SGW-59872
Revision 1

FEED STREAM ACCEPTANCE CRITERIA FOR THE 200W PUMP AND TREAT

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
under Contract DE-AC06-08RL14788

CH2MHILL
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Tables

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Terms

CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
MSU	modular storage unit
OU	operable unit
P&T	pump and treat facility
RD/RAWP	remedial design/remedial action work plan
ROD	record of decision
SAP	sampling and analysis plan

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1 Introduction

This document presents the criteria that will be considered for and outlines the approval process to accept new feed streams at the 200 West Pump and Treat Facility (200 West P&T), which includes several unit processes that have the ability to remove a number of different contaminants. The 200 West P&T serves as a central treatment facility for a number of operable units (OUs) primarily in the 200 Area but also receives water from the 100 Area as purgewater. With the 200 West P&T currently lacking hazard classification, new feed streams must be assessed for the ability of the 200 West P&T to provide adequate treatment and for the impact on hazard classification. Hazard classification is determined in a separate document (SGW-40032, *Soil and Groundwater Remediation Project Facility Hazard Categorization*).

Several feed streams have been approved for the 200 West P&T and are summarized in Table 1. As approved by the U.S. Environmental Protection Agency (EPA), new feed streams will be added to Table 1 to document the approved water sources.

Table 1. Accepted Feed Streams at the 200 West Pump and Treat Facility

Source	Year Added	Engineering Evaluation	Pretreatments Requirements [a]	Approximate Average Annual Flow (L/min)/(gal/min)	Intermittent or Continuous
200-ZP-1 (nonradioactive wells)	2012	--	None	6,000/1,585	Continuous
200-ZP-1 (radioactive wells)	2012	--	Technetium-99	800/211	
200-UP-1	2015	SGW-59108	Uranium and technetium-99	570/151	
200-BP-5	2015	SGW-59550	Uranium and technetium-99	570/151	
200-DV-1 “Perched”	2016	SGW-59550	Uranium and technetium-99	5/1.3	
Leachate from the Environmental Restoration Disposal Facility	2016	SGW-58619	Uranium and technetium-99	N/A	Intermittent. During transfer, flow is 38 to 57 L/min (10 to 20 gal/min)
Water from modular storage units optimization pilot test [b]	2018	SGW-61287	-- [c]	N/A	Intermittent. During transfer, flow is 35 to 190 L/min (9 to 50 gal/min)

Notes: Complete reference citations are provided in Chapter 4.

a. Pretreatment refers to treatment by the uranium ion exchange system or technetium-99 ion exchange system or both before treatment by the central biological treatment plant.

b. In 2018 and early 2019, the modular storage unit water was accepted at 200 West as part of an optimization pilot test. When accepted as an approved feed stream, this document will be updated.

c. After isolation, the modular storage unit water may be treated with copper sulfate, sodium hydroxide, sodium hypochlorite, or a combination to remove metals, algae, and bacteria. Sodium hypochlorite will also oxidize iron and manganese to insoluble forms that can be settled or filtered. The water may also be filtered.

N/A = not applicable, flow is intermittent

In 2018, the modular storage unit (MSU) optimization pilot test water was added with the associated evaluation, sampling requirements, and acceptance criteria as documented in DOE/RL-2018-28, *Optimization Test Plan for Treating Water from Modular Storage Units at 200 West Pump and Treat Facility*. This feedstream acceptance criteria document will be transitioned from a stand-alone document to an appendix of DOE/RL-2009-124, *200 West Pump and Treat Operations and Maintenance Plan*, which is reviewed annually and updated, as appropriate.

2 Feed Stream Acceptance Decision Process

The 200 West P&T will be evaluated to determine whether a new aqueous feed stream could be effectively treated to meet applicable cleanup levels. The approval to treat new feed streams at the 200 West P&T consists of an initial treatment feasibility evaluation before long-term acceptance and EPA approval. This evaluation will provide preliminary recommendations of where the feed stream should be introduced to the facility, the suggested blend ratio, and any recommendations for additional sampling.

