SGW-44181
Revision 0

Data Quality Objectives Summary Report for the Designation of Wastes From the 200-ZP-1 Operable Unit Pump and Treat System

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

P.O. Box 1600
Richland, Washington 99352

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Document Type: RPT

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Date Published
September 2010

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Terms

AA	alternative action
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CFR	*Code of Federal Regulations*
COC	contaminant of concern
COPC	contaminant of potential concern
DQO	data quality objective
DR	decision rule
DS	decision statement
ERDF	Environmental Restoration Disposal Facility
GAC	granular activated carbon
IX	ion exchange
MSW	miscellaneous solid waste
N/A	not applicable
OU	operable unit
P&T	pump-and-treat
PPE	personal protective equipment
PSQ	principal study question
ROD	Record of Decision
VPGAC	vapor phase granular activated carbon
WAC	*Washington Administrative Code*

1 Introduction

1.1 Purpose

The purpose of this data quality objectives (DQO) waste management report is to support the handling, designation, and disposition of waste sludges and spent ion exchange (IX) resins from the 200 West Area Pump-and-Treat (P&T) System. Miscellaneous solid waste (MSW) such as filters, gloves, wipes, small tools/equipment, and personal protective equipment (PPE) is also addressed. Wastes generated by treatability tests in support of this process may also be characterized in accordance with this DQO, provided the waste streams are from the same source (200 West groundwater) and fundamentally similar in physical characteristics and contaminant loading.

1.2 Background

The 200 West Area P&T System is a component of the overall 200-ZP-1 Operable Unit (OU) *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) remedial action as authorized by the EPA et al. (2008), *Record of Decision Hanford 200 Area 200-ZP-1 Superfund Site Benton County, Washington*. The 200-ZP-1 OU is located in the north part of the 200 West Area of the Hanford Site's Central Plateau. The action identified in the Record of Decision (ROD) involves extracting groundwater, treating the groundwater to remove contaminants, and injecting the treated water into the aquifer upgradient of the extraction wells. Waste generated from this remedial action will be managed according to DOE/RL-2009-124, *Waste Management Plan for the 200-ZP-1 Groundwater Operable Unit Remedial Action*.

The contaminants of concern (COC) identified for the 200-ZP-1 OU in the ROD are carbon tetrachloride, total chromium (trivalent [III] and hexavalent [VI]), nitrate, trichloroethylene, iodine-129, technetium-99, and tritium. An interim remedial measure P&T system is currently operating in the 200-ZP-1 OU and will continue to operate under the requirements established in the ROD until the treatment system required by the 200-ZP-1 OU ROD becomes operational, which is expected to occur by December 2011. The system is to include a new central treatment facility, new groundwater extraction wells, new treated groundwater injection wells, and the required infrastructure (e.g., transfer piping and pumping stations). The design also allows for expansion of the system to include additional treatment capabilities, extraction wells, injection wells, and performance monitoring wells, as needed, to optimize remedy performance.

In anticipation of future expansion, the 200 West Area P&T System will be capable of treating some contaminated groundwater outside the 200-ZP-1 OU. Following initial operations, it is anticipated that the system will be expanded to provide the necessary treatment capabilities for the contaminated groundwater in the 200-UP-1 OU following a final decision.

The 200 West Area P&T System uses Purolite[1] A530 resin to remove techniteum-99 and other contaminants from the groundwater. The groundwater will be further treated with a fluidized bed reactor and air stripper. The offgas from the unit systems (technetium-99 IX, fluidized bed reactor, and air stripper) will be filtered with vapor phase granular activated carbon (VPGAC). Some groundwater will be pretreated with Uranium IX resin in a sub-facility to be built within the system.

This DQO was prepared considering the fact that this is the first resin and sludge disposal for the 200 West Area P&T System. Therefore, the list of analytes identified to support the waste management

[1] Purolite is a registered trademark of the Purolite Company, Bala Cynwyd, Pennsylvania.

process is extensive, mainly due to uncertainties in the accumulation of contaminants in the resin that are not removed by regeneration. As other treatment components of the 200 West Area P&T System become operational in the future, the characterization strategy may need to be refined to address additional influent and waste streams.

1.3 Assumptions

- The waste generated from the 200 West Area P&T System will be managed, designated, and disposed of in accordance with DOE/RL-2009-124 and this DQO.
- Because the waste is in support of a CERCLA remedial action, the preferred disposal location is the Environmental Restoration Disposal Facility (ERDF). Waste characterization and sample design will consider data needs to comply with ERDF waste acceptance criteria.
- If waste cannot be disposed to ERDF, it will be evaluated for disposal at an offsite facility, or storage at the Hanford Site Solid Waste Operations Complex.
- Groundwater associated with the 200-ZP-1 OU has been determined to carry the following listed waste codes: F001 (carbon tetrachloride, 1,1,1 trichloroethane), F002 (methylene chloride), F003 (acetone, methyl isobutyl ketone), F004 (o-creosol, p-creosol), and F005 (methyl ethyl ketone). Therefore, waste streams that contact 200-ZP-1 OU groundwater will carry "F001" through "F005" listed waste codes (DOE/RL-2009-124 and CCN 081034, "Application of Listed Waste Codes to Secondary Solid Waste Related to Well Construction, Maintenance, and Sampling," Table 1-2).
- Groundwater-contacted waste will not be designated as "ignitable, corrosive, or reactive" based on CCN 0542880, "Waste Designation for Hanford Site Groundwater Contacted Waste."
- Because of the tendency for contaminants to concentrate in the granular activated carbon (GAC), sludges and the IX resins, contaminants not detected in 200-ZP-1 OU and 200-UP-1 OU wells, or detected at levels not normally of concern in the groundwater, may be present in these waste streams at elevated concentrations. This may impact waste management. Therefore, the contaminants of potential concern (COPCs) for waste management represent a larger list than those identified for the groundwater due to this propensity for contaminants to concentrate.
- The loaded GAC from the VPGAC systems is to be shipped off-site for regeneration. It will be sampled to meet transportation and other compliance criteria using the same analytical parameters as other waste streams, as provided in Tables 3-2 and 3-3.
- The spent resins from the technetium-99 IX unit will not be regenerated; spent resins from the uranium IX may be regenerated until the resin is spent. Both types of resins, when spent, are considered waste streams.
- Based on manufacturer's information (Appendix A), the Purolite A530E resin used in the IX column does not have inherent properties that would influence the waste designation and ultimate disposal to the ERDF. According to the manufacturer's website (www.purolite.com), the resin has been approved for the treatment of drinking water, so risks to human health are not likely an issue. The manufacturer Material Safety Data Sheet and other pertinent information on the resins have been included in Appendix A.

1.4 Existing References

Table 1-1 lists references that are relevant to the development of this waste DQO. The reference and a brief summary of the pertinent information obtained from each reference are provided.

Table 1-1. Summary of Principal References

References	Summary
DOE/RL-2009-124, *Waste Management Plan for the 200-ZP-1 Groundwater Operable Unit Remedial Action*	Provides the plan for managing and disposing of waste associated with the 200 West Area P&T System. Identifies listed waste codes for waste that comes in contact with the contaminated groundwater associated with the 200-ZP-1 OU. Codes F001 through F005 are identified for groundwater-contacted 200-ZP-1 OU wastes.
WMP-18977, *Data Quality Objectives Summary Report Supporting the 200-ZP-1 Operable Unit Remedial Investigation/Feasibility Study Process*	Appendix D provides the list of constituents (COPC list) that may have impacted the groundwater in the 200-ZP-1 OU, screens existing data at the time to reduce contaminant list, and provides a final list of constituents (COC list) to be analyzed for the OU. (Note: this Waste Management DQO uses the COPC list prior to screening and reduction of the list due to the propensity of contaminants to concentrate on the sludges and resins.)
SGW-37444, *Data Quality Objective Summary Report for the Designation of Investigation-Derived Waste Resins from the 200-ZP-1 Treatability Test*	Supports designation and disposal of resin and miscellaneous solid waste derived from a treatability test in the 200-ZP-1 OU. The wastes described in SGW-37444 are similar to the ones described in this Waste Management DQO. Provides a summary of the logic for retaining contaminants for waste designation based on the data. Contains information on the effects of concentration in resin of some chemicals and radionuclides.
WCH-191, *Environmental Restoration Disposal Facility Waste Acceptance Criteria*	Identifies waste acceptance criteria for ERDF.
CCN 081034, "Application of Listed Waste Codes to Secondary Solid Waste Related to Well Construction, Maintenance, and Sampling"	Contains the application of listed waste codes to groundwater related to well construction, maintenance, and sampling. The wells are associated with groundwater contamination that requires the use of F001 through F005 waste codes.
Manufacturer's information from Purolite website: www.purolite.com	Information on the resin used in the treatability test and planned to be used for the 200 West Area P&T. Information includes chemical parameters and the Material Safety Data Sheet. This information is provided in Appendix A.
DOE/RL-2008-78, *200 West Area 200-ZP-1 Pump-and-Treat Remedial Design/Remedial Action Work Plan*	Provides the design for the 200 West Area P&T System.

COC	= contaminant of concern	ERDF	= Environmental Restoration Disposal Facility
COPC	= contaminant of potential concern	OU	= operable unit
DQO	= data quality objectives	P&T	= pump-and-treat

1.5 COPCs and COCs

Tables 1-2 and 1-3 list COPCs that were identified in the DQO (WMP-18977, *Data Quality Objectives Summary Report Supporting the 200-ZP-1 Operable Unit Remedial Investigation/Feasibility Study*

Process, Appendix D) supporting the remedial investigation/feasibility study for the 200-ZP-1 OU. The list of COPCs in WMP-18977, Appendix D, was compiled using data from five major sources. These are:

- BHI-01477, *Remedial Investigation Data Quality Objectives Summary Report for the 200-PW-1 Operable Unit Phase I Representative Waste Sites*
- DOE/RL-91-61, *T Plant Source Aggregate Area Management Study Report; DOE/RL-92-16, 200 West Groundwater Aggregate Area Management Study Report*
- DOE/RL-2001-37, *Drilling, Sampling, and Analysis Plan for Installation of a Well Within the Vicinity of the Plutonium Finishing Plant*
- CP-15329, Data *Quality Objectives Summary Report for Establishing a RCRA/CERCLA/AEA Integrated 200 West and 200 East Groundwater Monitoring Network.*

In addition, all groundwater analytes from the 200-ZP-1 and 200-UP-1 OUs from January 1, 2003 to October 12, 2009. (200-UP-1 OU data were included because the P&T System is anticipated to treat 200-UP-1 OU groundwater in future operations.) Constituents with lab qualifier "C"[2] or validation qualifier "R"[3] were removed from the data set. Remaining constituents that were analyzed for in this time period were added to the COPC list. This list of constituents serves as the starting point for the evaluation of COPCs for this waste DQO. The COPCs for waste management were then screened using a set of criteria to achieve a final list of COCs to be sampled to support waste management. The criteria and logic are as follows.

For nonradionuclide chemicals, the COPCs were evaluated against the following:

- They were never analyzed for in the groundwater data (WMP-18977 Appendix D constituents only)
- They were never detected in the groundwater data or were detected once and at least 100 analyses have been performed for that constituent
- Whether WAC 173-303, "Dangerous Waste Regulations" specifies a dangerous waste limit for the COPC per WAC 173-303-090(8). The wastes with specified limits include those in 40 CFR 268.48, "Land Disposal Restrictions" "Universal Treatment Standards," which is incorporated by reference into WAC 173-303 (chemical constituents only)
- Whether the concentration is covered by the results of a different direct standard lab analysis (for example, ferrocyanide and ethyl cyanide are covered by cyanide and hexavalent chromium is covered by total chromium.)
- Whether the constituent is likely to be in groundwater based on process history
- Whether or not preliminary information indicates a tendency for the constituent to accumulate on resins

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[2] A "C" qualifier indicates that the analyte was detected in both the sample and the associated quality control blank, and the sample concentration was less than or equal to 5 times the blank concentration. The data should be considered unusable for decision-making purposes.

