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FEB 06 2020

Department of Ecology  
NWP - Richland

February 2, 2020

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

And

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

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

Dear Ms. McFadden and Mr. Bartus:

I am writing 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. The notification was dated January 27, 2020, for a comment period from January 24, 2020 to March 24, 2020. The modification was defined to include clarification and updates to operational requirements of the In-Container Mixer Unit at their mixed waste facility.

The permit modification request changes in the permit were limited to the Permit Conditions and Sections CC, FF, PP, and VV. In Summary:

**Changes to the Permit Conditions Section** of the permit requires documentation of the In-Container Mixing System to be placed in the operating record for each waste stream to be treated. Inspections of the catch pan, freeboard for containers during mixing, TSCA waste prohibitions, and sampling frequency (per the waste analysis plan) are defined. Solids to be treated are to be, by visual inspection, less than 5 mm in particle sizes OR which can be slurried with water to create a homogeneous mixture without adversely affecting the impeller or container. The date of the permit section is changed from **July 12, 2013** to January 16, 2020.

**Changes to Permit Attachment CC (Waste Analysis Plan)** describe and limit the In-Container Mixing particle sizes and operations, and establish qualitative means to determine completion of mixing. Solids particle sizes are **limited to 5 millimeters**. The date of the permit section is changed from August 24, 2018 to January 16, 2020.

**Changes to Appendix A of Permit Attachment CC (Waste Analysis Plan)** add sampling after the use of the In-Container Mixer, and change the date of the permit from **September 3, 1999** to January 16, 2020.

**Changes to Permit Attachment FF (Personnel Training)** add a training requirement for operators of the In-Container Mixing Unit to include operations and **qualitative identification** of the completion of mixing. The date of the permit is changed from May 14, 2013 to January 16, 2020.

**Changes to Permit Attachment PP (Process Engineering Description for Stabilization Building)** are limited to addition of inspection and operations of the In-Container Mixing System TT-03, **deletion of treatability tests**, addition of a “Treatment Plan” based on “careful consideration”, and use of a telescoping shaft on the mixer blade. Use of 85 gallon overpack drums is deleted. Solids from generators “**meeting the criteria**” are also identified as allowed. Drum ventilation is clarified. The operating record is clarified. A **200 degree F** temperature limit is established. The process ventilation system replaces a baghouse with a cyclone dust separator. Container freeboard is established. The maximum liquid waste flow rate is updated to be *75 gallons of liquid waste* per hour (1071 lb. of solid waste per hour). This previous limit was one 55 gallon drum *of stabilized waste* per hour. (7 cubic feet per hour with a density of 110 lb/cubic foot is deleted). The room containing the In Container Mixer (SB-08) is required to meet “all” requirements for secondary containment. The date of the Permit Attachment is changed from August 24, 2018 to January 16, 2020.

**Changes to Permit Attachment VV (Technical Specifications for Stabilization Building Processes)** are limited to the cover page, Equipment Datasheet 15140, Pumps, (information is deleted for suspended solids diameter, inlet pressure, air consumption, and lift, etc.) Maximum temperature of **120 degrees F** is unchanged. Specific gravity of 0.9 for solids is unchanged. Viscosity units of “SSU” are not defined. Materials are changed from stainless steel to plastics. The container pump manufacturer’s specification is added to the attachment. The specification identifies an operating temperature range up to 70 degrees C (**158 degrees F**). Erosion is not discussed. Material compatibility with waste compositions is not discussed. Basis for material selection is not discussed. The date of the Permit Attachment is changed from January 12, 2013 to January 16, 2020.

1. I appreciate having the redline documents to review. It would be even more helpful if Ecology will place the entire permit on-line so that reviewers can see if there are any changes that should have been made to other sections of the Permit.
2. The changes to the permit state that the 5 millimeter limit for solids is to be evaluated visually or is to be ignored based on a subjective judgement that the size will not impair the impeller or the container. Why are visual and subjective evaluations appropriate? What data are available to show the requirements of the equipment to resist solids/erosion? What data are available to show that operators can “eyeball” 5 mm

particles in a slurry objectively? Large, dense particles can sink to the bottom and resist mixing. A more robust method may be needed. What measurements or certifications are provided by the waste generator to verify particle sizes and solids density meet the limits?

