SGW-59872
Revision 2

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
Plateau Remediation Company

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Richland, Washington 99352

Approved for Public Release;
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Terms

200 West P&T	200 West Pump and Treat
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
MSU	modular storage unit
OU	operable unit
ROD	record of decision

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1 Introduction

This document presents the criteria that will be considered for each new feed stream and outlines the approval process to accept new feed streams at the 200 West Pump and Treat (200 West P&T) facility. This document will be superseded by Appendix F in DOE/RL-2009-124, *200 West Pump and Treat Operations and Maintenance Plan*. Until this aforementioned revision is published, the acceptance criteria contained herein will be used to evaluate new feed streams.

The 200 West P&T has the ability to remove a number of different contaminants. The 200 West P&T facility serves as a central treatment facility for a number of operable units (OUs) primarily in the 200 Area, but the 200 West P&T also receives purgewater from the 100 Area through the modular storage units (MSUs). The 200 West P&T is currently classified as a less than hazard class 3, and as new feed streams are considered, they must be assessed both for the ability of the 200 West P&T to provide adequate treatment and for the impact on hazard classification. Hazard classification is documented in a separate document (SGW-40032, *Soil and Groundwater Remediation Project Facility Hazard Categorization).*

A number of feed streams have been approved for the 200 West P&T and are summarized in Table 1. In 2018, the MSU optimization pilot test water was added with the associated evaluation, sampling requirements, and acceptance criteria documented in DOE/RL-2018-70, *Optimization Pilot Test Results of Treating Water from Modular Storage Units at 200 West Pump & Treat Facility*. In October 2019, several treatment processes were suspended per DOE/RL-2019-38, *200-ZP-1 Operable Unit Optimization Study Plan*. These feed streams were reevaluated to determine the suitability of the revised treatment system with active biological processing suspended to provide adequate treatment using the methods in this document and found to be acceptable. The evaluation is documented in SGW-64439, *Engineering Calculation: 2019 Integrated Mass Balance for the 200 West Pump and Treat Facility*. In addition, DOE/RL-2018-70 identified sampling requirements that have been incorporated into the sampling and analysis plan to verify that cleanup levels are met.

Table 1. Accepted Feed Streams at the 200 West P&T Facility

Source	Year Added	Engineering Evaluation	Pretreatment 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	

Table 1. Accepted Feed Streams at the 200 West P&T Facility

Source	Year Added	Engineering Evaluation	Pretreatment Requirements[a]	Approximate Average Annual Flow (L/min)/(gal/min)	Intermittent or Continuous
Leachate from the Environmental Restoration Disposal Facility	2016	SGW-58619	Uranium and technetium-99	Not applicable	Semicontinuously, considered continuous. During transfer, flow is 38 to 57 L/min (10 to 15 gal/min).
Modular storage unit water	2019	SGW-61287	--[b]	Not applicable	Intermittent. During transfer, flow is 35 to 190 L/min (9 to 50 gal/min).
Reacceptance of feed streams following suspension of biological treatment	2019	SGW-64439	--	Unchanged from above	Unchanged from initial acceptance.

Note: Complete reference citations are provided in Chapter 4.

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

b. After isolation, the modular storage unit water may be treated with copper sulfate, sodium hypochlorite, or both to remove 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.

2 Feed Stream Acceptance Decision Process

The ability of the 200 West P&T to treat a new aqueous feed stream will be evaluated to determine if the new feed stream could be effectively treated to meet applicable cleanup levels as described below.

2.1 New Feed Stream Treatment Feasibility Evaluation

All aqueous feed streams under consideration for treatment at the 200 West P&T will be characterized using existing analytical data, historical knowledge of Hanford Site use, and hydrology. Gaps in data will be assessed and additional data collected to assure that the feed stream is fully characterized, including for new constituents not currently addressed by the 200 West P&T. Treatment feasibility/evaluation of a new feed stream will be documented in a published soil and groundwater document. A feed stream will be considered feasible to treat if it will not do the following:

