



Sent via email

Laura Watson, Director
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RE: U.S. DOE Surveillance Report on Effluent Treatment Facility and Acetonitrile treatment and Request for Public Hearing

Dear Director Watson,

I am writing to express our concerns and request action based upon a DOE Surveillance entitled, "Surveillance of the Washington River Protection Solutions LLC Process Hazard Analysis for Effluent Treatment Facility Acetonitrile Treatment Project, DOE-ASMT-2021-3251, August 27, 2021."

Specifically, we are concerned that potentially hazardous working conditions involving the future operation of a waste treatment facility were overlooked by the contractor and the regulators. Secondly, we are concerned that the treatment plan calls for sending ETF waste over to Perma-Fix Northwest to be grouted, when that waste form will apparently contain very high levels of acetonitrile. Third, there is no obviously-stated disposal path for this highly-contaminated waste.

Based on the abovementioned publicly unavailable DOE surveillance report, and the new information in it, we request that the Department of Ecology hold a new public comment period so the public has an opportunity to make comments on the record, with responses to those comments made publicly available.

This surveillance was conducted by a DOE team to analyze problems identified during a review of WRPS's plans to start up the Effluent Treatment Facility (ETF), which will be handling liquid waste coming out of the vit plant and from other sources, including tanks. [Here is the [Ecology Fact Sheet on ETF, 2021](#)]

DOE states in its report, "After another year of [extensive equipment upgrades](#), EM Office of River Protection (ORP) tank operations contractor Washington River Protection Solutions (WRPS) is conducting its fiscal 2022 processing campaign at the [Hanford Site](#)'s Effluent Treatment Facility (ETF) with a goal to process approximately 1 million gallons of wastewater over the next few months. The facility removes radioactive and hazardous contaminants from wastewater generated by tank waste activities, groundwater projects, solid waste disposal facilities and other Hanford cleanup activities."

The [ETF](#) is being upgraded to support the Direct-Feed Low-Activity Waste ([DFLAW](#)) Program for treating tank waste by immobilizing it in a glass form. When fully operational, Hanford's [Waste Treatment and Immobilization Plant](#) will be the primary generator of liquid waste to be treated by the ETF.

This document raised numerous issues with WRPS for failing to appropriately identify and/or guard against the toxic vapor concerns associated with the Acetonitrile Treatment Project. Acetonitrile is a very toxic compound of cyanide, dangerous in tiny doses. The ETF Steam Stripper Project was initiated to remove acetonitrile from the Waste Treatment and Immobilization Plant effluent to be processed at ETF during direct-feed low-activity waste. The acetonitrile must be removed to meet RCRA requirements.

Acetonitrile is also known as Methyl Cyanide. According to the MSDS, "Potential Acute Health Effects: Severe overexposure can result in death. Potential Chronic Health Effects include: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED]. The substance is toxic to blood, kidneys, lungs, liver, mucous membranes, gastrointestinal tract, upper respiratory tract, skin, eyes, central nervous system (CNS). The substance may be toxic to the reproductive system. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs." **The permissible occupational exposure limit is 20 ppm. The Immediately Danger to Life and Health (IDLH) level is 137ppm.**

By contrast, the DOE Surveillance indicates that concentrations as "could reach up to 463,343 ppm in the concentrator condensate tank vent, which is connected to the vessel offgas system..." (emphasis added).

The document continued, "The assessment was initiated due to lack of consideration of the acetonitrile toxicological hazards in the original HAZOP, which led to a request from the Tank Farm Programs Division (TPD) manager to review the process to ensure compliance with workers safety and health laws, standards, and practices." (emphasis added).

The DOE Surveillance listed key "Opportunities for Improvement":

"OPPORTUNITY FOR IMPROVEMENT 0-01: Recommended modification of WRPS procedure TFC-ENGDESIGN-C-47 to require conducting a process HAZOP where significant workplace chemical hazards may exist regardless of the facility's radiological inventory or funding source. The application of the process HAZOP methodology for significant chemical hazards addressed the requirements of 29 CFR 1910 and 10 CFR 851 (cited above) and was viewed as a technical rigor improvement that would enhance the overall worker safety posture and ensure compliance with these codes, which did not differentiate between facilities based upon radiological inventory or funding source."

"OPPORTUNITY FOR IMPROVEMENT 0-02: The assessors could not confirm that all open items from the original HAZOP were tracked to closure. Because TFC-ENG-DESIGN-C-47 was not required for less than hazard category 3 facilities, this was sited as an opportunity for improvement (OFI), not an adverse condition. Recommended strengthening the procedure to emphasize comprehensive recording and tracking of all open items is a requirement."

