U.S. Department of Energy
Hanford Site

December 27, 2022

22-TF-002632

Mr. David Bowen, Program Manager
Nuclear Waste Program
Washington State Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99354

Dear Mr. Bowen:

SELECTED SCENARIOS FOR THE RIVER PROTECTION PROJECT SYSTEM PLAN, REV. 10

The U.S. Department of Energy (DOE) requests acknowledgment from the Washington State Department of Ecology (Ecology) on the submittal of the attached selected scenarios as partial completion of Milestone M-062-40, of the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement). DOE appreciates the joint meetings and discussions to develop the selected scenarios. The milestone includes a criterion that "One year prior to the issuance of the System Plan, DOE and Ecology will each select the scenarios (including underlying common and scenario specific assumptions) that will be analyzed in the System Plan, with DOE and Ecology each having the right to select a minimum of three scenarios each."

Consistent with the River Protection Project System Plan (System Plan) Rev. 9, the results of the Tri-Party Agreement compliant case previously developed (Scenario 6 in Rev. 8 of the System Plan) are still valid and will not be repeated in Rev. 10.

If you have any questions, please contact me on (509) 376-5166, or your staff may contact Paul Schroder, Acting Deputy Assistant Manager, Tank Farms Project, on (509) 373-8939.

Sincerely,

Delmar L. Noyes

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Date: 2022.12.27 08:41:34 -08'00'

Delmar L. Noyes
Assistant Manager
Tank Farms Project

TF:JJL

Attachment

cc: See page 2

cc w/attach:
J. Bell, NPT
S. L. Brasher, HMIS
A. Buck, Wanapum
L. Contreras, YN
D. R. Einan, EPA
M. Johnson, CTUIR
J. D. McDonald, Ecology
J. B. Price, Ecology
M. J. Turner, HMIS
M. Woods, ODOE
Administrative Record (M-062-40I)
Environmental Portal
HAB Facilitation

ATTACHMENT
22-TF-002632

SELECTED SCENARIOS FOR THE RIVER PROTECTION PROJECT
SYSTEM PLAN, REVISION 10

29 pages (including cover page)

EXECUTIVE SUMMARY

PARTIAL COMPLETION OF HANFORD FEDERAL FACILITY AGREEMENT AND CONSENT ORDER (TRI-PARTY AGREEMENT) INTERIM MILESTONE M-062-40

The U.S. Department of Energy (DOE), Office of River Protection (ORP) and Washington State Department of Ecology (Ecology) are submitting the attached blue sheet scenario summaries for System Plan, Revision 10 in fulfillment of the criteria established by Milestone M-062-40. "One year prior to the issuance of the System Plan, DOE and Ecology will each select the scenarios (including underlying common and scenario specific assumptions) that will be analyzed in the System Plan, with DOE and Ecology each having the right to select a minimum of three scenarios each."

The attached blue sheet scenario summaries are a result of joint efforts by members of both ORP and Ecology to provide a broad set of scenarios to inform future decision makers regarding the potential outcomes for the waste currently stored at Hanford. In addition to the Baseline, four other scenarios were proposed. The key assumptions defining the Baseline were outlined first, and the alternative scenarios were defined as modifications to those assumptions. The alternative scenarios are presented side-by-side with the Baseline for comparison. Estimated costs and schedules, assumptions, and scenarios are part of planning and modeling exercises and should not be viewed as a part of a decision document.

The ORP and Ecology expect continued open dialogue as scenarios are modeled to increase a common understanding of the mission.

Delmar L. Noyes

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Date: 2022.12.27 08:42:35 -08'00'

Delmar L. Noyes
Assistant Manager
Tank Farms Project
Department of Energy

David Bowen
Nuclear Waste Program Manager
Washington State Department of Ecology

System Plan 10 Scenario 1 – Baseline Case (DOE Case)

Objective: Evaluate the mission using current baseline plans and assumptions.

System Plan 10 Scenario 1A (Sensitivity) – Unconstrained Funding

Objective: Evaluate the mission using current baseline assumptions, but with relaxed funding constraints.

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 1A – Unconstrained Funding
SST Retrievals	• Retrieval volumes, chemical additions, and minimum durations consistent with RPP-PLAN-40145, Rev. 8 • Start S/SX Tank Farms as the next retrievals after A/AX Tank Farms with the goal of continuity of SST retrievals • In 200 West Area, T/TX/TY Tank Farms and then U Tank Farm is retrieved after the completion of S/SX Tank Farms' retrievals[1] • B/BX/BY Tank Farms' retrievals begin when there is sufficient space in the 200 East Area DSTs to support SST retrievals in both 200 East and West Areas (typically after startup of LAWST)[1] • One retrieval per area (200 East and West), increasing to two simultaneous per area in when possible given available DST space and treatment throughput[1] • Retrieve Tanks B-109 and T-111 as the first SSTs in B Complex and T Complex, respectively	No changes (Note: Footnote 1 does not apply.)
DST Operations	• The 27 DSTs (i.e., sans Tank AY-102) are assumed to remain in service for the full mission • Near-term transfers, retrievals, and evaporator campaigns shall be consistent with FY 2022 Q4 MYOP (RPP-PLAN-63778, Rev. 11) • Maintains 1.265 Mgal of emergency space • Perform Group A mitigation of Tank SY-103 after A/AX Tank Farms retrievals and before beginning S/SX Tank Farms retrievals; and perform Group A mitigation of Tank AN-104 before accumulating retrieved solids in SY Tank Farm[1] • Supernatant and slurry cross-site transfer lines available to support mitigation of Tank SY-103 and subsequent S/SX Tank Farms' retrievals[1] • Increase solids limit in two SY Tank Farm DSTs to 200 inches once the cross-site slurry transfer line is available and Tank AN-104 has been mitigated • DST heel retrieval durations based on Tank AY-102 (128 days)	No changes (Note: Footnote 1 does not apply.)

[1] Activity begins, when possible, based on budget constraints, but not earlier than any assumption-specific start date or constraints would allow.

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 1A – Unconstrained Funding
	• DST retrievals limited to two simultaneous maximum per farm and shall not exceed four simultaneous maximum including SST retrievals	
242-A Evaporator	• Available for the full mission for a maximum of six campaigns per year during DFLAW treatment, and nine campaigns per year after startup of the full WTP • 104-day sampling time per campaign	No changes
TSCR/TFPT Systems	• TSCR system operational on 01/24/2022 (actual) • Fed from Tank AP-107, treated waste to Tank AP-106, plant wash to Tank AP-108 • Feed transferred to the WTP LAW Vitrification Facility from Tank AP-106 (i.e., DFLAW operations) • Feed staged for 178 days per campaign in Tank AP-105 or another designated AP Tank Farm tank • Non-elutable resin (crystalline silicotitanate [CST]) • Three-year permitted service life for the initial HIHTL, requiring replacement and an associated 5-month downtime prior to continuing operations • After 5 years of operating the initial TSCR unit, an increased TFPT capacity (sufficient to match WTP LAW Vitrification production rate) will come online for the balance of DFLAW operations • Continues operating after DFLAW operations, as needed, to provide feed to LAWST • Spent CST IX columns stored on pads (additional pads added as-needed) until the end of the mission, at which point the CST is fed to the WTP HLW Vitrification Facility	No changes

WTP PT Facility	The following assumptions support completion of WTP "PT Facility Hot Commissioning" and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree[2], "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to the milestone date [12/31/2036], operating the WTP to produce high-level waste glass at an average rate of at least 4.2 Metric Tons of Glass (MTG)/day, and low-activity waste glass at an average rate of at least 21 MTG/day."
	• **Operational by 12/31/2033**[1]
	  ○ 70% TOE
	  ○ Fed from TWCS (HLW) and DSTs (LAW)
	  ○ Feeds WTP LAW and HLW Vitrification Facilities and LAWST
		No changes
		(Note: Footnote 1 does not apply.)

[2] The "Consent Decree" collectively refers to the Consent Decree in Case No. 2:08-CV-05085-FVS (E.D. WA October 25, 2010), the Amended Consent Decree, Case No. 2:08-CV-05085-RMP (March 11, 2016), the Second Amended Consent Decree, Case No. 2:08-CV-05085-RMP (April 12, 2016), the Third Amended Consent Decree, Case No. 2:08-CV-05085-RMP (October 12, 2018), and the COVID force majeure relief granted in Order Granting Defendant's Unopposed Motion to Enter Consent Decree Milestone Extensions and Modifying Amended Consent Decree Case No: 2:08-CV-05085-RMP (July 18, 2022).