2.1 Initial Treatment Feasibility

All aqueous feed streams under consideration for treatment at the 200 West P&T will be characterized using existing analytical data, historical knowledge of site use, and hydrology. Treatment feasibility/evaluation of a new feed stream will be included in a published soil and groundwater document. A feed stream will be considered feasible to treat if it will not cause a plant effluent exceedance beyond the cleanup levels listed in EPA et al., 2008, *Record of Decision Hanford 200 Area 200-ZP-1 Superfund Site Benton County, Washington* (hereinafter called the 200-ZP-1 record of decision [ROD]), and DOE/RL-2008-78, *200 West Area 200-ZP-1 Pump -and -Treat Remedial Design/Remedial Action Work Plan* (hereinafter called the 200-ZP-1 Remedial Design/Remedial Action Work Plan [RD/RAWP]). In addition, the contaminants of concern from several 100 Area OUs that contribute water to the MSUs as purgewater were considered. Thus, the feed stream acceptance criteria now includes the contaminants of concern listed in the following groundwater OUs:

- **100-BC-5** (DOE/RL-2003-38, *100-BC-5 Operable Unit Sampling and Analysis Plan*): chromium, strontium-90, and tritium
- **100-FR-3** (EPA and DOE, 2014, *Record of Decision Hanford 100 Area Superfund Site 100-FR-1, 100-FR-2, 100-FR-3, 100-IU-2, and 100-IU-6 Operable Units*): strontium-90, hexavalent chromium, trichloroethene, and nitrate
- **100-HR-3** (EPA/ROD/R10-96/134, *Record of Decision for the 100-HR-3 and 100-KR-4 Operable Units Interim Remedial Actions, Hanford Site, Benton County, Washington*, and EPA et al., 1999, *U.S. Department of Energy Hanford Site – 100 Area Benton County, Washington Amended Record of Decision, Decision Summary and Responsiveness Summary (100-HR-3 Operable Unit Interim Remedial Action)*) (includes co-contaminants[1] in gray): hexavalent chromium, nitrate, strontium-90, tritium, uranium, and technetium-99
- **100-KR-4** (EPA/ROD/R10-96/134) (includes co-contaminants as gray): hexavalent chromium, tritium, and strontium-90

[1] A co-contaminant is a constituent recognized as a contaminant, not obligated to be treated in the administrative record. For the evaluation of feed stream acceptance, the co-contaminants were considered a contaminant of concern that does need to be treated to the cleanup level.

- **100-NR-2** (EPA/ROD/R10-99/112, *Interim Remedial Action Record of Decision for the 100-NR-1 and 100-NR-2 Operable Units, Hanford Site, Benton County, Washington*) (includes co-contaminants as gray): strontium-90, tritium, nitrate, manganese, and sulfate
- **200-BP-5** (DOE/RL-2016-41, *Action Memorandum for 200-BP-5 Operable Unit Groundwater Extraction*): technetium-99, uranium, nitrate, iodine-129, cyanide, and tritium
- **200-DV-1 Perched Water** (DOE/RL-2014-34, *Action Memorandum for 200-DV-1 Operable Unit Perched Water Pumping/Pore Water Extraction*): uranium, technetium-99, nitrate, total chromium, hexavalent chromium, and tritium
- **200-PO-1** (DOE/RL-2003-04, *Sampling and Analysis Plan for the 200-PO-1 Groundwater Operable Unit*): arsenic, chromium, manganese, vanadium, iodine-129, nitrate, strontium-90, technetium-99, and tritium
- **200-UP-1** (EPA et al., 2012, *Record of Decision for Interim Remedial Action Hanford 200 Area Superfund Site 200-UP-1 Operable Unit*): iodine-129, technetium-99, tritium, uranium, nitrate, total chromium, hexavalent chromium, and carbon tetrachloride
- **300-FF-5** (EPA and DOE, 2013, *Hanford Site 300 Area Record of Decision for 300-FF-2 and 300-FF-5, and Record of Decision Amendment for 300-FF-1*): uranium, tritium, nitrate, trichloroethene, cis-1,2-dichloroethene, and gross alpha

In the event of differing cleanup levels, the more stringent value was used. Table 2 lists cleanup levels and their governing OUs.