[3] An "R" qualifier indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- Radionuclides with half-lives less than two years are not considered COCs for waste management per ERDF waste acceptance criteria (WCH-191, *Environmental Restoration Disposal Facility Waste Acceptance Criteria*)
- Radionuclides are eliminated if unlikely to contribute substantially to dose (if, for example, they have a low decay energy or were not a significant process radionuclide)
- They occur naturally (radioactive constituents only)

Table 1-2. Nonradiological COPCs

Metal COPCs	Inorganic, ion, and chelator COPCs	Volatile Organic COPCs	Semi-volatile organic, polychlorinated biphenyl, pesticide, and miscellaneous organic COPCs
Aluminum	Iron-II Ion	Linoleic acid	Benzophenone
Antimony	Mono-butyl phosphate	Methylene chloride	Benzothiazole
Arsenic	Nitrate	n-Butylbenzene	Bis(2-ethylhexyl) phthalate
Barium	Nitrite	n-Butyric Acid	Bisphenol A
Beryllium	Nitrogen in Nitrite and Nitrate	Propane, 1,1-dichloro-	Citrus red
Bismuth	Oxalate	Styrene	Cresols (total)
Boron	Phosphate	Tetrachloroethene	Cyclobutene, 2-propeny
Cadmium	Sulfate	Toluene	Cyclotetrasiloxane, Octamethyl
Calcium	Sulfide	trans-1,2-Dichloroethylene	Decane
Chromium	Trisodium hydroxyethyl ethylene-diamine tri-acetate (HEDTA)	trans-1,3-Dichloropropene	Decane, 2,3,5-trimethyl
Hexavalent Chromium	Ethylene-diamine tetra acetic acid (EDTA)	Trichloroethylene (TCE)	Dibenz[a,h]anthracene
Cobalt	**Volatile Organic COPCs**	Trichloromonofluoro methane	Dieldrin
Copper	1,1,1,2-Tetrachloroethane	Tricosane	Diethylphthalate
Iron	1,1,1-Trichloroethane	Vinyl chloride	Dimethyl phthalate
Lanthanum	1,1,2,2-Tetrachloroethane	Xylenes (total)	Di-n-butylphthalate
Lead	1,1,2-Trichloroethane	Xylene, -o	Dinoseb (2-sec-Butyl-4,6-dinitrophenol)
Lithium	1,1-Dichloroethane	Xylene (m+p)-	D-limonene

Table 1-2. Nonradiological COPCs

Magnesium	4-methyl-2-pentanone (hexone, MIBK)	**Semi-volatile organic, polychlorinated biphenyl, pesticide, and miscellaneous organic COPCs**	Elaidic Acid
Manganese	1,1-Dichloroethene	1,2,4-Trimethylbenzene	Endrin
Mercury	1,1-Dichloropropene	1,2-Benzisothiazole	Endrin aldehyde
Molybdenum	1,2,3-Trichloropropane	1,2-Propanediol	Ethyl 4-ethoxybenzoate
Nickel	1,2-Dibromoethane	1,3,5-Trimethylbenzene	Ethyl acetate
Phosphorus	1,2-Dichloroethane	1,3-Dichloropropane	Ethyl ether
Plutonium (total)	1,2-Dichloroethene (Total)	1,4-Dichlorobenzene	Gamma-BHC (Lindane)
Selenium	1,2-Dichloropropane	1,4-Dioxane	Heptachlor
Silicon	2,6-bis(1,1-dimethylethyl)-4-methyl-phenol	1,6-Hexanediol	Heptadecane
Silver	2-butanone (Methyl ethyl ketone or MEK)	11H-Dibenzo[b,e][1,4]d	Hexadecane
Sodium	2-Ethyl-1-hexanol	1-Ethyl-3,5-Dimethylbenzene	Hexadecanoic acid (9Cl)
Strontium	2-Hexanone	1-Methyl-2-pyrrolidinone	Hexadecanoic acid, butyl ester
Thallium	4-Heptanone, 3-methyl-	1-Phenyl-2-methyl-1-propene	Hexyl methyl ketone
Tin	Acetone	2,3,4,6-Tetrachlorophenol	Kerosene (TPH)
Titanium	Acetonitrile	2,4,6-Trichlorophenol	Methane
Uranium	Acrolein	2,4-Dichlorophenol	Methyl tert-butyl ether
Vanadium	Benzene	2,4-Dimethylphenol	Neopentyl glycol
Zinc	Bromodichloromethane	2,6-Dichlorophenol	n-Hexacosane
Zirconium oxide (analyze zirconium)	Bromoform	2,6-Dimethyl-undecane	N-nitrosodimethyl amine
Inorganic, ion, and chelator COPCs	Bromomethane	2-Benzothiazolethiol	Nonadecane
Alkalinity	Butanol (1-butanol) (n-butyl alcohol)	2-Butoxyethanol	Octachlorodibenzo-p-dioxin
Ammonia	Carbon disulfide	2-Chlorophenol	Octadecanoic acid
Ammonium ion	Carbon tetrachloride	2-Ethyl-1,4-Dimethylbenzene	
Ammonium nitrate	Chlorobenzene	2-Ethylhexanoic acid	Octanoic Acid

Table 1-2. Nonradiological COPCs

Biochemical Oxygen Demand	Chloroethane	2-Fluoro-6-nitrophenol	O-nitrophenol
Bromide	Chloroform	2-Naphthylamine	Polychlorinated Biphenyls
Carbonate	Chloromethane	2-Propanol	p-Cymene
Chloride	cis-1,2-Dichloroethylene	3,5-Di-tert-butyl-4-hydroxybenzaldehyde	Pentachlorophenol
Citrate	cis-1,3-Dichloropropene	3,6-Dimethyldecane	Phenol
Cyanide	Dibromochloromethane	3,7,7-trimethyl bicyclohep-3-ene	Ricinoleic Acid
Dibutyl phosphate (DBP)	Dichlorodifluoromethane	3-Hydroxy-3-methyl-2-butanone	Tetradecanoic acid
Dissolved oxygen	Diethyl ether	4,4'-DDD (Dichlorodiphenyl dichloroethane)	Tetrahydrofuran
Ferrocyanide	Ethanol	4,4'-DDT (Dichlorodiphenyl-ltrichloroethane)	Total inorganic carbon
Fluoride	Ethylbenzene	4-Chloro-3-methylphenol	Total organic carbon
Glycolate	Ethyl cyanide	4-Nitrophenol	Total organic halides
Hydroxide	Iodomethane	Aldrin	Tributyl phosphate
Hydroxylamine	Isobutyl alcohol	Benzoic acid	

Taken from WMP-18977, *Data Quality Objectives Summary Report Supporting the 200-ZP-1 Operable Unit Remedial Investigation/Feasibility Study Process*, Appendix D, "Radiological and Nonradiological Contaminant of Potential Concern Worksheets" and from 200-UP-1 and 200-ZP-1 groundwater data.

COPC = contaminant of potential concern

Table 1-3. Radiological COPCs for 200-ZP-1 OU

Actinium-225	Curium-242	Plutonium-240	Technetium-99
Actinium-227	Curium-243	Plutonium-241	Thallium-207
Americium-241	Curium-244	Plutonium-242	Thorium-227
Americium-242m	Curium-245	Polonium-210	Thorium-228
Americium-242m	Einsteinium-254	Polonium-214	Thorium-229
Americium-243	Europium-152	Polonium-215	Thorium-230
Antimony-125	Europium-154	Polonium-218	Thorium-231
Antimony-126m	Europium-155	Potassium-40	Thorium-232

Table 1-3. Radiological COPCs for 200-ZP-1 OU

Barium-133	Francium-221	Protactinium-231	Thorium-234
Barium-137m	Iodine-129	Protactinium-233	Tin-126
Beryllium-7	Lanthanum-140	Protactinium-234m	Tritium
Bismuth-210	Lead-209	Radium-223	Uranium-232
Bismuth-211	Lead-210	Radium-224	Uranium-233/234
Bismuth-213	Lead-211	Radium-225	Uranium-234
Bismuth-214	Lead-212	Radium-226	Uranium-235
Cadmium-109	Lead-213	Radium-228	Uranium-236
Cadmium-113m	Lead-214	Radon-222	Uranium-238
Carbon-14	Molybdenum-93	Ruthenium-101	Yttrium-90
Cerium/ Praseodymium-144	Neptunium-237	Ruthenium-103	Zinc-65
Cerium-141	Neptunium-239	Ruthenium-106	Zirconium/Niobium-95
Cesium-134	Nickel-59	Samarium-151	Zirconium-93
Cesium-135	Nickel-63	Selenium-79	Strontium-90
Cesium-137	Niobium-93m	Silver-110m	Gross alpha
Chlorine-36	Plutonium-238	Sodium-22	Gross beta
Cobalt-60	Plutonium-239	Strontium-89	

Taken from WMP-18977, *Data Quality Objectives Summary Report Supporting the 200-ZP-1 Operable Unit Remedial Investigation/Feasibility Study Process*, Appendix D, "Radiological and Nonradiological Contaminant of Potential Concern Worksheets" and from 200-UP-1 and 200-ZP-1 groundwater data.

COPC = contaminant of potential concern

OU = operable unit

1.5.1 COCs for Waste Management – Rationale for Inclusion or Exclusion

Tables 1-4 and 1-5 provide the rationale for screening based on waste management requirements, and establish the set of contaminants that must be evaluated.

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
Metal COPCs					
7429-90-5	Aluminum	1730	421	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7440-36-0	Antimony	3835	117	Regulated under WAC 173-303. Detected in groundwater.	Yes
7440-38-2	Arsenic	803	580	Regulated under WAC 173-303. Detected in groundwater.	Yes
7440-39-3	Barium	3875	3658	Regulated under WAC 173-303. Detected in groundwater.	Yes
7440-41-7	Beryllium	3821	281	Regulated under WAC 173-303. Detected in groundwater.	Yes
7440-69-9	Bismuth	103	6	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7440-42-8	Boron	92	50	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7440-43-9	Cadmium	3884	43	Regulated under WAC 173-303. Detected in groundwater.	Yes
7440-70-2	Calcium	3835	3408	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7440-47-3	Chromium	4057	2710	Regulated under WAC 173-303. Detected in groundwater.	Yes
18540-29-9	Hexavalent Chromium	539	269	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7440-48-4	Cobalt	3775	180	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7440-50-8	Copper	3804	327	Not a Washington State toxic or persistent waste. Detected in groundwater.	No

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
7439-89-6	Iron	3835	1956	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7439-91-0	Lanthanum	0	0	Not a Washington State toxic or persistent waste. No detects in groundwater. Not analyzed in groundwater.	No
7439-92-1	Lead	792	72	Regulated under WAC 173-303. Detected in groundwater.	Yes
7439-93-2	Lithium	222	129	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7439-95-4	Magnesium	3836	3778	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7439-96-5	Manganese	3871	1886	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7439-97-6	Mercury	580	21	Regulated under WAC 173-303. Detected in groundwater.	Yes
7439-98-7	Molybdenum	92	90	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7440-02-0	Nickel	3854	944	Regulated under WAC 173-303. Detected in groundwater.	Yes
7723-14-0	Phosphorus	102	57	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7440-07-5	Plutonium (total)	0	0	Not a Washington State toxic or persistent waste. No detects in groundwater. Not analyzed in groundwater.	No
7782-49-2	Selenium	378	151	Regulated under WAC 173-303. Detected in groundwater.	Yes

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
7440-21-3	Silicon	240	223	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7440-22-4	Silver	3814	134	Regulated under WAC 173-303. Detected in groundwater.	Yes
7440-23-5	Sodium	3836	3682	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7440-24-6	Strontium	3603	3518	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7440-28-0	Thallium	240	41	Regulated under WAC 173-303. Detected in groundwater.	Yes
7440-31-5	Tin	173	15	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7440-32-6	Titanium	147	4	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7440-61-1	Uranium	2225	2160	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
7440-62-2	Vanadium	3914	3530	Regulated under WAC 173-303. Detected in groundwater.	Yes
7440-66-6	Zinc	3870	1306	Regulated under WAC 173-303. Detected in groundwater.	Yes
1314-23-4	Zirconium oxide	0	0	Not a Washington State toxic or persistent waste. No detects in groundwater. Not analyzed in groundwater.	No
Inorganic, Ion, and Chelator COPCs					
ALKALINITY	Alkalinity	2475	2470	Not a Washington State toxic or persistent waste. Detected in groundwater.	No

