



Oregon

Theodore R. Kulongoski, Governor



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Mary Beth Burandt, Document Manager
Office of River Protection
U.S. Department of Energy
Post Office Box 1178
Richland, WA 99352

Dear Ms. Burandt:

The Oregon Department of Energy has completed a preliminary analysis of the draft Tank Closure and Waste Management Environmental Impact Statement (TC&WM EIS). In our initial review, we have focused in large part on the 11 Tank Closure alternatives that are analyzed in the EIS. We reviewed each against the following criteria:

- Long-term protectiveness of the Columbia River, primarily associated with preventing additional migration of contaminants into Hanford's groundwater
- Compliance with the Tri-Party Agreement; meeting schedules for waste treatment and requirements for quality of the final waste form
- Permanence of the actions (for example, durability of the waste form so as to prevent future releases)
- Minimizing natural resource injury liability
- Protectiveness of human health and the environment

While the various proposed alternatives provide useful information by analyzing and comparing potential impacts and differences among the alternatives, to our concern we found that perhaps only one of the Tank Closure alternatives satisfied all of these criteria. Many failed most or all of the criteria (see Attachment 1).

The U.S. Department of Energy's (DOE) recent decision not to pursue treating and sending some waste to the Waste Isolation Pilot Plant eliminates alternatives 3A, 3B, 3C, 4 and 5. Notwithstanding that decision, each of these alternatives, along with five of the remaining six alternatives, had one or more fatal flaws that prevented each from meeting our criteria.

There are elements scattered within the range of many of the alternatives which, if combined in a new alternative, would likely provide a preferable long-term approach for

successfully immobilizing Hanford's tank waste, closing the tank farms, and protecting the public and the environment.

Therefore, we propose and strongly encourage DOE to analyze the potential impacts of the following new alternative:

Alternative 7 – (the Oregon Proposal)

Tank Waste Storage. Continue current waste management operations using existing tank storage facilities. No new double-shell tanks would be required, *unless* there is a delay in getting the Waste Treatment Plant (WTP) operational. New Waste Receiver Facility tanks would be constructed. These tanks should be sized so that all necessary waste transfers will be possible, and to ease retrieval operations.

Tank Waste Retrieval. Retrieve a *minimum* 99 percent of the waste from each of the tanks. Determine on a tank-by-tank basis whether a final chemical wash, mechanical removal step, or other additional retrieval is necessary.

Tank Waste Treatment. Construct and operate the existing WTP as currently configured (two high-level waste melters and two low-activity waste [LAW] melters). Supplement the existing WTP by expanding LAW vitrification capacity to the extent necessary to complete LAW treatment no later than 2040. Do not use supplemental technologies such as bulk vitrification, cast stone or steam reforming. Pre-treat all waste streams routed to the WTP, and include technetium 99 removal in the pre-treatment process so that technetium is routed to the high-level waste melter. Assume that no waste will qualify as transuranic for disposal at the Waste Isolation Pilot Plant, but programmatically continue to pursue that as an option for the near future for a limited amount of waste.

As a sub-option, DOE should analyze the value of using iron phosphate glass in the second LAW treatment facility to determine whether that would provide useful flexibility in treating some waste streams and also whether it would result in a more durable glass form for those waste streams.

DOE should also analyze the impacts and benefits of using fractional crystallization to remove the bulk of the non-radioactive waste from the tank waste streams, in order to potentially reduce the volume of the glass waste form destined for the deep repository. The separated sodium wastes should be treated to destroy any RCRA hazards and to produce a waste form meeting the land disposal restrictions under RCRA, the Atomic Energy Act and Nuclear Regulatory Commission requirements for near-surface land disposal of mildly radioactive wastes.

Cesium and Strontium Capsules. Do not include the cesium and strontium capsules in the WTP waste stream. Instead, convert from pool storage to dry

storage and continue to pursue ultimate disposal into a geologic repository in a form suitable to meet the waste acceptance criteria for the facility as an alternative secondary waste form.

Tank Waste Disposal. Store immobilized high-level waste canisters on site in interim storage facilities until a national disposal facility is available. Assuming shallow burial of the immobilized LAW will be allowed, dispose of vitrified LAW on site. Since vitrified LAW may remain classified as high-level waste, flexibility will be required for planning for its permanent disposal.

Tank Farm Closure. Characterize leaked tank wastes in and beneath the tank farms, along with waste trapped between the steel and concrete tank structures and in pipelines and ancillary equipment. Use that information to make a risk-based decision on which tanks, pipelines and ancillary equipment have leaked and whether contamination may have spread beneath non-leaking tanks. As appropriate, exhume tanks to provide access to contaminated soils. This may include leaking tanks, adjacent (clean) tanks in contact with contaminated soil, and possibly some additional clean tanks that block access to heavily contaminated soil. Sample and characterize the below-tank contaminated soils and remediate soils as deeply as necessary. Build and operate a facility to treat contaminated soils as described in Alternatives 6A and 6B. Replace removed, contaminated material with clean soil from onsite sources.

