatment of pre-treated waste at offsite facilities, the information contained in the draft EA is incomplete. Detailed information about how the offsite facilities plan to safely grout the treated tank waste liquids is missing and should be required in the draft EA and resulting EIS.

We understand that the TBI EA for Phase 2 only considers treatment of 2,000 gallons, however we are concerned that conclusions drawn from analysis of Phase 2 alternatives will be incomplete without an alternative that considers an onsite treatment facility. There are major issues with using Perma-Fix Northwest that are exacerbated in the Phase 3's scale-up scenario, that won't show up as clearly in the Phase 2 EA.

Phase 3 would expand to production scale to grout 300,000 to 500,000 gallons of soluble radioactive tank wastes over an 18-month period. At DOE's Phase 3 production scale, the Perma-Fix Northwest facility would generate as many as 16,364 55-gallon drums at a rate of about one drum filled every 45 minutes. In 2018, Perma-Fix Northwest proposed a similar plan.

A review of TBI's Phase 3 done in 2018 by federal and contractor experts at Hanford, questioned "whether Perma-Fix has the physical capacity and personnel required to handle the volume of waste which will be generated."⁸ It would "require a 55 gallon drum to be produced roughly every 45 minutes."⁹ After the drums are filled nearly 1,000 would have to remain in lag storage each month at the site for about 30 days, so that the grout can be cured to ensure its compressive strength before transport.¹⁰ The transportation logistics for a waste volume this large have not been worked out. It's quite possible that the large waste volumes of about 1,000 drums per month, could create a transportation bottleneck resulting in a large backlog of stored grouted waste drums sitting at the Perma-Fix Northwest site.

5. Perma-Fix NW is operating under a temporary permit and has been since 2009.

The draft EA states that DOE is relying on a future permit for any tank waste treatment at PFNW in Richland: "PFNW is currently *in discussions with Ecology to renew PFNW's Dangerous Waste Regulations permit. After the permit renewal, DOE would verify that the 2,000 gallons of liquid waste could be treated and stabilized within the terms and conditions of the permit.*"

Perma-Fix NW does not have a reasonable expectation that a new permit will be issued to include Hanford tank waste for a test bed initiative in the near future. The permit is dependent on the issuance of a State Environmental Protection Act (SEPA) analysis, a draft of which has not been issued as of this date. Perma-Fix NW itself characterizes as "uncertain" as to the date for treating the 2,000 gallons of TBI waste to the Securities and Exchange Commission in their June 30, 2021 Form 10-Q

⁸ [U.S. Department of Energy, Richland Operations Office, OA Database entry 37276, Chief Engineer/TPD/TOD/MIO/ECD review of DFLAW Readiness, Downstream Treatment & Disposal \(LERF, ETF, Off-Site Treatment of MLLW, SALDS, TEDF, IDF\) April 19, 2018 p. 8.](#)

⁹ OA Database entry 37276, Chief Engineer/TPD/TOD/MIO/ECD review of DFLAW Readiness, Downstream Treatment & Disposal (LERF, ETF, Off-Site Treatment of MLLW, SALDS, TEDF, IDF), available at <https://www.dropbox.com/s/ramkr3y334k0ns2/FN%20200%202018%2004.19%20DOE%20Review%20of%20DFLAW%20Interfaces%20PFNW.pdf?dl=0>

¹⁰ W.L. Elbert and J.L. Jerden Jr., *Test Plan for Formulation and Evaluation of Grouted Waste Forms with SHINE Process Wastes*, U.S. Department of Energy, Argonne National Laboratory, ANL/NE-15/29, September 2015, p. 37, available at <https://publications.anl.gov/anlpubs/2017/02/133742.pdf>.

Quarterly Report for the period ending June 30, 2021.¹¹

6. Update history and information about hazardous waste components of SY-101 waste in the EA and potential impacts on grout integrity.