1. Cause a plant liquid effluent to exceed the treated water quality requirements listed in Table 2.

Table 2. Cleanup Levels Applicable to the 200 West P&T

COCs (Units)	Final Cleanup Level	Governing Operable Units
COCs Introduced by Continuous Feed Streams and MSU Purgewater		
Carbon tetrachloride (µg/L)	3.4	200-ZP-1, 200-UP-1
Chromium (total) (µg/L)	100	200-ZP-1, 200-UP-1, 200-DV-1 perched water, 200-PO-1 (GW), 100-HR-3
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, 100-BC-5
Nitrate as N (µg/L)	10,000[a]	200-ZP-1, 200-UP-1, 200-BP-5, 100-FR-3, 100-HR-3, 100-NR-2[b], 200-DV-1 perched water, 200-PO-1, 300-FF-5
Trichloroethene (µg/L)	1	200-ZP-1, 100-FR-3, 300-FF-5
Iodine-129 (pCi/L)	1	200-ZP-1, 200-UP-1, 200-BP-5, 200-PO-1
Technetium-99 (pCi/L)	900	200-ZP-1, 200-UP-1, 200-BP-5, 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[b], 100-NR-2[b], 200-DV-1 perched water, 200-PO-1, 300-FF-5
Uranium (µg/L)	30	200-UP-1, 200-BP-5, 200-DV-1 perched water, 300-FF-5
?Free cyanide (µg/L)	4.8	200-BP-5
COCs and Cocontaminants Introduced by MSU Purgewater Only		
Strontium-90 (pCi/L)	-- [c]	100-BC-5, 100-FR-3, 100-HR-3, 100-KR-4[b], 100-NR-2, 200-PO-1
Gross alpha (pCi/L) [b]	15	300-FF-5
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[b], 200-PO-1
Sulfate	N/A	100-NR-2[b]
cis-1,2-dichloroethene (µg/L)	16	300-FF-5

Note: Complete reference citations are provided in Chapter 4.

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. Nitrate treatment has been suspended per DOE/RL-2019-38, *200-ZP-1 Operable Unit Optimization Study Plan*.

b. These constituents are listed as cocontaminants. Cocontaminants do not have a cleanup level. The values represent cleanup levels for the governing operable unit(s) listed; not necessarily with 200-ZP-1, though there is overlap.

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

COC = contaminant of concern
EPA = U.S. Environmental Protection Agency
GW = groundwater
MCL = maximum contaminant level
MSU = modular storage unit
MTCA-B = refers to WAC 173-340-705 to determine the cleanup level
N/A = not applicable

2. Cause exceedance of solid waste disposal criteria (Appendix B of DOE/RL-2009-124).
3. Cause exceedance of the air emissions criteria (Appendix C of DOE/RL-2009-124).
4. Introduce new constituents at regulatory concern levels not already addressed elsewhere.

2.1.1 Continuously Processed Feed Streams

The following OUs have been authorized via a regulatory decision document to be treated at the 200 West P&T and are considered continuous feed streams:

- **ZP-1 OU** as stated 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]), as modified by DOE/RL-2019-38
- **200-UP-1 OU** as stated in EPA et al., 2012, *Record of Decision for Interim Remedial Action, Hanford 200 Area, Superfund Site, 200-UP-1 Operable Unit*
- **200-BP-5 OU** as stated in DOE/RL-2016-41, *Action Memorandum for 200-BP-5 Operable Unit Groundwater Extraction*
- **200-DV-1 OU (perched water)** as stated in DOE/RL-2014-34, *Action Memorandum for 200-DV-1 Operable Unit Perched Water Pumping / Pore Water Extraction*

Environmental Restoration Disposal Facility (ERDF) leachate is a currently approved feed stream. The ERDF leachate is required to meet the 200-ZP-1 (EPA et al., 2008) cleanup criteria but introduces no new cleanup criteria. New feed stream evaluations will consider the impact of processing the new feed stream concurrently with the contaminant concentrations and flow rates of the ERDF leachate feed stream.

2.1.2 Intermittently Processed Feed Streams

If a new feed stream is to be processed concurrently with an intermittently processed feed stream, the new feed stream will be evaluated to ensure cleanup levels of the OUs associated with the intermittently processed feed stream are not exceeded.

