



March 24, 2020

Washington State Department of Ecology  
Attn: Daina McFadden  
3100 Port of Benton Blvd  
Richland, WA 99354

U.S. Environmental Protection Agency  
Attn: Dave Bartus  
1200 Sixth Avenue, Suite 155  
Seattle, WA 98101

Washington State Department of Health  
Attn: John Martell  
309 Bradley Blvd., Suite 201  
Richland, WA 99352

Dear Ms. McFadden, Mr. Bartus, and Mr. Martell:

Please accept the comments of Hanford Challenge in response to the Class 2 Notice for a proposed permit modification to the Perma-Fix Northwest, Richland, Inc. Dangerous Waste Permit and TCSA Approval No. WAR 0000 10355. This is for the comment period from January 24, 2020 to March 24, 2020.

This modification was described as clarifications and updates to operational requirements of the In-Container Mixer Unit at the Perma-Fix Northwest mixed waste facility. Hanford Challenge has concerns and questions about Perma-Fix Northwest operations generally, as well as specific issues with the Permit Modification in question.

### **Interest of Commenter**

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 and dedicated to creating a future for Hanford that secures human health and safety, advances accountability, and promotes a sustainable environmental legacy. Members of Hanford Challenge work and/or recreate near Perma-Fix NW, where they may also be affected by hazardous materials emitted into the environment by Perma-Fix NW. All members have a strong interest in ensuring the safe and effective operation of any facility that treats hazardous, radioactive and toxic wastes from Hanford for themselves and for current and future generations, and who are therefore affected by conditions that endanger human health and the environment.

## Summary

The RCRA permit application by Perma-Fix Northwest, Inc. (hereinafter, Perma-Fix NW) is deficient and raises significant concerns about compliance with environmental requirements, safety of operations, and increases in the amounts of radioactive and other hazardous wastes currently and planned to be processed at the facility. As a result, the requested Permit Modification should be rejected until numerous concerns and issues are addressed. These concerns include:

- **Proximity of Residential Housing and Children:** According to the U.S. Environmental Protection Agency, 10,324 people live within 3 miles of the Perma-Fix NW facility. A children's day care center is located less than a mile away.
- **History as a Significant Non-Complier:** Between October 2018 and October 2019, the U.S. Environmental Protection Agency designated the Perma-Fix NW facility as a "significant Non-Complier" with environmental laws. EPA performance and compliance history for Perma-Fix is available on a web page.<sup>1</sup> In 2008, EPA settled with Perma-Fix for \$304,000 for PCB waste handling violations. More recently, Perma-Fix is listed as a "significant" noncomplier from October 1, 2018 to December 31, 2019. Fines from the last 5 years total \$59,775 for Enforcement Actions and \$23,375 for EPA cases. Violations were identified in every quarter from June 30, 2017 to March 31, 2018. Perma-Fix NW's history of non-compliance with environmental laws argues against allowing it to expand its production operations, and brings into focus whether this company has the requisite character, competence and integrity to be allowed to operate a nuclear facility which is surrounded by a residential population of over 10,000 persons within a 3-mile radius.
- **Percentage of DOE Waste Exceeds Original Operational Scope:** According to the U.S. Department of Energy (DOE), the operation was originally scoped to process no more than 25% of wastes from DOE. However, Hanford and other DOE sites (including Los Alamos National Laboratory in New Mexico, the Idaho National Engineering site, and the Oak Ridge nuclear reservation in Tennessee) provided the Perma-Fix NW facility with about 95% of all of its mixed low- level wastes and about 70% of the volume of low-level radioactive wastes.<sup>2</sup> That the Perma-Fix NW facility would survive without DOE customers is questionable.
- **Potential Conflict of Interest Due to Subsidized Technologies:** DOE at Hanford has heavily subsidized the technologies Perma-Fix NW with nearly \$400 million in R&D funds, which poses questions about conflicts-of-interest and whether DOE should include Perma-Fix NW in its air permits as a Hanford stack.

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<sup>1</sup> See <https://echo.epa.gov/detailed-facility-report?fid=110008062452>.

<sup>2</sup> U.S. Department of Energy, Continuing Qualification Audit of Perma-Fix Environmental Services Northwest - Richland, WA, May 2009.

- **Compliance Issues for Long-Dormant GasVit Processing Facility:** Perma-Fix NW continues to maintain a long-dormant processing facility, which failed to operate properly in apparent violation of state requirements. According to the permit application, the shuttered GasVit operation will annually process 8.6 million pounds of solid and liquid Mixed Low Level Waste (MLLW), transuranic wastes, polychlorinated biphenyls (PCBs), and other hazardous substances. However, Perma-Fix NW does not provide any information as to what steps it will have to take to make this hazardous processing facility operational, after some 20 years of dormancy. Has the Department of Ecology officially determined the Gas/Vit facility is safe and fully operational? The publicly-reported inability to ensure the Gas/Vit air ventilation system was functioning properly is what caused the Gas/Vit plant to fail – leading to the bankruptcy of its previous owner.
- **Risks to Workers and Community from Expanded GeoMelt Unit:** Perma-Fix NW is seeking to expand its GeoMelt (bulk vitrification) unit beyond its first small scale pilot operation to process approximately 1.5 metric tons of radiologically contaminated liquid sodium from the failed Fermi 1, plutonium “breeder” reactor near Detroit, Michigan. The Fermi 1 reactor experienced a partial core meltdown in 1966 and never restarted. Liquid sodium is highly reactive and pyrophoric, catching fire when exposed to the air. This activity increases the potential risks to workers and the nearby community. In fact, in the summer of 2019, records indicate that a sodium-related fire did occur at Perma-Fix NW. The fire occurred at a time when the fire sprinklers were inoperable, and the hourly checks by workers to compensate for the sprinkler system failure were not occurring. Ecology inspector notes characterized this fire as “a near catastrophe.”
- **Scattered and Fragmented Approach to Safety:** There is a haphazard approach to regulating the work of PermaFix NW. Some work falls under the Department of Ecology, while other work falls under Department of Health. A lack of coordination and enforcement presents increased risks to safety and health.
- **Risk to Surrounding Community from Significant Increase in Amount of Radioactive Material Handled:** Washington State has been incrementally permitting the Perma-Fix NW operation to significantly increase the amounts of radioactive materials it can handle, especially the highly toxic plutonium-239. By 2017, the Perma-Fix NW facility processed 3.5 times the annual limit set in 2005. Between 2013 and 2018, the facility processed more than 5.6 kilograms of plutonium-239. Last year, to accommodate the operation of the GeoMelt unit, the Washington State Department of Health granted a 30 percent increase in the radioactive emission license for Perma-Fix NW, including strontium-90. This proposed Permit Modification would increase the amount of waste that Perma-Fix NW can handle in the In-Container Mixer Unit. The modification would allow the Mixer Unit throughput up to 1,071 lb/hour, from 770 lbs/hour, an increase of nearly 40%.