Tank SY-101 is estimated to contain 892,000 gallons of supernate liquids and 223,000 gallons of salt cake.¹² As of 2013 it was estimated to contain about 705,000 curies of radioactivity, of which about 75% is from Cs-137.¹³ The salt cake in this tank contains retained hydrogen gas, which poses a hazard if released as a result of the addition of water to dissolve the salt.¹⁴

In 2007, a report by Pacific Northwest National Laboratory (PNNL) describes the history of this tank as follows:

“From 1990 through 1993, SY-101's flammable gas troubles were acknowledged as the highest priority safety issue in the entire DOE complex. Uncontrolled crust growth demanded another high-priority remedial effort from 1998 through April 2000. The direct cost of the bubbles, toils, and troubles was high. Overall, the price of dealing with the real and imagined hazards in SY-101 may have reached \$250 million. The indirect cost was also high.”¹⁵

Removing radioactive cesium elements is not enough to guarantee the integrity of the grout. There are also several chemicals in the SY-101 tank liquids that can cause deterioration of the cement used in grout. According to the Portland Cement Association, “chlorides and nitrates of ammonium, magnesium, aluminum, and iron all cause concrete deterioration, with those of ammonium producing the most damage.”¹⁶ All of these elements are present in Hanford's tank waste and it raises an important question as to whether Perma-Fix Northwest will have to control them to ensure the integrity of its grout.

Tank SY-101 has one of the largest Total Organic Carbon (TOC) loads of Hanford's HLW tanks. Nearly 150 volatile organic compounds have been measured in retained gas emanating from the slurry in this tank.¹⁷ At 46,900 kg,¹⁸ this quantity of organic compounds poses a significant challenge without

¹¹ <https://ir.perma-fix.com/all-sec-filings#document-50126-0001493152-21-019308>

¹² A.M Templeton, Waste Tank Summary Report for Month Ending November 30, 2018, p. 20, available at <https://www.emcbc.doe.gov/SEB/TCC/Documents/Site%20Tours/Waste%20Tank%20Summary%20Report%2011-18.pdf>

¹³ Tank Waste Inventory Network System, Best Basis Estimate 2013, available at <https://phoenix.pnnl.gov/phoenix/apps/tanks/index.html>

¹⁴ J. S. Rodriguez, J. W. Kelly, D. C. Larsen, *Integrated Waste Feed Delivery Plan Volume 3 – Project Plan* Washington River Protection Solutions, LLC, March 26, 2012. Table D-1, available at https://www.hanford.gov/files.cfm/RPP-40149-VOL3_-_Rev_02.pdf

¹⁵ Charles W. Stewart, *Hanford's Battle with Nuclear Waste Tank SY-101: Bubbles, Toils, and Troubles*, PNNL-SA-43778, June 2006, available at <https://www.osti.gov/biblio/892228-hanford-battle-nuclear-waste-tank-sy-bubbles-toils-troubles>

¹⁶ Robert Alvarez, *Reducing the Risks of High-Level Radioactive Wastes at Hanford*, Science and Global Security, 13:43–86, 2005, Table 1, available at <http://scienceandglobalsecurity.org/archive/sgs13alvarez.pdf>

¹⁷ L.M. Stock, *Occurrence and Chemistry of Organic Compounds in Hanford Site Waste Tanks*, RPP-21854, Rev. 0, 07/27/2004, Table 3-10, available at <https://hanfordvapors.com/wp-content/uploads/2016/09/Occurrence-and-Chemistry-of-Organic-Compounds-in-Hanford-Site-Waste-Tanks-RPP-21854-Rev.-0-07-29-2004.pdf>

¹⁸ Tank Waste Inventory Network System Best Basis Estimate 2013, available at <https://phoenix.pnnl.gov/phoenix/apps/tanks/index.html>.

potentially complex pretreatment prior to grouting in order to comply with RCRA land disposal restrictions.¹⁹

7. Groundwater risks need to be evaluated.

The fact that discussion of grout treatment at facilities like Perma-Fix Northwest does not include or evaluate the relative risks to groundwater, air, and local populations makes this draft EA incomplete. The Perma-Fix NW Annual Environment Report for 2020 states that “the area water table varies from approximately 10 feet at the west well to 21 feet at the east well²⁰.” Contrast this with the hundreds of feet to the water table in the Hanford 200 Areas. A spill during the handling or transportation of wastes at PFNW would quickly contaminate water that flows towards intakes and wells used by the City of Richland for drinking and irrigation. There is a history of Perma-Fix NW experiencing losses of contamination control at the facility²¹.

8. Tank vapor issues, including more accurate information on worker health and safety risks, and data on chemical constituents in the waste, need to be included.

Tank SY-101 was a “burping” gas-producing tank, containing a variety of organic and inorganic compounds. Tank vapor releases pose a threat to both workers and the public nearby the Perma-Fix NW facility. Incredibly, the DOE characterizes vapor risks for workers in the EA as minimal or temporary. This statement belies the long history of vapor exposures at Hanford and is demonstrative of the DOE’s dismissive attitude towards the health and safety of workers.

