



Removing & Concentrating Acetonitrile at the Effluent Treatment Facility

*Protect Workers &
Try to Destroy Acetonitrile
Instead of Concentrating It*

Take Action!

DEADLINE TO COMMENT: SAT JUNE 4, 2022



The U.S. Department of Energy is gathering your comments on a permit modification to deal with a new contaminant stream that will be generated by the treatment of tank waste. **The new contaminant is called acetonitrile, and it is created when tank waste liquids are mixed with the molten glass.**

When tank waste liquids are sent to the Low-Activity Waste facility and mixed with molten glass, the cyanide in the tank waste changes to acetonitrile when it is heated up and comes in contact with the sugars that are part of the glass formula.

Mixing the tank waste liquid with molten glass creates an off-gas stream that is captured by the facility and sent to the Effluent Management Facility for treatment. The treated off-gas waste is then sent to the Liquid Effluent Retention Facility's storage basins where it awaits treatment at the Effluent Treatment Facility, which removes contaminants from the liquid.

The biggest health and safety risk is inhalation of acetonitrile when it is vaporized. As it goes through the treatment system the concentration of acetonitrile increases as it is removed from the off-gas liquids. **Though the system is designed to keep it contained, workers still need to be protected.**

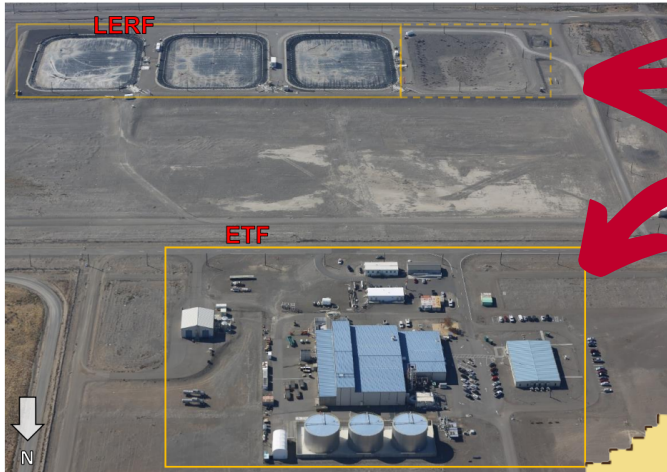
This comment period is about the additional equipment that will be installed at the Effluent Treatment Facility to remove and concentrate the acetonitrile. The concentrated acetonitrile distillate will later be shipped to a yet-to-be determined offsite facility to be mixed with grout for treatment. It is assumed that this waste will be disposed at the Hanford Site's Integrated Disposal Facility.

This permit modification is proposing to add treatment capability to the Effluent Treatment Facility to remove and concentrate the acetonitrile from the liquids sent to the Liquid Effluent Retention Facility from the Direct Feed Low Activity Waste facility.

continued....