- **Eliminated Requirements for Treatability Testing:** This permit modification includes a troubling deletion of the requirement for treatability tests. Treatability tests, require measurements of the composition of waste to be treated to assure that waste acceptance criteria are met. Instead of a test, employees are now able to look at the waste to make that determination using “careful consideration.” Subjective “consideration” is a poor substitute for controlled tests and measurements, and this provision should be eliminated. Hanford waste, for example, requires a treatability analysis in order to process waste at LERF/ETF. Treatability testing is required to meet acceptance criteria for the disposal facility.
- **Perma-Fix Should Be Included as a Stack in DOE Hanford’s Air Operating Permit:** Perma-Fix NW meets the criteria for inclusion in DOE Hanford’s Air Operating Permit (AOP) as a stack, and Ecology and EPA should reconsider its earlier decision to exclude Perma-Fix NW from the AOP.
- **Future Plans to Treat Hanford Tank Waste Should Be Disallowed:** DOE has publicized plans to utilize Perma-Fix NW’s treatment systems to potentially handle millions of gallons of tank waste treatment from Hanford. Given Perma-Fix NW’s history as an EPA “significant non-complier”, the long list of violations and penalties assessed against the facility, the recent serious lapses in judgment that led to a “near catastrophe” fire while fire sprinklers were disabled and hourly inspections were not occurring, and the alarming proximity of this facility to over 10,000 residents within 3 miles of the facility (including a day care center), expanded operations at Perma-Fix NW should not be permitted by Ecology, the Department of Health, the NRC or the EPA.

## Background

Perma-Fix NW is a radioactive and hazardous waste processing facility covering about 35 acres and located in an urban area directly adjacent to the Hanford nuclear site. It has a stated capacity to annually process more than 60 million pounds of low-level radioactive, transuranic, and low-level radioactive wastes mixed with non-radioactive hazardous substances, in addition to several kinds of toxic chemicals.

The Low Level Waste (LLW) operation occupies about 70,000 square feet and treats wastes from DOE and other government agencies as well as commercial entities such as hospitals, and power reactor operators, as well as from foreign sources. It has a capacity to treat about 8 million pounds of solid, liquid and wet wastes per year.

Between 2008 and 2018 Perma-Fix NW processed 587,159 pounds of non-radioactive toxic substances subject to EPA regulation (dioxin, hexachlorobenzene, lead and PCBs).<sup>3</sup> Between October 2018 and October 2019, Perma-Fix NW was designated as a “significant non-complier” by the EPA. The quantities of radioactive wastes are based on the total amount of radioactivity

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<sup>3</sup> <https://echo.epa.gov/detailed-facility-report?fid=110008062452>

the facility is limited to levels as defined by the Nuclear Regulatory Commission (NRC) and enforced by the Washington State Department of Health department.

The location of Perma-Fix NW in an urban area raises important questions regarding the safety of the public and workers. According to the U.S. Environmental Protection Agency, 10,324 people live within 3 miles of the Perma-Fix NW facility. A children's day care center is located less than a mile downwind. Between October 2018 and October 2019, EPA designated the Perma-Fix NW facility as a "significant Non-Complier" with environmental regulations.<sup>4</sup>

According to DOE, the operation was originally scoped to process no more than 25% of wastes from U.S. Department of Energy (DOE).<sup>5</sup> However, in 1998, the primary reason the facility was designed and constructed was to process radioactive and other hazardous wastes from the adjacent DOE Hanford site, which generated the largest inventory of military radioactive wastes in the country, resulting from plutonium production for nuclear weapons and several nuclear research and development projects.

In 2008, the DOE decided "that the least costly option was to send an estimated 9,000 cubic meters of transuranic (TRU) and other contaminated waste over a period of several years to Perma-Fix NW for processing. Perma-Fix NW 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)."<sup>6</sup>

As of 2009, Hanford and other DOE sites (including Los Alamos National Laboratory in New Mexico, the Idaho National Engineering site, and the Oak Ridge nuclear reservation in Tennessee) provided the Perma-Fix NW facility with about 95% of all of its mixed low- level wastes and about 70% of the volume of low-level radioactive wastes.<sup>7</sup> That the Perma-Fix NW facility would survive without DOE customers is questionable. This raises the issue as to whether DOE should be declaring Perma-Fix NW as a Hanford stack under DOE's air permits.

Moreover, Perma-Fix NW declared that it is actively seeking to grout 82,000 gallons of liquid secondary wastes, generated from waste stored in Hanford's high-level radioactive waste tanks, that would be placed in an estimated 3,578 fifty-five gallons drums for disposal at a commercial radioactive waste disposal site in Texas.<sup>8</sup> Perma-Fix NW has also indicated that it plans to grout 3 million gallons of tank waste through the Direct Feed Low Activity Waste program.