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 1A – Unconstrained Funding
	○ Handles recycle of secondary liquid waste from LAW and HLW processing ○ Flowsheet modifications to resolve DNFSB-identified technical safety issues	
WTP HLW Vitrification Facility	The following assumptions support completion of "HLW Construction Substantially Complete," "HLW Hot Commissioning Complete," and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree, "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to the milestone date [12/31/2036], operating the WTP to produce high-level waste glass at an average rate of at least 4.2 Metric Tons of Glass (MTG)/day..." • **Operational on 12/31/2033**[1] • Ramp-up (hot commissioning will not specifically be modeled) (70% TOE) 12/31/**2033** 3.0 MTG/day 12/31/**2034** 4.0 MTG/day 09/30/**2036** 4.2 MTG/day 12/31/**2038** 5.25 MTG/day (2^{nd} generation melters)	No changes (Note: Footnote 1 does not apply.)
WTP LAW Vitrification Facility	The following assumptions support completion of "LAW Hot Commissioning" and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree, "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to the milestone date [12/31/2036], operating the WTP to produce…low-activity waste glass at an average rate of at least 21 MTG/day." • **Operational on 01/24/2024** • Ramp-up (hot commissioning will not specifically be modeled) (70% TOE) First 7 months 9.0 MTG/day Next 12 months 18.0 MTG/day Balance of mission 21.0 MTG/day	No changes
CH-TRU	• CH-TRU operational after the full WTP and LAWST begin operations[1]	No changes
LERF/ETF	• Upgrades to treat variable secondary liquid wastes (242-A Evaporator condensate, IDF leachate, ERDF leachate, EMF/WTP condensates, and caustic scrubber) • Supplemental Secondary Effluent Treatment Facility operational in 2039 to support LAWST, sized so that secondary liquid effluent treatment does not drive mission[1] • Secondary solid waste as cast stone to IDF	No changes (Note: Footnote 1 does not apply.)
WTP EMF	• 100% recycle of concentrate to LAW feed (100 kgal space reserved in Tank AP-102 for emergency returns) • Caustic scrubber by-pass directly to LERF/ETF • Only operates during DFLAW operations	No changes

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 1A – Unconstrained Funding
WRFs	• T Complex WRF operational when retrieval of S/SX Tank Farms is complete[1] • B Complex WRF operational when there is sufficient space in the 200 East Area DSTs to support SST retrievals in both 200 East and West Areas (typically after start-up of LAWST)[1] • Six 150-kgal tanks each	No changes (Note: Footnote 1 does not apply.)
TWCS Capability	• Operational 18 months prior to completion of WTP HLW Vitrification Facility hot commissioning • Stage, mix, and sample waste to meet WTP PT Facility WAC (190-day sampling time) • Six 500-kgal tanks	No changes
LAWST	• **Operational 12/31/2039**[1] • Operates at 70% TOE • Estimated three LAW-melter-equivalent capacity (31.5 MTG/day), sized based on cost/benefit trade-off • Assumed to be a vitrification facility for cost purposes	No changes (Note: Footnote 1 does not apply.)
GFMs	• BARD[3] LAW GFM first 5 years of DFLAW • PNNL 2020 LAW GFM after first 5 years of DFLAW mission • PNNL 2016 HLW GFM	No changes
Budget/Funding	• Beginning in 2025, the mission is funded at $2.7B per year (FY 2023 $) escalated at 2.4% annually • Costs for completing WTP PT and HLW Vitrification Facilities estimated at $14B (FY 2023 $) • Activities are prioritized based on effect to the treatment end date	No explicit budgetary constraints

System Plan 10 Scenario 1B (Sensitivity) – Expedite B and T Complex Retrievals

Objective: Evaluate the effect on the cost-constrained baseline of retrieving B and T complex as the next SST farms after A and AX Tank Farms. Scenario 1B builds on Scenario 1.

System	Assumptions (where Different from Scenario 1) Scenario 1B – Expedite B and T Complex Retrievals
SST Retrievals	• Retrieval volumes, chemical additions, and minimum durations consistent with RPP-PLAN-40145, Rev. 8 • Start T/TX/TY and B/BX/BY Tank Farms as the next retrievals after A/AX Tank Farms • In 200 West Area, S/SX Tank Farms and then U Tank Farm is retrieved after the completion of T/TX/TY Tank Farms' retrievals
WRFs	• T Complex WRF operational 12/31/2033 • B Complex WRF operational 12/31/2033

[3] 24590-WTP-RPT-PT-02-005, 2011, *Flowsheet Bases, Assumptions, and Requirements*, Rev. 8, Bechtel National, Inc., Richland, Washington.

System Plan 10 Scenario 2 – Phased Start-Up (DOE Case)

Objective: Evaluate the effect of implementing the mission via a phased start-up of facilities, including starting an additional TSCR unit in SY Tank Farm in 2026 and the WTP HLW Vitrification Facility in a direct-feed configuration in 2033, but with minimal capital investment in other new facilities. Additional facilities, including LAWST (as a grouting facility) and a TWCS capability with expanded capabilities are brought online by 2050.

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 2 – Phased Start-Up
SST Retrievals	• Retrieval volumes, chemical additions, and minimum durations consistent with RPP-PLAN-40145, Rev. 8 • Start S/SX Tank Farms as the next retrievals after A/AX Tank Farms with the goal of continuity of SST retrievals • In 200 West Area, T/TX/TY Tank Farms and then U Tank Farm is retrieved after the completion of S/SX Tank Farms' retrievals • B/BX/BY Tank Farms' retrievals begin when there is sufficient space in the 200 East Area DSTs to support SST retrievals in both 200 East and West Areas (typically after startup of LAWST)[1] • One retrieval per area (200 East and West), increasing to two simultaneous per area in when possible given available DST space and treatment throughput[4] • Retrieve Tanks B-109 and T-111 as the first SSTs in B Complex and T Complex, respectively	• U Tank Farm retrieved along with S/SX Tank Farms prior to T/TX/TY Tank Farms retrievals • S/SX and U Tank Farms retrievals begin 01/01/2026, after startup of the SY Tank Farm TSCR unit • B/BX/BY Tank Farms retrievals start 12/31/2050 • Two simultaneous retrievals per area (200 East and West Areas)
DST Operations	• The 27 DSTs (i.e., sans Tank AY-102) are assumed to remain in service for the full mission • Near-term transfers, retrievals, and evaporator campaigns shall be consistent with FY 2022 Q4 MYOP (RPP-PLAN-63778, Rev. 11) • Maintains 1.265 Mgal of emergency space • Perform Group A mitigation of Tank SY-103 after A/AX Tank Farms retrievals and before beginning S/SX Tank Farms retrievals; and perform Group A mitigation of Tank AN-104 before accumulating retrieved solids in SY Tank Farm[1] • Supernatant and slurry cross-site transfer lines available to support mitigation of Tank SY-103 and subsequent S/SX Tank Farms' retrievals[1] • Increase solids limit in two SY Tank Farm DSTs to 200 inches once the cross-site slurry transfer line is available and Tank AN-104 has been mitigated • DST heel retrieval durations based on Tank AY-102 (128 days)	• Perform sampling and staging (120-day qualification time) of HLW feed in the DSTs • Perform washing of HLW feed in the DSTs prior to 2050 • Tank SY-103 mitigation complete by 01/01/2026, prior to startup of the SY Tank Farm TSCR unit • Cross-site supernatant transfer line is not reactivated • Commissioning of the cross-site slurry line is delayed as long as possible while maintaining continuity of SST retrievals and maintaining fewer than 400 inches of total solids in SY Tank Farm.

[4] Activity begins, when possible, based on budget constraints, but not earlier than any assumption-specific start date or constraints would allow.

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 2 – Phased Start-Up
	• DST retrievals limited to two simultaneous maximum per farm and shall not exceed four simultaneous maximum including SST retrievals	
242-A Evaporator	• Available for the full mission for a maximum of six campaigns per year during DFLAW treatment, and nine campaigns per year after startup of the full WTP • 104-day sampling time per campaign	• Available for the full mission for a maximum of six campaigns per year through 2050, and nine campaigns per year thereafter
TSCR/TFPT Systems	• TSCR system operational on 01/24/2022 (actual) • Fed from Tank AP-107, treated waste to Tank AP-106, plant wash to Tank AP-108 • Feed transferred to the WTP LAW Vitrification Facility from Tank AP-106 (i.e., DFLAW operations) • Feed staged for 178 days per campaign in Tank AP-105 or another designated AP Tank Farm tank • Non-elutable resin (crystalline silicotitanate [CST]) • Three-year permitted service life for the initial HIHTL, requiring replacement and an associated 5-month downtime prior to continuing operations • After 5 years of operating the initial TSCR unit, an increased TFPT capacity (sufficient to match WTP LAW Vitrification production rate) will come online for the balance of DFLAW operations • Continues operating after DFLAW operations, as needed, to provide feed to LAWST • Spent CST IX columns stored on pads (additional pads added as-needed) until the end of the mission, at which point the CST is fed to the WTP HLW Vitrification Facility	• The AP Tank Farm TSCR/TFPT system provides feed to the WTP LAW Vitrification Facility for the full mission • The AP Tank Farm TFPT system is expanded on 12/31/2050 to maintain adequate feed to the WTP LAW Vitrification Facility and LAWST capability (define needed pretreatment capacity as equivalent number of TSCR units) • Additional existing DSTs allotted to support expanded TFPT as-needed • An additional TSCR unit in SY Tank Farm operational on 01/01/2026 • The SY Tank Farm TSCR unit operates until all 200 West Area SST retrievals are complete • Tank SY-102 feeds and receives plant wash from the SY Tank Farm TSCR unit • Feed for the SY Tank Farm TSCR unit is staged in either Tank SY-101 or SY-103 • Treated waste from the SY Tank Farm TSCR unit is initially shipped offsite for treatment and disposal, and then is sent to LAWST after 12/31/2050 • No concentration of feed to or from the SY Tank Farm TSCR unit; feed delivered as-retrieved
WTP PT Facility	The following assumptions support completion of WTP "PT Facility Hot Commissioning" and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree[5], "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to the milestone date [12/31/2036], operating the WTP to produce high-level waste glass at an average rate of at least 4.2 Metric Tons of Glass (MTG)/day, and low-activity waste glass at an average rate of at least 21 MTG/day." • **Operational by 12/31/2033**[1] ○ 70% TOE	• The WTP PT Facility is not included in this scenario

[5] The "Consent Decree" collectively refers to the Consent Decree in Case No. 2:08-CV-05085-FVS (E.D. WA October 25, 2010), the Amended Consent Decree, Case No. 2:08-CV-05085-RMP (March 11, 2016), the Second Amended Consent Decree, Case No. 2:08-CV-05085-RMP (April 12, 2016), the Third Amended Consent Decree, Case No. 2:08-CV-05085-RMP (October 12, 2018), and the COVID force majeure relief granted in Order Granting Defendant's Unopposed Motion to Enter Consent Decree Milestone Extensions and Modifying Amended Consent Decree Case No: 2:08-CV-05085-RMP (July 18, 2022).

