DEPARTMENT OF ECOLOGY
State of Washington

Tank Waste Committee

Additional Tank Waste Treatment & Pre-treatment Capacity

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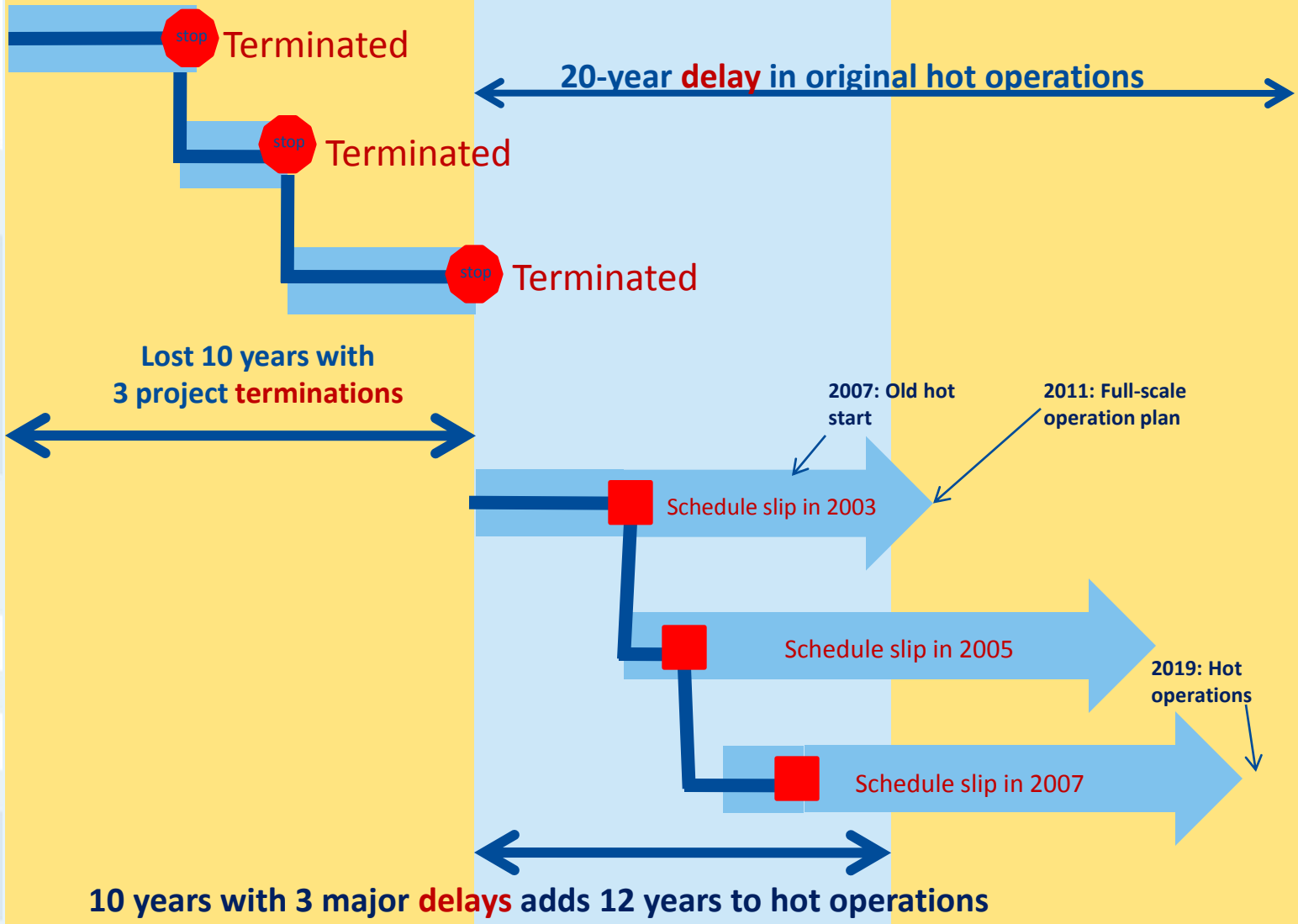
WA State Supports the Desire to Minimize Mission Duration for Tank Waste Treatment

Best way:

- Stay the course on baseline for vitrification treatment
  - Recent Settlement resulted in commitment to **Supplemental Vitrification Treatment**
- Don't undo baseline for promise of future "save-the-day" technologies or approaches
  - Finding (implied) fault in current baseline to support alternative approaches is not helpful
  - Hanford has a history of doing this, and it has cost us by eroding faith of Congress and public, causing delays in:
    - treatment start up
    - end of mission
  - 10 years in delays due to second guessing resulted in:
    - 10-year delay in end of mission @ $1 billion/year
    - $10 billion already lost!