"The mass and energy balance calculation performed in the RPP-CALC-63989, "ETF Steam Stripper Process Vent LFL Calculation," report indicated that the acetonitrile concentration could reach up to 463,343 ppm in the concentrator condensate tank vent, which is connected to the vessel offgas system and normally under negative pressure with respect to atmosphere, and could reach 49,910 ppm (H-2-

839048 SHI) in the vapor leaving the concentrator column, which is estimated to be at 12 inches water gauge positive pressure with respect to the surrounding equipment room in which it was installed."

"WRPS designers stated they performed modelling to observe the effects of a hypothetical spill from the condensate tank but did not perform any modeling or calculations to determine the effect of a vapor leak. Despite having multiple columns and flanged piping connections with very high concentrations of acetonitrile in vapor phase, the WRPS Industrial Hygiene (IH) team only modelled acetonitrile spills in liquid phase. During the June 7 interview with WRPS IH, it was determined that WRPS IH was unaware of the presence of a vapor-phase contaminant and was not consulted or made aware of this aspect of WRPS engineers originally stated that acetonitrile in the vapor phase would essentially be at atmospheric pressure, and thus there will be no large motive force that would cause a significant acetonitrile leakage from the flanges/fittings to enter the room." (emphasis added).

"OPPORTUNITY FOR IMPROVEMENT 0-03: WRPS did not evaluate or assess whether the concentration of acetonitrile in the worker breathing space, due to leakage from the pressurized portions of the system of vapor phase acetonitrile, would be below the 29 CFR 1910 limits."

"OPPORTUNITY FOR IMPROVEMENT 0-04: Recommended modification of WRPS Design Process and I PrHA procedures to specify IH participation at each stage of the design review process, and during HAZOP, such that they would be informed of all aspects of design, and consulted regarding potential associated industrial hygiene hazards."

"In general, the design team and the HAZOP process appeared to have focused primarily on hazards associated with condensed acetonitrile liquid and had not considered the toxicological hazard to workers associated with the high concentration of acetonitrile in vapor phase."

Hanford Challenge offers the following comments:

- This surveillance should have had findings and not "opportunities for improvement," because of the omission of significant vapor hazards from acetonitrile that rendered the hazards analysis inadequate to support design.
- In addition, the surveillance was limited to hazards analysis procedure and did not extend itself into the design process scope. How was this process selected? Why was it selected - how does it match up with the design-safety hierarchy to first have solutions that are designed for safety? Where was Quality Assurance?
- How could the contractor have selected this process when there is no disposal pathway for the concentrated acetonitrile? How could that happen if DOE needs to get a DOE Order 435.1 exemption before sending off-site? What alternatives are being used for disposal? Where is the preferred onsite treatment?
- What is being done to protect workers from the contents of the process and tanks? Are there design changes planned for the ETF ventilation system?
- Why was this hazard not identified long ago in the decades of interface control documents (ICDs) revisions and treatability studies being done for ETF/WTP?

- Dumbing down findings and deliberately limiting scope of reviews is a hallmark of the DOE/contractor partnership in failure.
- There have been worker exposures at ETF in the recent past (2018). <https://www.tricityherald.com/news/local/hanford/article222713370.html>

Concerns Relating to RCRA and Treatment Alternatives:

DOE told Ecology in the secondary waste plan in December that the concentrated acetonitrile distillate (produced in the steam stripper) would meet disposal criteria as generated, and it only needs solidification at PFNW. Is this information correct? The concentration as identified in the surveillance documents far exceed the treatment standards:

Acetonitrile Data

Concentrator Condensate Tank (Stream 302)

Acetonitrile 4.2309 lb/hr

Total Stream lb/hr 184.2393

PPM = 22,964 ppm Acetonitrile (2.3 wt%) (emphasis added).

- Source: RPP-RPT-63989, "Effluent Treatment Facility (ETF) Steam Stripper Process Vent Lower Flammability Limit (LFL) Calculation Report," February 2021

"The acetonitrile would need to be removed in order to ensure the ETF grouted brine waste stream would meet the Resource Conservation and Recovery Act's Land Disposal Restrictions for organic compounds." [Establishes delisting for the brine, but not the acetonitrile distillate.]