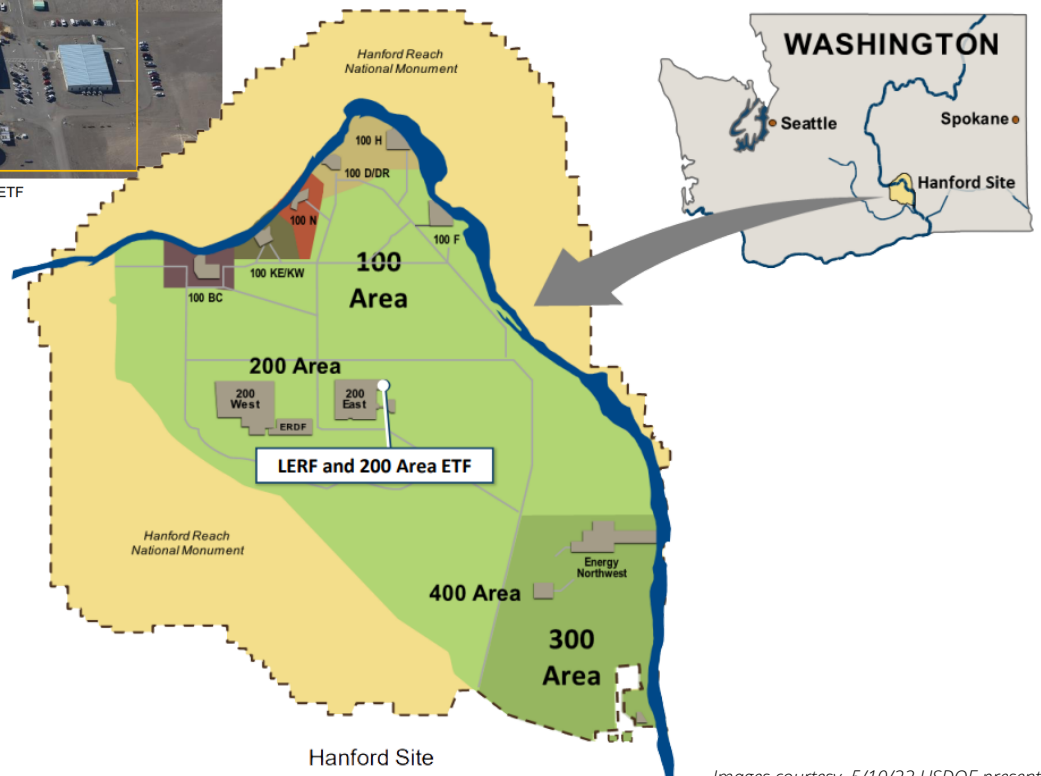
LERF & ETF BASICS: WHAT IS TREATED THERE?



Aerial view of the LERF and 200 Area ETF

Liquid Effluent Retention Facility
(where contaminated liquids are stored prior to treatment)

Effluent Treatment Facility
(where the contaminated liquids are treated)



Images courtesy, 5/10/22 USDOE presentation

LERF and ETF are facilities located on Hanford's Central Plateau in the 200 East Area. They store and treat the leftover liquid wastes from different facilities at Hanford that are heavily contaminated with chemicals, but aren't highly radioactive. LERF and ETF are designed to accept liquid waste from the following facilities:

- *Waste Treatment Plant (WTP) Effluent Management Facility (EMF):* Low-activity waste will be vitrified (turned into glass) at the WTP, leftover liquid waste from vitrification will be concentrated at EMF (similar to the 242-A evaporator) and remaining liquid sent to LERF & ETF. (This is where the acetonitrile will be coming from.)
- *242-A Evaporator:* Imagine boiling a pot of water for a long time. The amount of water in the pot will reduce as it evaporates. The 242-A Evaporator works the same way, except with tank waste. The waste that turns into steam is captured and transferred to LERF, while the reduced liquid waste is sent to a double shell tank for temporary storage.
- *Liquid Waste from Other Parts of Hanford:* Contaminated liquid from pumped and treated groundwater in the 200 West Area, water from spent fuel storage basins at old reactors, lab waste from sampling, leachate from landfills, and other waste from cleanup and waste management go to LERF & ETF for treatment.

HOW DOES LIQUID WASTE MOVE THROUGH LERF AND ETF?

Liquid Waste arrives through three avenues:

- 1 Waste Treatment Plant: Effluent Management Facility
- 2 Other Hanford Waste Management activities
- 3 242-A Evaporator