Hanford Tank Waste Treatment Project History

1989-2011

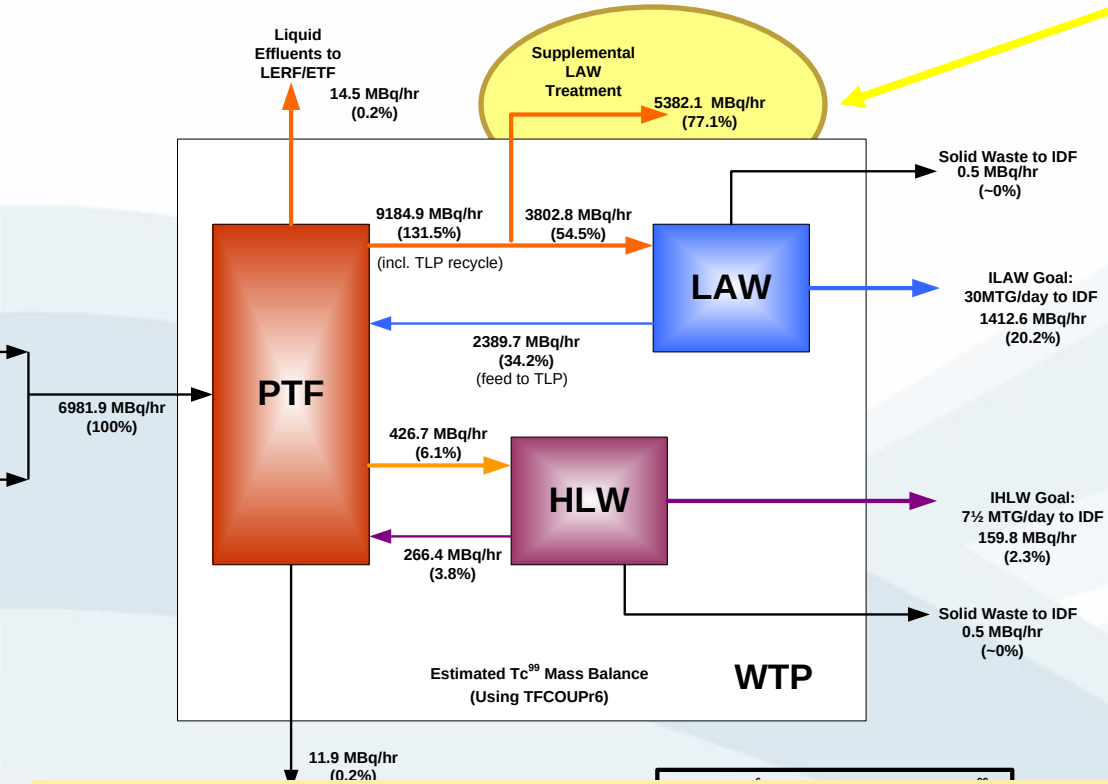


WA State Supports the Desire to Minimize Mission Duration for Tank Waste Treatment

Primary efforts should be:

- Starting WTP on time
- Early start up of LAW
- Ensuring all mechanisms are in place to support WTP operations
  - Secondary waste treatment facility
  - IHLW glass storage facility
  - Retrieval of 8-10 tanks per year
  - Blending/mixing facility
- Having the required additional vitrification capacity on board by the early 2020s

WTP Recycle



The recycle loop has been part of the design basis for more than a decade:

- Integral to managing many waste constituents
- Reviewed by many expert groups
- Essential part of maximizing many constituents of concern into the glass
- Testing and experience assures us that Tc-99 incorporation into glass is effective