Table 2. Selected Cleanup Levels Impacting the 200 West Pump and Treat Facility

Contaminant of Concern (units)	Final Cleanup Level	Governing Operable Units
Carbon tetrachloride (µg/L)	3.4	200-ZP-1, 200-UP-1
Chromium (total) (µg/L)	100	200-ZP-1, 200-UP-1, 100-BC-5, 200-DV-1 perched water, 200-PO-1 (GW)
Hexavalent chromium (µg/L)	48	200-ZP-1, 200-UP-1, 100-FR-3 (GW), 100-HR-3, 100-KR-4, 200-DV-1 perched water
Nitrate as N (µg/L)	10,000 [a]	200-ZP-1, 200-UP-1, 200-BP-5, 100-FR-3 (GW), 100-HR-3, 100-NR-2, 200-DV-1 perched water, 200-PO-1 (GW), 300-FF-5
Trichloroethene (µg/L)	1	200-ZP-1, 100-FR-3 (GW), 300-FF-5
Iodine-129 (pCi/L)		200-ZP-1, 200-UP-1, 200-BP-5, 200-PO-1 (GW)
Technetium-99 (pCi/L)	900	200-ZP-1, 200-UP-1, 200-BP-5, 100-HR-3, 200-DV-1 perched water, 200-PO-1
Tritium (pCi/L)	20,000	200-ZP-1, 200-UP-1, 200-BP-5 100-BC-5, 100-HR-3, 100-KR-4, 100-NR-2, 200-DV-1 perched water, 200-PO-1, 300-FF-5
Uranium (µg/L)	30	200-UP-1, 200-BP-5, 100-HR-3, 200-DV-1 perched water, 300-FF-5
Total cyanide (µg/L)	200	200-BP-5
Free cyanide (µg/L)	4.8	200-BP-5
Strontium-90 (pCi/L)	8 [b]	100-BC-5, 100-FR-3, 100-HR-3, 100-KR-4, 100-NR-2, 200-PO-1
Gross alpha (pCi/L) [c]	15	300-FF-5

Table 2. Selected Cleanup Levels Impacting the 200 West Pump and Treat Facility

Contaminant of Concern (units)	Final Cleanup Level	Governing Operable Units
Arsenic (µg/L)	MCL=10	200-PO-1
Vanadium	MTCA-B= 112 µg/L	200-PO-1
Manganese (µg/L)	Secondary MCL= 0.050 mg/L	100-NR-2, 200-PO-1
Sulfate	Secondary MCL= 250 mg/L	100-NR-2

References: Table 2-1 in DOE/RL-2008-78, *200 West Area 200-ZP-1 Pump-and-Treat Remedial Design/Remedial Action Work Plan*.

Table 1-3 in DOE/RL-2015-75, *Aquifer Treatability Test Report for the 200-BP-5 Groundwater Operable Unit.*

Table 11 in EPA et al., 2008, *Record of Decision Hanford 200 Area 200-ZP-1 Superfund Site Benton County, Washington*.

Table 14 in EPA et al., 2012, *Record of Decision for Interim Remedial Action Hanford 200 Area Superfund Site 200-UP-1 Operable Unit*.

WAC 173-340-705, "Model Toxics Control Act—Cleanup," "Use of Method B."

a. Nitrate may be expressed as total nitrate (NO_3) or as nitrogen (N). The maximum contaminant level for nitrate as NO_3 as N is 10 mg/L and as NO_3 is 45 mg/L. Concentrations are expressed in units of µg/L for convenience.

b. Strontium-90 is not directly regulated in drinking water. Rather, it is regulated with other alpha emitters to a total of 4 mrem/yr. The EPA has published guidelines to relate activities in pCi/L of known alpha emitters to annual exposure in mrem/yr. For strontium, 8 pCi/L is equivalent to 4 mrem/yr. However, other alpha emitters such as Cs-137 need to be considered in compliance assessments using a sum-of-fractions approach.

c. The key contributors to gross alpha in the groundwater are radon and uranium.

EPA = U.S. Environmental Protection Agency
GW = groundwater
P&T = pump and treat facility
MCL = maximum contaminant level
MTCA-B = refers to WAC 173-340-705, "Model Toxics Control Act—Cleanup," "Use of Method B," to determine cleanup level

Note that the values listed in Table 2 and in the drinking water standards are not the same as the criteria used to determine whether a feed stream can be treated. The 200 West P&T has the ability to remove contaminants, and the removal capability for each contaminant must be considered. Table 3 lists the partition factors for each contaminant that quantify the removal capability. The partition factor is the fraction of contaminant mass that is retained in the water stream. The partition factors are based on the values in SGW-45097, *Integrated Mass Balance for the 200 West Pump and Treat Facility*, and SGW-59108, *Integrated Mass Balance for Introduction of UP-1 Waste Stream to the 200 West Pump and Treat Facility*. In some cases, such as for cyanide, the partition coefficients were updated based on plant experience. There was no partition coefficient for arsenic, so a literature review was performed, which found that arsenic is removed by ferric chloride, the coagulant added to the aerated membrane tanks. The table notes whether the contaminant is biologically assimilated or transferred to the vapor or the solid phase. The plant profile data should be reviewed periodically to confirm or update the partition coefficients. This document should be reviewed annually as part of the annual operations and maintenance document review.