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 2 – Phased Start-Up
	○ Fed from TWCS (HLW) and DSTs (LAW) ○ Feeds WTP LAW and HLW Vitrification Facilities and LAWST ○ Handles recycle of secondary liquid waste from LAW and HLW processing ○ Flowsheet modifications to resolve DNFSB-identified technical safety issues	
WTP HLW Vitrification Facility	The following assumptions support completion of "HLW Construction Substantially Complete," "HLW Hot Commissioning Complete," and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree, "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to the milestone date [12/31/2036], operating the WTP to produce high-level waste glass at an average rate of at least 4.2 Metric Tons of Glass (MTG)/day..." • **Operational on 12/31/2033**[1] • Ramp-up (hot commissioning will not specifically be modeled) (70% TOE) 12/31/**2033** 3.0 MTG/day 12/31/**2034** 4.0 MTG/day 09/30/**2036** 4.2 MTG/day 12/31/**2038** 5.25 MTG/day (2^{nd} generation melters)	• Operates at 40% TOE (ramp-up adjusted proportionally) • Fed directly from the TWCS capability • Effluents returned to tank farms via the TWCS capability
WTP LAW Vitrification Facility	The following assumptions support completion of "LAW Hot Commissioning" and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree, "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to the milestone date [12/31/2036], operating the WTP to produce…low-activity waste glass at an average rate of at least 21 MTG/day." • **Operational on 01/24/2024** • Ramp-up (hot commissioning will not specifically be modeled) (70% TOE) First 7 months 9.0 MTG/day Next 12 months 18.0 MTG/day Balance of mission 21.0 MTG/day	• Operates at 40% TOE (ramp-up adjusted proportionally)
CH-TRU	• CH-TRU operational after the full WTP and LAWST begin operations[1]	• CH-TRU delayed until after start-up of B/BX/BY Tank Farms retrievals on 12/31/2050
LERF/ETF	• Upgrades to treat variable secondary liquid wastes (242-A Evaporator condensate, IDF leachate, ERDF leachate, EMF/WTP condensates, and caustic scrubber) • Supplemental Secondary Effluent Treatment Facility operational in 2039 to support LAWST, sized so that secondary liquid effluent treatment does not drive mission[1] • Secondary solid waste as cast stone to IDF	• The Supplemental Secondary Effluent Treatment Facility is not included in this scenario
WTP EMF	• 100% recycle of concentrate to LAW feed (100 kgal space reserved in Tank AP-102 for emergency returns) • Caustic scrubber by-pass directly to LERF/ETF • Only operates during DFLAW operations	• Operates for the full mission

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 2 – Phased Start-Up
WRFs	• T Complex WRF operational when retrieval of S/SX Tank Farms is complete[1] • B Complex WRF operational when there is sufficient space in the 200 East Area DSTs to support SST retrievals in both 200 East and West Areas (typically after start-up of LAWST)[1] • Six 150-kgal tanks each	• T Complex WRF operational when retrieval of S/SX and U Tank Farms is complete • B Complex WRF operational 12/31/2050
TWCS Capability	• Operational 18 months prior to completion of WTP HLW Vitrification Facility hot commissioning • Stage, mix, and sample waste to meet WTP PT Facility WAC (190-day sampling time) • Six 500-kgal tanks	• Initially consists of two 20,000-gallon tanks which serve as intermediate tankage for both feed and effluent returns between the DSTs and WTP HLW Vitrification Facility • Expanded TWCS capability operational 12/31/2050 • Expanded TWCS capability performs washing, leaching, and solids concentration for HLW feed • Expanded TWCS capability consists of two pretreatment trains, each containing a 70-kgal feed preparation tank, a 21-kgal filter feed tank, a cross-flow filtration unit, and a 30-kgal feed tank • Expanded TWCS capability includes an evaporator to concentrate dilute effluents from HLW vitrification and feed washing prior to returning to tank farms that includes two 60-kgal feed tanks and two 250-kgal concentrate receipt tanks
LAWST	• **Operational 12/31/2039**[1] • Operates at 70% TOE • Estimated three LAW-melter-equivalent capacity (31.5 MTG/day), sized based on cost/benefit trade-off • Assumed to be a vitrification facility for cost purposes	• Operational on 12/31/2050 • Assumed to be a grouting facility • Sized so that LAW treatment does not drive mission (define needed treatment capacity as equivalent number of LAW melters at 40% TOE for scenario comparison purposes) • Feed concentrated by a LAW feed evaporator (also concentrates feed to WTP LAW Vitrification Facility), operational on 12/31/2050
GFMs	• BARD[6] LAW GFM first 5 years of DFLAW • PNNL 2020 LAW GFM after first 5 years of DFLAW mission • PNNL 2016 HLW GFM	• No changes • Grout volume estimated by assuming a constant water/dry mix mass ratio of 0.6 per WRPS-1700633[7]
Budget/Funding	• Beginning in 2025, the mission is funded at $2.7B per year (FY 2023 $) escalated at 2.4% annually • Costs for completing WTP PT and HLW Vitrification Facilities estimated at $14B (FY 2023 $) • Activities are prioritized based on effect to the treatment end date	• No explicit budgetary constraints, however level-loading of the funding profile was considered in the definition of the scenario assumptions

[6] 24590-WTP-RPT-PT-02-005, 2011, *Flowsheet Bases, Assumptions, and Requirements*, Rev. 8, Bechtel National, Inc., Richland, Washington.

[7] WRPS-1700633, 2017, "Recommended Assumptions for Waste Loading in Low Activity Waste Grout for System Plan 8," (interoffice memorandum from D. J. Swanberg to L. M. Bergmann, February 21), Washington River Protection Solutions LLC, Richland, Washington.

System Plan 10 Scenario 3 – Phased Start-Up with Early High-Level Waste Effluent Management Capability (Ecology Case)

Objective: Evaluate the effect of implementing the mission via a phased start-up of facilities, including starting an additional TSCR unit in SY Tank Farm in 2026 and the WTP HLW Vitrification Facility in a direct-feed configuration in 2033, but with minimal capital investment in other new facilities. Additional facilities, including LAWST)(as a grouting facility) and a TWCS capability with expanded capabilities are brought online by 2050.

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 3 – Phased Start-Up with Early High-Level Waste Effluent Management Capability
SST Retrievals	• Retrieval volumes, chemical additions, and minimum durations consistent with RPP-PLAN-40145, Rev. 8 • Start S/SX Tank Farms as the next retrievals after A/AX Tank Farms with the goal of continuity of SST retrievals • In 200 West Area, T/TX/TY Tank Farms and then U Tank Farm is retrieved after the completion of S/SX Tank Farms' retrievals • B/BX/BY Tank Farms' retrievals begin when there is sufficient space in the 200 East Area DSTs to support SST retrievals in both 200 East and West Areas (typically after startup of LAWST)[1] • One retrieval per area (200 East and West), increasing to two simultaneous per area in when possible given available DST space and treatment throughput[8] • Retrieve Tanks B-109 and T-111 as the first SSTs in B Complex and T Complex, respectively	• U Tank Farm retrieved along with S/SX Tank Farms prior to T/TX/TY Tank Farms retrievals • S/SX and U Tank Farms retrievals begin 01/01/2026, after startup of the SY Tank Farm TSCR unit • B/BX/BY Tank Farms retrievals start 12/31/2050 • Two simultaneous retrievals per area (200 East and West Areas)
DST Operations	• The 27 DSTs (i.e., sans Tank AY-102) are assumed to remain in service for the full mission • Near-term transfers, retrievals, and evaporator campaigns shall be consistent with FY 2022 Q4 MYOP (RPP-PLAN-63778, Rev. 11) • Maintains 1.265 Mgal of emergency space • Perform Group A mitigation of Tank SY-103 after A/AX Tank Farms retrievals and before beginning S/SX Tank Farms retrievals; and perform Group A mitigation of Tank AN-104 before accumulating retrieved solids in SY Tank Farm[1] • Supernatant and slurry cross-site transfer lines available to support mitigation of Tank SY-103 and subsequent S/SX Tank Farms' retrievals[1] • Increase solids limit in two SY Tank Farm DSTs to 200 inches once the cross-site slurry	• Perform sampling and staging (120-day qualification time) of HLW feed in the DSTs • Perform washing of HLW feed in the DSTs prior to 2050 • Tank SY-103 mitigation complete by 01/01/2026, prior to startup of the SY Tank Farm TSCR unit • Cross-site supernatant transfer line is not reactivated • Commissioning of the cross-site slurry line is delayed as long as possible while maintaining continuity of SST retrievals and maintaining fewer than 400 inches of total solids in SY Tank Farm

[8] Activity begins, when possible, based on budget constraints, but not earlier than any assumption-specific start date or constraints would allow.