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<sup>4</sup> Available at <https://echo.epa.gov/detailed-facility-report?fid=110008062452>

<sup>5</sup> Washington Department of Ecology, Expanded Scoping for Perma-Fix Northwest SEPA EIS Public Comment Period Notification, January 2020. Available at [http://listserv.ecology.wa.gov/scripts/wa-ECOLOGY.exe?A3=1903&L=ECY-COMMERCIAL-MIXED-RAD-WASTE&E=quoted-printable&P=5710&B=-000\\_81ce7f77f42c4d72bdd029753f46c249ECYWAGOV\\_&T=text%2Fhtml;%20charset=us-ascii](http://listserv.ecology.wa.gov/scripts/wa-ECOLOGY.exe?A3=1903&L=ECY-COMMERCIAL-MIXED-RAD-WASTE&E=quoted-printable&P=5710&B=-000_81ce7f77f42c4d72bdd029753f46c249ECYWAGOV_&T=text%2Fhtml;%20charset=us-ascii)

<sup>6</sup> U.S. Department of Energy, The Successful Utilization of Commercial Treatment Capabilities to Disposition Hanford's No-Path-Forward, Suspect Transuranic Wastes, CH2M HILL Plateau Remediation company, January 2012, p.1. <https://www.osti.gov/servlets/purl/1034779>

<sup>7</sup> U.S. Department of Energy, DFLAW Readiness, Downstream Treatment & Disposal, Final Version, September 2018.

<sup>8</sup> Id.

## **Perma-Fix NW continues to maintain a long-dormant processing facility in an apparent long term violation of state requirements**

Currently, Perma-Fix NW continues to include the GasVit operation on its current RCRA permit application with the Washington Department of Ecology, projecting that this operation will annually process 8,642,121 pounds of solid and liquid MLLW, transuranic wastes, polychlorinated biphenyls (PCBs), and other hazardous substances.<sup>9</sup> This appears to be a violation of its current permit, which states "*The permittee shall commence closure of the unit no later than thirty (30) calendar days after the date on which the unit received its final quantity of waste.*"<sup>10</sup> Perma-Fix NW does not provide any information as to what steps it will have to take to make this hazardous processing facility operational, after some 20 years of dormancy.

The Gas/Vit facility does not appear to be capable of operation - especially its air ventilation system, necessary to capture and prevent the escape of radioactive and other hazardous materials into the environment. The publicly-reported inability to ensure this important system was functioning properly is what caused the Gas/Vit plant to fail – leading to the bankruptcy of its previous owner.

What steps, if any has Perma-Fix NW or the Department Ecology taken to assure the safe operability of this long dormant plant? Has the Department of Ecology officially determined the Gas/Vit facility is safe and fully operational?

The GasVit facility was developed by Integrated Environmental Technologies, LLC. In August 1997, Allied Technologies (ATG) entered into an agreement with agreement executed between ATG Inc., a California Corporation, Integrated Environmental Technologies, LLC, a New York Limited Liability Company ("IET"), that "covers the design fabrication, testing and delivery of a plasma energy gasification/vitrification (GASVIT) thermal treatment system by IET"<sup>11</sup> at the ATG (now Perma-Fix NW) site in Richland, WA. The GasVit facility was built for the processing of mixed low-level radioactive wastes at the Hanford site.

In February 2001, the US Environmental Protection Agency (EPA) approved the use of the GasVit technology.<sup>12</sup> However, an EPA-sponsored performance assessment cautioned a year later that "test data was insufficient for such evaluation criteria as reliability, availability, and maintenance (RAM), lifecycle costs, and hazard exposures to workers from operations and maintenance."<sup>13</sup>

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<sup>9</sup> Perma-fix, RCRA/TSCA Permit application, January 2020

<sup>10</sup> **Permit Condition 11.M.5. Closure** - *The permittee shall commence closure of the unit (5) no later than thirty (30) calendar days after the date on which the unit received its final quantity of waste.*

<sup>11</sup> U. S. Security Exchange Commission, Purchase and License Agreement with Integrate Environmental Technologies, ATG Inc, August 1997. <https://contracts.onecle.com/atg/iet-purchase-1997-09-05.shtml>

<sup>12</sup> U.S. Environmental Protection Agency, letter to Douglas E. McKinley, Jr, Director of Administration, Integrated Environmental Technologies, from James R. Berlow, Director, Hazardous Waste Minimization and Management Division, February 15, 2001.

<sup>13</sup> Environmental Technology Evaluation Center, Environmental Technology Verification Report for the Plasma Enhanced Melter™, CREF/HEC Report; # 40633 My 2002, p.xix. [https://clu-in.org/download/contaminantfocus/pops/evtec\\_finalreport.pdf](https://clu-in.org/download/contaminantfocus/pops/evtec_finalreport.pdf)

After spending well over \$300 million on research and development, (much of which went to Battelle Pacific Northwest National Laboratory at Hanford)<sup>14</sup>, for the GasVit technology, DOE was planning to process 5,120 cubic meters of Hanford radioactive wastes over a 10- year period at the Perma-Fix NW site.<sup>15</sup> Subsequently, DOE awarded a \$24 million 15-year contract to Allied Technology Group (ATG) to treat Hanford's low-level mixed waste.<sup>16</sup>

Meanwhile, in 1999, ATG began constructing the GasVit facility to claiming that it would reduce any type of mixed waste to a vitrified state, including PCBs, while a final cleansing stage would supposedly break down emissions and reconstitute them into "harmless" carbon dioxide and steam.

After sinking \$40 million in the GasVit plant, ATG filed for bankruptcy on December 3, 2001. While the facility tried reopening in 2002, the GasVit plant never restarted. During pilot operations, the plant kept shutting down due to the repeated failure to purify and control air emissions. Problems with the system resulted in a backlog of untreated waste shipped from the Hanford site, which was reported to be "the size of a medium house. The radioactive wastes clogged behind it could fill a small lake."<sup>17</sup> ATG's commercial complex near Hanford was planned for full-scale treatment operations by December of 2000. By 2002, the GasVit unit was shuttered.<sup>18</sup> In 2008, seven years after ATG's bankruptcy, the site now owned by Perma-Fix NW since 2007<sup>19</sup>, had a backlog of 1.4 million pounds of untreated MLLW from Hanford due to the GasVit failure.<sup>20</sup>

## The GeoMelt Facility

In early 2019 Perma-Fix NW announced it had begun the preliminary deployment of a third mixed waste thermal treatment process based on the GEOMelt technology, also known as bulk in-box vitrification, that uses high heat melters to immobilize MLLW wastes into a ceramic form. Perma-Fix NW is in a joint partnership with the Veolia Corp, based in Richland, WA, which was the beneficiary of \$93 million of an estimated \$329 million in DOE funds to develop bulk vitrification.<sup>21</sup> Serious concerns about the bulk vitrification demonstration project at Hanford have been raised by the Energy Department's Defense Nuclear Facility Safety Board in 2005, including --

<sup>14</sup> <http://www.inenetc.com/about-inenetc/inenetc-story/>

<sup>15</sup> U.S. Department of Energy, Environmental Assessment, Offsite Thermal Treatment of Low-level Mixed Waste, DOE/EA-1135, March 1999, Table 1-1.