Table 3. Partitioning Factors Used to Determine the Acceptance Criteria

Contaminant	Uranium IX [a]	Tc-99 IX [b]	Bioconversion FBR/AMT [c]	AMT/RDT/ Centrifuge Capture in Biosolids [d]	AMT Partition to Vapor Phase [e]	Air Stripper (Partition to Vapor Phase) [e]
Contaminants of Concern [f]						
Technetium-99	0.12	0.987	0	0.428	0	0
Iodine-129	0.027	0.027	0.12	0	0	0
Tritium	0	0	0	0	0	0
Uranium	0.99	0.012	0	0.109	0	0
Carbon tetrachloride	0	0	0.36	0	0.92	0.993
Trichloroethene	0	0.05	0.362	0	0.84	0.55
Nitrate	0	0.01	0.82	0	0	0
Total chrome	0.00088	0.00088	0	0.81928	N/A	0
Hexavalent chrome	0.000027	0.34	0.55	0	0	0.083
Ferrocyanide [g]	0.95	0.2	0	0	0	0
Free cyanide [g]	0	0	0	0	0	0
Arsenic [h]	0	0	0	0.14	0	0
Strontium-90	0.1	0.1	0	0.0007	0	0
Gross alpha – U	0.99	0.012	0.10	0.013	0	0
Gross alpha – radon	0	0	0	0	0.40	0.60
Manganese (Mn)	0	0	0	0.211	0	0
Sulfate (SO_4)	0	0	0	0	0	0
Vanadium	0.01	0.07	0	0.73	0	0
Contaminants of Interest [i]						
1,1,1-TCA	0	0	0	0	0.748	0.9995
1,2-DCA	0	0	0	0	0.042	0.55
Benzene	0	0	0	0	0.528	0.996
Acetone	0	0	0.90	0	0.000	0.0013
Chloroform	0	0	0	0	0.381	0.98
Dibromochloromethane	0	0	0	0	0.020	0.45
Methylene chloride	0	0	0	0	0.372	0.9795
Dichloroethenes (all)	0	0	0	0	0.691	0.9995
Vinyl chloride	0	0	0	0	0.835	0.9995
Beryllium	0	0	0	0.65	0	0
Lead	0	0	0	0.47	0	0
Cobalt-60	0.39	0.39	0	0.93	0	0

Table 3. Partitioning Factors Used to Determine the Acceptance Criteria

Contaminant	Uranium IX [a]	Tc-99 IX [b]	Bioconversion FBR/AMT [c]	AMT/RDT/ Centrifuge Capture in Biosolids [d]	AMT Partition to Vapor Phase [e]	Air Stripper (Partition to Vapor Phase) [e]
Constituents with Secondary Maximum Contaminant Limit [j]						
Iron (Fe)	0	0	0	0.737	0	0
Total dissolved solids	0	0	0	0	0	0

Note: Partition coefficients are calculated as follows: mass fraction removed = (influent mass-effluent mass)/influent mass. Partition coefficients are from SGW-45097, *Integrated Mass Balance for the 200 West Pump and Treat Facility*, and SGW-59108, *Integrated Mass Balance for Introduction of UP-1 Waste Stream to the 200 West Pump and Treat Facility*, unless otherwise noted.

a. The fraction of influent mass adsorbed to the uranium IX system.

b. The fraction of influent mass adsorbed to the Tc-99 IX system.

c. The fraction of influent mass that is bioconverted to another compound (e.g., carbon tetrachloride is converted to carbon dioxide and water).

d. The fraction of influent mass attached to solids and removed by solids processing. Includes partition to solids in AMT, RDT, and centrifuge. Treated solids with attached contaminants are sent to ERDF.

e. The fraction of influent mass volatilized to offgas and adsorbed to granular activated carbon.

f. Contaminants with a cleanup level or drinking water limit identified in Table 2.

g. Data from plant experience with cyanide.

h. Data from literature for arsenic removal with ferric coagulants.

i. Contaminants not included in Table 2 but identified as potential contaminants in the original mass balance for the 200 West Pump and Treat Facility.

j. Contaminants that have secondary drinking water limits that occur in the water processed by the treatment facility.