After waste retrieval of at least 99 percent from tanks, pipelines and ancillary equipment, fill remaining (clean) tanks and ancillary equipment with a highly durable fill material to immobilize the residual waste, prevent future tank subsidence, and discourage intruder access. Close these remaining tanks using a landfill barrier designed to ensure long term permanence and isolation of the remaining wastes. It may be necessary first to remove some soil and ancillary equipment if there have been leaks from pipelines and other equipment.

Dispose of treated contaminated soils, tank shells and ancillary equipment on site in a new disposal facility. Monitor the site using post-closure care.

Tank Farm Cribs and Trenches Closure. As single-shell tank farm closure operations are completed, sample and characterize the associated cribs and trenches (ditches) disposal sites. Remove-treat-dispose of the contaminated materials and soils that exceed protectiveness criteria. Close the cribs and trenches (ditches) using a landfill barrier.

We won't know whether the proposed Alternative 7 will meet the criteria that we have identified until and unless DOE analyzes each of these actions individually and collectively. We hope that DOE will agree to conduct that analysis.

We will provide additional written comments prior to the comment deadline that will address additional details related to tank waste treatment and tank closure. We will

also provide comments on the Waste Management and Fast Flux Test Facility alternatives.

If you have questions or comments on Oregon's proposed alternative, please contact me at 503-378-4906.

Sincerely,

A handwritten signature in black ink, appearing to read "Ken Niles". The signature is fluid and cursive, with the first name "Ken" being more prominent than the last name "Niles".

Ken Niles
Assistant Director

- c.c. Jane Hedges, Washington Department of Ecology
- Dennis Faulk, U.S. Environmental Protection Agency
- Shirley Olinger, U.S. Department of Energy Office of River Protection
- Dave Brockman, U.S. Department of Energy Richland Office
- Stuart Harris, Confederated Tribes of the Umatilla Indian Reservation
- Gabriel Bohnee, Nez Perce Tribe
- Russell Jim, Yakama Indian Nation
- Oregon Hanford Cleanup Board
- Hanford Advisory Board
- Hanford Natural Resource Trustee Council

ATTACHMENT 1

Why Existing Tank Closure Alternatives Are Not Acceptable

Alternative 1 – No Action. Leaving the waste in Hanford's tanks for 100 years and canceling the planned waste treatment program would result in wide-spread environmental contamination. Moreover, the "No Action" alternative need not be a stop action alternative. It can and usually is presumed to continue the actions in progress as the basis for which further actions are contrasted.

Alternative 1 is not protective of the Columbia River; does not comply with the Tri-Party Agreement; there are no actions taken that would have a positive permanent affect; natural resource injury liabilities are not minimized; and this alternative is not protective of human health and the environment.

Alternative 2A – Existing WTP Vitrification; No Closure. Treatment capacity must be expanded beyond the 2 + 2 configuration of the WTP in order to accomplish immobilization of Hanford's tank waste in a somewhat reasonable time frame. Treating waste until 2093 would likely result in extensive tank leaks during that period and additional wide-spread environmental contamination. Eventually ceasing administrative control of the tank farms without closure would also likely have significant adverse environmental impacts. Prolonging the treatment mission so as to have to replace the WTP, the double-shell tanks, and other major facilities is not reasonable. This alternative also excludes technetium 99 from pre-treatment. As technetium is one of the primary radionuclides in terms of projected long-term impacts, we believe a robust system must be in place to ensure that technetium 99 is diverted to the high-level vitrification waste stream. Alternative 2A is a step backward from the existing plans.

Alternative 2A is not protective of the Columbia River; does not comply with the Tri-Party Agreement schedules; natural resource injury liabilities are not minimized; and this alternative is not protective of human health and the environment.

Alternative 2B – Expanded WTP Vitrification; Landfill Closure. Our major objection with this alternative is closing the entire tank farm system using a landfill barrier. That does nothing to deal with leaked waste beneath the tanks farms that is currently in the vadose zone – much of which will likely eventually reach the groundwater and potentially the Columbia River. This alternative does include removing soil and tank infrastructure down to 15 feet from two tank farms. We believe this is a concept that should be expanded to include other tanks farms, but the 15 foot limit does not adequately address contamination existing at greater depth in many if not all of the single-shell tank farms. This alternative does include technetium 99 removal in the pre-

treatment process, which would help get one of the longer-lived radionuclides into the high-level glass.

Alternative 2B is not protective of the Columbia River; natural resource injury liabilities are not minimized; and this alternative is not protective of human health and the environment.

Alternative 3A – Existing WTP Vitrification with Supplemental Treatment (Bulk Vitrification); Landfill Closure.

Alternative 3B – Existing WTP Vitrification with Supplemental Treatment (Cast Stone); Landfill Closure.