<sup>16</sup> State of Oregon, Department of Energy, Hanford Cleanup: The First 25 Years | Page 45

<sup>17</sup> John Stang, "Radioactive Red Ink – Glitches Stall Progress at Allied Technology Group Melter, But Officials Still Optimistic," Tri-City Herald 23 Sept. 2001

<sup>18</sup> John Stang, "ATG getting back to business," Tri-City Herald 6 May 2002.

<sup>19</sup> Perma-Fix acquired Nuvotec USA, Inc. and its wholly owned subsidiary, Pacific EcoSolutions, Inc. (PECoS), which assumed operation of the facility, once owned by ATG.

<sup>20</sup> U.S. Department of Energy, Continuing Qualification Audit of Perma-Fix Environmental Services Northwest - Richland, WA, May 2009.

<sup>21</sup> U.S. Government Accountability Office, DOE Should Reassess Whether the Bulk Vitrification Demonstration Project at Its Hanford Site Is Still Needed to Treat Radioactive Waste, June 2007, GAO-07-062, p 17.

<https://www.gao.gov/assets/270/261926.pdf>

“The current design has a number of major vulnerabilities with respect to overall confinement of radioactive and hazardous materials. Contrary to DOE’s design requirements to use successive physical barriers for protection against the release of radioactivity,’ the current design uses only one barrier to confine material in portions of the plant. The project’s confinement strategy also relies on a mix of active and passive safety-significant systems, non-safety-related design features, and administrative controls… As a result of these vulnerabilities, the potential exists for the failure of a single non-safety-related barrier that could lead to the unfiltered release of radioactive or toxic materials and unacceptable consequences to workers. For example, failure of the integrity of the non-safety related vitrification container could result in an unfiltered and untreated release of radioactive and toxic material.”<sup>22</sup>

After completing a “hot commissioning and first demonstration melt” Perma-Fix NW is preparing to proceed to process approximately 1.5 metric tons of radiologically contaminated liquid sodium from the failed Fermi 1, plutonium “breeder” reactor near Detroit, Michigan. The Fermi 1 reactor experienced a partial core meltdown in 1966 and never restarted.<sup>23</sup>

Washington State Department of Health is allowing the GeoMelt unit to discharge 30 percent more radioactivity, such as strontium-90 than its original permit limit.<sup>24</sup> The Energy Department at Hanford details the extraordinary hazards of liquid sodium.

“Sodium reacts vigorously with water and steam and is extremely reactive, oxidizing rapidly when exposed to air. It melts at about 190 °C (208 °F) to form a silvery liquid. The normal boiling point of sodium is 1,600 °C (1,618 °F). The basic chemical reaction is an exothermic reaction with water that, for excess water, produces a caustic sodium hydroxide solution and the evolution of hydrogen gas.”<sup>25</sup>

Perma-Fix NW has already demonstrated its incompetence in handling sodium materials. An inspection report<sup>26</sup> on Perma-Fix NW dated July 11, 2019, detailed a fire “that could have been catastrophic” at Perma-Fix NW facilities due to an incident at the GeoMelt unit. The report stated,

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<sup>22</sup> U.S. Department of Energy, Defense Nuclear Facility Safety Board, Memorandum for J. K. Fortenberry, Technical Director, from: J.W. Troan, Re; Demonstration Bulk Vitrification Project, Hanford Tank Farms, August 9, 2005.

<sup>23</sup> U.S. Nuclear Regulatory Commission, Fermi Unit 1, November 19, 2019.

<sup>24</sup> Letter to Alex Smith, Nuclear Waste Program Manager, Washington State Department of Ecology, October 23, 2019. “Its new permit requires only HEPA filtration for abatement and allows up to 534 Curies of Sr-90, for example, to be processed during a year (possession limit). This is in license Number AIR 18-906. The 534 curies exceed the original air permit limit of 380 curies for any radioactive material for atomic numbers 1-83 established in DOH Perma-Fix Air Permits WNI0393- 1 and WN-I0508-1.

<sup>25</sup> U.S. Department of Energy, Hanford Site-wide Risk Review Project Final Report – August 31, 2018, p. F.5-1

<sup>26</sup> Compliance Report, July 11, 2019, PermaFix Northwest, Washington Department of Ecology, Nuclear Waste Program, for inspections on January 30, 2019 and May 20, 2019.

"I asked for the exact time line of events. Mr. Cannon said one of their workers observed the fire and went over and put the fire out with a fire extinguisher. He explained their fire alarms were down at the time.

Ms. Wiegman said they sent us a notification that the fire alarms were down with the alternate method using employee rounds. Ms. Conaway and I acknowledged receipt of the notification.

Note: On April 17, 2019, Becky Wiegman from PermaFix Northwest notified Stephanie Schleif and others from the Department of Ecology the following in an e-mail. [text of email in attachment]

On May 29, 2019, I received a response to my question regarding records showing hourly rounds (in place of fire alarm being out) were completed at the Mixed-Waste facility on May 16, 2019 and May 17, 2019. I received the below response from PermaFix Northwest.

See attached MWF Operations Log for May 16, 2019 thru May 17, 2019. During the investigation of the fire incident, it was discovered that hourly fire rounds were not being performed the night of the fire. From midnight to 4:00 pm on May 16, hourly rounds were being performed by Mixed Waste personnel. When the shift for the Mixed Waste personnel ended, there was a failure to communicate that the Low Level personnel were then responsible for the hourly rounds.

This communication failure has been documented as part of the root cause analysis, and corrective actions are being identified to ensure better communication between facilities.

I observed on the Mixed Waste facility fire inspection rounds that no fire inspections were performed from 1700 hours on May 16, 2019 until 1545 hours on May 17, 2019."