AMT = aerated membrane tank
ERDF = Environmental Restoration Disposal Facility
FBR = fluidized bed reactor
IX = ion exchange
N/A = not applicable
RDT = rotary drum thickener

The maximum concentrations that can be treated by the 200 West P&T and meet the cleanup levels in Table 2, and the drinking water standards are listed in Table 4. These values were based on the following formula:

$$Feedstream\ Criteria = \frac{Cleanup\ Level\ or\ Drinking\ Water\ Standard}{(1 - partition\ factor\ process\ 1)\ x\ (1 - partition\ factor\ process\ 2) x \ldots (1 - partition\ factor\ process\ x)}$$

For example, the feed stream criteria for total chromium is 554 µg/L and is calculated as follows:

$$Feedstream\ Criteria = \frac{100\ \frac{\mu g}{L}}{(1 - 0.00088) x (1 - 0.00088) x (1 - 081928)} = 554\ \mu g/L$$

In many cases, the calculated values were rounded down to two significant figures to provide a modest level of conservatism.

Table 4. Feed Stream Acceptance Criteria for the 200 West Pump and Treat Facility

Contaminant	Cleanup Level or Drinking Water Standard (µg/L or pCi/L for Activity)	Removal (%)		Acceptance Criteria (µg/L or pCi/L for Activity)	
		By Full Treatment [a]	By Central Treatment Only	Full Treatment [b]	Central Treatment Plant [c]
Contaminants of Concern [d]					
Carbon tetrachloride	3.4	99.96	99.96	9,400	9,400
Trichloroethene	1	95.6	95.4	23	22
Hexavalent chromium	48	91.3	86.8	550	360
Total chromium	100	82.0	81.9	554	554
Gross alpha - radon (activity)	15	76.0	76.0	60	60
Vanadium	None [e]	75.8	73.7	--	--
Tc-99 (activity)	500 [f]	99.4	46.0	80,000	920
Manganese	50	21.1	21.1	60	60
Arsenic	10	14.4	14.4	11.7	11.7
Iodine-129 (activity)	1	16.7	12.0	1.2	1.1
Uranium	30	99.4	11.15	5,100	34
Gross alpha - U (activity)	15	99.4	11.1	2,500	17
Strontium-90 (activity)	8	19.1	0.1	10	8
Nitrate (as N)	10	N/A [g]	N/A [g]	44	44
Ferrocyanide [h]	200	96.0	0.0	5,000	200
Free cyanide	4.8	0.0	0.0	4.8	4.8
Tritium (activity)	20,000	0.0	0.00	20,000	20,000
Sulfate	250	0.0	0.0	250	250
Contaminants of Interest [i]					
1,1,1-trichloroethane	200	99.99	99.9	1,500,000	1,500,000
1,2-dichlorethane	5	56.9	56.9%	12	12
Chloroform	70	98.8	98.0	5,600	5,600
Dichloroethenes (all)	70	100.0	100.0	453,000	453,000
Cobalt-60 (activity)	100	97.4	93.0	3,800	1,400
Constituents with Secondary Maximum Contaminant Limit [j]					
Fe	300	73.7	73.7	1,140	1,140
Total dissolved solids	500	0.0	0.0	500	500
pH	6.5 to 9.5	N/A [k]	N/A [k]	<7.8	>6.0

Note: The shaded columns highlight the acceptance criteria for Full Treatment and Central Treatment Plant.

a. Includes ion exchange, biological reactors, and air stripping.

b. Treatment by ion exchange, biological reactors, and air stripping; this is the maximum level that can be treated in the blended stream entering the ion exchange system.

c. Treatment by biological reactors and air stripping; this is the maximum level in the blended stream entering the central treatment plant.