This statement come on the heels of a [just-released report](#) from the Washington State Department of Commerce that conducted a survey of some 1,600 Hanford workers who reported that 57% of those surveyed had been exposed to toxic vapors.

- Nearly a third, 32%, reported they had long-term exposure to hazardous materials at the nuclear reservation, rather than exposure during a single incident. The survey was conducted by the [Hanford Healthy Energy Workers Board](#). The board was created by the Legislature and directed to survey workers and then provide recommendations to better meet the health care needs of Hanford workers.
- Over 21% of those surveyed said they had illnesses due to a short-term exposure to hazardous materials at Hanford. In addition, 28% said they had illnesses from long-term exposure to hazardous materials at Hanford.

The EA does not contain information on the chemical constituents present in the waste. This is the kind of data that an environmental analysis must contain.

¹⁹ U.S. Department of Energy, Savannah River National Laboratory, *Report of Analysis of Approaches to Supplemental Treatment of Low-Activity Waste at the Hanford Nuclear Reservation*, SRNL-RP-2018-00687 October 10, 2019, Table 2, p. 28, available at <https://www.nationalacademies.org/documents/embed/link/LF2255DA3DD1C41C0A42D3BEF0989ACAEC3053A6A9B/file/D5103F716F7BE9B50A8749F6FAD7382E42825D4BFC3E>.

²⁰ PermaFix Northwest Richland, Inc., Annual Environmental Monitoring Report for 2020, submitted to the Washington Department of Health, July 29, 2021.

²¹ Hanford Challenge, *Risky Business at Perma-Fix Northwest*, Nov 2020, available at <https://static1.squarespace.com/static/568adf4125981deb769d96b2/t/5fce533274a40730fbc928bf/1607357241336/2020+12.04+PermaFix+Report+updated.pdf>.

9. The DOE EA does not perform any kind of cumulative impact analysis of the operations at Perma-Fix NW.

The DOE EA states that the 2,000 gallon treatment project would be a “small” fraction of the total capacity at Perma-Fix NW and elsewhere. The EA should evaluate the cumulative impact of the waste forecast for treatment at Perma-Fix NW, per DOE’s “emwims.org” web page. The sum of all the waste to be sent to PFNW is not only large by any standard, but is expected to grow even larger in the near future.

The volume and degree of radiologically-contaminated and high hazard waste DOE plans to send to Perma-Fix Northwest over the next 45 years should be considered against the additional waste DOE may send to Perma-Fix NW for treatment. The EA should assess the cumulative human and environmental risks to the surrounding residential communities and workers. According to DOE projections, Perma-Fix NW is planning to accept and treat more than 43,000 cubic meters of mixed and low level radioactive wastes from Hanford and other sites between now and 2066. This will include toxic lead, cadmium, and mercury; pyrophoric depleted uranium metal, organic liquids, Waste Treatment Plant (WTP) wastes, contaminated equipment, radioactive lead wastes, transuranic wastes, contaminated pumps, Direct-Feed Low-Activity Waste (DFLAW) residuals, contaminated devices, and transfer lines. This also includes more than 600 cubic meters of radioactive wastes in packages larger than 10 cubic meters and with contact activity above 200 mRem per hour which will require remote handling. Some wastes, such as 473 cubic meters of spent resin (possibly for Cs-137 removal) will have unknown activity.

The magnitude of dangerous radioactive and non-radioactive hazardous waste envisioned to be processed by DOE at Perma-Fix Northwest over the next 45 years, if realized, could well exceed the current regulatory capabilities of Washington State and the EPA to ensure safety of workers and the public.

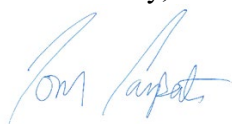
Conclusion

Hanford Challenges submits these comments to bring to the attention of the Department of Energy the issues that we believe need to be addressed in the draft TBI EA currently being considered by the agency.

We therefore request that the DOE –

1. Consider our preliminary comments on the completeness, factual accuracy, and additional information for consideration in the EA.
2. Establish a public comment period of at least 60 days on the draft Phase 2 TBI EA.
3. Hold a public hearing on the draft Phase 2 TBI EA.
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Submitted by,



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Hanford Challenge