3. No objective criteria are provided to prove success in qualitative training for meeting the mixing criteria. What sample data and test runs provide a basis to show that the qualitative criteria are valid for homogeneous mixing? That operators can implement them correctly? How do the operators see the waste if it is under a hood? What impact do these observations have on personnel doses, since the waste is radioactive?
4. Treatability tests are deleted in favor of “careful consideration.” How does subjective “consideration” substitute for controlled tests and measurements? Hanford waste, for example, requires a treatability analysis in order to process waste at LERF/ETF. No justification is provided for the deletion in this permit. Isn’t a test necessary to meet acceptance criteria for the disposal facility?
5. How generators are to document that solids “meet the criteria” is not defined in Section PP. The criteria are not referenced at the point where the generator requirement is established. It would help if the criteria were referenced when they are cited.
6. The 200 degree F temperature limit for the waste in the process engineering description exceeds the 120 degree and 158 degree temperature limits described in the Technical Specifications.
7. The previous limit on solidified liquid waste was one 55-gallon drum of waste per hour. This was 7 cubic feet per hour at a density of 110 lb/cubic foot, equal to 770 lb/hour. The new limit is 75 gallons of liquid waste per hour (resulting in 1,071 lb of solid waste/hour). The old mass limit was 770 lb/hr of solidified liquid waste. The new mass limit is 1,071 lb of *solidified* liquid waste per hour. This is an increase of 39%.

Does the rest of the equipment and the SEPA analysis support the increased throughput?

The liquid feed rate previously would have been far less than 55 gallons per hour. The volume of liquid waste feed establishes the source term. As a result the feed liquid flow rate should be included in the permit so that it can be monitored directly for comparison with the Part A possession quantities.

8. The In-Container Mixing Room secondary containment requirements are not specifically identified in Section PP. What are they? Is there a reference?



9. Information is deleted on the equipment data sheet (Section VV); the new equipment selection does not cite any erosion or corrosion evaluation. Material compatibility and key operating parameters should be provided.
10. Does the cyclone dust separator (Section PP) have a basis that makes it equivalent or better than the baghouse filter? Where is the separator waste disposed?
11. The Perma-Fix Dangerous Waste permit expired in 2009 and has not been renewed, in favor of making smaller modifications. According to the March 10, 2019 Tri-City Herald article<sup>1</sup>: *“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.”* 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.”*

Applications to renew this permit have been found deficient for four years by the Department of Ecology. For example, see 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, any increase in production rate as is proposed, is not appropriate.

12. Perma-Fix Northwest has been identified as one of the facilities excluded from the Hanford Air Operating Permit, No. 00-05-006, Renewal 3. According to the Statement of Basis, Ecology has concluded these activities are not under the common control of DOE Hanford Site operations offices, and, consequently these facilities are not part of the Hanford Site. However, one of the criteria for this decision (See item 1 on Page 9 of the Statement of Basis for Standard Terms and General Conditions<sup>2</sup>) asks if the percentage of the entity’s output to DOE Hanford Site Operations Offices is greater than 50%. Another criterion is whether DOE exercises *direct influence* over the entities’ economic or other pollutant-emitting activities.

In the first case, the Department of Ecology has already pointed out that the majority of Perma-Fix business arises from Hanford Site Waste (per the March 10, 2019 Tri-City

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<sup>1</sup> <https://www.tri-cityherald.com/news/local/hanford/article227254174.html>

<sup>2</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)



Herald). This is confirmed by EPA online records<sup>3</sup>. And DOE bears RCRA “cradle to grave responsibility” for mixed waste arising from Hanford or other DOE sites, such as Idaho.

In the second case, 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>4</sup>.

In addition, future work is identified in Ecology’s DOE Budget Priorities Letter for FY2021 (18-BUD-0083, Planning Data Sheet 3 of 5), which calls for certification of large/small containers and TRU waste disposition at “PFNW,” which is “Perma-Fix Northwest.

As a result, I would appreciate if EPA and Ecology will consider whether Perma-fix should be treated as a Hanford stack for Air Permit purposes, dose evaluation purposes, and purposes of public availability of documentation.

13. EPA wrote specifically about the Perma-Fix RCRA/Dangerous Waste Permit in the context of maintaining permits, in a January 2016 report.<sup>5</sup> In this report, EPA described a Perma-Fix Class 3 permit modification in which Perma-Fix sought to install new evaporators, increase storage capacity, allow storage of mixed waste in tanker trucks, and *replace its vitrification system*. Ecology noted that the modification was missing a thermal risk assessment work plan, demonstration test, and information on the proposed wastewater streams proposed to be treated in the evaporation systems. Perma-Fix did not supply the requested information and responded by rescinding the permit modification request. The long delay in maintaining this permit current allows an unknown amount of changed work to go on without adequate review.

