Heart of America Northwest comments to National Academy of Sciences, Engineering and Mathematics
Review of the Continued Analysis of Supplemental Treatment of Low-Activity Waste at the Hanford Nuclear Reservation
on FFRDC's Second Report

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Heart of America Northwest is the region's largest and oldest public interest organization working for the cleanup of the Hanford Nuclear Reservation, http://www.hanfordcleanup.org/.

- Heart of America Northwest members span the Pacific Northwest, and the organization has often been responsible for the majority of public comments and attendance on major proposals. Heart of America Northwest successfully led the efforts to end use of massive unlined ditches to dispose of USDOE's radioactive and chemical wastes from other USDOE nuclear weapons and reactor programs as well as for on-site wastes; to have a groundwater cleanup plan; to end unpermitted discharges of liquid wastes to the soil; development of permit limitations for disposal of waste in the new IDF landfill; cleanup of soil and groundwater at numerous sites along the Columbia River shorelines; and for numerous health and safety initiatives.
- Representative Pollet is on the faculty of the University of Washington School of Public Health. He was co-author of Washington's hazardous waste law exposure scenario and risk assessment regulations, key provisions of Washington's hazardous waste cleanup law, was involved in development of the Federal Facilities Compliance act provisions of RCRA and has taught extensively on Tribal and environmental law.

Hanford meetings should start with a land acknowledgement

Treaties of 1855 RESERVED the rights to the lands and resources which USDOE has contaminated:

“the exclusive right of taking fish in the streams running through and bordering said reservation

is hereby secured to said Indians, and at all other *usual and accustomed stations in common with citizens of the United States*, and of erecting suitable buildings for curing the same; the *privilege of hunting, gathering roots and berries and pasturing* their stock on unclaimed lands in common with citizens, is also secured to them” (Umatilla, Cayuse and Walla Walla)

NASEM should recognize that USDOE does not adequately consider long-term harms to human health and the environment from either leaking High-Level Waste tanks or from disposal of the total quantities of wastes which USDOE proposes to be disposed on-site

Offsite Disposal is the only reasonable answer. Offsite disposal is the only proposal that is protective of groundwater and human health.

- Using available offsite treatment, per the Test Bed Initiative (TBI), makes sense from the perspectives of allowing immediate risk reduction; and to recognize financial and managerial capacity limitations.
- Offsite disposal is only path to protect health, groundwater and resources and reduce the risks from the incredibly large sum of all contaminants that would be disposed in near surface landfills.
- Near term risk reduction must be of the utmost importance because we already have leaking High Level Waste tanks. Two are leaking as we speak. More will leak in five years.
    - USDOE has ignored this need for immediate risk reduction, but NASEM should not.