Alternative 3C – Existing WTP Vitrification with Supplemental Treatment (Steam Reforming); Landfill Closure.

None of these supplemental treatment technologies are demonstrated to be effective at safely immobilizing the waste once disposed in Hanford's soils. Bulk vitrification has been demonstrated to not meet the "good as glass" criteria for the final waste form. Cast stone as a waste form is greatly inferior to bulk vitrified waste. Steam reforming as a waste form is greatly inferior to bulk vitrified waste and cast stone. Two of the three alternatives also exclude technetium 99 from pre-treatment. All three of these options have complete landfill closure of the single-shell tank farms, which we have already indicated is not protective. DOE has also ruled out treating and sending some waste to the Waste Isolation Pilot Plant, which effectively eliminates these alternatives, as they were presented in the draft EIS, from further consideration.

Alternatives 3A, 3B, and 3C are not protective of the Columbia River; supplemental technologies are not protective because the waste form will not sufficiently hold the waste over time (fails the permanence criteria) and does not meet Tri-Party Agreement requirements for the quality of the final waste form; natural resource injury liabilities are not minimized; and this alternative is not protective of human health and the environment.

Alternative 4 – Existing WTP Vitrification with Supplemental Treatment Technologies; Selective Clean Closure/Landfill Closure. This alternative calls for supplementing the WTP with a combination of cast stone and bulk vitrification, which we indicated above is not a protective form of treatment. This alternative also excludes technetium 99 from pre-treatment. The closure combination of mixing selective clean closure with landfill closure is the most reasonable closure alternative – although it would need to be based on actual conditions in the vadose zone within and beneath the various tank farms. The BX and SX tank farms may or may not be appropriate for clean closure. Certainly other tank farms would need clean or partial clean closure. DOE has also ruled out treating and sending some waste to the Waste Isolation Pilot Plant.

Alternative 4 is not protective of the Columbia River; supplemental technologies are not acceptable because the waste form will not sufficiently hold the waste over time (fails the permanence criteria) and does not meet Tri-Party Agreement requirements for the quality of the final waste form; natural resource injury liabilities are not minimized; and this alternative is not protective of human health and the environment.

Alternative 5 – Expanded WTP Vitrification with Supplemental Treatment Technologies; Landfill Closure. Tank waste retrieval to only 90 percent would leave an amount of waste within the tanks that would likely eventually cause significant adverse environmental impacts. This alternative also calls for use of cast stone and bulk vitrification, which we have already indicated would not sufficiently immobilize the waste for disposal in Hanford soils. This option also excludes technetium 99 from the pre-treatment process. We do support the idea of further exploring sulfate removal after pre-treatment to reduce the amount of vitrified low-activity waste. This alternative also includes landfill closure of the single-shell tank farms, which we have indicated is not protective. DOE has also ruled out treating and sending some waste to the Waste Isolation Pilot Plant.

Alternative 5 is not protective of the Columbia River; supplemental technologies are not acceptable because the waste form will not sufficiently hold the waste over time (fails the permanence criteria) and does not meet Tri-Party Agreement requirements for the quality of the final waste form; natural resource injury liabilities are not minimized; and this alternative is not protective of human health and the environment.

Alternative 6A – All Vitrification/No Separations; Clean Closure. The WTP is currently being constructed to include pre-treatment and LAW vitrification melters. We support pre-treatment to separate the waste streams and believe it is unnecessary to treat all the waste as high-level waste. It also would unnecessarily prolong the treatment mission to 2163, requiring eventual replacement of the double-shell tanks and construction of two replacement Waste Treatment Plants. We also believe that clean closure of all of the 149 single-shell tanks is probably not necessary.

Alternative 6A may offer the best long-term protectiveness of the Columbia River over any of the other alternatives as all the tank waste is vitrified and disposed off-site. However, the increased time to vitrify all the wastes increases the chances of additional tank leaks during the treatment mission, which could pose an increased threat to the Columbia River and would not be protective of human health and the environment. It also does not comply with Tri-Party Agreement schedules.

Alternative 6B – All Vitrification with Separations; Clean Closure. This alternative may meet all of our criteria. It would depend in large part on the ultimate disposition of the immobilized LAW canisters. Since there would not be pre-treatment to ensure that the technetium 99 ended up in the immobilized high-level glass, if the immobilized LAW were to end up in shallow burial at Hanford, the disposal environment may not sufficiently contain the technetium. This could eventually lead to spread of technetium into Hanford's groundwater. In addition, this alternative presumes landfill barrier of the cribs and trenches, which may not be protective. This alternative also proposes complete clean closure of all of the 149 single-shell tanks, which is probably not necessary.

Alternative 6B may meet all of our criteria, but not if the technetium ends up in shallow burial at Hanford.

Alternative 6C – All Vitrification with Separations; Landfill Closure. This alternative includes landfill closure of the single-shell tank farms, which we have indicated is not protective.

Alternative 6C is not protective of the Columbia River and is not protective of human health and the environment.