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
7664-41-7	Ammonia	50	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
14798-03-9	Ammonium ion	96	64	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
BOD	Biochemical Oxygen Demand	154	24	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
24959-67-9	Bromide	559	213	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
144-55-8	Carbonate	0	0	Not a Washington State toxic or persistent waste. No detects in groundwater. Not analyzed in groundwater. No evidence of concentration on resins based on influent and effluent data from the Tc-99 IX resin treatability test.	No
16887-00-6	Chloride	3814	2693	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
126-44-3	Citrate	0	0	Not a Washington State toxic or persistent waste. No detects in groundwater. Not analyzed in groundwater.	No
57-12-5	Cyanide	177	11	Regulated under WAC 173-303. Detected in groundwater.	Yes
107-66-4	Dibutyl phosphate (DBP)	0	0	Not a Washington State toxic or persistent waste. No detects in groundwater. Not analyzed in groundwater.	No
DO	Dissolved oxygen	1521	1521	Not a Washington State toxic or persistent waste. Detected in groundwater.	No

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
13408-63-4	Ferrocyanide	0	0	Covered by another analytical method (cyanide). No detects in groundwater. Not analyzed in groundwater.	No
16984-48-8	Fluoride	3830	3525	Not regulated (in solid waste) under WAC 173-303. Detected in groundwater.	No
79-14-1	Glycolate	0	0	Not a Washington State toxic or persistent waste. No detects in groundwater. Not analyzed in groundwater.	No
3352-57-6	Hydroxide	0	0	Not a Washington State toxic or persistent waste. No detects in groundwater. Not analyzed in groundwater.	No
7803-49-8	Hydroxylamine	0	0	Not a Washington State toxic or persistent waste. No detects in groundwater. Not analyzed in groundwater.	No
FE(II)	Iron-II Ion	6	6	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
85391-11-3	Mono-butyl phosphate	0	0	Not a Washington State toxic or persistent waste. No detects in groundwater. Not analyzed in groundwater.	No
14797-55-8	Nitrate	4452	4371	Not a Washington State toxic or persistent waste. Detected in groundwater. No evidence of concentration on resins based on influent and effluent data from the Tc-99 IX resin treatability test.	No

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
14797-65-0	Nitrite	3811	388	Not a Washington State toxic or persistent waste. Detected in groundwater. No evidence of concentration on resins based on influent and effluent data from the Tc-99 IX resin treatability test.	No
NO2+NO3-N	Nitrogen in Nitrite and Nitrate	150	147	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
97993-78-7	Oxalate	0	0	Not a Washington State toxic or persistent waste. No detects in groundwater. Not analyzed in groundwater.	No
14265-44-2	Phosphate	315	1	Not a Washington State toxic or persistent waste. One detect of over 100 analyses in groundwater.	No
14808-79-8	Sulfate	3820	3586	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
18496-25-8	Sulfide	92	4	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
62029-50-9	Trisodium hydroxyethyl ethylene-diamine tri-acetate (HEDTA)	0	0	Not a Washington State toxic or persistent waste. No detects in groundwater. Not analyzed in groundwater.	No
94108-75-5	Ethylene-diamine tetra acetic acid (EDTA)	0	0	Not a Washington State toxic or persistent waste. No detects in groundwater. Not analyzed in groundwater.	No
Volatile Organic COPCs					
630-20-6	1,1,1,2-Tetrachloroethane	173	0	Not a Washington State toxic or persistent waste. No detects in groundwater.	No
71-55-6	1,1,1-Trichloroethane	2401	16	Regulated under WAC 173-303. Detected in groundwater.	Yes

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
79-34-5	1,1,2,2-Tetrachloroethane	594	1	Regulated under WAC 173-303. One detect of over 100 analyses in groundwater.	No
79-00-5	1,1,2-Trichloroethane	2401	4	Regulated under WAC 173-303. Detected in groundwater.	Yes
75-34-3	1,1-Dichloroethane	2401	2	Regulated under WAC 173-303. Detected in groundwater.	Yes
75-35-4	1,1-Dichloroethene	2349	33	Regulated under WAC 173-303. Detected in groundwater.	Yes
563-58-6	1,1-Dichloropropene	7	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
96-18-4	1,2,3-Trichloropropane	166	0	Not a Washington State toxic or persistent waste. No detects in groundwater.	No
106-93-4	1,2-Dibromoethane	173	1	Regulated under WAC 173-303. One detect of over 100 analyses in groundwater.	No
107-06-2	1,2-Dichloroethane	2401	14	Regulated under WAC 173-303. Detected in groundwater.	Yes
540-59-0	1,2-Dichloroethene (Total)	668	2	Regulated under WAC 173-303. Detected in groundwater.	Yes
78-87-5	1,2-Dichloropropane	594	1	Regulated under WAC 173-303. One detect of over 100 analyses in groundwater.	No
106-46-7	1,4-Dichlorobenzene	2070	20	Regulated under WAC 173-303. Detected in groundwater.	Yes
97123-41-6	2,6-bis(1,1-dimethylethyl)-4-methyl-phenol	0	0	Not a Washington State toxic or persistent waste. No detects in groundwater. Not analyzed in groundwater.	No

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
78-93-3	2-butanone (Methyl ethyl ketone or MEK)	2701	44	Regulated under WAC 173-303. Detected in groundwater.	Yes
104-76-7	2-Ethyl-1-hexanol	18	18	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
591-78-6	2-Hexanone	670	1	Not a Washington State toxic or persistent waste. One detect of over 100 analyses in groundwater.	No
15726-15-5	4-Heptanone, 3-methyl-	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
108-10-1	4-methyl-2-pentanone (hexone, MIBK)	2398	6	Regulated under WAC 173-303. Detected in groundwater.	Yes
67-64-1	Acetone	2701	340	Regulated under WAC 173-303. Detected in groundwater.	Yes
75-05-8	Acetonitrile	241	4	Regulated under WAC 173-303. Detected in groundwater.	Yes
107-02-8	Acrolein	172	1	Regulated under WAC 173-303. One detect of over 100 analyses in groundwater.	No
6484-52-2	Ammonium nitrate	0	0	Not a Washington State toxic or persistent waste. No detects in groundwater. Not analyzed in groundwater.	No
71-43-2	Benzene	2831	29	Regulated under WAC 173-303. Detected in groundwater.	Yes
75-27-4	Bromodichloromethane	671	57	Regulated under WAC 173-303. Detected in groundwater.	Yes
75-25-2	Bromoform	597	2	Regulated under WAC 173-303. Detected in groundwater.	Yes

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
74-83-9	Bromomethane	593	21	Regulated under WAC 173-303. Detected in groundwater.	Yes
71-36-3	Butanol (1-butanol) (n-butyl alcohol)	1906	4	Regulated under WAC 173-303. Detected in groundwater.	Yes
75-15-0	Carbon disulfide	2401	148	Regulated under WAC 173-303. Detected in groundwater.	Yes
56-23-5	Carbon tetrachloride	3706	3310	Regulated under WAC 173-303. Detected in groundwater.	Yes
108-90-7	Chlorobenzene	1748	7	Regulated under WAC 173-303. Detected in groundwater.	Yes
75-00-3	Chloroethane	594	1	Regulated under WAC 173-303. One detect of over 100 analyses in groundwater.	No
67-66-3	Chloroform	3688	3117	Regulated under WAC 173-303. Detected in groundwater.	Yes
74-87-3	Chloromethane	598	51	Regulated under WAC 173-303. Detected in groundwater.	Yes
156-59-2	cis-1,2-Dichloroethylene	2031	17	Detected in less than 1% of groundwater samples.	No
10061-01-5	cis-1,3-Dichloropropene	593	1	Regulated under WAC 173-303. One detect of over 100 analyses in groundwater.	No
124-48-1	Dibromochloromethane	597	4	Regulated under WAC 173-303. Detected in groundwater.	Yes
75-71-8	Dichlorodifluoromethane	173	1	Regulated under WAC 173-303. One detect of over 100 analyses in groundwater.	No
60-29-7	Diethyl ether	8	1	Regulated under WAC 173-303. Detected in groundwater.	Yes

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
64-17-5	Ethanol	2	0	Not a Washington State toxic or persistent waste. No detects in groundwater.	No
107-12-0	Ethyl cyanide	1982	0	Regulated under WAC 173-303. No detects in groundwater. Covered by another analytical method (cyanide).	No
74-88-4	Iodomethane	172	6	Regulated under WAC 173-303. Detected in groundwater.	Yes
78-83-1	Isobutyl alcohol	172	1	Regulated under WAC 173-303. One detect of over 100 analyses in groundwater.	No
60-33-3	Linoleic acid	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
75-09-2	Methylene chloride	2696	413	Regulated under WAC 173-303. Detected in groundwater.	Yes
104-51-8	n-Butylbenzene	98	0	Not a Washington State toxic or persistent waste. No detects in groundwater.	No
107-92-6	n-Butyric Acid	2	2	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
78-99-9	Propane, 1,1-dichloro-	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
100-42-5	Styrene	594	6	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
127-18-4	Tetrachloroethene	2974	478	Regulated under WAC 173-303. Detected in groundwater.	Yes
108-88-3	Toluene	2831	87	Regulated under WAC 173-303. Detected in groundwater.	Yes

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
156-60-5	trans-1,2-Dichloroethylene	2030	1	Regulated under WAC 173-303. One detect of over 100 analyses in groundwater.	No
10061-02-6	trans-1,3-Dichloropropene	594	2	Regulated under WAC 173-303. Detected in groundwater.	Yes
79-01-6	Trichloroethylene (TCE)	3708	2077	Regulated under WAC 173-303. Detected in groundwater.	Yes
75-69-4	Trichloromonofluoro methane	468	1	Regulated under WAC 173-303. One detect of over 100 analyses in groundwater.	No
638-67-5	Tricosane	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
75-01-4	Vinyl chloride	2401	1	Regulated under WAC 173-303. One detect of over 100 analyses in groundwater.	No
1330-20-7	Xylenes (total)	2401	11	Regulated under WAC 173-303. Detected in groundwater.	Yes
95-47-6	Xylene, -o	16	1	Regulated under WAC 173-303. Detected in groundwater. Covered by another analytical method (total Xylenes).	No
179601-23-1	Xylene (m+p)-	11	1	Covered by another analytical method. Detected in groundwater.	No
Semi-volatile Organic, Polychlorinated Biphenyl, Pesticide, and Miscellaneous Organic COPCs					
95-63-6	1,2,4-Trimethylbenzene	20	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
272-16-2	1,2-Benzisothiazole	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
57-55-6	1,2-Propanediol	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
108-67-8	1,3,5-Trimethylbenzene	8	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
142-28-9	1,3-Dichloropropane	7	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
123-91-1	1,4-Dioxane	974	6	Regulated under WAC 173-303. Detected in groundwater.	Yes
629-11-8	1,6-Hexanediol	4	4	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
13450-73-2	11H-Dibenzo[b,e][1,4]d	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
934-74-7	1-Ethyl-3,5-Dimethylbenzene	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
872-50-4	1-Methyl-2-pyrrolidinone	40	40	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
768-49-0	1-Phenyl-2-methyl-1-propene	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
58-90-2	2,3,4,6-Tetrachlorophenol	210	5	Regulated under WAC 173-303. Detected in groundwater but all detects associated with contaminated blanks. Pesticide, not expected to be in groundwater.	No
88-06-2	2,4,6-Trichlorophenol	271	0	No detects in groundwater.	No
120-83-2	2,4-Dichlorophenol	367	0	No detects in groundwater.	No
105-67-9	2,4-Dimethylphenol	271	0	No detects in groundwater.	No
87-65-0	2,6-Dichlorophenol	210	0	No detects in groundwater.	No
17301-23-4	2,6-Dimethyl-undecane	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
149-30-4	2-Benzothiazolethiol	2	2	Not a Washington State toxic or persistent waste. Detected in groundwater.	No