"I asked for more clarity on the events. Mr. Cannon said Mr. Noggles smelled smoke outside and went to Building 8 to look at the cameras in the Mixed Waste Facility. He said Mr. Noggles observed smoke in the Truck Bay on the cameras. Mr. Cannon said Mr. Noggles then ran over and observed the glass monolith on fire and called the fire department. He said Mr. Noggles put the fire out using fire extinguishers. Mr. Cannon said the wood pallet the glass monolith was sitting on, and the packaging material were what caught fire. Mr. Cannon said they made phone notifications about the incident and that the fire was out when the fire department arrived. He explained that PermaFix Northwest employees lifted the monolith and the fire department sprayed underneath to fully extinguish the remaining parts of the wood pallet that were stuck to the bottom of the monolith.

I observed an article that explained they completed a melt of 55 drums of radioactive contaminated sodium wastes on December 20, 2018. I said this sounded a lot like mixed-waste and asked if they have processed any mixed-waste in the GeoMelt system. Mr. Cannon said it was residual sodium, but not at Resource Conservation and Recovery Act

(RCRA) levels. Ms. Wiegman explained the drums were RCRA empty containers processed through the system.”

- July 11, 2019 Ecology Inspection, pp. 19, 20 (emphasis added).

The Ecology Compliance Report ended with a series of concerns:

#### “Concerns

- 1) The fire at PermaFix Northwest could have been catastrophic, as the fire alarms were not working, and hourly fire inspections (in place of the fire alarms) were not being performed when the fire occurred. Additionally, PermaFix stated there are no fire sprinkler systems installed at the Mixed Waste facility due to potential radiological contamination issues. Since the fire alarms were not working, PermaFix Northwest should have ensured that proper fire inspections were performed by facility staff, especially when thermal treatments are being conducted at the Mixed Waste Facility.
- 2) I observed through document review, in numerous cases, that solidification treatments were repeatedly not working from waste being treated in the low capacity mixer. I observed five treatments of the same waste did not meet Land Disposal Restriction treatment limits among numerous others with the records provided. Analysis showed that treatment was occurring without dilution, but not to amounts meeting regulatory requirements. When treatment issues occur, PermaFix Northwest should investigate the root cause in a timely manner or consider other treatment approaches.”

- July 11, 2019 Ecology Inspection Report, p. 55 (emphasis added).

In 2009, DOE discontinued bulk vitrification in large part, due to costs and safety uncertainties. Of concern were the potential for fires and explosions. According to a safety analysis of bulk vitrification prepared for DOE in 2008 major hazards include:

- “Release of NOx gases generated during the melt process. The primary hazardous components of the off gas are NOx. Two of these, nitrogen dioxide (NO<sub>2</sub>) and nitrogen oxide (NO), are toxic to humans at relatively low concentrations
- Release of dried waste product in the form of dust. The hazard is caused by a waste dryer or dry waste product transport equipment confinement failure that creates an airborne dust hazard.
- Leaks and spills during waste transfers within the facility... The caustic waste can cause chemical burns if a worker is wetted by the leak or spill.
- Deflagrations or explosions within process equipment or confinement/containment structures or vessels where grievous injury or death to a facility worker may result from the fragmentation of the process equipment failing or the confinement (or containment) with the facility worker close by - Chemical or thermal burns to a facility worker that could reasonably cover a significant portion of the facility worker's body where self-

- protective actions are not reasonably available due to the speed of the event or where there may be no reasonable warning to the facility worker of the hazardous condition.
- Exposures to radiological or toxic materials of sufficient magnitude that death or ongoing large-scale medical intervention may reasonably be expected to result. Leaks from process systems where asphyxiation of a facility worker normally present may result.”<sup>27</sup>

## Scattered and Fragmented Safety Oversight

The Department of Ecology has not provided an integrated assessment of the Perma-Fix NW operation with the Department of Health. In terms of radiological safety oversight and regulation, it appears that the DOE has a more rigorous and less fragmented set of requirements for its facilities that perform the same kind of work on the Hanford site, than is required by the Washington Department of Health. For instance, Perma-Fix NW would fall under a “Category 3” nuclear facility’ if there is only the potential for "significant localized consequences." According to DOE, “essentially all industrial facilities have a potential for significant localized consequences because the potential to injure workers from typical industrial accidents is always present. However, Category 3 facilities pose additional hazards due to the presence of radionuclides.” The amount of plutonium Perma-Fix NW is allowed to possess is more than 5 times the threshold exposure limit for a Category 3 DOE facility.<sup>28</sup>

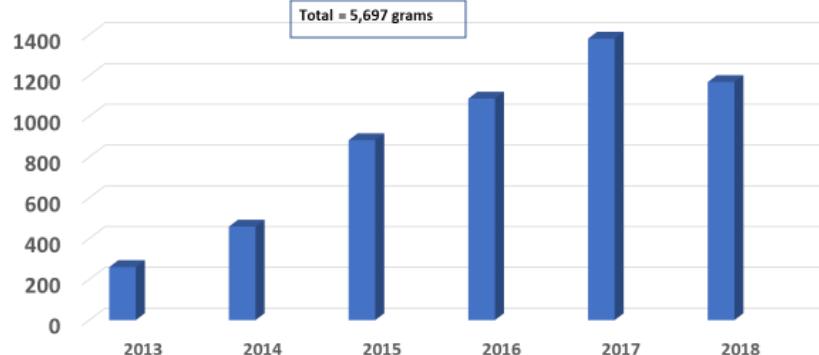
It is not apparent based on the radiological license granted by Washington State that a hazard analysis similar to that for a DOE facility is required.

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<sup>27</sup> Safety Analysis of the Demonstration Bulk Vitrification System, CH2M-36385-FP, Revision 0, 04/08/2008, pp. 15-16.

<sup>28</sup> U.S. Department of Energy, DOE STANDARD HAZARD CATEGORIZATION OF DOE NUCLEAR FACILITIES, DOE-STD-1027-2018 November 2018. Table 1.1.

**Figure 1**  
**Plutonium-239 Processed at Perma-Fix Northwest**  
**2013-2018**  
**(grams)**



### **Increases in the amount of Plutonium processed at Perma-Fix NW**

In October 2018, Perma-Fix NW informed the Washington State Department of Ecology, that “in the near future, Perma-Fix NW 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.”<sup>29</sup> This represents a significant increase in the level of potential hazard to workers and the public.