Table 4. Feed Stream Acceptance Criteria for the 200 West Pump and Treat Facility

Contaminant	Cleanup Level or Drinking Water Standard (µg/L or pCi/L for Activity)	Removal (%)		Acceptance Criteria (µg/L or pCi/L for Activity)	
		By Full Treatment [a]	By Central Treatment Only	Full Treatment [b]	Central Treatment Plant [c]

d. Contaminants with a cleanup level or drinking water limit identified in Table 2.

e. Vanadium does not have a cleanup level for drinking water regulation, but as a redox metal similar to manganese, it has the potential to be a well foulant.

f. The cleanup level for technetium-99 is 900 pCi/L. An activity of 500 pCi/L has been adopted at the 200 West P&T to limit potential nuclear radiation exposure that may result from the accumulation of technetium-99 on metal surfaces in the central treatment facility.

g. Design limited to 44 mg/L as N at 9,464 L/min (2,500 gal/min).

h. Ferrocyanide is the primary component of total cyanide measured in groundwater treated by the 200 West P&T. Ferrocyanide was used to help separate cesium-137 in some of the storage tanks (PNL-7822, *A Summary of Available Information on Ferrocyanide Tank Wastes*).

i. Contaminants not listed in Table 2 but identified as potential contaminants in the original mass balance for the 200 West P&T.

j. Contaminants with secondary drinking water limits that occur in the water processed by the treatment facility.

k. pH is not "removed" per se but can be adjusted to some extent.

N/A = not applicable

P&T = pump and treat facility

The quantity of water to be treated will also be considered. Small quantities of highly contaminated water can be processed as long as the blend ratio is managed. New feed streams with concentrations greater than those listed in Tables 4 and 5 or with new constituents will have to be reviewed on a case-by-case basis to meet the requirements identified in the 200-ZP-1 RD/RAWP (DOE/RL-2008-78) and other governing decision documents. Any one feed stream can exceed the concentrations listed in Tables 4 and 5, as long as the blend is less than the concentration indicated.

Table 5. Other Constituents Impacting Treatment

Parameter (Units)	Criteria	Source	Comments
Hardness (mg/L as $CaCO_3$)	300	Engineering estimate	Hardness fouls instruments, scales pipe, fittings, and ion exchange media
Total suspended solids (mg/L)	500	DOE/RL-2010-13	Filters, pipe, fittings, and ion exchange media are fouled.
Dissolved oxygen (mg/L)	11.3		Nitrate removal is compromised as the dissolved oxygen increases.
Alkalinity (mg/L as $CaCO_3$)	200	Engineering estimate	Effectiveness of acids used for pH adjustment is limited.

Reference: DOE/RL-2010-13, *200 West Area Groundwater Pump-and-Treat Remedial Design Report*.

Note: The parameters impacting treatment do not have cleanup levels, but exceeding the acceptance criteria can impact operation of the 200 West Pump and Treat system. The impact should be evaluated before accepting the new feed stream.

In some cases, additional sampling will be recommended, and the results may change the recommendation presented in the initial treatment feasibility document. If it is determined that a feed stream can be feasibly treated, the initial treatment feasibility evaluation (including recommendations) will be shared with the U.S. Department of Energy (DOE) for review and consideration. The EPA will be briefed as soon as practical at the discretion of DOE. Upon agreement to pursue treatment of the new feed stream, a sampling strategy consisting of process and laboratory sampling will be developed.
The 200 West P&T sampling and analysis plan (SAP) (Appendix D in DOE/RL-2009-124) describes the sampling necessary to be performed to verify that the plant effluent does not exceed the criteria listed in Tables 2, 4, and 5. All samples that are sent to an off-site laboratory will be analyzed in accordance with the 200 West P&T SAP.

Some feed streams that have been accepted for treatment are delivered on an episodic basis. Prior to delivery, these feed streams will be characterized and reviewed using the criteria listed in Tables 4 and 5. Further, these feed streams may be sampled before delivery, and the data analyzed for changes may impact the ability for the 200 West P&T to meet the requirements of the 200-ZP-1 ROD (EPA et al., 2008) and RD/RAWP (DOE/RL-2008-78). The frequency of the feed stream sampling before delivery will be adjusted using a risk-based approach. That is, a feed stream with a history of consistent quality that is considered to be easily treated will be sampled and analyzed less frequently than a feed stream variable in quality and more difficult to treat. With one exception, the frequency of data collection will be documented in the 200 West P&T SAP (Appendix D in DOE/RL-2009-124). Sampling frequency for leachate from the Environmental Restoration Disposal Facility (ERDF) is the one exception, which is documented in WCH-182, *Environmental Restoration Disposal Facility Leachate and Washwater Management Plan*.