For example, the MSUs are a currently approved intermittently processed feed stream. During the time that the MSU water is processed at the 200 West P&T, the effluent from the 200 West P&T must meet all of the cleanup criteria for the OUs that send water to the MSUs. If a new feed stream is to be processed concurrently with the intermittently processed MSU water, the new feed stream will be evaluated to ensure cleanup levels of the OUs that send water to the MSUs, listed in Table 2, are not exceeded. A restriction on processing the new feed stream may be established during MSU transfer if the evaluation shows that the MSU cleanup criteria would be exceeded if the streams are processed concurrently.

In addition to the OUs listed in Section 2.1.1, the following OUs contribute water to the MSUs:

- **100-BC-5** (DOE/RL-2003-38, *100-BC-5 Operable Unit Sampling and Analysis Plan*)
- **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*)
- **100-HR-3** (EPA and DOE, 2018, *Record of Decision Hanford 100 Area Superfund Site, 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, and 100-HR-3 Operable Units*)

- **100-KR-4** (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)*
- **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*)
- **200-PO-1** (DOE/RL-2003-04, *Sampling and Analysis Plan for the 200-PO-1 Groundwater Operable Unit*)
- **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*)

2.1.3 Calculation Approach

The 200 West P&T has the ability to remove and blend contaminants, and the removal/blending 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 removed from 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 data collected during processing. Table 3 notes whether the contaminant is transferred to the vapor phase or to the solid phase. The plant profile data should be reviewed periodically to confirm or update the partition coefficients. The updated partition coefficients should be used to verify or update the feed stream acceptance criteria as new information is obtained.

The maximum concentrations in the blended influent that can be treated by the 200 West P&T and meet the cleanup levels in Table 2 are listed in Table 4. The contaminants listed have cleanup requirements identified in the 200-ZP-1 ROD (EPA et al., 2008) or other governing decision documents. New feed streams will also be evaluated for constituents from Table D-3 (Appendix D of DOE/RL-2009-124) to verify if the new feed stream can be processed concurrently with the MSU water. The acceptance criteria 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 carbon tetrachloride is 2,125 µg/L and is calculated as follows:

$$Feedstream\ Criteria = \frac{3.4\ \frac{\mu g}{L}}{(1 - 0.2) x (1 - 0.998)} = 2{,}125\ \mu g/L$$

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

Table 3. Partitioning Factors Used to Determine the Acceptance Criteria

Contaminant	Uranium IX[a]	Tc-99 IX[b]	EQ/Recycle Tanks Partition to Vapor Phase[c]	Air Stripper (Partition to Vapor Phase)[d]
Technetium-99	0.12	0.987	0	0
Iodine-129	0.027	0.027	0	0
Tritium	0	0	0	0
Uranium	0.993	0.012	0	0
Carbon tetrachloride	0	0	0.2	0.998
Trichloroethene	0	0.05	0.07	0.85
Nitrate	0	0.01	0	0
Total chromium	0.00088	0.00088	N/A	0
Hexavalent chrome	0.000027	0.344	0	0
Total cyanide[e]	0.991	0.97	0	0
Free cyanide[e]	0	0	0	0
Arsenic	0	0	0	0
Strontium-90	0.1	0.1	0	0
Gross alpha – U	0.993	0.012	0	0
Gross alpha – radon	0	0	0.53	0.40
Manganese (Mn)	0	0	0	0
Sulfate (SO_4)	0	0	0	0
Vanadium	0.01	0.07	0	0
Contaminants of Interest[f]				
1,1,1-Trichloroethane	0	0	0.13	0.9995
1,2-Dichloroethane	0	0	0.02	0.55
Benzene	0	0	0.04	0.55
Acetone	0	0	0.000	0.0013
Chloroform	0	0	0.02	0.98
Dibromochloromethane	0	0	0.01	0.45
Methylene chloride	0	0	0.02	0.9795
Dichloroethenes (all)	0	0	0.02	0.9995
Vinyl chloride	0	0	0.20	0.9995
Beryllium	0	0	0	0
Lead	0	0	0	0
Cobalt-60	0.39	0.39	0	0

Table 3. Partitioning Factors Used to Determine the Acceptance Criteria

Contaminant	Uranium IX[a]	Tc-99 IX[b]	EQ/Recycle Tanks Partition to Vapor Phase[c]	Air Stripper (Partition to Vapor Phase)[d]
Constituents that are Well Foulants or with Secondary Maximum Contaminant Limit				
Iron (Fe)	0	0	0	0
Total dissolved solids	0	0	0	0
Aluminum	0	0	0	0
Phosphate	0	0	0	0
Chemical oxygen demand	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 passively volatilized to off-gas and adsorbed to granular activated carbon.

d. The fraction of influent mass volatilized to off-gas and adsorbed to granular activated carbon.

e. Data from plant experience with cyanide.

f. Contaminants that were identified as potential contaminants in the original mass balance for the 200 West Pump and Treat facility, or that have secondary drinking water limits that may occur in the water processed by the treatment facility or are believed to be associated with well fouling.