In 2005 the Washington State Department of Health (DOH) placed an annual possession limit for plutonium-239 at 25 Ci (697 grams)<sup>30</sup> to be processed at the Perma-Fix NW facility. According to Perma-Fix NW annual environmental reports this limit was exceeded in 2015 (883g)<sup>31</sup>, 2016(1,087g)<sup>32</sup>, 2017 (1,381g)<sup>33</sup> and 2018 (1,1186g).<sup>34</sup>

Did Perma-Fix NW seek approval for these increased amounts of Pu-239 and if so, what was the justification the approval(s)?

See Figure 1.

### **A History of Environmental Non-Compliance and Penalties**

<sup>29</sup> Letter from John B. Price SEPA Responsible Official, Washington Department of Ecology, to Richard Grondin, Vice President and General Manager Perma-Fix Northwest Richland, Incorporated, November 2018.

<sup>30</sup> 06-24. 2005 letter from Washington Department Health to Curt Cannon from PeCos (now PERMA-FIX NW ),

<sup>31</sup> PermaFix Northwest, Richland, Annual Monitoring Report for 2015, Table 2.1.

<sup>32</sup> PermaFix Northwest, Richland, Annual Monitoring Report for 2016, Table 2.1.

<sup>33</sup> Permafix Northwest, Richland, Annual Monitoring Report for 2017, Table 2.1.

<sup>34</sup> Permafix Northwest, Richland, Annual Monitoring Report for 2018, Table 2.1.

There is a good reason behind EPA's designation of Perma-Fix NW as a "significant non-complier" with environmental laws: the company has a long and checkered history of failed inspections, violations and penalties. Below is a list of the ones that could be deduced from the public record:

### **Perma-Fix Northwest Compliance Dockets and Penalties**

Date	Topic	Docket #	Agency	Penalty
9/25/2008	Consent Agreement and Final Order -	RCRA-10-2008-0161	EPA	\$304,500

Prior to June 13, 2007, the facility was owned and operated by the former permittee, Pacific EcoSolutions, Inc (PEcoS). On June 13, 2007, the facility was acquired by Respondent [Perma-Fix]. Time of the EPA inspection was on **March 6, 2007**.

**Count 1:** Storage Of RCRA Waste Generated On-site For More Than One Year

**Count 2:** Failure To Dispose Of TSCA PCB Waste In Storage Within 365 Days

**Count 3:** Failure To Manage Mixed-TSCA Regulated PCB Waste In Accordance With The Permit

**Count 4:** Failure To Label Containers Of Dangerous Waste

**Count 5a:** Failure To Determine If A Generated Solid Waste Is A Dangerous Waste [Incinerator Baghouse Dust]

**Count 5b:** Failure To Determine Whether Hazardous Waste Must Be Treated To Meet Land Disposal Restrictions [LDRs]

**Count 5c:** Transporting a Dangerous Waste Without a Manifest

**Count 5d:** Disposal of a Dangerous Waste at an Unpermitted Facility

**Count 6:** Failure to Properly Label Containers of Used Oil

**Count 7:** Failure To File Exception Reports For Waste Shipments With **Unsigned Manifests**

2/1/2011	RESOURCE CONSERVATION AND RECOVERY ACT COMPLIANCE INVESTIGATION REPORT  PFNW was not applying the accumulation start date at the point of generation for their <b>baghouse [incinerator] ash</b> , which is generated from the thermal BPU on the low level side of the plant.  PFNW was accumulating containers of mixed	NEICVP088SE01	EPA	None
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"dangerous" waste for more than 90 days in an area not covered by its permit.

PFNW was storing hazardous waste in an area that was not included in its permit. PFNW has permitted treatment units that have not undergone closure but which received their final quantity of waste several years prior to the NEIC inspection. The following inactive units were observed during the inspection: **Gas vitrification** unit - last used around 1998 or 1999; PFNW has an existing VDOE operating permit that was issued on May 28, 1999. The Waste Analysis Plan (WAP) contained in the current operating permit does not adequately describe how the facility will comply with the requirements of 40 CFR § 264. I3(a). The new application, submitted in May 2009, also does not adequately address current waste sampling frequency or the rationale for ensuring that treated wastes meet the Land Disposal Restrictions (LDR) treatment standards. The waste analysis plan does not fully describe the analysis of incoming wastes used to develop a treatment recipe; Empty containers waiting to be sent back to generators are being stored throughout the facility. PFNW should develop a plan to return the containers in order to maintain inventory control and good housekeeping on-site; Currently, PFNW has a number of tanks and processing equipment that is included in the permit, but is inoperable. The facility's permit should reflect the current operations at the site, and discontinued operations should be closed and taken out of the permit; violations were found during the RCRA inspection in March 2007, and EPA issued an administrative penalty action on September 26, 2008.

7/16/2013	<b>Consent Agreement and Final Order</b> - Findings Failure to determine if a generated hazardous waste is a dangerous waste; storage of mixed waste in units not covered by the Permit, in violation of WAC 173-303-800 and of Permit condition III.A.1; storage of on-site generated waste for more than one year, in violation of condition 2.11 of Attachment LL to the Permit; <i>failure to notify Ecology prior to changes in dangerous waste activity</i> , in violation of WAC 173- 303-060(2); and <i>failure to follow the permit modification process to add additional storage units</i> , in violation of Permit condition I.B.3. At the time of the 2010 Inspection, Respondent had accumulated and stored at least six containers of <b>baghouse ash</b> , a mixed waste, in Building 15 (a unit not covered by	RCRA-10-2013-0106	EPA	\$187,620
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Respondent's permit) for more than 90 days awaiting analytical results.