- Source: DOE Surveillance of the Washington River Protection Solutions LLC Process Hazard Analysis for Effluent Treatment Facility Acetonitrile Treatment Project, DOE-ASM T-2021-3251, August 27, 2021.

"The Concentrator Column is a packed bed with condensed Stripper Column vapor entering the top of the packing, and steam entering the bottom. Liquid at the bottom of the column is recycled to Stripper Column feed. Vapor leaving the top of the column, containing most of the organics fed to the Steam Stripper System, is condensed prior to transfer to a Distillate Storage Tank where it is stored awaiting disposal."

- Source: RPP-RPT-62702, Rev 0. "Effluent Treatment Facility (ETF) Steam Stripper Hazard and Operability Study (HAZOP) Report," November 2020.

"Distillate from steam stripping, containing essentially all acetonitrile present, will be accumulated in a Distillate Storage Tank prior to disposal. Several disposal options are currently under investigation."

- Source: RPP-RPT-62821, Rev B, February 2021, "Effluent Treatment Facility (ETF) Acetonitrile Steam Stripper Hazardous Area Classification."

“The treatment and disposal pathway for the concentrated acetonitrile distillate secondary waste stream will be part of another permit modification and the public will have the chance to review it. Ecology will ensure the concentrated acetonitrile waste stream is treated, stored and disposed of at an approved facility and in full compliance with dangerous waste regulations and applicable permits in a manner fully protective of human health and the environment.”

- Source: “Response to Comments Effluent Treatment Facility Supplemental Organic Treatment permit modification,” Publication 21-05-025, Department of Ecology, August 22, 2021.

“3.4.3 Acetonitrile Distillate - The new waste stream to be generated from the ETF primary treatment train is the acetonitrile distillate. This waste stream will be generated from operating the new supplemental organic treatment capability from the steam stripper system.

The WTP DFLAW effluent source is the only waste stream currently anticipated to be treated by the steam stripper system. When the new steam stripper system is operating, the acetonitrile distillate will be generated. The waste stream will meet treatment standards as generated. The waste stream will be shipped offsite **to PFNW** to perform solidification treatment to meet the IDF waste acceptance criteria.” (emphasis added).

- Source: DOE/ORP-2021-05, Rev 0, “DIRECT-FEED LOW-ACTIVITY WASTE SECONDARY LIQUID AND SOLID WASTE WORK PLAN,” December 16, 2021.

The universal treatment standard for acetonitrile (methyl cyanide) is 5.6 mg/L for wastewater, and 38 mg/L for non-wastewater. Per 40 CFR 268.48.

The concentration of acetonitrile in the distillate is 22,694 ppm (mg/L). So it appears that this stream cannot meet standards to be grouted upon treatment with the steam stripper. This is newly generated dangerous waste, created in WTP vitrification. Grouting may not be acceptable. Use of PFNW is not approved per DOE Order 435.1 exemption, nor has DOE justified this in the face of the preferred approach to treat waste onsite. In addition, the DOE surveillance document (DOE-ASM-T-2021-3251) shows that vapor hazards were ignored when selecting the steam stripping process.

In a letter dated January 2022, Ecology wrote, “Ecology received the submittal of the referenced [“Direct Feed-Low-Activity Waste Secondary Liquid and Solid Waste Work Plan,” DOE/ORP-2021-05 Revision 0,] document on December 16, 2021. Ecology is extending the completion date for our review and comment response period to March 2, 2022, in accordance with Section 9.2 of the Hanford Federal Facility Agreement and Consent Order, 89-10, Revision 8.”

- Source: Letter 22-NWP-020, Ecology John Temple to Brian Vance, Re: U.S. Department of Energy Transmittal of DOE/ORP-2021-05, "Direct Feed-Low-Activity Waste Secondary Liquid and Solid Waste Work Plan," Revision 0, to Meet "Hanford Federal Facility Agreement and Consent Order" Target Milestones M-062-51-T01 AND M-062-52-T01.

We urge the Washington State Department of Ecology to carefully consider the information that has become available in the DOE Surveillance documents and to re-open the public comment process to allow the public the opportunity to comment on the new information presented.

We would appreciate a response to this letter.

Sincerely yours,

A handwritten signature in blue ink that reads "Tom Carpenter". The signature is written in a cursive style with a large, stylized initial "T".

Tom Carpenter, Executive Director
Hanford Challenge

Cc: David Bowen, Manager, Nuclear Waste Program
WA Attorney General Bob Ferguson
EPA Region 10