EQ = equalization tank IX = ion exchange N/A = not applicable

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 Table 4 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 ROD (EPA et al., 2008) and other governing decision documents. Any one feed stream can exceed the concentrations listed in Table 4, as long as the blended concentration when discharged to the aquifer is less than the concentration indicated. The blending calculation will consider the concentrations, flow rates, location of input into the plant, and operational margins as a buffer to regulatory limits.

In some cases, additional sampling will be recommended, and the results may change the recommendation presented in the initial treatment feasibility document.

Table 4. Feed Stream Acceptance Criteria for the 200 West P&T Facility

Contaminant	Cleanup Level or Drinking Water Standard (µg/L or pCi/L for Activity)[a]	Removal by Full Treatment (IX and Central Treatment) (%)	Removal by Central Treatment Only (%)	Acceptance Criteria IX Treatment Only (µg/L or pCi/L for Activity)[b]	Acceptance Criteria - Full Treatment (Treatment by IX and Air Stripping) (µg/L or pCi/L for Activity)[b]	Acceptance Criteria Central Treatment Plant (Treatment by Air Stripping) (µg/L or pCi/L for Activity)[c]
Contaminants of Concern[d]						
Carbon tetrachloride	3.4	99.8	99.8	3.4	2,125	2,125
Trichloroethene	1	86.7	86.1	1	8	7
Hexavalent chromium	48	34.4	0.0	73	73	48
Total chromium	100	0.2	0.0	100	100	100
Gross alpha - radon (activity)	15[e]	71.8	71.8	15	53	53
Vanadium	112 µg/L	7.9	0.0	--	--	--
Tc-99 (activity)	540[f]	98.9	0.0	47,203	47,203	540
Manganese	15[g]	0.0	0.0	15	15	15
Arsenic	10	0.0	0.0	10	10	10
Iodine-129 (activity)	1	5.3	0.0	1.1	1.1	1.0
Uranium	30	99.3	0.0	4,555	4,555	30
Gross alpha - U (activity)	15[e]	99.3	0.0	2,277	2,277	15
Strontium-90 (activity)	--[h]	19.0	0.0	10	10	8
Nitrate (as N)	10,000	N/A[i]	N/A[i]	10	44,000	44,000
Total cyanide[j]	200[e]	99.96	0.0	740,741	740,741	200
Free cyanide	4.8	0.0	0.0	4.8	4.8	4.8
Tritium (activity)	20,000	0.0	0.00	20,000	20,000	20,000
cis-1,2-dichloroethene	16	99.95	99.95	16	32,653	32,653

Table 4. Feed Stream Acceptance Criteria for the 200 West P&T Facility

Contaminant	Cleanup Level or Drinking Water Standard (µg/L or pCi/L for Activity)[a]	Removal by Full Treatment (IX and Central Treatment) (%)	Removal by Central Treatment Only (%)	Acceptance Criteria IX Treatment Only (µg/L or pCi/L for Activity)[b]	Acceptance Criteria - Full Treatment (Treatment by IX and Air Stripping) (µg/L or pCi/L for Activity)[b]	Acceptance Criteria Central Treatment Plant (Treatment by Air Stripping) (µg/L or pCi/L for Activity)[c]
Contaminants of Interest[k]						
1,1,1-trichloroethane	200[e]	99.96	99.6	200	459,770	459,770
1,2-dichlorethane	5[e]	55.9	55.9	5	11	11
Chloroform	70[e]	98.0	98.0	70	3,570	3,570
Dichloroethenes (all)	70[e]	99.95	99.95	70	142,850	142,850
Cobalt-60 (activity)	100[e]	62.8	0.0	269	269	100
Constituents that are Well Foulants or with Secondary Maximum Contaminant Limit						
Iron	150[g]	0.0	0.0	150	150	150
Total dissolved solids	500[l]	0.0	0.0	500	500	500
pH	6.5 to 9.5[e]	N/A[m]	N/A[m]	<7.8	<7.8	>6.0
Aluminum	75[g]	0.0	0.0	75	75	75
Phosphate	100[g]	0.0	0.0	100	100	100
Chemical oxygen demand	7,000[g]	0.0	0.0	7,000	7,000	7,000