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
111-76-2	2-Butoxyethanol	4	4	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
95-57-8	2-Chlorophenol	313	0	No detects in groundwater.	No
1758-88-9	2-Ethyl-1,4-Dimethylbenzene	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
149-57-5	2-Ethylhexanoic acid	2	2	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
1526-17-6	2-Fluoro-6-nitrophenol	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
91-59-8	2-Naphthylamine	10	1	Regulated under WAC 173-303 in wastewater only. Detected in groundwater.	No
67-63-0	2-Propanol	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
1620-98-0	3,5-Di-tert-butyl-4-hydroxybenzaldehyde	2	2	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
17312-53-7	3,6-Dimethyldecane	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
13466-78-9	3,7,7-trimethyl bicyclohep-3-ene	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
115-22-0	3-Hydroxy-3-methyl-2-butanone	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
72-54-8	4,4'-DDD (Dichlorodiphenyl dichloroethane)	4	0	Surface application only, not expected in groundwater. No detects in groundwater.	No
50-29-3	4,4'-DDT (Dichlorodiphenyl-trichloroethane)	4	0	Surface application only, not expected in groundwater. No detects in groundwater.	No

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
59-50-7	4-Chloro-3-methylphenol	313	1	Regulated under WAC 173-303. One detect of over 100 analyses in groundwater.	No
100-02-7	4-Nitrophenol	313	2	Regulated under WAC 173-303. Detected in groundwater in less than 1% of the samples. All detects below the CRDL.	No
309-00-2	Aldrin	4	0	Surface application only, not expected in groundwater. No detects in groundwater.	No
65-85-0	Benzoic acid	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
119-61-9	Benzophenone	2	2	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
95-16-9	Benzothiazole	103	6	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
117-81-7	Bis(2-ethylhexyl) phthalate	167	18	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
80-05-7	Bisphenol A	5	5	Regulated under WAC 173-303. Detected in groundwater but all detects below CRDL. If present will show up under EPA method 8270.	No
6358-53-8	Citrus red	0	0	Not a Washington State toxic or persistent waste. No detects in groundwater. Not analyzed in groundwater.	No
1319-77-3	Cresols (total)	0	0	Cresols are regulated under WAC 173-303. The o- and p- cresols are presumed to be in 200-ZP-1 OU groundwater per CCN081034	Yes

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
52097-85-5	Cyclobutene, 2-propeny	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
556-67-2	Cyclotetrasiloxane, Octamethyl	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
-	Decane	0	0	Not a Washington State toxic or persistent waste.	No
62238-11-3	Decane, 2,3,5-trimethyl	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
53-70-3	Dibenz[a,h]anthracene	70	2	Regulated under WAC 173-303. Detected in groundwater.	Yes
60-57-1	Dieldrin	4	0	Surface application only, not expected in groundwater. No detects in groundwater.	No
84-66-2	Diethylphthalate	70	6	Regulated under WAC 173-303. Detected in groundwater.	Yes
131-11-3	Dimethyl phthalate	70	1	Regulated under WAC 173-303. Detected in groundwater.	Yes
84-74-2	Di-n-butylphthalate	70	3	Regulated under WAC 173-303. Detected in groundwater.	Yes
88-85-7	Dinoseb (2-sec-Butyl-4,6-dinitrophenol)	214	0	Regulated under WAC 173-303. No detects in groundwater.	No
5989-27-5	D-limonene	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
112-79-8	Elaidic Acid	3	3	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
72-20-8	Endrin	4	0	Surface application only, not expected in groundwater. No detects in groundwater.	No

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
7421-93-4	Endrin aldehyde	4	0	Surface application only, not expected in groundwater. No detects in groundwater.	No
23676-09-7	Ethyl 4-ethoxybenzoate	2	2	Not a Washington State toxic or persistent waste. Detected in groundwater. No standard analytical method.	No
141-78-6	Ethyl acetate	95	0	Regulated under WAC 173-303. No detects in groundwater.	No
93-18-5	Ethyl ether	0	0	Regulated under WAC 173-303. No detects in groundwater. Not analyzed in groundwater.	No
100-41-4	Ethylbenzene	2123	8	Regulated under WAC 173-303. Detected in groundwater.	Yes
58-89-9	Gamma-BHC (Lindane)	4	0	Surface application only, not expected in groundwater. No detects in groundwater.	No
76-44-8	Heptachlor	4	0	Surface application only, not expected in groundwater. No detects in groundwater.	No
629-78-7	Heptadecane	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
544-76-3	Hexadecane	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
57-10-3	Hexadecanoic acid (9CI)	5	5	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
111-06-8	Hexadecanoic acid, butyl ester	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
111-13-7	Hexyl methyl ketone	2	2	Not a Washington State toxic or persistent waste. Detected in groundwater.	No

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
TPHKEROSENE	Kerosene (TPH)	126	0	Not a Washington State toxic or persistent waste. No detects in groundwater.	No
74-82-8	Methane	16	7	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
1634-04-4	Methyl tert-butyl ether	7	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
126-30-7	Neopentyl glycol	2	2	Regulated under WAC 173-303. Detected in groundwater. No standard analytical method.	No
630-01-3	n-Hexacosane	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
62-75-9	N-nitrosodimethyl amine	10	0	Regulated under WAC 173-303. No detects in groundwater.	No
629-92-5	Nonadecane	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
3268-87-9	Octachlorodibenzo-p-dioxin	4	1	Regulated under WAC 173-303. Detected once in groundwater below detection limit at very low level (3.4E-06 ug/L).	No
57-11-4	Octadecanoic acid	2	2	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
124-07-2	Octanoic Acid	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
88-75-5	o-Nitrophenol	367	0	No detects in groundwater.	No
-	Polychlorinated Biphenyls	28	0	Surface application only, not expected in groundwater. Not detected in groundwater (analyzed as separate Aroclors).	No
99-87-6	p-Cymene	8	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No

Table 1-4. Rationale for Inclusion or Exclusion of Nonradiological COPCs for Waste Management at the 200 West Area P&T System

COPC CAS	COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
87-86-5	Pentachlorophenol	367	0	No detects in groundwater.	No
108-95-2	Phenol	367	10	Detected in groundwater.	Yes
7431-95-0	Ricinoleic Acid	1	1	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
544-63-8	Tetradecanoic acid	2	2	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
109-99-9	Tetrahydrofuran	1956	19	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
TINC	Total Inorganic Carbon	49	49	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
TOC	Total organic carbon	1311	693	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
59473-04-0	Total organic halides	1225	827	Not a Washington State toxic or persistent waste. Detected in groundwater.	No
126-73-8	Tributyl phosphate	128	1	Not a Washington State toxic or persistent waste. One detect of over 100 analyses in groundwater.	No

CAS = Chemical Abstracts Service
CFR = *Code of Federal Regulations*
COPC = contaminant of potential concern
IX = ion-exchange
P&T = pump & treat system
P&T = pump-and-treat
TPH = total petroleum hydrocarbon
WAC = *Washington Administrative Code*

Table 1-5. Rationale for Inclusion or Exclusion of Radiological COPCs for Waste Management at the 200 West Area P&T System

COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
Actinium-225	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Actinium-227	0	0	No detects in groundwater. Not analyzed in groundwater. Present in T-Plant process at very small amounts compared to Cs-137.	No
Americium-241	21	10	Detected in groundwater.	Yes
Americium-242	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Americium-242m	0	0	No detects in groundwater. Not analyzed in groundwater. Concentration can be accurately calculated	No
Americium-243	0	0	No detects in groundwater. Not analyzed in groundwater. Concentration can be accurately calculated	No
Antimony-125	495	0	No detects in groundwater.	No
Antimony-126m	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Barium-133	0	0	No detects in groundwater. Not analyzed in groundwater. Not likely to be substantial contributor to dose or any waste management issues.	No
Barium-137m	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Beryllium-7	489	1	One detect of over 100 analyses in groundwater. Half life <2 years.	No
Bismuth-210	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Bismuth-211	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Bismuth-213	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Bismuth-214	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Cadmium-109	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Cadmium-113m	0	0	No detects in groundwater. Not analyzed in groundwater. Not likely to be substantial contributor to dose or any waste management issues.	No

Table 1-5. Rationale for Inclusion or Exclusion of Radiological COPCs for Waste Management at the 200 West Area P&T System

COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
Carbon-14	232	27	Detected in groundwater.	Yes
Cerium/Praseodymium-144	1	0	No detects in groundwater. Half life <2 years.	No
Cerium-141	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Cesium-134	495	0	No detects in groundwater. Half life <2 years.	No
Cesium-135	0	0	No detects in groundwater. Not analyzed in groundwater. Not likely to be substantial contributor to dose or any waste management issues.	No
Cesium-137	606	1	One detect of over 100 analyses in groundwater. May be concentrated in resins.	Yes
Chlorine-36	0	0	No detects in groundwater. Not analyzed in groundwater. Not likely to be substantial contributor to dose or any waste management issues.	No
Cobalt-60	574	9	Detected in groundwater.	Yes
Curium-242	1	0	No detects in groundwater.	No
Curium-243	0	0	No detects in groundwater. Not analyzed in groundwater.	No
Curium-244	1	0	No detects in groundwater.	No
Curium-245	0	0	No detects in groundwater. Not analyzed in groundwater.	No
Einsteinium-254	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Europium-152	498	0	No detects in groundwater.	No
Europium-154	547	0	No detects in groundwater.	No
Europium-155	547	0	No detects in groundwater.	No
Francium-221	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Iodine-129	1807	323	Detected in groundwater.	Yes
Lanthanum-140	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Lead-209	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No

Table 1-5. Rationale for Inclusion or Exclusion of Radiological COPCs for Waste Management at the 200 West Area P&T System

COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
Lead-210	0	0	No detects in groundwater. Not analyzed in groundwater.	No
Lead-211	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Lead-212	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Lead-213	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Lead-214	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Molybdenum-93/Niobium-93m	0	0	No detects in groundwater. Not analyzed in groundwater. Not a major radionuclide in the process; not expected to contribute significantly to dose or to be present in groundwater at levels of concern.	No
Neptunium-237	145	6	Detected in groundwater.	Yes
Neptunium-239	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Nickel-59	0	0	No detects in groundwater. Not analyzed in groundwater. Not expected to be at significant concentrations in the limited volume of waste	No
Nickel-63	19	16	Detected in groundwater.	Yes
Niobium-93m	0	0	No detects in groundwater. Not analyzed in groundwater. Not a major radionuclide in the process; not expected to contribute significantly to dose or to be present in groundwater at levels of concern.	No
Plutonium-238	55	0	Can be estimated from other radionuclide concentrations. No detects in groundwater.	No
Plutonium-239/240	55	8	Detected in groundwater.	Yes
Plutonium-241	0	0	Can be estimated from other radionuclide concentrations. No detects in groundwater. Not analyzed in groundwater.	No
Plutonium-242	0	0	Can be estimated from other radionuclide concentrations. No detects in groundwater. Not analyzed in groundwater.	No

Table 1-5. Rationale for Inclusion or Exclusion of Radiological COPCs for Waste Management at the 200 West Area P&T System

COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
Polonium-210	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Polonium-214	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Polonium-215	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Polonium-218	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Potassium-40	497	12	Detected in groundwater. Naturally occurring radionuclide.	No
Protactinium-231	122	2	Detected in groundwater but only at concentrations very close to the detection limit (within precision tolerance of MDA) . ORIGEN2 modeling estimates concentration of 1E-7 pCi/L, therefore not a waste management concern.	No
Protactinium-233	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Protactinium-234m	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Radium-223	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Radium-224	0	0	No detects in groundwater. Not analyzed in groundwater. Naturally occurring radionuclide.	No
Radium-225	0	0	No detects in groundwater. Not analyzed in groundwater. Naturally occurring radionuclide.	No
Radium-226	37	2	Detected in groundwater. Present in T-Plant process at very small amounts compared to Cs-137.	No
Radium-228	3	0	No detects in groundwater. Present in T-Plant process at very small amounts compared to Cs-137.	No
Radon-222	0	0	No detects in groundwater. Not analyzed in groundwater. Naturally occurring gaseous constituent; not likely to be in groundwater	No
Ruthenium-101	0	0	No detects in groundwater. Not analyzed in groundwater. Stable isotope	No

Table 1-5. Rationale for Inclusion or Exclusion of Radiological COPCs for Waste Management at the 200 West Area P&T System

COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
Ruthenium-103	1	0	No detects in groundwater. Half life <2 years.	No
Ruthenium-106	491	0	No detects in groundwater. Half life <2 years.	No
Samarium-151	0	0	No detects in groundwater. Not analyzed in groundwater. Low decay energy, not expected to contribute significantly to dose.	No
Selenium-79	221	40	Detected in groundwater.	Yes
Silver-110m	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Sodium-22	0	0	No detects in groundwater. Not analyzed in groundwater. Short half-life (2.6 years); not expected to be found in groundwater at significant concentrations due to decay; not expected to contribute significantly to dose	No
Strontium-89	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Technetium-99	4254	3567	Detected in groundwater.	Yes
Thallium-207	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Thorium-227	0	0	No detects in groundwater. Not analyzed in groundwater. Present in T-Plant process at very small amounts compared to Cs-137.	No
Thorium-228	3	0	No detects in groundwater. Half life <2 years.	No
Thorium-229	0	0	No detects in groundwater. Not analyzed in groundwater. Present in T-Plant process at very small amounts compared to Cs-137.	No
Thorium-230	0	0	No detects in groundwater. Not analyzed in groundwater. Present in T-Plant process at very small amounts compared to Cs-137.	No
Thorium-231	0	0	No detects in groundwater. Not analyzed in groundwater. Present in T-Plant process at very small amounts compared to Cs-137.	No

Table 1-5. Rationale for Inclusion or Exclusion of Radiological COPCs for Waste Management at the 200 West Area P&T System

COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
Thorium-232	3	0	No detects in groundwater. Present in T-Plant process at very small amounts compared to Cs-137.	No
Thorium-234	0	0	No detects in groundwater. Not analyzed in groundwater. Present in T-Plant process at very small amounts compared to Cs-137.	No
Tin-126	0	0	No detects in groundwater. Not analyzed in groundwater. Produced in fuel at less than 1% of Tc-99	No
Total beta radiostrontium	242	24	Detected in groundwater. See Strontium-90.	No
Tritium	2900	2241	Detected in groundwater.	Yes
Uranium-232	0	0	No detects in groundwater. Not analyzed in groundwater. Negligible compared to U-234 and U-238	No
Uranium-233	14	14	Not discernable from U-234; evaluated with U-234	Yes
Uranium-234	51	51	Detected in groundwater.	Yes
Uranium-235	68	17	Detected in groundwater.	Yes
Uranium-236	0	0	Can be estimated from other radionuclide concentrations. No detects in groundwater. Not analyzed in groundwater.	No
Uranium-238	237	228	Detected in groundwater.	Yes
Yttrium-90	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Zinc-65	1	0	No detects in groundwater. Half life <2 years.	No
Zirconium/Niobium-95	0	0	No detects in groundwater. Not analyzed in groundwater. Half life <2 years.	No
Zirconium-93	0	0	No detects in groundwater. Not analyzed in groundwater. Present in T-Plant process at very small amounts compared to Cs-137.	No
Strontium-90	323	24	Detected in groundwater.	Yes
Gross alpha	953	296	Detected in groundwater. May be used as an indicator parameter once the waste profile is developed and supported with analyses.	No

Table 1-5. Rationale for Inclusion or Exclusion of Radiological COPCs for Waste Management at the 200 West Area P&T System

COPC Name	Number of Analyses	Number of Detects	Exclusion / Inclusion Criteria	Analysis Required?
Gross beta	940	934	Detected in groundwater. May be used as an indicator parameter once the waste profile is developed and supported with analyses.	No

COPC = contaminant of potential concern

P&T = pump-and-treat

1.5.2 Final COCs for the 200 West Area P&T System Waste Management

Table 1-6 lists the final COCs for waste management (designation and disposal) that need to be sampled and analyzed to complete the waste disposal process.

Table 1-6. Final List of COCs for Waste Management That Require Sampling and Analysis at the 200 West Area P&T System

Radiological COCs			
Americium-241	Iodine-129	Selenium-79	Uranium-234
Carbon-14	Neptunium-237	Strontium-90	Uranium-235
Cesium-137	Nickel-63	Technetium-99	Uranium-238
Cobalt-60	Plutonium-239/240	Tritium	
Nonradiological COCs			
Metals			
Antimony	Cadmium	Nickel	Thallium
Arsenic	Chromium	Selenium	Vanadium
Barium	Lead	Silver	Zinc
Beryllium	Mercury		
Volatile Organics			
1,1,1-Trichloroethane	Benzene	Chloroform	Methylene chloride
1,1,2-Trichloroethane	Bromodichloromethane	Chloromethane	Tetrachloroethene
1,1-Dichloroethane	Bromoform	Cresols (total)	Toluene
1,1-Dichloroethene	Bromomethane	Dibromochloromethane	trans-1,3-Dichloropropene
1,2-Dichloroethane	Butanol (1-butanol) (n-butyl alcohol)	Diethyl ether	Trichloroethylene (TCE)
1,2-Dichloroethene (Total)	Carbon disulfide	Iodomethane	Xylenes (total)

Table 1-6. Final List of COCs for Waste Management That Require Sampling and Analysis at the 200 West Area P&T System

Acetone	Carbon tetrachloride	Methyl ethyl ketone (2-butanone, MEK)	
Acetonitrile	Chlorobenzene	Methyl isobutyl ketone (4-methyl-2-pentanone, hexone, MIBK)	
Semi-Volatile Organics			
1,4-Dichlorobenzene	Dibenz[a,h]anthracene	Dimethyl phthalate	Ethylbenzene
1,4-Dioxane	Diethylphthalate	Di-n-butylphthalate	Phenol
3-Methylphenol (m-cresol)	4- Methylphenol (p-cresols)	2-Methylphenol (o-cresol)	
Non-Metal Inorganics			
Cyanide			

COC = contaminant of concern

P&T = pump-and-treat

1.6 Expected Waste Streams

Expected waste streams were determined for each unit within the 200 West Area P&T System. Each waste stream will be analyzed for the same constituents. Figure 1-1 presents a simplified flow diagram of the P&T process, showing the waste streams.

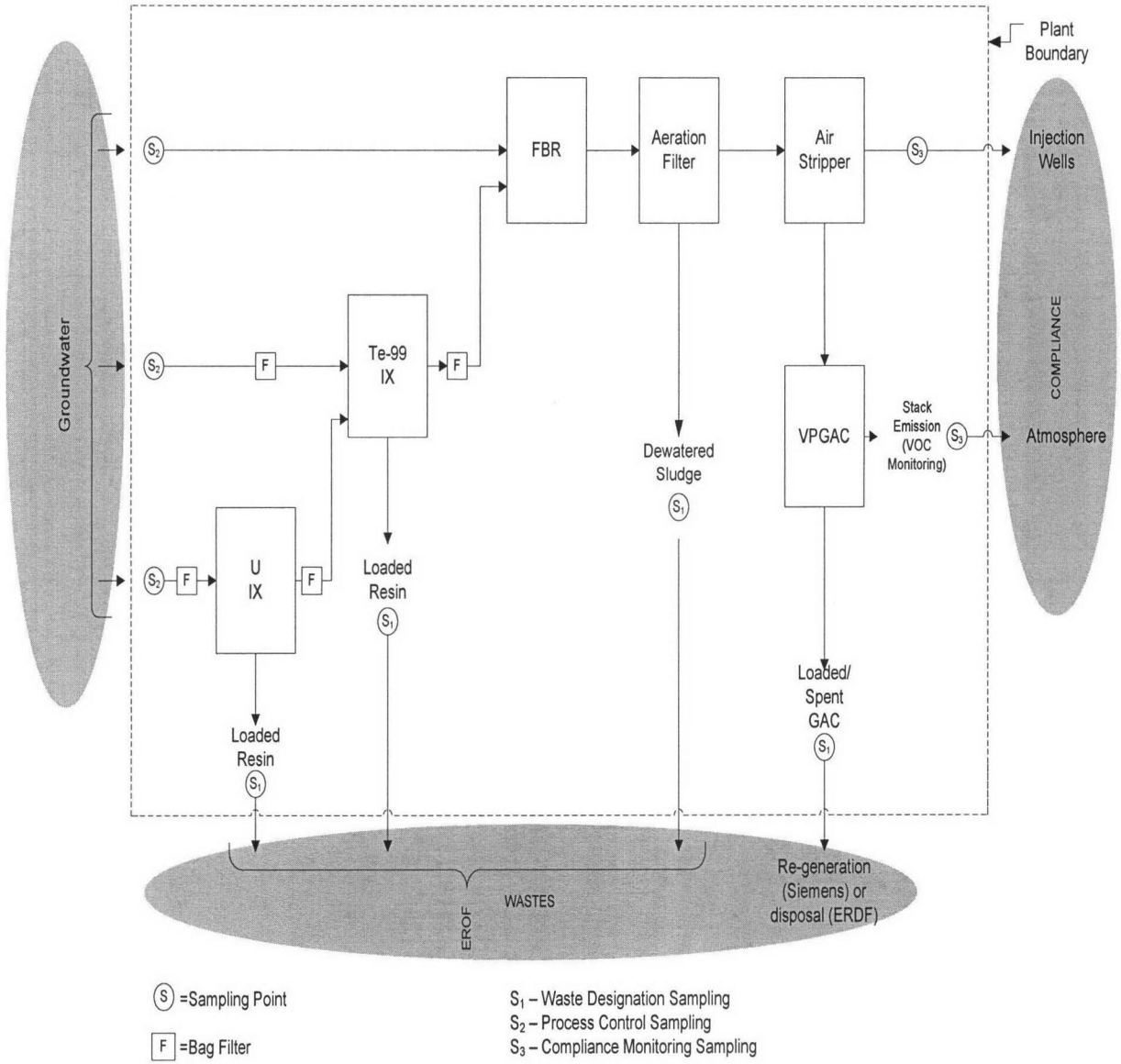

Figure 1-1. 200 West Area P&T System Flowchart

Table 1-7 presents individual waste streams identified from the descriptions of unit processes described above, along with a brief description of the principal contaminants, the preferred disposal facility, and the type of sampling need to confirm expected waste profiles (no sample, batch, or not applicable). In addition to the waste streams indicated in Table 1-7, waste may be generated from sampling and analysis activities and from unplanned releases.

Table 1-7. 200 West Area P&T System Waste Streams

Waste Stream	Major Expected Contaminants	Presumed Disposal Facility and Confirmatory Sampling Type
Uranium IX System		
Inflow bag filters	Fine mineral particulates	ERDF (no sample, to be designated per Uranium resin)
Outflow bag filters	Uranium-bearing resin particles, possible VOCs	ERDF (no sample, to be designated per Uranium resin)
Dewatered loaded resin	Uranium, possible VOCs	ERDF (Batch)
Loaded GAC	CCl_4, TCE	Off-site (N/A)
Uranium-bearing sludge	Uranium, polymer, limestone, lime	ERDF (Batch)
Degraded, stripped resin	(no data)	(no data)
Technetium-99 IX System		
Inflow bag filters	Fine mineral particulates	ERDF (no sample, to be designated per Tc-99 resin)
Outflow bag filters	Tc-99-bearing resin particles, possible VOCs	ERDF (no sample, to be designated per Tc-99 resin)
Dewatered loaded resin	Tc-99, possible VOCs, traces I-129 & U	ERDF (Batch)
Loaded GAC	CCl_4, TCE	Off-site (N/A)
Fluidized Bed Reactor/Aeration Filters		
Dewatered sludge	Carbon (GAC), biomass, mineral particulates	ERDF (Batch)
Air Stripper		
Loaded GAC	CCl_4, TCE	Off-site (N/A)
Spent GAC	CCl_4, TCE	ERDF (Batch)

ERDF = Environmental Restoration Disposal Facility
GAC = granular activated carbon
IX = ion-exchange
N/A = not applicable
P&T = pump-and-treat
TCE = trichloroethylene
VOC = volatile organic compound

1.7 Expected Sample Collection Types

The sample collection types needed for waste management fall into three general categories that are described in the following subsections.

1.7.1 Sludge and Resin Batch Samples

The following types of waste are destined for disposal at the ERDF. They will need to be batch-sampled and characterized for the purpose of waste management:

- Loaded IX resin
- Biosolid waste.