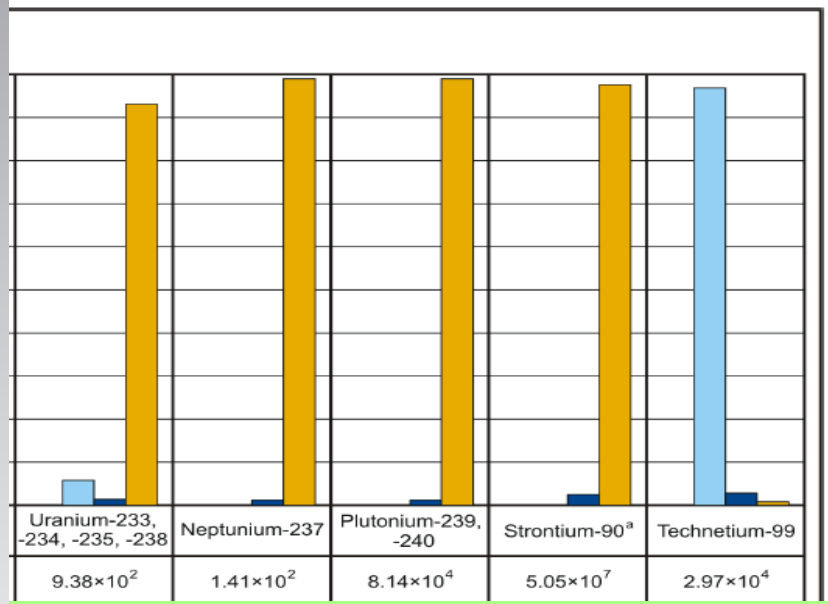
This issue has been a source of some peoples concerns:

- It is outdated and based on Bulk Vit – which had it's own internal Tc-99 recycle in sintered metal filter
- Prior to this, the 2nd Facility recycled back to PTF
- Currently, the baseline has 2nd Facility recycling to PTF
- PTF has always been sized to handle the recycle streams from both LAW treatment facilities
- Process plans in place to handle build up of sodium and sulfate

Northwest's Commitment to Glass for LAW

Why does the Northwest care about the LAW waste form?

- 90% of the tank waste by volume will be treated and stay in a shallow landfill above our groundwater that feeds the Columbia River - **FOREVER**
- This waste must be in a durable, dependable and trusted waste form
- For us, that is and has been **GLASS**



% disposal

Onsite (glass)[b]	19.8	1.0	0.0
Onsite (grout)[c]	80.4	1.4	1.3
Offsite (glass)[d]	0.0	97.9	0.0
Total[e]	100.2	100.3	1.3

[a] This figure excludes the inventory and secondary waste generated by the treatment of
[b] Immobilized low-activity waste glass.
[c] Tank residuals, retired low-activity waste melters, solid secondary waste, and Effluent T
[d] Immobilized high-level radioactive waste glass.
[e] Totals may exceed 100 percent due to conservative estimates or rounded numbers. C
and stack or to the State-Approved Land Disposal Site.

Note: Only Tank Closure Alternative 2A waste is included. Fast Flux Test Facility decomm
Comprehensive Environmental Response, Compensation, and Liability Act, non-tank was
Key: %=percent.

Figure D–14. Tank Closure Alternative 2A

Current and past modeling show:

- 98+% of the Tc-99 going into the glass
- Release from glass waste form to environment is very low and protective of future groundwater

New Technology

Action	Duration (years)	Action Dates[1]	Action Dates[2]
Commissioning and ORR	2	2022 2020	2030 2028
Construction	5	2020 2015	2028 2023
Permit	2	2015 2013	2023 2021
Design	3	2013 2010	2021 2018
Funding	3	2010 2007	2018 2015
Development and Proof at Full Scale	5	2007 2002	2015 2010

[1] Based on 2022 Hot Start Date as outlined in Settlement
[2] Based on starting the process from 2010

2nd LAW Vitrification

Action	Duration (years)	Action Dates[1]	Action Dates[2]
Commissioning and ORR	2	2022 2020	2022
Construction	4	2020 2016	
Permit	0.5	2016 2015	
Design	1	2015 2014	
Funding	1	2014 2013	2015
Development and Proof at Full Scale	NA	NA	NA

[1] Based on 2022 Hot Start Date as outlined in Settlement
[2] In Settlement discussions USDOE stated a 2nd LAW Vit could be brought online between 2015 and 2020.

Steam Reforming (SR)

Ecology is not considering SR or any other non-vit technology as possible supplemental treatment (see December 16, 2010 letter)

- 1997 WIR determination by NRC specified vitrification and stipulated that, if the waste form changed, the WIR request would have to be resubmitted
- Current environmental assessment shows that SR waste does not:
  - Protect the groundwater for Hanford waste
  - Compare to glass performance
- Several decades went into qualifying glass as a waste form
- Qualifying SR as a viable waste form in 1-3 years is not a viable path
- Full-scale operability of the reformers, waste blending/feed system, and off-gas systems have not been demonstrated
- Simply put, there are too many issues to resolve and demonstrate in the limited time available

SR at Hanford cannot be compared to other USDOE sites because they are:

- Using the non-mineralized form – not depending on mineral structure to capture the waste
- Using it for much smaller volumes of waste
- Going to send the SR waste to deep geologic repositories

Ecology Would Like Efforts Devoted To

- Completing all components of treatment baseline (including early commissioning)
- Better blending strategies
- Increase number of retrievals per year
- Melter enhancements
- Development of other vitrification technologies
- Build on what we have – keep moving forward
- No more second guessing

Questions?