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 3 – Phased Start-Up with Early High-Level Waste Effluent Management Capability
	transfer line is available and Tank AN-104 has been mitigated • DST heel retrieval durations based on Tank AY-102 (128 days) • DST retrievals limited to two simultaneous maximum per farm and shall not exceed four simultaneous maximum including SST retrievals	
242-A Evaporator	• Available for the full mission for a maximum of six campaigns per year during DFLAW treatment, and nine campaigns per year after startup of the full WTP • 104-day sampling time per campaign	• Available for the full mission for a maximum of six campaigns per year through 2050, and nine campaigns per year thereafter
TSCR/TFPT Systems	• TSCR system operational on 01/24/2022 (actual) • Fed from Tank AP-107, treated waste to Tank AP-106, plant wash to Tank AP-108 • Feed transferred to the WTP LAW Vitrification Facility from Tank AP-106 (i.e., DFLAW operations) • Feed staged for 178 days per campaign in Tank AP-105 or another designated AP Tank Farm tank • Non-elutable resin (crystalline silicotitanate [CST]) • Three-year permitted service life for the initial HIHTL, requiring replacement and an associated 5-month downtime prior to continuing operations • After 5 years of operating the initial TSCR unit, an increased TFPT capacity (sufficient to match WTP LAW Vitrification production rate) will come online for the balance of DFLAW operations • Continues operating after DFLAW operations, as needed, to provide feed to LAWST • Spent CST IX columns stored on pads (additional pads added as-needed) until the end of the mission, at which point the CST is fed to the WTP HLW Vitrification Facility	• The AP Tank Farm TSCR/TFPT system provides feed to the WTP LAW Vitrification Facility for the full mission • The AP Tank Farm TFPT system is expanded on 12/31/2050 to maintain adequate feed to the WTP LAW Vitrification Facility and LAWST capability (define needed pretreatment capacity as equivalent number of TSCR units) • Additional existing DSTs allotted to support expanded TFPT as-needed • An additional TSCR unit in SY Tank Farm operational on 01/01/2026 • The SY Tank Farm TSCR unit operates until all 200 West Area SST retrievals are complete • Tank SY-102 feeds and receives plant wash from the SY Tank Farm TSCR unit • Feed for the SY Tank Farm TSCR unit is staged in either Tank SY-101 or SY-103 • Treated waste from the SY Tank Farm TSCR unit is initially shipped offsite for treatment and disposal, and then is sent to LAWST after 12/31/2050 • No concentration of feed to or from the SY Tank Farm TSCR unit; feed delivered as-retrieved
WTP PT Facility	The following assumptions support completion of WTP "PT Facility Hot Commissioning" and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree[9], "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to the milestone date [12/31/2036], operating the WTP	• The WTP PT Facility is not included in this scenario

[9] The "Consent Decree" collectively refers to the Consent Decree in Case No. 2:08-CV-05085-FVS (E.D. WA October 25, 2010), the Amended Consent Decree, Case No. 2:08-CV-05085-RMP (March 11, 2016), the Second Amended Consent Decree, Case No. 2:08-CV-05085-RMP (April 12, 2016), the Third Amended Consent Decree, Case No. 2:08-CV-05085-RMP (October 12, 2018), and the COVID force majeure relief granted in Order Granting Defendant's Unopposed Motion to Enter Consent Decree Milestone Extensions and Modifying Amended Consent Decree Case No: 2:08-CV-05085-RMP (July 18, 2022).

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 3 – Phased Start-Up with Early High-Level Waste Effluent Management Capability
	to produce high-level waste glass at an average rate of at least 4.2 Metric Tons of Glass (MTG)/day, and low-activity waste glass at an average rate of at least 21 MTG/day." • **Operational by 12/31/2033**[1] o 70% TOE o Fed from TWCS (HLW) and DSTs (LAW) o Feeds WTP LAW and HLW Vitrification Facilities and LAWST o Handles recycle of secondary liquid waste from LAW and HLW processing o Flowsheet modifications to resolve DNFSB-identified technical safety issues	
WTP HLW Vitrification Facility	The following assumptions support completion of "HLW Construction Substantially Complete," "HLW Hot Commissioning Complete," and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree, "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to the milestone date [12/31/2036], operating the WTP to produce high-level waste glass at an average rate of at least 4.2 Metric Tons of Glass (MTG)/day..." • **Operational on 12/31/2033**[1] • Ramp-up (hot commissioning will not specifically be modeled) (70% TOE) 12/31/**2033** 3.0 MTG/day 12/31/**2034** 4.0 MTG/day 09/30/**2036** 4.2 MTG/day 12/31/**2038** 5.25 MTG/day (2^{nd} generation melters)	• Operates at 40% TOE (ramp-up adjusted proportionally) • Fed directly from the TWCS capability • Effluents returned to tank farms via the TWCS capability
WTP LAW Vitrification Facility	The following assumptions support completion of "LAW Hot Commissioning" and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree, "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to the milestone date [12/31/2036], operating the WTP to produce…low-activity waste glass at an average rate of at least 21 MTG/day." • **Operational on 01/24/2024** • Ramp-up (hot commissioning will not specifically be modeled) (70% TOE) First 7 months 9.0 MTG/day Next 12 months 18.0 MTG/day Balance of mission 21.0 MTG/day	• Operates at 40% TOE (ramp-up adjusted proportionally)
CH-TRU	• CH-TRU operational after the full WTP and LAWST begin operations[1]	• CH-TRU delayed until after start-up of B/BX/BY Tank Farms retrievals on 12/31/2050
LERF/ETF	• Upgrades to treat variable secondary liquid wastes (242-A Evaporator condensate, IDF leachate, ERDF leachate, EMF/WTP condensates, and caustic scrubber) • Supplemental Secondary Effluent Treatment Facility operational in 2039 to support	• No change from Scenario 1

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 3 – Phased Start-Up with Early High-Level Waste Effluent Management Capability
	LAWST, sized so that secondary liquid effluent treatment does not drive mission[1] • Secondary solid waste as cast stone to IDF	
WTP EMF	• 100% recycle of concentrate to LAW feed (100 kgal space reserved in Tank AP-102 for emergency returns) • Caustic scrubber by-pass directly to LERF/ETF • Only operates during DFLAW operations	• Operates for the full mission
WRFs	• T Complex WRF operational when retrieval of S/SX Tank Farms is complete[1] • B Complex WRF operational when there is sufficient space in the 200 East Area DSTs to support SST retrievals in both 200 East and West Areas (typically after start-up of LAWST)[1] • Six 150-kgal tanks each	• T Complex WRF operational when retrieval of S/SX and U Tank Farms is complete • B Complex WRF operational 12/31/2050
TWCS Capability	• Operational 18 months prior to completion of WTP HLW Vitrification Facility hot commissioning • Stage, mix, and sample waste to meet WTP PT Facility WAC (190-day sampling time) • Six 500-kgal tanks	• The initial TWCS capability includes a 160-kgal feed receipt tank, a 100-kgal feed tank, and an evaporator to concentrate dilute effluents from HLW vitrification and feed washing prior to returning to tank farms. The evaporator includes two 60-kgal feed tanks and two 250-kgal concentrate receipt tanks • Expanded TWCS capability operational 12/31/2050 • Expanded TWCS capability performs washing, leaching, and solids concentration for HLW feed • Expanded TWCS capability consists of two pretreatment trains, each containing a 70-kgal feed preparation tank, a 21-kgal filter feed tank, a cross-flow filtration unit, and a 30-kgal feed tank
LAWST	• **Operational 12/31/2039**[1] • Operates at 70% TOE • Estimated three LAW-melter-equivalent capacity (31.5 MTG/day), sized based on cost/benefit trade-off • Assumed to be a vitrification facility for cost purposes	• Operational on 12/31/2050 • Operates at 40% TOE • Sized so that LAW treatment does not drive mission (define needed treatment capacity as equivalent number of LAW melters at 40% TOE for scenario comparison purposes) • Feed concentrated by a LAW feed evaporator (also concentrates feed to WTP LAW Vitrification Facility), operational on 12/31/2050
GFMs	• BARD[10] LAW GFM first 5 years of DFLAW • PNNL 2020 LAW GFM after first 5 years of DFLAW mission • PNNL 2016 HLW GFM	• No change from Scenario 1
Budget/Funding	• Beginning in 2025, the mission is funded at $2.7B per year (FY 2023 $) escalated at 2.4% annually	• No explicit budgetary constraints

[10] 24590-WTP-RPT-PT-02-005, 2011, *Flowsheet Bases, Assumptions, and Requirements*, Rev. 8, Bechtel National, Inc., Richland, Washington.