For example, Perma-Fix advertised in a January 25, 2020 News Feed<sup>6</sup> that Veolia

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<sup>3</sup> [https://ofmpub.epa.gov/enviro/rcrainfoquery\\_3.facility\\_information?pgm\\_sys\\_id=WAR000010355](https://ofmpub.epa.gov/enviro/rcrainfoquery_3.facility_information?pgm_sys_id=WAR000010355)

Links to Biennial Report Summaries are provided at this web site.

<sup>4</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>5</sup> EPA-530-R-15-001, *Permit Modifications Report, Safeguarding the Environment in the Face of Changing Business Needs*, January 2016. Located at: [https://www.epa.gov/sites/production/files/201601/documents/permit\\_mod\\_report\\_final\\_508.pdf](https://www.epa.gov/sites/production/files/201601/documents/permit_mod_report_final_508.pdf).

<sup>6</sup> See <http://www.perma-fix.com/news.aspx>, as of January 22, 2019. Pages 4-5 are enclosed.



Nuclear Services has installed a new vitrification system (GeoMelt®) to treat radioactively contaminated reactive metal waste. This equipment is “cooperatively installed and operated” by Perma-Fix Northwest at the Perma-Fix Richland, WA location. Perma-Fix advertised that the GeoMelt demonstration “illustrates the unique nature of our facilities, permits, and capabilities.” Perma-Fix appears to have installed and operated new mixed waste equipment under this dangerous waste permit, without providing the information that Ecology had requested. The work is actually contrary to the permit, given that thermal treatment of reactive metals (sodium metal is pyrophoric) is not part of the Part A permissions. The adaptation of the Perma-Fix ventilation system to handle Veolia’s GeoMelt® equipment, has not been reviewed. The operation of the GeoMelt equipment is shown in a “youtube” video<sup>7</sup> does not discuss off-gas treatment at all, and does not show shielding for personnel moving vitrified waste. Text provided with this video states that:

*The GeoMelt® technology converts radioactive, hazardous, and mixed wastes into a volume-reduced robust, obsidian-like inert glass form for safe disposal. The GeoMelt® Richland System is the third GeoMelt® facility in operation and is located at the Perma-Fix facility, close to the Hanford site (U.S.A). Veolia Nuclear Solutions will use its GeoMelt® Richland System to treat radioactive contaminated sodium wastes shipped in Fermi Drums that were received at the Idaho National Laboratory in the 1980s.*

I have not seen any public review that has been conducted for including the GeoMelt® system in the Perma-Fix Permit. Yet it is installed and is being operated. Perma-Fix further advertised a demonstration of Laser Ablation system for decontamination on July 17, 2019, without an evaluation that no hazardous waste was present (chromium being a common contaminant arising from metals). Laser technology is also not evaluated in the permit.

14. EPA, in a recent review of enforcement actions<sup>8</sup> identified that Perma-Fix paid a penalty of \$23,375 and entered into a consent agreement in 2019 due to alleged failure to maintain appropriate third party liability financial assurance requirements. In 2012-2014, the facility’s liability insurance policy did not provide adequate coverage for third party [e.g. to the public?] bodily injury and property damage claims. The Consent Agreement from this enforcement action<sup>9</sup> identifies Perma-Fix as the owner and operator, yet Perma-Fix is now providing a home to the GeoMelt® equipment that is owned by VEOLIA, and is advertising that the Perma-Fix permits provide regulatory coverage. Has Perma-Fix adequately provided insurance for the equipment that is owned and operated by others? This is important, based on releases elsewhere at DOE Facilities, such as at Portsmouth,

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<sup>7</sup> See <https://www.youtube.com/watch?v=72kOy0wdDjM>.

<sup>8</sup> See <https://www.epa.gov/newsreleases/recent-epa-enforcement-cases-throughout-pacific-northwest>

<sup>9</sup> [https://yosemite.epa.gov/OA/RHC/EPAAdmin.nsf/Filings/C40A4F93BB3775548525845600634CCF/\\$File/RCRA-10-2019-0130%20-%20Perma-Fix%20Northwest%20Richland,%20Inc.%20-%20CAFO.pdf](https://yosemite.epa.gov/OA/RHC/EPAAdmin.nsf/Filings/C40A4F93BB3775548525845600634CCF/$File/RCRA-10-2019-0130%20-%20Perma-Fix%20Northwest%20Richland,%20Inc.%20-%20CAFO.pdf)



where public schools and private residences may have been contaminated.