8/12/2019	<b>Consent Agreement -</b> On or about May 15, 2018, EPA conducted a compliance evaluation inspection of the Richland facility pursuant to Section 3007 of RCRA, 42 U.S.C. § 6927. The EPA alleges that between September 1, 2013 and September 1, 2014, Respondent failed to establish adequate financial responsibility exclusive of legal defense costs in Policy Number PLS-1959292 for bodily injury and property damage to third parties caused by sudden accidental occurrences arising from operations of the Richland facility as required by Permit Condition 1-4a and WAC-173-303-620(8)(a). 3.25. The EPA alleges that Respondent's failure to establish adequate financial responsibility as required by the RCRA authorized regulation at WAC-173-303-620(8)(a) constitutes a violation of Permit Condition 1-4a. 3.26. Under Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and 40 C.F.R. Part 19, EPA may assess a civil penalty of not more than \$37,500 per day of noncompliance for each violation of a requirement of Subtitle C of RCRA, issue an order requiring compliance, or both. EPA has determined and Respondent agrees that an appropriate penalty to settle this action is \$23,375 (the "Assessed Penalty").	RCRA-10-2019-0130	EPA	\$23,375
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Add to the above list the following excerpts from the U.S. Department of Energy, *Continuing Qualification Audit of Perma-Fix Environmental Services Northwest -Richland, WA, May 2009.*

- Although, the Washington Department of Ecology compliance inspector told the DOE auditors that the Perma-Fix facility “is operating in compliance with “regulatory permits and requirements,” he admitted that “Ecology had not conducted and inspection of the PFN facility during the previous few years.” P.13
- A review of waste sampling and procedures by the DOE auditors found that “actual practices used in sampling thermal residues and baghouse ash in the LLW treatment facility were not in conformance with PFN procedures submitted to the EPA. .. inspection of sample storage areas indicated that sample custody was not consistently maintained or documented as required ..[by] EPA requirements and the facility hazardous waste permit. “ p-10
- None of the containers in waste storage “inside and outside” the 90-day accumulation areas were labeled to warn of major risk(s) pertaining to corrosive, flammable substances, as required under state regulation, for emergency response and to determine chemical compatibility. The company had claimed that all wastes in the 90-day accumulation area were “labeled as required,” when in fact that none were not. P. 12

- The facility's chemical laboratory was storing an accumulation of old and expired and potentially hazardous reagents, including poisonous liquids, and spontaneously combustible materials in the same drum. P. 12
- Posting of radiological areas were not in accordance with Washington State regulations. Areas with the potential for airborne contamination were not properly posted to advise workers of the presence of radioactivity. P.18
- The staff were not properly recording the stop and start times for the flow rate when radioactive effluents were being discharged into the air. The audit team reported that, "this information is critical for determining radioactive airborne concentrations." P.19

Perma-Fix NW's history of non-compliance with environmental laws argues against allowing it to expand its production operations, and brings into focus whether this company has the requisite character, competence and integrity to be allowed to operate a nuclear facility which is surrounded by a residential population of over 10,000 persons within a 3-mile radius.

### **Increases in Perma-Fix NW Mission Scope to Include Tank Waste Treatment**

Hanford intends to utilize Perma-Fix NW for near-future treatment of Hanford tank waste, which is currently categorized as high-level waste. A 2018 internal memorandum indicates not only the increased scope of the waste that would go to Perma-Fix, but also internal concerns that even Hanford officials have, at least privately, articulated. For example, a 2018 internal memo<sup>35</sup> reveals --

"The bottleneck in the ETF process for some waste streams is the thin film dryer, which reduces the waste to a powder form. To address this the plant can be modified with a brine load-out port to bypass the thin-film dryer, taking liquid waste to Permafix for grouting (transported in 330 gallon totes). This is the baseline plan for DFLAW. Design for the Brine Load-out/Stabilization will begin in FY19, with installation in FY20. This work is estimated at \$1.8M, of which \$1M has been pulled forward into FY18 to support design and permitting work." p. 6 (emphasis added)

"The brine solution coming to Perma-Fix from ETF would be approximately 82,000 gallons per year, with constituents shown in the table below (Source: Dale Halgren, WRPS ETF Process Engineer, based upon latest WTP Apps data and June 2018 WTP waste characterization estimate).

Table 3, ETF Secondary Waste Production – DFLAW Mission"

Source	Feed Volume (gal/yr)	Brine Volume (gal/yr)	Powder (kg/yr)	Total Drums
242-A PC	3.00E+06	6.95E+03	4.20E+03	20
DFLAW EMF/CS	4.27E+06	6.75E+04	8.07E+04	394
MWT/IDF/Misc	2.00E+06	7.79E+03	1.99E+03	10
<b>Total</b>	<b>9.27E+06</b>	<b>8.23E+04</b>	<b>8.69E+04</b>	<b>424</b>

Table 4, Primary Waste Constituents to LERF

Primary ETF waste Constituents	From DFLAW EMF/CS			From 242-A PC		
	Brine mg/L	Powder mg/kg		Brine mg/L	Powder mg/kg	
Na+	9.64E+04	3.05E+05		6.54E+03	4.19E+04	
NH4+	4.58E+03	1.45E+04		3.14E+04	2.01E+05	
Al+3	1.30E+00	4.13E+00				
Ca+2				2.56E+03	1.64E+04	
SO4-2	2.13E+05	6.75E+05		1.13E+05	7.21E+05	
NO3-	1.02E+03	3.24E+03		3.23E+02	2.07E+03	
Cl-	1.88E+02	5.95E+02		1.01E+03	6.48E+03	
Hg+2	2.11E+00	6.69E+00	LDR	5.20E-02	3.33E-01	
	Brine pCi/L	Powder pCi/g		Brine pCi/L	Powder pCi/g	
99-Tc	8.86E+06	2.80E+04		5.08E+05	3.25E+03	
129-I	8.11E+05	2.57E+03		8.39E+06	5.37E+04	
3-H				1.12E+06		
Constituents	95% Na <sub>2</sub> SO <sub>4</sub>					

Id., p. 7, 8 (emphasis added)

#### “Perma-Fix Permitting:

Permafix is not currently permitted to treat liquid, mixed low-level waste under their existing permit. In Ecology’s letter to Permafix (14-NWP-244 dated December 8, 2014) Permafix was told their permit modification to install two evaporators and five tanks required the following information (A SEPA checklist, which required a supplemental SEPA analysis, a thermal risk assessment, and more detail on whether the waste streams can be treated in the proposed evaporator. Subsequent to this letter Permafix withdrew their permit application and has not submitted a permit modification.” - Id. at p. 8.

