

Questions and Responses
Draft Waste Incidental to Reprocessing (WIR) Evaluation for Vitrified
Low Activity Waste (VLAW) Disposed Onsite at Hanford Site, Washington
Public Meeting - June 10, 2020

Presentation # 1 – DOE EM HQ Overview of the Waste Incidental to Reprocessing Process

1. **Question** – What is RAI?

Response – Request for Additional Information

2. **Question** – What is the scope of the WIR Evaluation, and what is the plan for the secondary waste? How will that secondary waste be classified? Will a citation WIR determination be used for the secondary waste?

Response – The Draft WIR Evaluation addresses vitrified low activity waste which will be pretreated using the DFLAW approach and disposed of at the Integrated Disposal Facility (IDF). The IDF performance assessment includes all low-level radioactive waste which may be disposed at the IDF, and includes other waste in addition to the VLAW covered by the Draft WIR Evaluation. Secondary solid wastes are low-level radioactive solid wastes derived from WTP operations and will include a wide variety of wastes from routine maintenance activities, non-routine maintenance activities, and day-to-day operating activities. The secondary waste streams, such as HEPA filters and carbon bed absorbers, are low-level radioactive waste generated during vitrification of the LAW, after the LAW has been pretreated under the DFLAW approach to remove key radionuclides to the maximum extent technically and economically practical. The secondary waste streams are outside the scope of the Draft WIR Evaluation and the citation WIR process. The secondary solid waste streams will be characterized and classified before disposal, must meet the waste acceptance criteria for the IDF, and are evaluated in the IDF PA.

3. **Question** – The waste is considered HLW based on the source that it came from. This WIR process, is a process to change from the designation of HLW to LLW. Is this part of the new definition about HLW designation?

Response – DOE is not reclassifying waste and has not issued a new definition of HLW. DOE has no plans to apply its June 2019 Supplemental Notice of the proper interpretation of the statutory term “high-level radioactive waste”, as defined in the Atomic Energy Act of 1954, as amended, and the Nuclear Waste Policy Act of 1982, as amended, to Hanford LAW. To the extent that DOE would ever apply its interpretation of HLW at Hanford, it would engage in full consultation with state and local representatives and the public, and complete all necessary environmental evaluations and safety analyses to establish in advance the safety to workers, the public, and the environment.

3a. **Question** – Is this a process that allows you to reclassify HLW as LLW, based on the 3 criteria?

Response – No. DOE is not reclassifying the waste. The DFLAW approach at Hanford is a process that will begin with in-tank settling; separation (removal by decanting) of the supernate (including dissolved saltcake and interstitial liquids); followed by filtration and

cesium removal using ion exchange columns in a tank-side cesium removal. The pretreated waste will then be vitrified at the LAW Facility. The Draft WIR Evaluation and supporting documents demonstrate that the pretreated and vitrified waste can be safely managed and disposed of as LLW in the Hanford Integrated Disposal Facility

4. **Question** – Will there be a record of today's questions, comments and responses? How will the questions and comments be viewable? If not, why not?

Response – Responses to all written comments will be available to the public on Hanford's website – <https://www.hanford.gov/page.cfm/VitrifiedLowActivityWaste>

5. **Question** – Similar to Jeff Burrigh's question, in order to understand today's big picture, can you address if the performance assessment includes the potential for all forms and quantities of waste proposed to be disposed in IDF within scope and analyzed in the Performance Assessment being discussed? That would include secondary waste streams from vitrification, chemical wastes, etc. Will it include all proposed waste or just vitrified waste?

Response – The performance assessment discussed today encompasses all waste that may be disposed at the Integrated Disposal Facility at Hanford.

6. **Question** – How do the criteria match the NRC derived criteria in 1997 for immobilized low activity waste?

Response – This question appears to be referring to the petition for rulemaking and the criteria proposed by DOE to NRC for determining that waste is incidental to reprocessing. Those criteria have been formalized in DOE Manual 435.1-1. This history of NRC and Hanford interaction is discussed in Appendix D of the Draft WIR Evaluation.

7. **Question** – In this time of Covid-19 meeting restrictions, it difficult to develop comments. After the public comment period ends in September 2020, will comments such as Hanford Advisory Board (HAB) input be accepted up to October 2021 when the NRC review is complete and before the final WIR Evaluation is issued? The comment period is 120-days. My question is when is the drop dead date for HAB to provide comments? Due to Covid-19 the HAB has not been able to meet. Would you be willing to extend the comment period to October 2021?

Response – DOE will consider late filed comments to the extent practical. If additional time is believed to be necessary to submit your comments, DOE suggests submitting a written request to extend the public comment period.

Presentation # 2 – NRC Review of the Hanford VLAW Draft Waste Incidental to Reprocessing Evaluation

8. **Question** – There is an Ohio study that looks at glass performance and found corrosion. Will NRC be addressing the new research?

Response – NRC will look at material DOE provided as well as additional information, and requests that Mr. Burrigh send the information he has.

9. **Question** – Related to Iodine-129 and the drinking water standards, DOE compares the performance results to the MCL using both EPA and DOE dosimetry methodologies. Will NRC weigh in on what is the appropriate number to base performance?

Response – NRC has started to look into this issue, although not sure if NRC will provide a comment. NRC does not have a separate drinking water standard. NRC includes consideration of the ground and surface water pathways for the NRC performance objective of 25 mrem/year to any member of the public, for protection of the general population from releases of radioactivity.

10. **Question** – NRC commented on using the Features, Events, and Processes (FEPs). At Hanford we reduced from the international process to a process specific to Hanford. When you implement a FEPs process, are you doing it to the international standard or the Hanford standard?