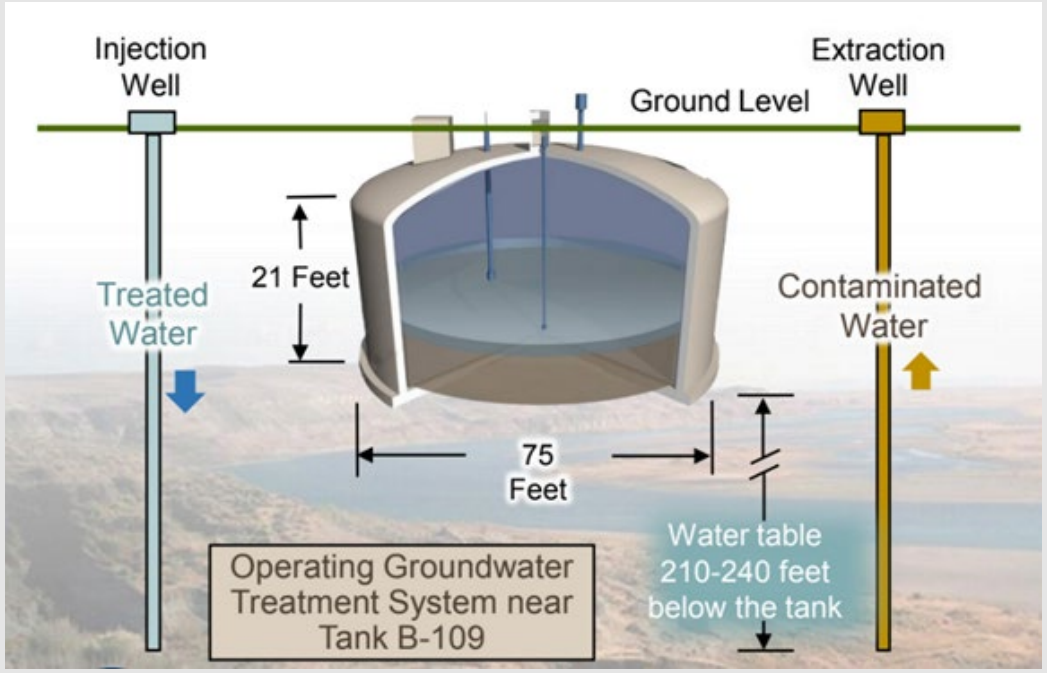
Financial and Management Risks Are Only Alleviated Under the Offsite Treatment and Disposal Alternatives:

- Funding to complete and operate HLW High Activity Waste Vitrification plant is already in jeopardy for a 2033 startup. USDOE presented scenario of Supplemental Treatment for LAW within 6 months of HAW vitrification. Two large onsite capital facilities are a challenge that USDOE is unlikely to successfully meet.
- Unnecessary to take on the capital and management challenges to construct two facilities when offsite adjacent capacity exists.
  - 4% escalation assumption is not realistic. WA State major capital facilities escalated far higher rates in recent years. .

USDOE does not have a response plan for leaking High-Level Waste tanks.

- Near term risk reduction must be of the utmost importance because we already have leaking High Level Waste tanks. Two are leaking as we speak. More will leak in five years.
  - USDOE has ignored this need for immediate risk reduction, but NASEM should not.
- NASEM can encourage immediate demonstration of In-Tank Pretreatment (Cesium removal) while using enhanced salt well pumping to remove the leakable liquid wastes from Tank B-109. Use this as demonstration for Test Bed Initiative with offsite treatment to RCRA LDR standards and offsite Waste Acceptance Criteria (uses same Cesium ion exchange resin as Tank Side Cesium Removal / TSCR).

Leaking Tank B-109



123,000 gallons of High-Level Nuclear Waste with an estimated 15,000 of pumpable liquids

- USDOE says: “no increased health or safety risk,” so NO effort to remove waste to stop the leak