The internal memo ends by expressing deep concerns about Perma-Fix NW:

“PermaFix is currently in the process of updating their permit in order to be able accommodate waste coming from LERF/ETF. However, Ecology has yet to approve their permit modifications and Permafix has not submitted the design information to support modifications to their permit to support DFLAW based on the 2014 letter from Ecology. Several concerns as to what the issues might be:

- Permafix was fined in 2016 for improperly handling mixed dangerous and radioactive waste. They failed to “properly designate the waste, storing waste in a non-permitted area, and failing to inspect an area that was found to contain dangerous, potentially cancer-causing substances.”
- Permafix reportedly performed a poor mock-up demonstration for EPA where they punctured a drum containing simulant waste with a forklift.

- Permafix's Class 1 modification to replace a drum mixer was recently rejected by Ecology "due to new knowledge regarding the intent of the process". (Ecology letter 18-NWP-086 dated May 24, 2018 –Rejection of PMR-181 In-Container Mixer Replacement). Permafix will need a Class 1 permit modification and a demonstration test must be conducted before the Class 1 permit modification will be approved. This has not been scheduled. The drum mixer will have to be the same design and capacity that Permafix currently has. No expansion of capacity is being considered.

These concerns should be investigated immediately as it seems unlikely for PermaFix to be approved for their permit modifications in time to support the DFLAW liquid secondary waste mission. Suggest DOE consider treating waste on site to meet LDR requirements, similar to what was done prior to 2008, when capacity existed at Central Waste Complex, WRAP and T-Plant to treat waste." - Id., at 15.

## **Perma-Fix NW Should be Included in Hanford's Air Operating Permit**

Hanford's Air Operating Permit should be amended to include Perma-Fix NW as an emitter stack. The current AOP<sup>36</sup> states –

"In general, the following criteria will be used by Ecology and/or EPA to determine whether a source is to be included in the Hanford Site AOP.

1. Is the percentage of the entity's output provided to DOE Hanford Site operations offices greater than 50%?
2. Do the lease/contract terms indicate that DOE Hanford Site operations offices will control the entity?
  - a) What do the lease/contract terms indicate with regard to pollution control/permitting responsibilities?
  - b) Who accepts responsibility for compliance with air quality control requirements?
  - c) Who accepts responsibility for violations of the requirements?
  - d) Does DOE have the power to issue a stop-work order to the entity for incidents or conditions harmful to the environment?
  - e) Does DOE exercise directing influence over the entities economic or other pollutant-emitting activities?"

Perma-Fix NW relies heavily on the DOE to provide services, and the Hanford Site is responsible for the majority of Perma-Fix NW's business. This was affirmed by the Department of Ecology itself as described in the local newspaper, the Tri-City Herald<sup>37</sup>. In that article, Ecology manager John Price was quoted as saying,

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<sup>36</sup> See [https://fortress.wa.gov/ecy/nwp/permitting/AOP/renewal/Three/AOP\\_00-05-06\\_Renewal\\_3\\_SoB\\_STGC.pdf](https://fortress.wa.gov/ecy/nwp/permitting/AOP/renewal/Three/AOP_00-05-06_Renewal_3_SoB_STGC.pdf)

<sup>37</sup> <https://www.tri-cityherald.com/news/local/hanford/article227254174.html#storylink=cpy>

“When the last environmental study was done in 1998, Perma-Fix said just 20 percent of its business could come from the Department of Energy.

Now the majority of its business comes from the Hanford nuclear reservation and other DOE sites,” Price said.

Perma-Fix did not anticipate handling any transuranic waste — waste with sufficient quantities of radionuclides such as plutonium that triggers a requirement to be disposed of at the nation’s transuranic repository in New Mexico, the Waste Isolation Pilot Plant.

Now Perma-Fix receives Hanford transuranic waste to compact and pack it for return to Hanford until the New Mexico repository is ready to take it.

DOE has arranged for the RL contractor (via budget guidance) to send sufficient waste volumes to Perma-Fix to keep Perma-Fix operating, exercising direct influence over Perma-Fix’s economic and polluting-emitting activities, particularly with respect to transuranic contaminated waste. In addition, DOE has a primary interest in the Perma-Fix permit, such that the Department of Ecology identified a “strategic alignment” with DOE to reissue the Perma-Fix permit as a 2019- 2021 Initiative.<sup>38</sup>

Further, the DOE has conducted at least one audit<sup>39</sup> and demanded corrective action reports from Perma-Fix NW, which is certainly an indicia of influence and control.

For the foregoing reasons, it is apparent that the Department of Ecology and the EPA need to revisit their past determination that exempted Perma-Fix NW from the Hanford Air Operating Permit.

## Conclusion

Perma-Fix NW is applying for a Permit Modification that would increase its production capacity. Yet, Perma-Fix NW is operating under an expired permit (and has done so since 2009) and its applications to renew this permit have been found deficient for four years by the Department of Ecology. By way of example, letters 18-NWP-165, “Perma-Fix Northwest Letter of Incompleteness for Remaining Sections of Permit Renewal Application Revision 3, Site Identification Number WAR 00001 0355”, October 11, 2018, and 16-NWP-001, “Perma-Fix Northwest Letter of Incompleteness for Process Section of Permit Renewal Application Revision 3, Site Identification Number WAR 00001 0355,” January 5, 2016.

As a result, and because of the tortured regulatory history of Perma-Fix NW and its many incidents, accidents, regulatory failures, and a history of non-compliance, any increase in

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<sup>38</sup> See 20-NWP-022, “Re: Federal Fiscal Year (FFY) 2020 Budget and Integrated Priority List,” January 28, 2020, Ecology/EPA/DOE Strategic Alignment Map. Located at <https://pdw.hanford.gov/document/AR-03470>.

<sup>39</sup> U.S. Department of Energy, Continuing Qualification Audit of Perma-Fix Environmental Services Northwest - Richland, WA, May 2009.

production rate as is proposed, is not appropriate. Accordingly, we urge the Department of Ecology to deny the Permit Modification. Further, we request that the Department of Ecology and the EPA reconsider its past decision to exempt the Perma-Fix NW facility from the Hanford Air Operating Permit, and to include Perma-Fix NW emissions as a Hanford stack.

Submitted by,

A handwritten signature in blue ink that reads "Tom Carpenter".

Tom Carpenter, Executive Director  
Hanford Challenge