Response – DOE uses an approach based on safety functions. Usually the international approach is to do a “bottom up” approach, or start from a large list and eliminate those that aren’t relevant. NRC will evaluate the approach DOE used and determine if the scope of the evaluation was appropriate.

11. **Question** – Is the review of the Draft WIR Evaluation and supporting information performed in a risk-informed manner? If so, how will the review be risk-informed?

Response – Yes it is. For example, for the Draft WIR Evaluation for WMA-C, the staff identified a large number of potential issues but then debated and shorten that list to only ask those questions that may influence the decisions. We evaluate risk in terms of meeting the criteria and not other measures of radiation impacts.

Presentation # 3 – Performance Assessment in Support of Decision-Making

12. **Question** – Is there a possibility that potentially disruptive processes could be missed in the current approach?

Response – We try to envision what could go wrong by looking at individual barriers and what could impact each barrier. How likely is it and the potential significance of the consequences are key considerations. It’s hard to say you have considered everything, but the safety functions and FEPs approach along with the multiple reviews are intended to try to identify and include disruptive processes that are reasonably likely to occur.

13. **Question** – For this particular site, do you see climate trends as in favor of or against safety?

Response – That is a question for a member of the PA team. The IDF PA addresses potential changes in climate.

Presentation # 4 – Draft Waste Incidental to Reprocessing Evaluation for Vitrified Low-Activity Waste Disposed of Onsite at the Hanford Site, Washington (IDF Performance Assessment Overview)

14. **Question** – Historically, DOE had conceived tank waste treatment to include several different radionuclide removal systems. This VLAW Draft WIR Evaluation indicates Cs removal as the predominate treatment. How will DOE ensure that volatile radionuclides such as Tc-99 and I-129 will not end up in the secondary waste streams that are part of the LAW melter offgas system?

Response –The LAW offgas system is designed to continually recycle the Tc-99 and I-129, after being concentrated at the Effluent Management Facility (EMF), back through the LAW vitrification process to incorporate it into the glass waste form.

In the IDF PA analysis, the impacts to the groundwater from Tc-99 and I-129 are from secondary solid waste, not VLAW. For instance, about 20-30 Ci of Tc-99 ends up in secondary solid waste, which is responsible for most of the impact to groundwater in 10,000 years. This 20-30 Ci is out of the approximately 26,000 Ci of Tc-99 potentially destined for IDF, as modeled in the IDF PA, or roughly 0.1%. This means that about 99.9% of the Tc-99 is predicted to end up in the VLAW through recycle.

The amount of iodine in the secondary waste stream for HEPA filters, which causes the greatest impact to groundwater, is about 0.12 Ci out of the estimated 29 Ci predicted in the IDF PA to potentially be disposed at the IDF. No available technology has been demonstrated to remove the relatively low concentrations of I-129 in the Hanford LAW. The secondary waste streams are outside the scope of the Draft WIR Evaluation. The IDF PA shows that Tc and I from the VLAW will present little risk to the public or human intruder, and that potential doses from disposal of the VLAW to a member of the public and a hypothetical human intruder are well below performance objectives and performance measures for disposal of LLW.

15. **Question** – On slide # 23, Groundwater Pathway Radionuclide Dose, the graph x-axis has Time After Exposure (2051). Does this mean the projections are based on the assumption that IDF will be fully closed by 2051? Where is the date coming from?

Response – The x-axis label is intended to mean that the closure date assumed in the IDF PA was 2051. This was the anticipated mission completion date for LAW vitrification in 2014 when the IDF PA analyses were started. Although the timing of mission completion looks different today, the nice thing about computer simulations is that this date can be changed and the analyses can be (and will be) re-run with a revised date.

16. **Question** – The water going into the Columbia has tritium in it, what happens to the tritium that was leaking out of the tanks? What is happening to that?

Response – For additional information outside the scope of the Draft WIR Evaluation, tritium has a half-life of 12.3 years. Most of the leak events from tank farms occurred between 1951 and 1980 meaning that 90% or more of the tritium has naturally decayed. The tritium plume that reached the Columbia River was from very large volumes of water from PUREX operations in the 1980s, more than 1 billion gallons of process effluent. By contrast, tank

leaks were much smaller in volume, a few thousand gallons up to about 100,000 gallons. The smaller driving force on past tank leaks has prevented the tank leaks from spreading from the Central Plateau.

The Tank Closure and Waste Management EIS (DOE/EIS-0391) evaluated the potential impact of past tank leaks from tritium and other key contaminants. The results were compared to the drinking water standard of 20,000 pCi/L. The maximum predicted impact at the Columbia River shoreline is 1 pCi/L, which is well below the drinking water standard.

17. **Question** – You just said there is no technology to remove iodine, but we have heard in the HAB tank waste committee Purolite resin being used at 200W pump and treat facility to remove both technetium and iodine. How do these two ideas relate? The previous answer suggested that no available technology has been demonstrated to remove the relatively low concentrations of I-129 in the Hanford LAW feed stream. However, CHPRC is utilizing an IX resin at the pump and treat facility to remove Tc-99 which has been shown to also remove I-129. Is this being considered relative to the removal of I-129 from tank waste being processed through the WTP?

Response – Although I'm not conversant in the specifics of the Tc-99 removal IX resin and process being used by the CH2M HILL Plateau Remediation Company (CHPRC) pump and treat facility and its performance for groundwater, DOE has explored whether there is an available technology to remove I-129 from the LAW tank waste, and no technology has been demonstrated to remove I-129 at the relatively low concentrations present in the LAW addressed by the DFLAW approach. DOE will continue to consider additional information and available technologies.

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