If the evaluation indicates that the feed stream cannot be feasibly treated, DOE will be informed of the evaluation results. The EPA will be briefed as soon as practical at the discretion of the DOE. Recommendations for potential system modifications to accommodate the new feed stream will be provided for consideration.

2.2 Feed Stream Acceptance And Approval

The EPA recommendation to provide acceptance for long-term treatment and approval of a feed stream will be made with consideration of the regulatory cleanup commitments made in existing RODs and RD/RAWPs for those feed streams. This recommendation will be made to DOE and EPA who will make the final decision for or against long-term feed stream acceptance. Each feed stream is evaluated on a case-by-case basis to determine if long-term treatment of the new feed stream will jeopardize attainment of existing regulatory commitments. The 200 West P&T *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) documents will be updated as necessary based on process knowledge, system performance, and changes due to other newly accepted feed streams (i.e., DOE/RL-2009-124).

Accepted feed streams will be documented in Table 1 and in SGW-57790, *Characterization data for New Waste Streams (200-UP-1, ERDF Leachate, 200-BP5 and Perched Water) for the 200 West Pump-and-Treat Facility*. The impact on treatment will be determined by adding the feed stream to the 200 West P&T Integrated Mass Balance Model. A Tri-Party Agreement Change Notice will be used to document changes, and the feed stream will be added to Table 1 of this document (Ecology et al., 1989, *Hanford Federal Facility Agreement and Consent Order*).

Because the 200 West P&T is a remedial action remedy component regulated under CERCLA and implemented under a CERCLA decision document negotiated between DOE and EPA, any addition of a new feed stream to the 200 West P&T will require DOE and EPA approval. Authority to send new feed streams to the 200 West P&T is found in the originating facility's governing CERCLA documents pending approval as described in this document. Implementing documents for the feed stream(s) are listed in Chapter 3 of this document, ensuring that there are no impacts to the 200-ZP-1 OU ROD commitments, RD/RAWP commitments, or other OU commitments.

3 Existing Evaluations

The following is a brief overview of the information and evaluations contained in each of the existing soil and groundwater documents for feed streams to be treated at the 200 West P&T:

- SGW-47536, *Functional Design Criteria for 200-UP-1 Groundwater Operable Unit Remedial Design*, presents functional design criteria for the 200-UP-1 OU, providing the design criteria for the 200 West P&T and flow path control portion of the selected remedy for the U Plant plume.
- SGW-57790, *Characterization data for New Waste Streams (200-UP-1, ERDF Leachate, 200-BP5 and Perched Water) for the 200 West Pump-and-Treat Facility*, provides a technical basis for evaluations of hazard classification and treatment assessments for potential feed streams from 200-ZP-1, 200-BP-5, 200-DV-1 perched water, 200-UP-1, and leachate from ERDF for treatment at the 200 West P&T.
- SGW-58619, *Impact of Environmental Restoration Disposal Facility (ERDF) Leachate on the 200 West Area Pump and Treat Facility*, provides an evaluation of contaminant concentrations in ERDF leachate and compares the expected concentration to the 200 West P&T design criteria.
- SGW-59550, *Initial Operation of Uranium Ion Exchange at 200 West Pump and Treat*, provides direction in the use of ion exchange resin for removing uranium in contaminated water from 200-UP-1, 200-BP-5, and 200-DV-1 perched water.
- SGW-59852, *Sampling Strategy for Water Delivered to the Offload Tank*, provides the approach to characterize water to be delivered to the offload station and to maintain steady influent concentrations of key water quality constituents during treatment.
- SGW-59871, *ERDF Leachate Sampling Strategy*, provides the sampling strategy and actions to ensure that leachate from ERDF does not hinder treatment at the 200 West P&T.
- SGW-61287, *Impact of Modutank Water on the 200 West Pump and Treat*, provides an evaluation of contaminant concentrations in the MSUs and compares the concentrations of contaminants to the feedstream acceptance criteria.
- DOE/RL-2018-28, *Optimization Test Plan for Treating Water from Modular Storage Units at 200 West Pump and Treat Facility*, provides the plan for testing the treatment of MSU water at the 200 West P&T.

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