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 3 – Phased Start-Up with Early High-Level Waste Effluent Management Capability
	• Costs for completing WTP PT and HLW Vitrification Facilities estimated at $14B (FY 2023 $) • Activities are prioritized based on effect to the treatment end date	

System Plan 10 Scenario 3A (Sensitivity) – Add New Double-Shell Tanks

Objective: Evaluate whether adding new DSTs to Scenario 3 improves the timeline for treating all the Hanford tank waste.

System	Assumptions (where Different from Scenario 3) Scenario 3A – Add New Double-Shell Tanks
DST Operations	• Add a number of new DSTs located in 200 East Area and/or 200 West Area as determined by demonstrable benefit to the timeline for treating all tank waste • New DSTs shall be available 12/31/2037 • New DSTs shall have an operating volume of 1.25 Mgal each

System Plan 10 Scenario 4 – Phased Start-Up with Expedited B and T Complex Retrievals (Ecology Case)

Objective: Evaluate the effect of implementing the mission via a phased start-up of facilities, including starting an additional TSCR unit in SY Tank Farm in 2026 and the WTP HLW Vitrification Facility in a direct-feed configuration in 2033 supported by a new HLW Effluent Management Capability, but with otherwise minimal capital investment in other new facilities. Scenario 4 also accelerates the availability of and adds capacity in the B and T Complex WRFs, allowing expedited retrieval of the SSTs in B and T Complexes. Additional facilities, including LAWST (as a grouting facility) and a TWCS capability with expanded capabilities are brought online by 2050.

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 4 – Phased Start-Up with Expedited B and T Complex Retrievals
SST Retrievals	• Retrieval volumes, chemical additions, and minimum durations consistent with RPP-PLAN-40145, Rev. 8 • Start S/SX Tank Farms as the next retrievals after A/AX Tank Farms with the goal of continuity of SST retrievals • In 200 West Area, T/TX/TY Tank Farms and then U Tank Farm is retrieved after the completion of S/SX Tank Farms' retrievals • B/BX/BY Tank Farms' retrievals begin when there is sufficient space in the 200 East Area DSTs to support SST retrievals in both 200 East and West Areas (typically after startup of LAWST)[1] • One retrieval per area (200 East and West), increasing to two simultaneous per area in when possible given available DST space and treatment throughput[11] • Retrieve Tanks B-109 and T-111 as the first SSTs in B Complex and T Complex, respectively	• T/TX/TY Tank Farms retrieved prior to S/SX and U Tank Farms • T/TX/TY Tank Farms retrievals begin 12/31/2036 • B/BX/BY Tank Farms retrievals start 12/31/2036 • Retrieve Tank T-111 to the DSTs (as opposed to Supplemental CH-TRU Treatment) • Two simultaneous retrievals per area (200 East and West Areas)
DST Operations	• The 27 DSTs (i.e., sans Tank AY-102) are assumed to remain in service for the full mission • Near-term transfers, retrievals, and evaporator campaigns shall be consistent with FY 2022 Q4 MYOP (RPP-PLAN-63778, Rev. 11) • Maintains 1.265 Mgal of emergency space • Perform Group A mitigation of Tank SY-103 after A/AX Tank Farms retrievals and before beginning S/SX Tank Farms retrievals; and perform Group A mitigation of Tank AN-104 before accumulating retrieved solids in SY Tank Farm[1] • Supernatant and slurry cross-site transfer lines available to support mitigation of Tank SY-103 and subsequent S/SX Tank Farms' retrievals[1]	• Perform sampling and staging (120-day qualification time) of HLW feed in the DSTs • Perform washing of HLW feed in the DSTs prior to 2050 • Tank SY-103 mitigation complete by 01/01/2026, prior to startup of the SY Tank Farm TSCR unit • Cross-site supernatant transfer line is not reactivated • Commissioning of the cross-site slurry line is delayed as long as possible while maintaining continuity of SST retrievals and maintaining fewer than 400 inches of total solids in SY Tank Farm

[11] Activity begins, when possible, based on budget constraints, but not earlier than any assumption-specific start date or constraints would allow.

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 4 – Phased Start-Up with Expedited B and T Complex Retrievals
	• Increase solids limit in two SY Tank Farm DSTs to 200 inches once the cross-site slurry transfer line is available and Tank AN-104 has been mitigated • DST heel retrieval durations based on Tank AY-102 (128 days) • DST retrievals limited to two simultaneous maximum per farm and shall not exceed four simultaneous maximum including SST retrievals	
242-A Evaporator	• Available for the full mission for a maximum of six campaigns per year during DFLAW treatment, and nine campaigns per year after startup of the full WTP • 104-day sampling time per campaign	• Available for the full mission for a maximum of six campaigns per year through 2050, and nine campaigns per year thereafter
TSCR/TFPT Systems	• TSCR system operational on 01/24/2022 (actual) • Fed from Tank AP-107, treated waste to Tank AP-106, plant wash to Tank AP-108 • Feed transferred to the WTP LAW Vitrification Facility from Tank AP-106 (i.e., DFLAW operations) • Feed staged for 178 days per campaign in Tank AP-105 or another designated AP Tank Farm tank • Non-elutable resin (crystalline silicotitanate [CST]) • Three-year permitted service life for the initial HIHTL, requiring replacement and an associated 5-month downtime prior to continuing operations • After 5 years of operating the initial TSCR unit, an increased TFPT capacity (sufficient to match WTP LAW Vitrification production rate) will come online for the balance of DFLAW operations • Continues operating after DFLAW operations, as needed, to provide feed to LAWST • Spent CST IX columns stored on pads (additional pads added as-needed) until the end of the mission, at which point the CST is fed to the WTP HLW Vitrification Facility	• The AP Tank Farm TSCR/TFPT system provides feed to the WTP LAW Vitrification Facility for the full mission • The AP Tank Farm TFPT system is expanded on 12/31/2050 to maintain adequate feed to the WTP LAW Vitrification Facility and LAWST capability (define needed pretreatment capacity as equivalent number of TSCR units) • Additional existing DSTs allotted to support expanded TFPT as-needed • An additional TSCR unit in SY Tank Farm operational on 12/31/2031 • The SY Tank Farm TSCR unit operates until all 200 West Area SST retrievals are complete • Tank SY-102 feeds and receives plant wash from the SY Tank Farm TSCR unit • Feed for the SY Tank Farm TSCR unit is staged in either Tank SY-101 or SY-103 • Treated waste from the SY Tank Farm TSCR unit is initially shipped offsite for treatment and disposal, and then is sent to LAWST after 12/31/2050 • No concentration of feed to or from the SY Tank Farm TSCR unit; feed delivered as-retrieved
WTP PT Facility	The following assumptions support completion of WTP "PT Facility Hot Commissioning" and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree[12], "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to	• The WTP PT Facility is not included in this scenario

[12] The "Consent Decree" collectively refers to the Consent Decree in Case No. 2:08-CV-05085-FVS (E.D. WA October 25, 2010), the Amended Consent Decree, Case No. 2:08-CV-05085-RMP (March 11, 2016), the Second Amended Consent Decree, Case No. 2:08-CV-05085-RMP (April 12, 2016), the Third Amended Consent Decree, Case No. 2:08-CV-05085-RMP (October 12, 2018), and the COVID force majeure relief granted in Order Granting Defendant's Unopposed Motion to Enter Consent Decree Milestone Extensions and Modifying Amended Consent Decree Case No: 2:08-CV-05085-RMP (July 18, 2022).