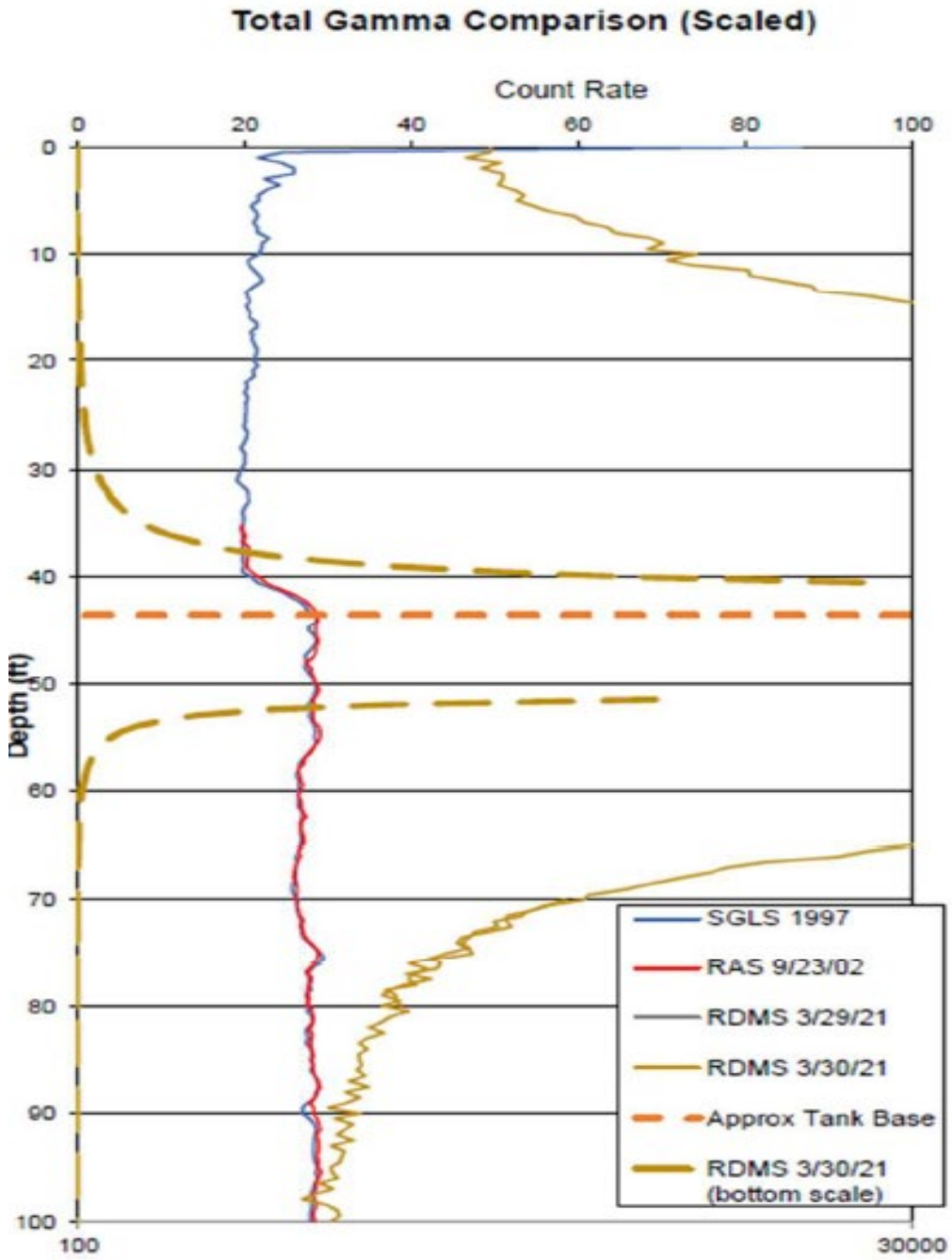
- USDOE erroneously says pumping and treating groundwater after the contamination moves through the soil column will prevent any harm.
- Contamination likely to start reaching groundwater in around 25 years, and would keep contaminating it for thousands of years

The leak was evident 3 years ago.. Not one action has been taken to end the leak as required by law

- The precipitous drop in Interstitial liquid level from December 2018 to March 2019 required USDOE to report the evidence of this leak immediately to EPA & Ecology and removal of waste. Loss of 4.09 gallons / day, > 120 gallons/month.
- USDOE reported 4-29-21
- Drop in liquid level March 2016 should have triggered review if not report of suspected leak

USDOE did not disclose to the public and in required leak report that Gamma borehole logging shows leak serious and moving

- “The gamma activity count rates at this drywell were elevated for nearly the entire length of the drywell, with peak count rates occurring at 41 ft.(~41,000 cps) and at 51.5 ft. (~21,000 cps) below the top of the casing. Between these depths, the detector was saturated, indicating count rates greater than 55,000 cps and a potential leak from Tank B-109.”
- Contamination already > 50-65’ below top
- Groundwater approximately 200 foot below



Available mobile, low cost, timely option for retrieving leakable liquids from leaking Tank B-109