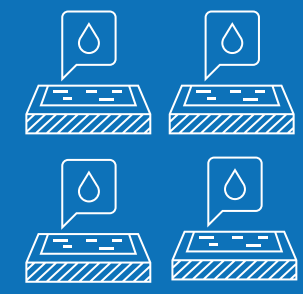
Acetonitrile

Four Storage Basins

Treatment Process

Liquid Effluent Retention Facility Basins

Effluent Treatment Facility



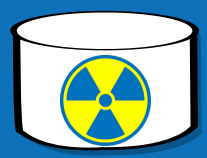
Process condensate waste stream

Concentrated waste stream

Final Storage

Primary Treatment Process

Double-shell tank



State Approved Land Disposal Site

Treated Liquid Waste

Liquid is reused to clean ETF and LERF

Final Storage

Treated Powder Waste

Secondary Treatment Process

Brine Waste

Acetonitrile Distillate

Environmental Restoration Disposal Facility



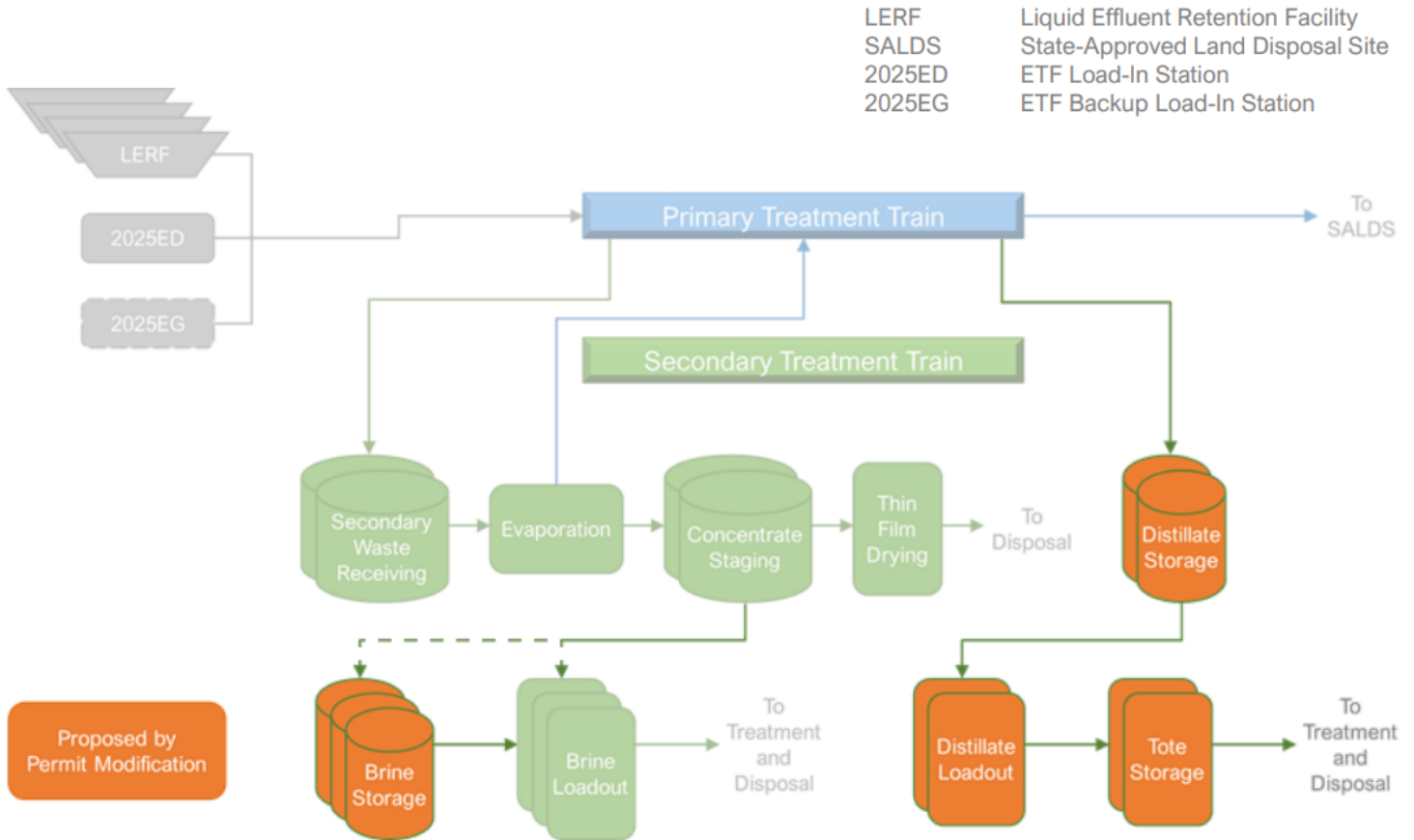
Authorized Dangerous Waste Facility



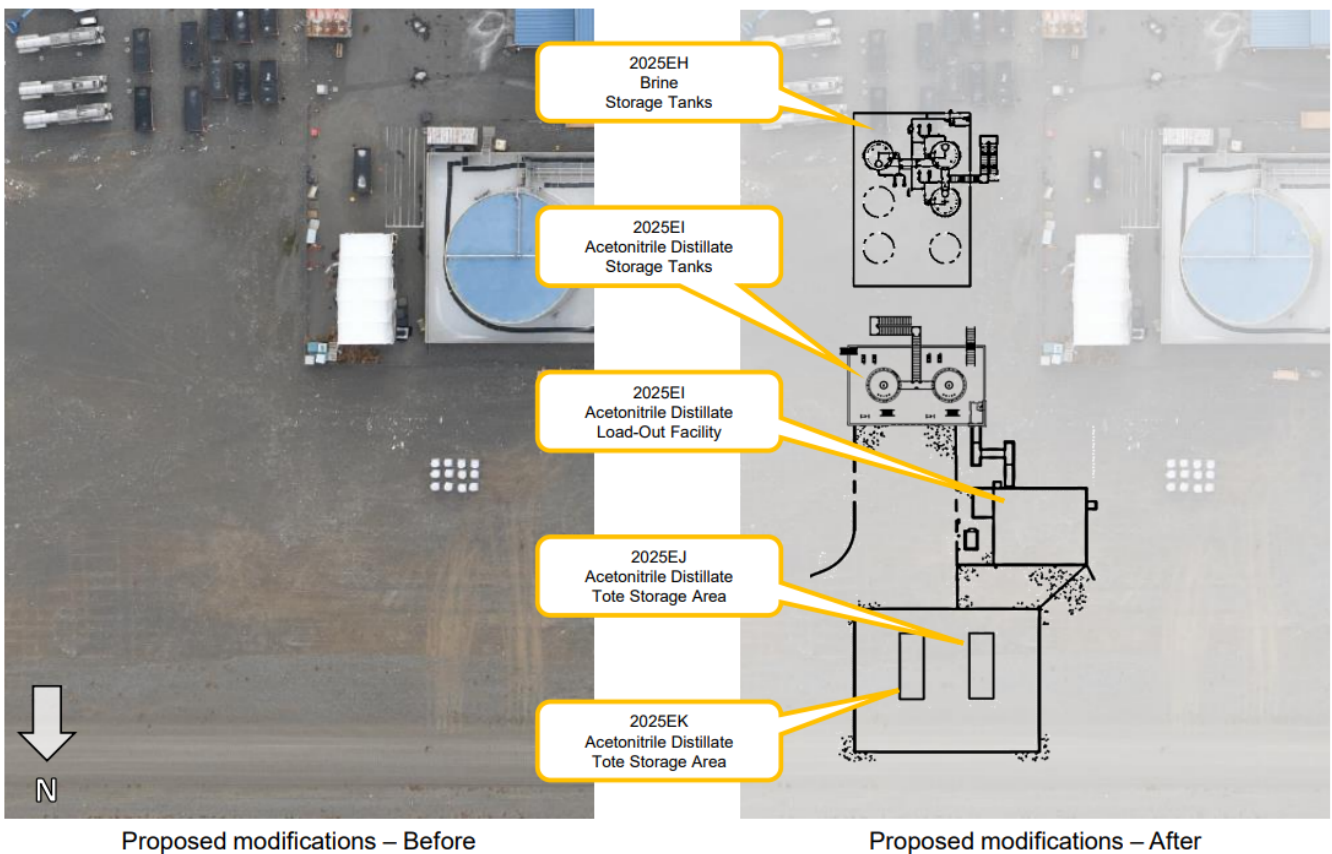
Integrated Disposal Facility (onsite disposal)

WHAT IS BEING ADDED TO ETF?

The proposed change would add the components in orange: **acetonitrile distillate storage**, an **acetonitrile distillate loadout facility**, and **acetonitrile tote storage** to the Effluent Treatment Facility. It is also adding **additional brine storage** for other concentrated contaminants that have been pulled out of liquid treated by ETF.



Images courtesy, 5/10/22 USDOE presentation



Proposed modifications – Before

Proposed modifications – After

Where does the waste go?

Step One: Inside ETF, liquid waste passes through a primary treatment system (primary treatment train) based on the contaminants present.