1.7.2 GAC

The GAC from the various VPGAC trains will become loaded with COCs (e.g., carbon tetrachloride and trichloroethylene). The GAC will be shipped to the Siemens Water Technologies carbon regeneration facility in Parker, Arizona, or other appropriate treatment, storage, and disposal facility. It will be sampled per requirements needed to ship the waste as specified in DOE/RL-2009-124.

1.7.3 Filters

Filters will not be sampled. They will be designated for waste management using the appropriate resin profile, as described in detail in Section 7.0. Filter types that may need to be disposed at ERDF after designation for waste management include:

- Bag filters used to prevent particulates from influent entering the IX columns.
- Bag filters used as resin traps for pretreated influent leaving the IX columns.

1.7.4 MSW Characterization

MSW will not be sampled. If MSW shows elevated readings in the field, MSW will be designated for waste management as described in detail in Section 7.0. MSW includes items such as gloves, wipes, small tools/equipment, and PPE.

1.8 Statement of the Problem

Characterization data may be needed for designation and disposal of waste generated from the 200 West Area P&T System at the Hanford Site.

2 Identify the Decision

To address the problem of waste management, a series of principal study questions (PSQ) needs to be answered. Table 3-1 presents the PSQs and the alternative actions (AA) that will be taken when each PSQ is answered, along with a description and severity rating of the consequences of implementing the wrong AA. Each PSQ and the corresponding AAs then are combined into a decision statement (DS).

Table 2-1. Summary of Data Quality Objective Information

PSQ-AA#	Description of AA	Description of Consequences of Implementing the Wrong AA	Severity of Consequences (Low/Moderate/ Severe)
PSQ #1 – Is the material radiologically contaminated above ERDF disposal criteria?			
1-1	Determine if the material is radiologically compliant with ERDF waste acceptance criteria and evaluate material for treatment/disposal at the ERDF.	Loss of control of radiological contamination. Environmental harm from improper disposal of radioactive waste.	Severe.
1-2	Determine if the material is radiologically contaminated above levels compliant with ERDF waste acceptance criteria and perform treatment at an onsite or offsite facility prior to ERDF disposal. If treatment options are not available, the waste may be managed within the Solid Waste Operations Complex (SWOC).	Unnecessary cost of storing waste that could have been disposed to ERDF.	Low to moderate
DS #1 – Determine if the material is radiologically compliant with ERDF waste acceptance criteria and will be evaluated for treatment/disposal at ERDF OR if it is radiologically contaminated above ERDF waste acceptance criteria levels and will be evaluated for treatment at an onsite or offsite facility prior to ERDF disposal or managed within the SWOC.			
PSQ #2 – Is the material a listed dangerous waste?			
2-1	Determine if the material is a listed dangerous waste and evaluate for treatment/disposal at the ERDF or perform treatment at an onsite or offsite facility prior to ERDF disposal. If treatment options are not available, the waste may be managed within the SWOC.	Unnecessary cost of treating non-listed dangerous material as if it were listed.	Low to moderate
2-2	Determine if the material is not a listed dangerous waste and evaluate for disposal at the ERDF.	Waste placed in the ERDF would be misclassified.	Moderate
DS #2 – Determine if the material is a listed dangerous waste and will be evaluated for treatment/disposal at ERDF or treatment at an onsite or offsite facility prior to ERDF disposal or managed within the SWOC OR if the material is not a listed dangerous waste and will be evaluated for disposal at ERDF.			

Table 2-1. Summary of Data Quality Objective Information

PSQ-AA#	Description of AA	Description of Consequences of Implementing the Wrong AA	Severity of Consequences (Low/Moderate/ Severe)
PSQ #3 – Is the material a characteristic waste (e.g., ignitable, corrosive, reactive, or toxic)?			
3-1	Determine if the material is a characteristic dangerous waste and evaluate for treatment/disposal at the ERDF or perform treatment at an onsite or offsite facility prior to ERDF disposal. If treatment options are not available, the waste may be managed within the SWOC.	Unnecessary cost of treating non-characteristic dangerous material as if it were characteristic.	Low to moderate
3-2	Determine if the material is not a characteristic dangerous waste and evaluate for disposal at the ERDF.	Waste placed in the ERDF would be misclassified.	Moderate
DS # 3 – Determine if the material is a characteristic waste and will be evaluated for treatment/disposal at ERDF or treatment at an onsite or offsite facility prior to ERDF disposal or managed within the SWOC OR if the material is not a characteristic waste and will be evaluated for disposal at ERDF.			
PSQ #4 – Is the material a toxic dangerous waste as defined by Washington State criteria?			
4-1	Determine if the material is a toxic dangerous waste and evaluate for treatment/disposal at the ERDF or perform treatment at an onsite or offsite facility prior to ERDF disposal. If treatment options are not available, the waste may be managed within the SWOC.	Unnecessary cost of treating non-toxic material as if it were toxic.	Low to moderate
4-2	Determine if the material is not a toxic dangerous waste and evaluate for disposal at the ERDF.	Waste placed in the ERDF would be misclassified.	Moderate
DS #4 – Determine if the material is a toxic dangerous waste and will be evaluated for treatment/disposal at ERDF or treatment at an onsite or offsite facility prior to ERDF disposal or managed within the SWOC OR if the material is not a toxic dangerous waste and will be evaluated for disposal at ERDF.			
PSQ #5 – Is the material a persistent waste as defined by Washington State criteria?			
5-1	Determine if the material is a persistent dangerous waste and evaluate for treatment/disposal at the ERDF or perform treatment at an onsite or offsite facility prior to ERDF disposal. If treatment options are not available, the waste may be managed within the SWOC.	Unnecessary cost of treating non-persistent material as if it were persistent.	Low to moderate
5-2	Determine if the material is not a persistent dangerous waste and evaluate disposal at the ERDF.	Waste placed in the ERDF would be misclassified.	Moderate

Table 2-1. Summary of Data Quality Objective Information

PSQ-AA#	Description of AA	Description of Consequences of Implementing the Wrong AA	Severity of Consequences (Low/Moderate/ Severe)
DS #5 – Determine if the material is a persistent waste and will be evaluated for treatment/disposal at ERDF or treatment at an onsite or offsite facility prior to ERDF disposal or managed within the SWOC OR if the material is not a persistent waste and will be evaluated for disposal at ERDF.			
PSQ #6 – Is the material a PCB waste?			
6-1	Determine if the material is a PCB waste and evaluate for treatment/disposal at the ERDF or perform treatment at an onsite or offsite facility prior to ERDF disposal. If treatment options are not available, the waste may be managed within the SWOC.	Unnecessary cost of treating non-PCB waste as if it were PCB waste.	Low to moderate
6-2	Determine if the material is not a PCB waste and evaluate for disposal at the ERDF.	Waste placed in the ERDF would be misclassified.	Moderate
DS #6 – Determine if the material is a PCB waste and will be evaluated for treatment/disposal at ERDF or treatment at an onsite or offsite facility prior to ERDF disposal or managed within the SWOC OR if the material is not a PCB waste and will be evaluated for disposal at ERDF.			
PSQ #7 – Is the material land-disposal restricted?			
7-1	Determine if the material is land-disposal restricted and treat material before disposal.	Unnecessary cost of treating clean material as if it were land-disposal restricted.	Low to moderate
7-2	Determine if the material is not land-disposal restricted and do not treat the material before disposal. Dispose of the material in an onsite facility without treatment.	Public may be exposed to land-disposal restricted waste.	Severe
DS #7 – Determine if the material is land-disposal restricted and requires treatment before disposal OR if the material is not land-disposal restricted and may be disposed of in an onsite facility without treatment.			

AA = alternative action
DS = decision statement
ERDF = Environmental Restoration Disposal Facility
PCB = polychlorinated biphenyl
PSQ = principal study question
SWOC = Hanford Site Solid Waste Operations Complex

3 Identify Inputs to the Decision

This section identifies the inputs needed to resolve each of the DSs identified in Section 3.0. Table 3-1 identifies the data needed to resolve each of the DSs and identifies whether or not the data already exist and are of sufficient quality to resolve the DSs.

Table 3-1. Required Information and Reference Sources

DS #	Information	Required Data	Do Data Exist? (Y/N)	Source Reference	Sufficient Quality? (Y/N)	Additional Information Required? (Y/N)
1	Radiological composition and concentration levels of waste	Requirements specified in ERDF waste acceptance criteria as listed in WCH-191 and 0000X-DC-W0001	Y, field screening data for gamma emitters exist	HEIS database, data from source and surrounding wells, radiological field screening data	N	Y
2	Listed dangerous waste codes that apply to the waste	Listed dangerous waste code status per WAC 173-303, CCN 081034, WHC-MR-0517.	Y	HEIS database; data from source and surrounding wells.	N	Y
3	Characteristic waste codes that apply to the waste	Characteristic waste code status per WAC 173-303	Y	HEIS database, data from source and surrounding wells	Y	N
4	Toxic waste codes that apply to the waste	Toxic waste code status per WAC 173-303, CCN 081034, WHC-MR-0517.	Y	HEIS database, data from source and surrounding wells	N	Y
5	Persistent waste codes that apply to the waste	Persistent waste code status per WAC 173-303	Y	HEIS database, data from source and surrounding wells	Y	N
6	PCB concentrations	Process knowledge	Y	HEIS database, data from source and surrounding wells	Y	N
7	Land disposal restricted materials	Requirements specified in 40 CFR 268.40	Y	HEIS database, data from source and surrounding wells	N	Y

CFR = *Code of Federal Regulations*
DS = decision statement
ERDF = Environmental Restoration Disposal Facility
HEIS = *Hanford Environmental Information System*
PCB = polychlorinated biphenyl
WAC = *Washington Administrative Code*

3.1 Analytical Performance Requirements

Tables 3-2 and 3-3 define the analytical performance requirements for the data that need to be collected to resolve the DSs for waste generated during the remedial action. The COCs for waste management and their associated target required quantitation limits, precision, and accuracy are included in the tables.

Table 3-2. Performance Requirements for Chemical Analyses

COCs	CAS #	Preliminary Action Level: TC Dangerous Waste Threshold (mg/kg)[a]	Preliminary Action Level: Universal Treatment Standard (mg/kg)[b]	Name/ Analytical Technology[c]	Target Required Quantitation Limits (mg/kg)	Precision Solid	Accuracy Solid
Metals							
Antimony	7440-36-0	N/A	1.15[d]	EPA Method 6010 or 200.8	6	±30%[e]	70-130%[e]
Arsenic	7440-38-2	100	5[d]	EPA Method 6010 or 200.8	10	±30%[e]	70-130%[e]
Barium	7440-39-3	2000	21[d]	EPA Method 6010 or 200.8	2	±30%[e]	70-130%[e]
Beryllium	7440-41-7	N/A	1.22[d]	EPA Method 6010 or 200.8	0.5	±30%[e]	70-130%[e]
Cadmium	7440-43-9	20	0.11[d]	EPA Method 6010 or 200.8	0.5	±30%[e]	70-130%[e]
Chromium	7440-47-3	100	0.60[d]	EPA Method 6010 or 200.8	1	±30%[e]	70-130%[e]
Lead	7439-92-1	100	0.75[d]	EPA Method 6010 or 200.8	5	±30%[e]	70-130%[e]
Mercury	7439-97-6	4	0.025[d]	EPA Method 7471	0.2	±30%[e]	70-130%[e]
Nickel	7440-02-0	N/A	11[d]	EPA Method 6010 or 200.8	4	±30%[e]	70-130%[e]
Selenium	7782-49-2	N/A	5.7[d]	EPA Method 6010 or 200.8	10	±30%[e]	70-130%[e]
Silver	7440-22-4	100	0.14[d]	EPA Method 6010 or 200.8	1	±30%[e]	70-130%[e]
Thallium	7440-28-0	N/A	0.2[d]	EPA Method 6010 or 200.8	0.2	±30%[e]	70-130%[e]
Vanadium	7440-62-2	N/A	1.6[d]	EPA Method 6010 or 200.8	2.5	±30%[e]	70-130%[e]
Zinc	7440-66-6	N/A	4.3[d]	EPA Method 6010 or 200.8	1	±30%[e]	70-130%[e]
General Inorganics							