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 4 – Phased Start-Up with Expedited B and T Complex Retrievals
	the milestone date [12/31/2036], operating the WTP to produce high-level waste glass at an average rate of at least 4.2 Metric Tons of Glass (MTG)/day, and low-activity waste glass at an average rate of at least 21 MTG/day." • **Operational by 12/31/2033**[1] o 70% TOE o Fed from TWCS (HLW) and DSTs (LAW) o Feeds WTP LAW and HLW Vitrification Facilities and LAWST o Handles recycle of secondary liquid waste from LAW and HLW processing o Flowsheet modifications to resolve DNFSB-identified technical safety issues	
WTP HLW Vitrification Facility	The following assumptions support completion of "HLW Construction Substantially Complete," "HLW Hot Commissioning Complete," and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree, "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to the milestone date [12/31/2036], operating the WTP to produce high-level waste glass at an average rate of at least 4.2 Metric Tons of Glass (MTG)/day..." • **Operational on 12/31/2033**[1] • Ramp-up (hot commissioning will not specifically be modeled) (70% TOE) 12/31/**2033** 3.0 MTG/day 12/31/**2034** 4.0 MTG/day 09/30/**2036** 4.2 MTG/day 12/31/**2038** 5.25 MTG/day (2nd generation melters)	• Operates at 40% TOE (ramp-up adjusted proportionally) • Fed directly from the TWCS capability • Effluents returned to tank farms via the TWCS capability
WTP LAW Vitrification Facility	The following assumptions support completion of "LAW Hot Commissioning" and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree, "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to the milestone date [12/31/2036], operating the WTP to produce…low-activity waste glass at an average rate of at least 21 MTG/day." • **Operational on 01/24/2024** • Ramp-up (hot commissioning will not specifically be modeled) (70% TOE) First 7 months 9.0 MTG/day Next 12 months 18.0 MTG/day Balance of mission 21.0 MTG/day	• Operates at 40% TOE (ramp-up adjusted proportionally)
CH-TRU	• CH-TRU operational after the full WTP and LAWST begin operations[1]	• CH-TRU delayed until after start-up of LAWST on 12/31/2050
LERF/ETF	• Upgrades to treat variable secondary liquid wastes (242-A Evaporator condensate, IDF leachate, ERDF leachate, EMF/WTP condensates, and caustic scrubber) • Supplemental Secondary Effluent Treatment Facility operational in 2039 to support LAWST, sized so that secondary liquid effluent treatment does not drive mission[1]	• No change from Scenario 1

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 4 – Phased Start-Up with Expedited B and T Complex Retrievals
	• Secondary solid waste as cast stone to IDF	
WTP EMF	• 100% recycle of concentrate to LAW feed (100 kgal space reserved in Tank AP-102 for emergency returns) • Caustic scrubber by-pass directly to LERF/ETF • Only operates during DFLAW operations	• Operates for the full mission
WRFs	• T Complex WRF operational when retrieval of S/SX Tank Farms is complete[1] • B Complex WRF operational when there is sufficient space in the 200 East Area DSTs to support SST retrievals in both 200 East and West Areas (typically after start-up of LAWST)[1] • Six 150-kgal tanks each	• T Complex WRF operational 12/31/2036 • B Complex WRF operational 12/31/2036 • Twelve 150-kgal tanks each
TWCS Capability	• Operational 18 months prior to completion of WTP HLW Vitrification Facility hot commissioning • Stage, mix, and sample waste to meet WTP PT Facility WAC (190-day sampling time) • Six 500-kgal tanks	• The initial TWCS capability includes a 160-kgal feed receipt tank, a 100-kgal feed tank, and an evaporator to concentrate dilute effluents from HLW vitrification and feed washing prior to returning to tank farms. The evaporator includes two 60-kgal feed tanks and two 250-kgal concentrate receipt tanks • Expanded TWCS capability operational 12/31/2050 • Expanded TWCS capability performs washing, leaching, and solids concentration for HLW feed • Expanded TWCS capability consists of two pretreatment trains, each containing a 70-kgal feed preparation tank, a 21-kgal filter feed tank, a cross-flow filtration unit, and a 30-kgal feed tank
LAWST	• **Operational 12/31/2039**[1] • Operates at 70% TOE • Estimated three LAW-melter-equivalent capacity (31.5 MTG/day), sized based on cost/benefit trade-off • Assumed to be a vitrification facility for cost purposes	• Operational on 12/31/2050 • Operates at 40% TOE • Sized so that LAW treatment does not drive mission (define needed treatment capacity as equivalent number of LAW melters at 40% TOE for scenario comparison purposes) • Feed concentrated by a LAW feed evaporator (also concentrates feed to WTP LAW Vitrification Facility), operational on 12/31/2050
GFMs	• BARD[13] LAW GFM first 5 years of DFLAW • PNNL 2020 LAW GFM after first 5 years of DFLAW mission • PNNL 2016 HLW GFM	• No changes
Budget/Funding	• Beginning in 2025, the mission is funded at $2.7B per year (FY 2023 $) escalated at 2.4% annually • Costs for completing WTP PT and HLW Vitrification Facilities estimated at $14B (FY 2023 $)	• No explicit budgetary constraints

[13] 24590-WTP-RPT-PT-02-005, 2011, *Flowsheet Bases, Assumptions, and Requirements*, Rev. 8, Bechtel National, Inc., Richland, Washington.

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 4 – Phased Start-Up with Expedited B and T Complex Retrievals
	• Activities are prioritized based on effect to the treatment end date	

System Plan 10 Scenario 4A (Sensitivity) – Add New Double-Shell Tanks

Objective: Evaluate whether adding new DSTs to Scenario 4 improves the timeline for treating all the Hanford tank waste.

System	Assumptions (where Different from Scenario 4) Scenario 4A – Add New Double-Shell Tanks
DST Operations	• Add a number of new DSTs located in 200 East Area and/or 200 West Area as determined by demonstrable benefit to the timeline for treating all tank waste • New DSTs shall be available 12/31/2037 • New DSTs shall have an operating volume of 1.25 Mgal each

System Plan 10 Scenario 5 – New High-Level Waste Pretreatment Capability and Full-Mission Direct-Feed Low-Activity Waste (Ecology Case)

Objective: Evaluate the effect of replacing the WTP PT Facility in the flowsheet with an expanded TWCS capability including HLW feed pretreatment and HLW effluent management. Treatment of LAW continues to use the direct-feed flowsheet for the entire mission.

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 5 – New High-Level Waste Pretreatment Capability and Full-Mission Direct-Feed Low-Activity Waste
SST Retrievals	• Retrieval volumes, chemical additions, and minimum durations consistent with RPP-PLAN-40145, Rev. 8 • Start S/SX Tank Farms as the next retrievals after A/AX Tank Farms with the goal of continuity of SST retrievals • In 200 West Area, T/TX/TY Tank Farms and then U Tank Farm is retrieved after the completion of S/SX Tank Farms' retrievals • B/BX/BY Tank Farms' retrievals begin when there is sufficient space in the 200 East Area DSTs to support SST retrievals in both 200 East and West Areas (typically after startup of LAWST)[1] • One retrieval per area (200 East and West), increasing to two simultaneous per area in when possible given available DST space and treatment throughput[14] • Retrieve Tanks B-109 and T-111 as the first SSTs in B Complex and T Complex, respectively	• The SSTs defined as Group 1 (see Single-Shell Tank Group 1 table below) shall be the first 31 SSTs retrieved • The SSTs defined as Group 2 (see Single-Shell Tank Group 2 table below) shall be the next 37 SSTs retrieved following Group 1 • All remaining unretrieved SSTs shall be retrieved following Group 2 • Retrieve Tank T-111 to the DSTs (as opposed to Supplemental CH-TRU Treatment) • Two simultaneous retrievals per area (200 East and West Areas)
DST Operations	• The 27 DSTs (i.e., sans Tank AY-102) are assumed to remain in service for the full mission • Near-term transfers, retrievals, and evaporator campaigns shall be consistent with FY 2022 Q4 MYOP (RPP-PLAN-63778, Rev. 11) • Maintains 1.265 Mgal of emergency space • Perform Group A mitigation of Tank SY-103 after A/AX Tank Farms retrievals and before beginning S/SX Tank Farms retrievals; and perform Group A mitigation of Tank AN-104 before accumulating retrieved solids in SY Tank Farm[1] • Supernatant and slurry cross-site transfer lines available to support mitigation of Tank SY-103 and subsequent S/SX Tank Farms' retrievals[1] • Increase solids limit in two SY Tank Farm DSTs to 200 inches once the cross-site slurry transfer line is available and Tank AN-104 has been mitigated	• Perform sampling and staging (120-day qualification time) of HLW feed in the DSTs • Supernatant and slurry cross-site transfer lines available 2028 and 2033, respectively, with the date of first use provided as a model output

[14] Activity begins, when possible, based on budget constraints, but not earlier than any assumption-specific start date or constraints would allow.

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 5 – New High-Level Waste Pretreatment Capability and Full-Mission Direct-Feed Low-Activity Waste
	• DST heel retrieval durations based on Tank AY-102 (128 days) • DST retrievals limited to two simultaneous maximum per farm and shall not exceed four simultaneous maximum including SST retrievals	
242-A Evaporator	• Available for the full mission for a maximum of six campaigns per year during DFLAW treatment, and nine campaigns per year after startup of the full WTP • 104-day sampling time per campaign	• Available for the full mission for a maximum of six campaigns per year through 2033, and nine campaigns per year thereafter
TSCR/TFPT Systems	• TSCR system operational on 01/24/2022 (actual) • Fed from Tank AP-107, treated waste to Tank AP-106, plant wash to Tank AP-108 • Feed transferred to the WTP LAW Vitrification Facility from Tank AP-106 (i.e., DFLAW operations) • Feed staged for 178 days per campaign in Tank AP-105 or another designated AP Tank Farm tank • Non-elutable resin (crystalline silicotitanate [CST]) • Three-year permitted service life for the initial HIHTL, requiring replacement and an associated 5-month downtime prior to continuing operations • After 5 years of operating the initial TSCR unit, an increased TFPT capacity (sufficient to match WTP LAW Vitrification production rate) will come online for the balance of DFLAW operations • Continues operating after DFLAW operations, as needed, to provide feed to LAWST • Spent CST IX columns stored on pads (additional pads added as-needed) until the end of the mission, at which point the CST is fed to the WTP HLW Vitrification Facility	• The AP Tank Farm TSCR/TFPT system provides feed to the WTP LAW Vitrification Facility for the full mission • The AP Tank Farm TFPT system is expanded on 12/31/2039 to maintain adequate feed to the WTP LAW Vitrification Facility and LAWST capability (define needed pretreatment capacity as equivalent number of TSCR units) • Additional existing DSTs allotted to support expanded TFPT as-needed
WTP PT Facility	The following assumptions support completion of WTP "PT Facility Hot Commissioning" and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree[15], "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to the milestone date [12/31/2036], operating the WTP to produce high-level waste glass at an average rate	• The WTP PT Facility is not included in this scenario

[15] The "Consent Decree" collectively refers to the Consent Decree in Case No. 2:08-CV-05085-FVS (E.D. WA October 25, 2010), the Amended Consent Decree, Case No. 2:08-CV-05085-RMP (March 11, 2016), the Second Amended Consent Decree, Case No. 2:08-CV-05085-RMP (April 12, 2016), the Third Amended Consent Decree, Case No. 2:08-CV-05085-RMP (October 12, 2018), and the COVID force majeure relief granted in Order Granting Defendant's Unopposed Motion to Enter Consent Decree Milestone Extensions and Modifying Amended Consent Decree Case No: 2:08-CV-05085-RMP (July 18, 2022).