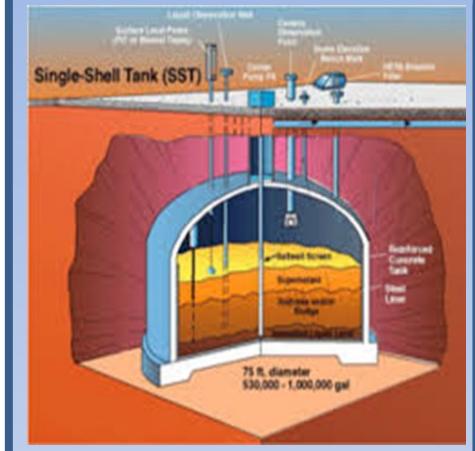
- B-109 will continue to leak unless liquids are removed.
- Liquids that leak from B-109 carry high Gamma radionuclides into soil as shown in Gamma drywell monitoring at B-109 (March 2021) with peak radiation levels 41 to 51 feet below surface.
- Uses an In-Tank Pretreatment System = ITPS
- Components already developed and delivered

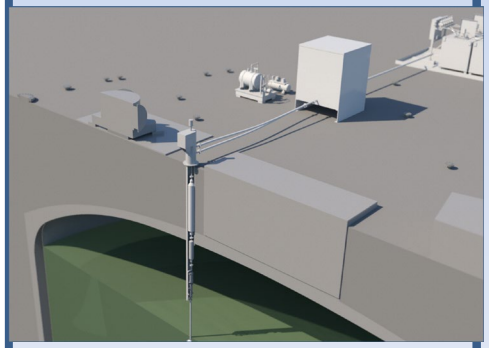
- Low cost

- Ion exchange is in the assembly put into the tank.
- Allows removal of Cesium, Strontium, TRU before waste exits tank.
- Ion exchange similar to TSCR.
- Mobile – double contained transfer lines to transport.
- Demonstrate offsite treatment to RCRA standards and use as test of TBI.
- Move to next leaking tank…

Tank B-109 Waste Retrieval and Pretreatment
Key Features – support slides

Easy to install system in riser of B-109 to retrieve liquids before they leak





Key Features

- Approach is like the one used for interim stabilization of SSTs (i.e. removal of liquids)
- USDOE has greatly improved salt well pumping capability – put pump and salt well into B-109 and can retrieve far more liquid than when tanks were interim stabilized 20+ years ago.
- Leverages systems and components already developed and tested for a similar application in other tanks
- Allows retrieval and pretreatment of ~2000 gallons of interstitial liquid waste before it can leak to the environment
- If demonstration of first 2000 gallons of interstitial liquid waste is successful, continue to remove all interstitial liquid from B-109.
- Low personnel, operations and environmental risk
- Pretreatment of the liquids is done inside the tank, simplifying operational and nuclear safety evaluations
- Lab analysis of retrieved waste is verified to be MLLW before treating to RCRA standards followed by out of state disposal
- Big benefit – waste is not disposed in Hanford IDF landfill and is first reduction in total on-site contaminant load
- Approach enables DOE to have a ready and tested means for addressing future SST tank leaks as infrastructure continues to age and more tanks leak
- When ion exchange resin is expended, it gets pulled out and a new ITPS installed. Cost approximately $150,000.

USDOE's analyses and decisions reflect its improper claim that it does not need to consider Tribal exposures from contamination of soil, groundwater, plants and resources on Hanford's Central Plateau.

- Only Congress can abrogate a Treaty right. However, USDOE has unilaterally asserted that it does not have to consider Tribal exposures because it claims it extinguished the Tribes' Treaty rights to utilize resources on the Hanford Central Plateau.
- The USDOE, in the 1999 Record of Decision (ROD) for the Comprehensive Land Use Plan EIS, relied on and formally incorporated the ERDA 1975 Hanford Waste Management Operations EIS in order to conclude that the resources in the central plateau were "irreversibly and irretrievably" (I&I) committed to waste storage and contamination as the legacy of Hanford's nuclear weapons production mission. "Industrial" land use is the only land use which USDOE said was allowable or required to be planned for under future cleanup decisions (CERCLA and RCRA) for the Central Plateau.