Following treatment, the liquid is sampled. If contaminants are gone, waste is delisted (no longer considered dangerous) and either:

- **discharged to the ground** at the State Approved Land Disposal Site (SALDS) or,
- **used to clean** out the LERF basins or ETF, then **treated again** and sent to SALDS

AND NEW: the equipment that is a part of this proposal will:

- concentrate acetonitrile as **acetonitrile distillate** and store it as a liquid inside storage totes. These totes are later transferred to an authorized *yet-to-be-determined* offsite dangerous waste facility for further treatment.

Step Two: If contaminants are still present, the liquid waste moves through the secondary treatment process (treatment train) where it is concentrated in one of the following ways:

- dried out in **powder** form for disposal at the Environmental Restoration Disposal facility (ERDF) on the Hanford site.
- concentrated in a liquid **brine** solution is transferred to an authorized dangerous waste facility for further treatment (offsite, right now Perma-Fix Northwest).

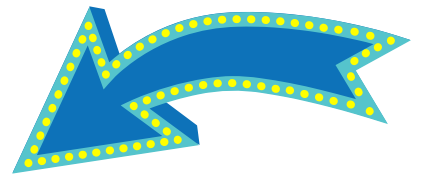
Why do we care?

The estimated concentrations of acetonitrile are higher than the limit for worker exposure under [NIOSH](#). We would rather see efforts made to destroy acetonitrile rather than concentrating it. We also want to ensure workers are protected from acetonitrile in its vapor state. PPM = Parts Per Million

Recommended Airborne Exposure Limit (NIOSH)	20 ppm
Immediately Dangerous to Life & Health (NIOSH)	137 ppm
Estimated Concentration in Low-Activity Waste Offgas System (after tank waste is mixed with molten glass)	60 ppm
Estimated Concentration of the Acetonitrile Distillate after being concentrated at ETF	23,000 ppm

[link to NIOSH pocket guide to acetonitrile](#)

HANFORD CHALLENGE SUGGESTED COMMENTS



Create a Solution that Destroys Acetonitrile Instead of Concentrating It:

Due to Acetonitrile's flammability, explosion risk, and hazard in low concentrations to workers, please create a solution that destroys acetonitrile instead of concentrating it into a liquid that then requires treatment and disposal.

Protect Workers from Acetonitrile Vapor Hazards:

More robust worker protections are needed including training on the hazard and appropriate emergency response measures; clean, compliant, fit-tested, and functional personal protective equipment, such as respirators and supplied air; real-time monitoring of acetonitrile at the point of generation and anywhere the acetonitrile is present; and alarm systems at the Low-Activity Waste facility, Effluent Management Facility, and at the Effluent Treatment Facility to ensure that workers are protected.

Don't Send Acetonitrile to Perma-Fix Northwest for Treatment:

Perma-Fix NW appears in documents related to the ETF Steam Stripper project as one of the potential treatment locations for treatment of acetonitrile distillate. Perma-Fix NW has off-gas stacks and groundwater within the Richland city limits, where residential communities are potentially impacted from releases. Perma-Fix NW is not a facility that should be under consideration for treating acetonitrile distillate.

Don't Bury Grouted Acetonitrile at the Integrated Disposal Facility (IDF):

As we understand it, acetonitrile is often explosive and is flammable. Due to these risks, this waste should not be grouted in a concentrated form for disposal on the Hanford site at IDF. It would be better to destroy the acetonitrile, rather than bury it at IDF where it could potentially start an underground fire.

Resources

- [U.S. DOE Fact Sheet](#)
- [Effluent Treatment Facility Acetonitrile Treatment Permit Application](#)
- [Presentation from U.S. DOE Public Meeting on Tues, May 10, 2022](#)
- [Video link from public meeting on Tues, May 10th, 2022](#)
- [Hanford Challenge and Columbia Riverkeeper Joint Comments](#)
- Hanford Challenge [report on Perma-Fix Northwest](#) "*Risky Business at Perma-Fix Northwest*"

[QUICK CLICK TO SUBMIT
COMMENTS HERE](#)

Comments DUE by midnight on Sat June 4th