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 5 – New High-Level Waste Pretreatment Capability and Full-Mission Direct-Feed Low-Activity Waste

	of at least 4.2 Metric Tons of Glass (MTG)/day, and low-activity waste glass at an average rate of at least 21 MTG/day."
	• **Operational by 12/31/2033**[1]
	  ○ 70% TOE
	  ○ Fed from TWCS (HLW) and DSTs (LAW)
	  ○ Feeds WTP LAW and HLW Vitrification Facilities and LAWST
	  ○ Handles recycle of secondary liquid waste from LAW and HLW processing
	  ○ Flowsheet modifications to resolve DNFSB-identified technical safety issues	

WTP HLW Vitrification Facility	The following assumptions support completion of "HLW Construction Substantially Complete," "HLW Hot Commissioning Complete," and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree, "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to the milestone date [12/31/2036], operating the WTP to produce high-level waste glass at an average rate of at least 4.2 Metric Tons of Glass (MTG)/day..."
	• **Operational on 12/31/2033**[1]
	• Ramp-up (hot commissioning will not specifically be modeled) (70% TOE)
	  12/31/**2033** 3.0 MTG/day
	  12/31/**2034** 4.0 MTG/day
	  09/30/**2036** 4.2 MTG/day
	  12/31/**2038** 5.25 MTG/day (2^{nd} generation melters)
		• Operates at 40% TOE (ramp-up adjusted proportionally)
		• Fed directly from the TWCS capability
		• Effluents returned to tank farms via the TWCS capability

WTP LAW Vitrification Facility	The following assumptions support completion of "LAW Hot Commissioning" and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree, "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to the milestone date [12/31/2036], operating the WTP to produce…low-activity waste glass at an average rate of at least 21 MTG/day."
	• **Operational on 01/24/2024**
	• Ramp-up (hot commissioning will not specifically be modeled) (70% TOE)
	  First 7 months 9.0 MTG/day
	  Next 12 months 18.0 MTG/day
	  Balance of mission 21.0 MTG/day
		• Operates at 40% TOE (ramp-up adjusted proportionally)

CH-TRU	• CH-TRU operational after the full WTP and LAWST begin operations[1]	• No change from Scenario 1
LERF/ETF	• Upgrades to treat variable secondary liquid wastes (242-A Evaporator condensate, IDF leachate, ERDF leachate, EMF/WTP condensates, and caustic scrubber) • Supplemental Secondary Effluent Treatment Facility operational in 2039 to support LAWST, sized so that secondary liquid effluent treatment does not drive mission[1]	• No change from Scenario 1

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 5 – New High-Level Waste Pretreatment Capability and Full-Mission Direct-Feed Low-Activity Waste
	• Secondary solid waste as cast stone to IDF	
WTP EMF	• 100% recycle of concentrate to LAW feed (100 kgal space reserved in Tank AP-102 for emergency returns) • Caustic scrubber by-pass directly to LERF/ETF • Only operates during DFLAW operations	• Operates for the full mission
WRFs	• T Complex WRF operational when retrieval of S/SX Tank Farms is complete[1] • B Complex WRF operational when there is sufficient space in the 200 East Area DSTs to support SST retrievals in both 200 East and West Areas (typically after start-up of LAWST)[1] • Six 150-kgal tanks each	• T Complex WRF operational once the retrieval of the Group 1 SSTs is complete • B Complex WRF operational once the retrieval of the Group 1 SSTs is complete
TWCS Capability	• Operational 18 months prior to completion of WTP HLW Vitrification Facility hot commissioning • Stage, mix, and sample waste to meet WTP PT Facility WAC (190-day sampling time) • Six 500-kgal tanks	• Expanded TWCS capability performs washing, leaching, and solids concentration for HLW feed • Expanded TWCS capability consists of two pretreatment trains, each containing a 70-kgal feed preparation tank, a 21-kgal filter feed tank, a cross-flow filtration unit, and a 30-kgal feed tank • Expanded TWCS capability includes an evaporator to concentrate dilute effluents from HLW vitrification and feed washing prior to returning to tank farms that includes two 60-kgal feed tanks and two 250-kgal concentrate receipt tanks
LAWST	• **Operational 12/31/2039**[1] • Operates at 70% TOE • Estimated three LAW-melter-equivalent capacity (31.5 MTG/day), sized based on cost/benefit trade-off • Assumed to be a vitrification facility for cost purposes	• Operates at 40% TOE • Sized so that LAW treatment does not drive mission (define needed treatment capacity as equivalent number of LAW melters at 40% TOE for scenario comparison purposes) • Feed concentrated by a LAW feed evaporator (also concentrates feed to WTP LAW Vitrification Facility), operational on 12/31/2050
GFMs	• BARD[16] LAW GFM first 5 years of DFLAW • PNNL 2020 LAW GFM after first 5 years of DFLAW mission • PNNL 2016 HLW GFM	• No change from Scenario 1
Budget/Funding	• Beginning in 2025, the mission is funded at $2.7B per year (FY 2023 $) escalated at 2.4% annually • Costs for completing WTP PT and HLW Vitrification Facilities estimated at $14B (FY 2023 $) • Activities are prioritized based on effect to the treatment end date	• No explicit budgetary constraints

[16] 24590-WTP-RPT-PT-02-005, 2011, *Flowsheet Bases, Assumptions, and Requirements*, Rev. 8, Bechtel National, Inc., Richland, Washington.

System Plan 10 Scenario 5A (Sensitivity) – Add New Double-Shell Tanks

Objective: Evaluate whether adding new DSTs to Scenario 5 improves the timeline for retrieving the Hanford SSTs.

System	Assumptions (where Different from Scenario 3) Scenario 5A – Add New Double-Shell Tanks

DST Operations	• Add a number of new DSTs located in 200 East Area and/or 200 West Area as determined by meeting as many of the below criteria as possible
	  ○ Group 1 SSTs retrieved by 2040
	  ○ Group 2 SSTs retrieved by 2050
	  ○ All SSTs retrieved as early as practical
	• New DSTs shall be available 12/31/2037
	• New DSTs shall have an operating volume of 1.25 Mgal each

Single-Shell Tank Group 1		
A and AX Tank Farms	**S and SX Tank Farms**	**U Tank Farm**
• A-101	• S-102	• U-101
• A-102	• S-103	• U-104
• A-103	• S-107	• U-106
• A-104	• SX-106	• U-107
• A-105	• SX-107	• U-110
• A-106	• SX-108	• U-111
• AX-101	• SX-109	• U-112
	• SX-110	• U-201
	• SX-111	• U-202
	• SX-112	• U-203
	• SX-113	• U-204
	• SX-114	
	• SX-115	

Single-Shell Tank Group 2	
B, BX, and BY Tank Farms	**T, TX, and TY Tank Farms**
• B-101	• T-101
• B-102	• T-102
• B-103	• T-104
• B-106	• T-105
• B-109	• T-106
• B-110	• T-108
• B-111	• T-111
• B-112	• T-112
• BX-102	• TX-101
• BX-103	• TX-103
• BX-104	• TX-104
• BX-105	• TX-107
• BX-106	• TX-108
• BX-107	• TX-109
• BX-109	• TY-101
• BX-111	• TY-102
• BX-112	• TY-103
	• TY-104
	• TY-105
	• TY-106

System Plan 10 Scenario 6 – Baseline Case with Simultaneous S/SX/B/T Tank Farms Retrievals and Unconstrained Funding (Ecology Case)

Objective: Evaluate the effect on the cost-unconstrained baseline of retrieving B and T Tank Farms in parallel with S and SX Tank Farms as the next SST farms after A and AX Tank Farms with unconstrained funding. Scenario 6 builds on Scenario 1A.