Table 3-2. Performance Requirements for Chemical Analyses

COCs	CAS #	Preliminary Action Level: TC Dangerous Waste Threshold (mg/kg)[a]	Preliminary Action Level: Universal Treatment Standard (mg/kg)[b]	Name/ Analytical Technology[c]	Target Required Quantitation Limits (mg/kg)	Precision Solid	Accuracy Solid
Cyanide	57-12-5	N/A	590	Total Cyanide 9010	0.5	±30%[e]	70-130%[e]
Volatile Organics							
1,1,1-Trichloroethane	71-55-6	N/A	6	EPA Method 8260	0.005	±30%[f]	65-135%
1,1,2-Trichloroethane	79-00-5	N/A	6	EPA Method 8260	0.005	±30%[f]	65-135%
1,1-Dichloroethane	75-34-3	N/A	6	EPA Method 8260	0.01	±30%[f]	65-135%
1,1-Dichloroethene	75-35-4	14	6	EPA Method 8260	0.01	±30%[f]	65-135%
1,2-Dichloroethane	107-06-2	10	6	EPA Method 8260	0.005	±30%[f]	65-135%
1,2-Dichloroethene (Total)	540-59-0	N/A	N/A	EPA Method 8260	0.01	±30%[f]	65-135%
1,4-Dichlorobenzene	106-46-7	150	6	EPA Method 8260	0.005	±30%[f]	65-135%
2-butanone (Methyl ethyl ketone or MEK)	78-93-3	4000	36	EPA Method 8260	0.01	±30%[f]	65-135%
4-methyl-2-pentanone (hexone, MIBK)	108-10-1	N/A	33	EPA Method 8260	0.01	±30%[f]	65-135%
Acetone	67-64-1	N/A	160	EPA Method 8260	0.02	±30%[f]	65-135%
Acetonitrile	75-05-8	N/A	38	EPA Method 8260	0.1	±30%[f]	65-135%
Benzene	71-43-2	10	10	EPA Method 8260	0.005	±30%[f]	65-135%
Bromodichloromethane	75-27-4	N/A	15	EPA Method 8260	0.005	±30%[f]	65-135%
Bromoform	75-25-2	N/A	15	EPA Method 8260	0.005	±30%[f]	65-135%
Bromomethane	74-83-9	N/A	15	EPA Method 8260	0.01	±30%[f]	65-135%

Table 3-2. Performance Requirements for Chemical Analyses

COCs	CAS #	Preliminary Action Level: TC Dangerous Waste Threshold (mg/kg)[a]	Preliminary Action Level: Universal Treatment Standard (mg/kg)[b]	Name/ Analytical Technology[c]	Target Required Quantitation Limits (mg/kg)	Precision Solid	Accuracy Solid
Butanol (1-butanol) (n-butyl alcohol)	71-36-3	N/A	2.6	EPA Method 8260	0.1	±30%[f]	65-135%
Carbon disulfide	75-15-0	N/A	4.8[d]	EPA Method 8260	0.005	±30%[f]	65-135%
Carbon tetrachloride	56-23-5	10	6	EPA Method 8260	0.005	±30%[f]	65-135%
Chlorobenzene	108-90-7	2000	6	EPA Method 8260	0.005	±30%[f]	65-135%
Chloroform	67-66-3	120	6	EPA Method 8260	0.005	±30%[f]	65-135%
Chloromethane	74-87-3	N/A	30	EPA Method 8260	0.01	±30%[f]	65-135%
Dibromochloromethane	124-48-1	N/A	15	EPA Method 8260	0.005	±30%[f]	65-135%
Diethyl ether	60-29-7	N/A	160	EPA Method 8260	0.005	±30%[f]	65-135%
Ethylbenzene	100-41-4	N/A	10	EPA Method 8260	0.005	±30%[f]	65-135%
Iodomethane	74-88-4	N/A	65	EPA Method 8260	0.01	±30%[f]	65-135%
Methylene chloride	75-09-2	N/A	30	EPA Method 8260	0.005	±30%[f]	65-135%
Tetrachloroethene	127-18-4	14	6	EPA Method 8260	0.005	±30%[f]	65-135%
Toluene	108-88-3	N/A	10	EPA Method 8260	0.005	±30%[f]	65-135%
trans-1,3-Dichloropropene	10061-02-6	N/A	18	EPA Method 8260	0.005	±30%[f]	65-135%
Trichloroethylene (TCE)	79-01-6	10	6	EPA Method 8260	0.005	±30%[f]	65-135%
Xylenes (total)	1330-20-7	N/A	30	EPA Method 8260	0.01	±30%[f]	65-135%
Semi-Volatile Organics							

Table 3-2. Performance Requirements for Chemical Analyses

COCs	CAS #	Preliminary Action Level: TC Dangerous Waste Threshold (mg/kg)[a]	Preliminary Action Level: Universal Treatment Standard (mg/kg)[b]	Name/ Analytical Technology[c]	Target Required Quantitation Limits (mg/kg)	Precision Solid	Accuracy Solid
1,4-Dioxane	123-91-1	N/A	170	EPA Method 8270	0.4	±30%[f]	65-135%
2-Methylphenol (o-cresol)	95-48-7	4000	5.6	EPA Method 8270	0.33	±30%[f]	65-135%
3-Methylphenol (m-cresol)	108-39-4	4000	5.6	EPA Method 8270	0.66	±30%[f]	65-135%
4-Methylphenol (p-cresol)	106-44-5	4000	5.6	EPA Method 8270	0.33	±30%[f]	65-135%
Phenol	108-95-2	N/A	6.2	EPA Method 8270	0.33	±30%[f]	65-135%
Dibenz[a,h]anthracene	53-70-3	N/A	8.2	EPA Method 8270	0.33	±30%[f]	65-135%
Diethylphthalate	84-66-2	N/A	28	EPA Method 8270	0.33	±30%[f]	65-135%
Dimethyl phthalate	131-11-3	N/A	28	EPA Method 8270	0.33	±30%[f]	65-135%
Di-n-butylphthalate	84-74-2	N/A	28	EPA Method 8270	0.33	±30%[f]	65-135%

a Waste disposition for this project will comply with the "Toxicity Characteristic," 40 CFR 268.40, "Land Disposal Restrictions," and "Applicability of Treatment Standards." This value applies to the maximum concentration of contaminants for designation as a dangerous waste under the toxicity characteristic. This value is 20 times the TCLP value. EPA allows the use of 20 times the TCLP values to determine the total action levels because of the "20 times" dilution used in the TCLP process.

b Value reflects the Universal Treatment standard as an underlying hazardous constituent in accordance with 40 CFR 268.48, "Land Disposal Restrictions," "Universal Treatment Standards." The unit value is in mg/kg.

c For EPA Methods 300.0 and 350.1, see EPA/600/4-79/020. For EPA Method 200.8, see EPA/600/R-94/111. For 4-digit EPA methods, see SW-846.

d Value reflects the Universal Treatment standard as an underlying hazardous constituent in accordance with 40 CFR 268.48, "Land Disposal Restrictions," "Universal Treatment Standards." The unit value is in mg/L TCLP.

e Precision and accuracy requirements are identified and defined in the referenced EPA procedures.

f Accuracy criteria are the minimum for associated batch laboratory control sample percent recoveries. Laboratories must meet statistically based control if more

Table 3-2. Performance Requirements for Chemical Analyses

COCs	CAS #	Preliminary Action Level: TC Dangerous Waste Threshold (mg/kg)[a]	Preliminary Action Level: Universal Treatment Standard (mg/kg)[b]	Name/ Analytical Technology[c]	Target Required Quantitation Limits (mg/kg)	Precision Solid	Accuracy Solid

stringent. Additional analyte-specific evaluations also performed for matrix spikes and surrogates as appropriate to the method. Precision criteria for batch laboratory replicate matrix spike analyses.

CAS = Chemical Abstracts Service

CFR = Code of Federal Regulations

COC = contaminant of concern

EPA = U.S. Environmental Protection Agency

N/A = not applicable

TC = toxicity characteristic

TCLP = toxicity characteristic leaching procedure

Table 3-3. Performance Requirements for Radiological Analyses

COCs	CAS #	Name/Analytical Technology	Target Required Quantitation Limits (pCi/g)	Precision Solid	Accuracy Solid
Radionuclides					
Americium-241	14596-10-2	Americium isotopic – AEA	1	±35%	65-135%
Carbon-14	14762-75-5	Carbon-14 – liquid scintillation	5	±35%	65-135%
Cesium-137	10045-97-3	GEA	0.1	±35%	65-135%
Cobalt-60	10198-40-0	GEA	0.05	±35%	65-135%
Iodine-129	15046-84-1	Iodine-129 – liquid scintillation	2	±35%	65-135%
Neptunium-237	13994-20-2	Neptunium-237 – AEA	1	±35%	65-135%
Nickel-63	13981-37-8	Nickel-63 – liquid scintillation	30	±35%	65-135%
Plutonium-239/240	Pu-239/240	Plutonium isotopic – AEA	1	±35%	65-135%
Selenium-79	15758-45-9	Selenium-79– liquid scintillation	10	±35%	65-135%
Strontium-90	10098-97-2	Total radioactive strontium – GPC	1	±35%	65-135%
Technetium-99	14133-76-7	Technetium-99 – liquid scintillation	15	±35%	65-135%
Tritium	10028-17-8	Tritium – liquid scintillation	400	±35%	65-135%
Uranium-234	U-233/234	Isotopic uranium – AEA	1	±35%	65-135%
Uranium-235	15117-96-1	Isotopic uranium – AEA	1	±35%	65-135%
Uranium-238	U-238	Isotopic uranium – AEA	1	±35%	65-135%

AEA = alpha energy analysis
CAS = Chemical Abstracts Service
COC = contaminant of concern
GEA = gamma energy analysis
GPC = gas proportional counting

4 Define the Boundaries

This DQO includes:

- Solid waste streams from groundwater processing that are expected to be disposed to ERDF.
- Loaded GAC from the VPGAC systems to be sent off the Hanford Site for regeneration.

This DQO does not include:

- Debris from construction, operation, maintenance, and decommissioning of the 200 West Area P&T System
- Emissions

5 Develop Decision Rules

This step develops decision rules (DR) that provide the criteria for taking actions. The DRs state what action is to be taken when prescribed conditions are met. Table 5-1 presents the DRs that correspond to each of the DSs identified in Table 2-2. Figure 5-1 presents a flow chart of the decision making process for the resins and sludges.