Nuclear Waste Program

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DEPARTMENT OF ECOLOGY
State of Washington

M-062-30

Without restricting the discretion reserved to DOE and Ecology under M-062-45 item #3 to make the supplemental treatment decision in accordance with M-062-45 item #3 under that milestone, DOE and Ecology shall complete negotiations establishing milestones for implementing near-term (2011-2016) actions, such as those identified in the 2008 External Technical Review of System Planning for Low-Activity Waste Treatment at Hanford report, for enhancing WTP tank waste treatment and advancing the evaluation of supplemental treatment options. Such actions may include, among other actions: enhancing WTP LAW melter production rates; installing a third melter in the WTP LAW Facility; cold and hot testing strategies for bulk vitrification; and evaluating and implementing sodium mitigation strategies.

- M-062-31-T01 Complete Final Design and Submit a complete RCRA Part B Permit Modification request for Enhanced WTP and/or Supplemental Vitrification Treatment Facility based on the M-062-45 decision.
- M-062-32-T01 Start construction of Supplemental Vitrification Treatment Facility and/or WTP Enhancements.
- M-062-33-T01 Complete construction of Supplemental Treatment Vitrification Facility and/or WTP Enhancements.
- M-062-34-T01 Complete Hot Commissioning of Supplemental Treatment Vitrification Facility and/or WTP Enhancements.

M-62-40 (Partial)

TANK WASTE TREATMENT

The Plan will evaluate scenarios and identify potential near and long-term actions to optimize tank waste treatment so that the treatment mission is completed as quickly as is technically feasible but not later than the date established in milestone M-062-00, with and without consideration of (i) whether such further optimization would be excessively difficult or expensive within the context of such activities and (ii) any impact on the overall cleanup mission.

The Plan will, at a minimum, describe how the tank waste treatment mission can:

- Pretreat 100% of the retrievable tank waste (at a rate sufficient to operate the HLW facility, LAW facility, and Supplemental Treatment system simultaneously at their estimated average production rates).
- Vitrify 100% of the separated high-level waste stream at estimated average production rates.
- Vitrify 100% of separated low-activity waste stream at estimated average production rates.
- Appropriately manage secondary waste streams.

The Plan will take into account the results from testing of the Pretreatment Engineering Platform and other studies.

M-62-40 (partial)
SUPPLEMENTAL TREATMENT

The Plan will also describe:

- How much total sodium will need to be treated.
- The needed capacity for supplemental treatment to have all the tank waste treated by a date that is as quickly as is technically feasible but not later than the date established in milestone M-062-00, with and without consideration of (i) whether such further optimization would be excessively difficult or expensive within the context of such activities and (ii) any impact on the overall cleanup mission.

The System Plan will outline specific options to treat all the LAW. Such options include:

- Build and operate a 2nd LAW Vitrification Facility.
- Build and operate a Bulk Vitrification Facility.

Not later than the System Plan Report due date of 10/31/2014, DOE will submit a one-time Hanford Tank Waste Supplemental Treatment Technologies Report, which will be required if a tank waste supplemental treatment technology is proposed, other than a 2nd LAW Vitrification Facility.

This report will:

- Describe additional treatment facilities and technologies, and cost which in combination with the WTP are needed to vitrify all of Hanford's tank waste by a date that is as quickly as is technically feasible but not later than the date established in milestone M-062-00, with and without consideration of (i) whether such further optimization would be excessively difficult or expensive within the context of such activities and (ii) any impact on the overall cleanup mission.
- Apply the same selection criteria to all options and include a 2nd LAW Vitrification Facility as an option.
- Include all the results from all waste form performance data (compared against the performance of borosilicate glass) for all the treatment technologies being considered.
- Describe the technologies being considered (including size, throughput, sodium loading, quantity of waste to be processed, quantity of final waste forms, secondary waste quantity and nature, technical viability, and life cycle cost and schedule estimates).
- Include data from both cold and hot testing if bulk vitrification is to be retained as an option.