USDOE's analyses fail to consider Tribal exposures from contamination of soil, groundwater, plants and resources on Hanford's Central Plateau.

- The implications of Treaty rights which USDOE has failed to consider are that the reasonably foreseeable uses for which cleanup standards must protect include rights to resource use pursuant to the Treaties of 1855. This is required by CERCLA, MTCA, RCRA and HWMA. The IDF landfill is a landfill for cleanup wastes.
- Thus, the applicable health protective cleanup standards are found in CERCLA and MTCA, not USDOE's self-determined use of 25 or 100 millirem per year dose; and the standards must be applied to be protective for exposures under a Tribal exposure scenario.

USDOE's WIR Performance Assessment for Vitrified LAW is Based on Unacceptable and Impermissible Doses that Would Result in Unconscionable Risks to Native Americans Exercising Treaty Rights on Hanford's Central Plateau

- USDOE's analysis is based on striving to meet an acceptable dose of 25 millirem and a limit of 100 mrem per year.
- USEPA has issued formal guidance that standards which utilize 25 or 15 millirem "are not protective of human health and the environment" at CERCLA sites.
- Hanford's Central Plateau and IDF landfill are, of course, within a CERCLA site.
- The relevant standard to apply is either the carcinogen standard from CERCLA or the more protective carcinogen standard from Washington's MTCA (hazardous substance cleanup law).
- CERCLA requires that wastes and contamination at the site not exceed a risk of one excess cancer for every ten thousand individuals exposed. MTCA – which applies at CERCLA sites in Washington – requires that the most vulnerable population not have a risk level that exceeds one excess cancer in every one hundred thousand

USDOE's WIR Performance Assessment for Vitrified LAW is Based on Unacceptable and Impermissible Doses that Would Result in Unconscionable Risks to Native Americans Exercising Treaty Rights on Hanford's Central Plateau

- The BEIR VII (Biological Effects of Ionizing Radiation, National Academy of Sciences, 2006) data shows that 100 mrem/year could result in cancers in 1% of exposed adults.
- USDOE's goal and assessment based on 25 mr/year allows for 15 excess cancers for every ten thousand persons exposed / 1.5 excess cancers for every thousand exposed.
- Women and children have significantly greater risks from the same dose (3-10x).
- USDOE modeling of exposures does not take into account reasonably foreseeable higher exposures of Native Americans exercising Treaty rights on the Central Plateau
- As noted earlier, USDOE improperly and unconscionably asserts that it extinguished those Treaty rights by declaring the resources and groundwater irreversibly and irretrievably committed ("I&I").
- CERCLA and MTCA require use of the reasonably foreseeable maximum exposures, which are, per se, exposures pursuant to exercising Treaty rights.

The principles of seeking maximum risk reduction, uncertainties in modeling, failure to consider the applicable health based standards, failure to consider Tribal exposure, the need for urgent action to reduce near-term risks from leaking tanks and long-term risks from releases from disposed wastes all point to benefits of the Test Bed Initiative and maximizing use of offsite treatment and disposal

- Disposal of all secondary and LAW tank wastes in the IDF landfill is very likely to exceed IDF landfill permit limits (75% of MCL) and CERCLA/MTCA standards and certainly fails to consider Tribal exposures and Treaty rights.
- Claiming that the risks are acceptable without considering Tribal exposures is unconscionable and will not hold up under legal scrutiny.
- NASEM can encourage immediate testing of the In-Tank Pretreatment System and offsite treatment of waste from leaking tank B-109 to immediately reduce risks and determine if the offsite path is practicable.