15. Changing a date for the entire permit section from September 3, 1999 for example, to January of 2020, based on limited changes can give the impression that the entire section has been updated. Yet this permit has expired. Ecology should publish the expiration date on every page of the permit.
  
16. Ecology advertised a renewal SEPA-EIS to support permit renewal in Publication No. 19-05-003, with a draft to be available by the end of 2019, but no draft has been released for public review. Ecology requested input from Perma-Fix in For example, see letter 18-NWP-179, "*State Environmental Policy Act (SEPA) scoping for Perma-Fix Northwest Dangerous Waste Regulations Permit,*" November 2, 2018.
  
17. As noted above, Perma-Fix has installed equipment, owned by others (Veolia) that is not covered by the Dangerous Waste Permit, but has advertised that the work is permitted. **Figure 1** shows that the Perma-Fix Facility is treating reactive metals by vitrification, which is not covered by permit *WAR 00001 0355*. On September 12, 2018, the Washington Department of Health issued a Final Approval for Notice of Construction for this equipment, (AIR-18-906) but failed to evaluate the off-gas system or hazards associated with treating reactive metals. The Department of Health noted that Perma-Fix had identified the GeoMelt equipment as a "**temporary**" operation, but gave no expiration date for the air permit. GeoMelt Vitrification and its off-gas system are not described in the Department of Health process information. The Figure 1 news release does not identify this as a temporary arrangement. Ecology should evaluate this process, and the hazards to the growing community and businesses adjacent to the Perma-Fix plant. Ecology should evaluate whether Veolia should permit its own equipment, as the liability for its operation appears to be unclear. This equipment is also not covered in the existing Perma-Fix SEPA/EIS.
  
18. Further, Veolia has previously installed equipment that was contrary to its lease requirements. On April 17, 2019, the Port of Benton found that Veolia made tenant improvements not approved by the Port of Benton<sup>10</sup>. Subsequently, meeting minutes from June 12, 2019 show that the Port of Benton reviewed a lease extension request for Veolia, based on Veolia obtaining the necessary local, state, and *environmental permits* for the technology base,<sup>11</sup> with plans required to be submitted prior to approval of

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<sup>10</sup> See [https://portofbenton.com/tricities/wp-content/uploads/2019/05/Minutes\\_4-17-19.pdf](https://portofbenton.com/tricities/wp-content/uploads/2019/05/Minutes_4-17-19.pdf)

<sup>11</sup> See <https://www.nuclearsolutions.veolia.com/en/our-expertise/technologies/our-modular-vitrification-system-mvs-stabilize-liquid-waste>

construction<sup>12</sup>. No such review was performed for the GeoMelt installation at Perma-Fix. Veolia's Port of Benton lease is described as being located at 2345 Stevens Drive, in Richland, close to homes and businesses, according to August 8, 2018 meeting minutes<sup>13</sup>. Ecology's Nuclear Waste Program web page does not list any Veolia permit.

19. EPA performance and compliance history for Perma-Fix is available on a web page, ECHO.EPA.GOV<sup>14</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. According to EPA's web page, 10,324 people live within 3 miles of the Perma-Fix Facility. These numbers may be low, due to extensive housing construction in the north Richland and Horn Rapids areas.

These comments provide a number of reasons why this permit modification should not be approved, at least as far as expanding waste processing rates. EPA and Ecology should ensure that this permit is re-examined. It does not make sense for DOE, which owns hundreds of square miles of nuclear reservations, to ship mixed waste into local communities.

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Veolia Nuclear Solutions technology base appears to include additional, induction based modular vitrification, <https://www.nuclearsolutions.veolia.com/en/our-expertise/technologies/our-modular-vitrification-system-mvs-stabilize-liquid-waste>

<sup>12</sup> See [https://portofbenton.com/tricities/wp-content/uploads/2019/07/Minutes\\_6-12-19.pdf](https://portofbenton.com/tricities/wp-content/uploads/2019/07/Minutes_6-12-19.pdf)

<sup>13</sup> See [https://portofbenton.com/tricities/wp-content/uploads/2018/09/8-8-18\\_Minutes.pdf](https://portofbenton.com/tricities/wp-content/uploads/2018/09/8-8-18_Minutes.pdf)

<sup>14</sup> See <https://echo.epa.gov/detailed-facility-report?fid=110008062452>.