Note: The shaded columns highlight the acceptance criteria for full treatment and central treatment plant.

a. The values listed apply to the 200-ZP-1 operable units. The values listed are recommended to be used as limits in the effluent from the 200 West Area. Values shown are based on the regulatory cleanup level unless noted.

b. This is the maximum level in the blended stream entering the IX system.

c. This is the maximum level in the blended stream entering central treatment.

d. Contaminants with a cleanup level or drinking water limit.

e. Limit based on primary drinking water limit.

f. The cleanup level for technetium-99 is 900 pCi/L. An activity of 540 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. Limit recommended to limit the potential for well fouling.

h. No specific cleanup level; refer to Table 2.

i. Nitrate treatment has been suspended as of October 2019, as described in DOE/RL-2019-38, *200-ZP-1 Operable Unit Optimization Study Plan*.

Table 4. Feed Stream Acceptance Criteria for the 200 West P&T Facility

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

j. The primary component of total cyanide measured in groundwater treated by the 200 West P&T is ferrocyanide. 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*).

k. Contaminants that were identified as potential contaminants in the original mass balance for the 200 West P&T.

l. Limit based on secondary drinking water limit.

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

IX = ion exchange

N/A = not applicable

P&T = pump and treat

Table 5 lists water quality parameters that may impact treatment at the 200 West P&T that do not have cleanup levels. Exceeding the acceptance criteria may impact the operation of the 200 West P&T. The impact of new feed streams on these criteria should be evaluated before acceptance.

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)	10	DOE/RL-2010-13	Filters, pipe, and fittings may become fouled. Solids will foul injection wells.
Alkalinity (mg/L as Ca CO_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*.

If a determination is made that a feed stream can be feasibly treated, the initial treatment feasibility evaluation, including recommendations, will be presented to the U.S. Department of Energy (DOE) and will be shared with the U.S. Environmental Protection Agency (EPA) 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 and approved by DOE and EPA.

Some feed streams may be accepted for treatment on an intermittent basis. A feed stream that has a history of consistent quality and is considered to be easily treated may not require sampling before processing. A feed stream that is variable in quality and more difficult to treat may require sampling before processing. The frequency of data collection for the new feed stream will be documented in the 200 West P&T sampling and analysis plan (Appendix D of DOE/RL-2009-124).

2.2 Feed Stream Acceptance and Approval

The recommendation to accept a new feed stream for treatment at the 200 West P&T will be made by DOE to EPA. EPA will make the final decision for feed stream acceptance. Each feed stream is evaluated on a case-by-case basis to determine how treatment of the new feed stream will impact existing regulatory commitments. The 200 West P&T *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* documents will be updated as necessary based on process knowledge, system performance, and changes due to other newly accepted feed streams (e.g., performance monitoring plan, remedial design/remedial action work plan).

A Tri-Party Agreement (Ecology et al., 1989, *Hanford Federal Facility Agreement and Consent Order*) change notice will be used to document changes. The new feed stream will be added to the following:

- DOE/RL-2009-124
- SGW-57790, *Characterization Data for New Waste Streams (200-UP-1, ERDF Leachate, 200-BP-5 and Perched Water) for the 200 West Pump-and-Treat Facility*
- SGW-59108

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 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, *Engineering Evaluation: Receiving Water in Offload Station*, 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 feed stream acceptance criteria.
- DOE/RL-2018-28, *Optimization Test Plan for Treating Water from Modular Storage Units at 200 West Pump & Treat Facility*, provides the plan for testing the treatment of MSU water at the 200 West P&T.
- DOE/RL-2018-70 provides the results of testing performed under DOE/RL-2018-28.
- SGW-64439 presents the results of the integrated mass balance without treatment previously provided by the fluidized bed reactors and membrane bioreactors.

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