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 6 – Baseline Scenario with Simultaneous S, SX, B, and T Tank Farms Retrievals and Unconstrained Funding (Ecology Case)
SST Retrievals	• Retrieval volumes, chemical additions, and minimum durations consistent with RPP-PLAN-40145, Rev. 8 • Start S/SX Tank Farms as the next retrievals after A/AX Tank Farms with the goal of continuity of SST retrievals • In 200 West Area, T/TX/TY Tank Farms and then U Tank Farm is retrieved after the completion of S/SX Tank Farms' retrievals • B/BX/BY Tank Farms' retrievals begin when there is sufficient space in the 200 East Area DSTs to support SST retrievals in both 200 East and West Areas (typically after startup of LAWST)[1] • One retrieval per area (200 East and West), increasing to two simultaneous per area in when possible given available DST space and treatment throughput[17] • Retrieve Tanks B-109 and T-111 as the first SSTs in B Complex and T Complex, respectively	• Start T and B Tank Farms retrievals in 2033 with WRF startup in parallel to S/SX Tank Farm Retrievals • In 200 West Area, complete any remaining S/SX Tank Farms retrievals and then U Tank Farm and then TX/TY Tank Farms are retrieved after the completion of T Tank Farms retrievals • In 200 East Area, BX/BY Tank Farms are retrieved after the completion of B Tank Farm Retrievals
DST Operations	• The 27 DSTs (i.e., sans Tank AY-102) are assumed to remain in service for the full mission • Near-term transfers, retrievals, and evaporator campaigns shall be consistent with FY 2022 Q4 MYOP (RPP-PLAN-63778, Rev. 11) • Maintains 1.265 Mgal of emergency space • Perform Group A mitigation of Tank SY-103 after A/AX Tank Farms retrievals and before beginning S/SX Tank Farms retrievals; and perform Group A mitigation of Tank AN-104 before accumulating retrieved solids in SY Tank Farm[17] • Supernatant and slurry cross-site transfer lines available to support mitigation of Tank SY-103 and subsequent S/SX Tank Farms' retrievals[17] • Increase solids limit in two SY Tank Farm DSTs to 200 inches once the cross-site slurry transfer line is available and Tank AN-104 has been mitigated	No changes (Note: Footnote 17 does not apply.)

[17] Activity begins, when possible, based on budget constraints, but not earlier than any assumption-specific start date or constraints would allow.

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 6 – Baseline Scenario with Simultaneous S, SX, B, and T Tank Farms Retrievals and Unconstrained Funding (Ecology Case)
	• DST heel retrieval durations based on Tank AY-102 (128 days) • DST retrievals limited to two simultaneous maximum per farm and shall not exceed four simultaneous maximum including SST retrievals	
242-A Evaporator	• Available for the full mission for a maximum of six campaigns per year during DFLAW treatment, and nine campaigns per year after startup of the full WTP • 104-day sampling time per campaign	No changes
TSCR/TFPT Systems	• TSCR system operational on 01/24/2022 (actual) • Fed from Tank AP-107, treated waste to Tank AP-106, plant wash to Tank AP-108 • Feed transferred to the WTP LAW Vitrification Facility from Tank AP-106 (i.e., DFLAW operations) • Feed staged for 178 days per campaign in Tank AP-105 or another designated AP Tank Farm tank • Non-elutable resin (crystalline silicotitanate [CST]) • Three-year permitted service life for the initial HIHTL, requiring replacement and an associated 5-month downtime prior to continuing operations • After 5 years of operating the initial TSCR unit, an increased TFPT capacity (sufficient to match WTP LAW Vitrification production rate) will come online for the balance of DFLAW operations • Continues operating after DFLAW operations, as needed, to provide feed to LAWST • Spent CST IX columns stored on pads (additional pads added as-needed) until the end of the mission, at which point the CST is fed to the WTP HLW Vitrification Facility	No changes
WTP PT Facility	The following assumptions support completion of WTP "PT Facility Hot Commissioning" and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree[18], "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to the milestone date [12/31/2036], operating the WTP to produce high-level waste glass at an average rate	No changes (Note: Footnote 17 does not apply.)

[18] The "Consent Decree" collectively refers to the Consent Decree in Case No. 2:08-CV-05085-FVS (E.D. WA October 25, 2010), the Amended Consent Decree, Case No. 2:08-CV-05085-RMP (March 11, 2016), the Second Amended Consent Decree, Case No. 2:08-CV-05085-RMP (April 12, 2016), the Third Amended Consent Decree, Case No. 2:08-CV-05085-RMP (October 12, 2018), and the COVID force majeure relief granted in Order Granting Defendant's Unopposed Motion to Enter Consent Decree Milestone Extensions and Modifying Amended Consent Decree Case No: 2:08-CV-05085-RMP (July 18, 2022).

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 6 – Baseline Scenario with Simultaneous S, SX, B, and T Tank Farms Retrievals and Unconstrained Funding (Ecology Case)

	of at least 4.2 Metric Tons of Glass (MTG)/day, and low-activity waste glass at an average rate of at least 21 MTG/day."
	• **Operational by 12/31/2033**[17]
	  ○ 70% TOE
	  ○ Fed from TWCS (HLW) and DSTs (LAW)
	  ○ Feeds WTP LAW and HLW Vitrification Facilities and LAWST
	  ○ Handles recycle of secondary liquid waste from LAW and HLW processing
	  ○ Flowsheet modifications to resolve DNFSB-identified technical safety issues	

WTP HLW Vitrification Facility	The following assumptions support completion of "HLW Construction Substantially Complete," "HLW Hot Commissioning Complete," and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree, "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to the milestone date [12/31/2036], operating the WTP to produce high-level waste glass at an average rate of at least 4.2 Metric Tons of Glass (MTG)/day..."
	• **Operational on 12/31/2033**[17]
	• Ramp-up (hot commissioning will not specifically be modeled) (70% TOE)
	  12/31/**2033** 3.0 MTG/day
	  12/31/**2034** 4.0 MTG/day
	  09/30/**2036** 4.2 MTG/day
	  12/31/**2038** 5.25 MTG/day (2^{nd} generation melters)
		No changes
		(Note: Footnote 17 does not apply.)

WTP LAW Vitrification Facility	The following assumptions support completion of "LAW Hot Commissioning" and "Achieve Initial Plant Operations for the WTP" as defined in the Amended Consent Decree, "Initial Plant Operations under this Decree is defined as, over a rolling period of at least 3 months leading to the milestone date [12/31/2036], operating the WTP to produce…low-activity waste glass at an average rate of at least 21 MTG/day."
	• **Operational on 01/24/2024**
	• Ramp-up (hot commissioning will not specifically be modeled) (70% TOE)
	  First 7 months 9.0 MTG/day
	  Next 12 months 18.0 MTG/day
	  Balance of mission 21.0 MTG/day
		No changes

CH-TRU	• CH-TRU operational after the full WTP and LAWST begin operations[17]	No changes
LERF/ETF	• Upgrades to treat variable secondary liquid wastes (242-A Evaporator condensate, IDF leachate, ERDF leachate, EMF/WTP condensates, and caustic scrubber) • Supplemental Secondary Effluent Treatment Facility operational in 2039 to support LAWST, sized so that secondary liquid effluent treatment does not drive mission[17]	No changes (Note: Footnote 17 does not apply.)

System	Assumptions Scenario 1 – Baseline Case	Assumptions Scenario 6 – Baseline Scenario with Simultaneous S, SX, B, and T Tank Farms Retrievals and Unconstrained Funding (Ecology Case)
	• Secondary solid waste as cast stone to IDF	
WTP EMF	• 100% recycle of concentrate to LAW feed (100 kgal space reserved in Tank AP-102 for emergency returns) • Caustic scrubber by-pass directly to LERF/ETF • Only operates during DFLAW operations	No changes
WRFs	• T Complex WRF operational when retrieval of S/SX Tank Farms is complete[17] • B Complex WRF operational when there is sufficient space in the 200 East Area DSTs to support SST retrievals in both 200 East and West Areas (typically after start-up of LAWST)[17] • Six 150-kgal tanks each	• T Complex WRF operational 12/31/2033 • B Complex WRF operational 12/31/2033
TWCS Capability	• Operational 18 months prior to completion of WTP HLW Vitrification Facility hot commissioning • Stage, mix, and sample waste to meet WTP PT Facility WAC (190-day sampling time) • Six 500-kgal tanks	No changes
LAWST	• **Operational 12/31/2039**[17] • Operates at 70% TOE • Estimated three LAW-melter-equivalent capacity (31.5 MTG/day), sized based on cost/benefit trade-off • Assumed to be a vitrification facility for cost purposes	No changes (Note: Footnote 17 does not apply.)
GFMs	• BARD[19] LAW GFM first 5 years of DFLAW • PNNL 2020 LAW GFM after first 5 years of DFLAW mission • PNNL 2016 HLW GFM	No changes
Budget/Funding	• Beginning in 2025, the mission is funded at $2.7B per year (FY 2023 $) escalated at 2.4% annually • Costs for completing WTP PT and HLW Vitrification Facilities estimated at $14B (FY 2023 $) • Activities are prioritized based on effect to the treatment end date	No explicit budgetary constraints

[19] 24590-WTP-RPT-PT-02-005, 2011, *Flowsheet Bases, Assumptions, and Requirements*, Rev. 8, Bechtel National, Inc., Richland, Washington.