## NEW GEOMELT® VITRIFICATION SYSTEM SUCCESSFULLY COMPLETES HOT COMMISSIONING AND FIRST DEMONSTRATION MELT



JANUARY 22, 2019

Perma-Fix Environmental Services, Inc. (NASDAQ: PESI) announced that Veolia Nuclear Services (VNS) (<http://www.nuclearsolutions.veolia.com>) new 10-tonne GeoMelt® In-Container Vitrification (ICV™) plant, cooperatively installed and operated by Perma-Fix at the Perma-Fix Northwest (PFNW) facility in Richland, Washington ([pfnw.aspx](http://www.pfnw.aspx)), has successfully completed hot commissioning and its first in a series of demonstration melts for the US Department of Energy (DOE) Idaho National Laboratory (INL) to treat sodium contaminated radioactive wastes.

The contract with the INL to treat the sodium contaminated wastes follows successful engineering scale demonstrations of the patented GeoMelt® technology earlier in the year. The goal of the engineering scale testing was to confirm the ability of the GeoMelt® technology to create a safer treatment approach that lowers the lifecycle cost to disposition radioactive contaminated reactive metal waste streams resulting from decommissioning sodium cooled reactors. The demonstration, supported by glass formulation and crucible testing, consisted of a series of bench scale ICV™ melt

that processed elemental sodium into a stable non-reactive form.

The objective of the new INL contract, awarded in September to VNS Federal Services LLC (VNSFS), is to demonstrate at full-scale the treatment capabilities of the GeoMelt® technology by chemically converting the reactive metals to an inert oxide, thereby delisting the sodium hazard in the waste and immobilizing and stabilizing the radioactive contamination. Under the agreement, Perma-Fix and VNS ([www.nuclearsolutions.veolia.com](http://www.nuclearsolutions.veolia.com)) will treat the drums contaminated with radioactive sodium wastes. The Fermi Drums were received at INL in the 1980s. They were contaminated with low-level radioactively contaminated elemental sodium from the Enrico Fermi Atomic Power Plant and have been maintained at INL for decades. However, as a credit to the partnership with INL, the maturity of the technology and an aggressive construction schedule, the team successfully completed the first melt of 55 drums of radioactive contaminated sodium wastes on December 20, 2018.

Mark Duff, Perma-Fix President & CEO, stated, "I am pleased to report we successfully completed hot commissioning and an important demonstration project for the US Department of Energy Idaho National Laboratory to treat sodium contaminated radioactive wastes. Expanding our PFW facility to accept and treat sodium contaminated radioactive wastes provides outlet for these wastes that is not currently available. This successful demonstration marks an important milestone in our partnership with Veolia Nuclear Solutions and illustrates the unique nature of our facilities, permits and capabilities. Importantly, we continue to execute on our strategy to broaden our market base by treating complex waste streams through new technologies and partnerships within our industry."

### RELATED ARTICLES:

Perma-Fix Announces New GeoMelt® Vitrification System Successfully Completes Hot Commissioning and First Demonstration Melt (January 22, 2019): [CLICK HERE TO READ \(https://www.perma-fix.com/press-releases/detail/4787/perma-fix-announces-new-geomelt-vitrification-system\)](https://www.perma-fix.com/press-releases/detail/4787/perma-fix-announces-new-geomelt-vitrification-system) the Perma-Fix Press Release

Veolia Announces New GeoMelt® Vitrification System Successfully Completes Hot Commissioning and First Demonstration Melt (January 22, 2019): [CLICK HERE TO READ \(https://www.nuclearsolutions.veolia.com/en/media/news/new-geomelt-vitrification-system-successfully-completes-hot-commissioning-and-its-first-demonstration-melt\)](https://www.nuclearsolutions.veolia.com/en/media/news/new-geomelt-vitrification-system-successfully-completes-hot-commissioning-and-its-first-demonstration-melt) the Veolia Press Release

<http://www.perma-fix.com/news.aspx>

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Figure 1. Perma-Fix Advertises Veolia Geomelt Process for Reactive Metal Waste.  
From <http://www.perma-fix.com/news.aspx>