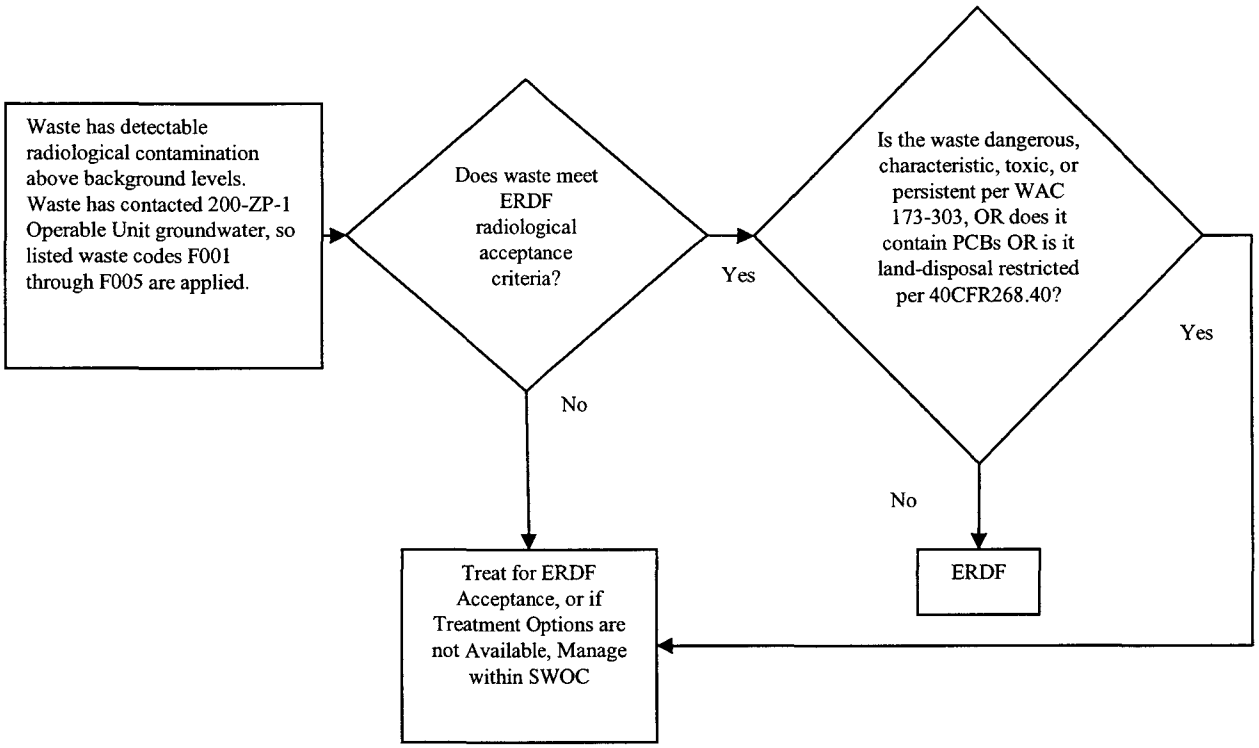

Figure 5-1. 200 West Area P&T System Waste Disposition Flowchart

Table 5-1. Decision Rules

DS #	DR #	Decision Rule
1	1	Radiologically contaminated: If the maximum concentrations of radionuclides in the materials **do exceed** the disposal facility waste acceptance criteria, perform a chemical waste designation and evaluate other storage and disposal options, including SWOC. Proceed to DS# 2.
2	2	Listed dangerous waste: If the materials **are** a listed dangerous waste, then evaluate for treatment/disposal at the ERDF or perform treatment at an onsite or offsite facility prior to ERDF disposal. If treatment options are not available, the waste may be managed within the SWOC. Proceed to DS# 3. If the materials **are not** a listed dangerous waste, then evaluate for treatment/disposal at the ERDF. Proceed to DS# 3.

Table 5-1. Decision Rules

DS #	DR #	Decision Rule
3	3	Characteristic dangerous waste: If the chemical concentrations in the materials **do exceed** the criteria for being a characteristic dangerous waste, treat the material as a radiologically contaminated characteristic dangerous waste and evaluate for treatment/disposal at the ERDF or perform treatment at an onsite or offsite facility prior to ERDF disposal. If treatment options are not available, the waste may be managed within the SWOC. Proceed to DS# 4. If the chemical concentrations in the materials **do not exceed** the criteria for being a characteristic dangerous waste, do not treat the material as a characteristic dangerous waste and evaluate for treatment/disposal at the ERDF. Proceed to DS# 4.
4	4	Toxic dangerous waste: If the chemical concentrations in the materials **do exceed** the criteria for being a toxic dangerous waste then treat the material as a radiologically contaminated toxic dangerous waste and evaluate for treatment/disposal at the ERDF or perform treatment at an onsite or offsite facility prior to ERDF disposal. If treatment options are not available, the waste may be managed within the SWOC. Proceed to DS# 5. If the chemical concentrations in the materials **do not exceed** the criteria for being a toxic dangerous waste, then do not treat the material as a toxic dangerous waste and evaluate for treatment/disposal at the ERDF. Proceed to DS# 5.
5	5	Persistent dangerous waste: If the chemical concentrations in the materials **do exceed** the criteria for being a persistent dangerous waste then treat the material as a radiologically contaminated persistent dangerous waste and evaluate for treatment/disposal at the ERDF or perform treatment at an onsite or offsite facility prior to ERDF disposal. If treatment options are not available, the waste may be managed within the SWOC. Proceed to DS# 6. If the chemical concentrations in the materials **do not exceed** the criteria for being a persistent dangerous waste, then do not treat the material as a persistent dangerous waste and evaluate for treatment/disposal at the ERDF. Proceed to DS# 6.
6	6	PCB waste: If the chemical concentrations in the materials **do exceed** the criteria for being a PCB waste, treat the material as a radiologically contaminated PCB waste and evaluate for treatment/disposal at the ERDF or perform treatment at an onsite or offsite facility prior to ERDF disposal. If treatment options are not available, the waste may be managed within the SWOC. Proceed to DS# 7. If the chemical concentrations in the materials **do not exceed** the criteria for being a PCB waste, do not treat the material as a PCB waste and evaluate for treatment/disposal at the ERDF. Proceed to DS# 7.
7	7	Land disposal restricted: If process knowledge or analytical results **do dictate** land-disposal restriction-imposed treatment, the materials shall be treated/disposed of at the ERDF or perform treatment at an onsite or offsite facility prior to ERDF disposal. If treatment options are not available, the waste may be managed within the SWOC. If process knowledge or analytical results **do not dictate** land disposal restriction-imposed treatment, then do not treat the materials as land-disposal restricted and evaluate for treatment/disposal at the ERDF.

Table 5-1. Decision Rules

DS #	DR #	Decision Rule

DR = decision rule

DS = decision statement

ERDF = Environmental Restoration Disposal Facility

PCB = polychlorinated biphenyl

SWOC = Hanford Site Solid Waste Operations Complex

6 Specify Limits on Decision Error

The terms "statistical" and "non-statistical" can be independently applied to two factors of the sampling design. First, the number of samples may or may not be determined statistically. In addition, the locations may or may not be determined randomly. If the location is not determined randomly, the design is biased (judgmental). If the locations are biased to an area of high or low concentrations, then applying statistical calculations is not appropriate for evaluation of the results. If the locations are random, statistical calculations can be performed on the results.

Because a biased characterization approach is being used statistical limits have not been established for this DQO.

7 Optimize the Design for Obtaining Data

This section provides details on the type of sampling that will be performed to determine the disposition of the spent resins, dewatered sludges; it also addresses filters and MSW.

The process flow diagram presented in Figure 5-1 shall be used to determine where the waste will be disposed. Because the wastes have contacted the groundwater, the F001 through F005 waste codes will be applied. A toxicity characteristic leaching potential test will not likely be needed to support evaluation of compliance with WAC 173-303 criteria.

An offsite determination by the U.S. Environmental Protection Agency (in accordance with 40 CFR 300.40, "National Oil and Hazardous Substances Pollution Contingency Plan") is required for waste that does not meet the ERDF waste acceptance criteria (WCH-191). The waste may subsequently be shipped to the Central Waste Complex for storage or other approved facility for disposal.

Efficiencies to the sampling plan may be gained by revisiting the waste management COC list in this DQO (annually, when there is an upset in the process, when new wells are added if the influent changes significantly, and at startup for each expansion) and updating the COCs as needed.

Once the original batch of resins and sludges has been initially sampled, analyzed, designated, and disposed, future batches of resins can be disposed per the designation package to be prepared in accordance with this DQO with annual confirmatory sampling. Future batches of resins and sludges from the 200 West Area P&T System will require sampling due to upsets in processing, or a significant change in the process design and/or the influent; in this case, the list of analytes to be applied to the initial batches of waste from the changed process should be the list of COCs per this waste management DQO. As other treatment components of the 200 West Area P&T System become operational in the future, the characterization strategy may need to be refined to address waste streams not generated in initial operations.

Radiological control and industrial hygiene technicians will monitor the sampling activities with field instruments in accordance with radiological protection and health and safety documents.

Specific sampling instructions for different wastes are provided in the following subsections.

7.1 Loaded Resins, Dewatered Sludge and Spent GAC

The dewatered sludge from the central treatment facility, the spent GAC from the VPGAC system, and the loaded resins from the IX units will be batch sampled as containers are initially filled. These waste streams will be sampled for waste management purposes as many times as needed to develop a consistent waste profile. The number of times it will be sampled is dependent on how consistent the waste profile is from container to container. It is anticipated that approximately three containers will need to be initially sampled. The analytes will be the COCs listed in Table 1-6.

The manufacturer recommends that the Purolite A530E resin used in the technetium-99 IX unit not be regenerated because of the difficulty in handling the pertechnetate ion. Therefore, resins are to be disposed after reaching design parameters and levels. The manufacturer further recommends that a composite sample across the length of the treatment column is the most representative method of collecting samples. Potential sampling methods could include sampling through the top of the column with a sampling tool capable of reaching the bottom of the column, then compositing the sample for submittal to the laboratory. Another option would be to open the column lengthwise and collect a multi-increment sample along the length of the column for submittal to the laboratory. This sampling method

(sampling along the length of the resin) can be used to sample loaded resin in the waste container if it is more convenient to do so.

7.2 Filters

Filters will be designated with the same waste profile as the resins in the IX system unit with which they are associated. Because the filters are associated with the groundwater, the F001 through F005 waste codes will be applied.

7.3 MSW

The MSW (e.g., PPE, wipes, small equipment) from the remedial action activities may be monitored in the field for release based on the provisions of PRC-PRO-RP-40026, *Standard Radiological Release Surveys for Material and Equipment.* If elevated readings are detected, the MSW shall be conservatively designated using a combination of the resin and sludge waste profiles and data. If the MSW contact the groundwater, the F001 through F005 waste codes will be applied. The field survey results for any MSW with elevated readings will be used to scale the concentrations of COCs.

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Appendix A

Manufacturer's Information on Resins

PUROLITE ION EXCHANGE RESINS 150 Monument Rd, Bala Cynwyd, PA 19004 800-343-1500 610-668-9090	**Material Safety Data Sheet** complies with: OSHA's Hazard Communication Standard, 29 CFR 1910.1200

IDENTITY (As Used on Label and List)		A-530E
CAS#	69011-19-4	

SECTION I Manufacturer's Name & Contact Information			**Purolite Hazard Rating**		**Scale**
The Purolite Company 150 Monument Road Bala Cynwyd, PA 19004, USA	Emergency Telephone Number : 610-668-9090 Telephone # for Information : 610-668-9090		Toxicity	1	4 = Extreme 3 = High 2 = Moderate 1 = Slight 0 = Insignificant
			Fire	1	
			Reactivity	0	
			Special	-	
	Date Prepared :	Nov2004			

SECTION II Ingredients/Identity Information				
Components (Specific Chemical Identity: Common Name(s))	OSHA	PEL	ACGIH TLV	Other Limits
Quaternary amine styrene divinylbenzene copolymer in the Chloride form 35%-65% Water 35%-65%	N/A	N/A	N/A	N/A

SECTION III Physical/Chemical Characteristics					
Boiling Point	N/A	Specific Gravity (H_2O = 1)	Approx 1.2	Solubility in Water	Negligible
Vapor Pressure (mm Hg)	N/A	Evaporation Rate (Butyl Acetate = 1)	N/A	Melting Point	N/A
Vapor Density (AIR = 1)	N/A	Appearance and Odor	Spherical beads with slight amine (fishy) odor when new		

SECTION IV Fire and Explosion Hazard Data				
Flash Point (Method Used)	None	Flammable Limits auto/ign. 427°C / 800°F (estimated) No flash point	LEL	UEL
			N/A	N/A
Extinguishing Media		CO_2, Dry chemical, Water fog		
Special Fire Fighting Procedures		Wear MSHA /NIOSH approved, pressure demand, self contained breathing apparatus		
Unusual Fire and Explosion Hazards		None		

SECTION V - Reactivity Data			
Stability	Stable	Conditions to Avoid	Avoid temperatures over 220°C (424°F)
Incompatibility (Materials to Avoid)		Avoid contact with concentrated nitric acid, or strong oxidizing agents.	
Hazardous Decomposition or Byproducts		CO, CO_2, Styrene monomer, $N(CH_2OH)$, NH_3, Divinylbenzene	
Hazardous Polymerization	Will not occur	Conditions to Avoid	N/A

A-530E

SECTION - VI Health Hazard Data

Route(s) of Entry: N/A	Inhalation?	N/A	Skin?	N/A	Ingestion?	N/A
Health Hazards (Acute and Chronic)	Eye Contact: Like other foreign bodies, particles may cause mechanical irritation of the eye					
Carcinogenicity: N/A	NTP?	N/A	IARC Monographs?	N/A	OSHA Regulated?	N/A
Signs and Symptoms of Exposure	N/A					
Medical Conditions Generally Aggravated By Exposure	Eye Contact: Like other foreign bodies, particles may cause mechanical irritation of the eye					
Emergency and First Aid Procedures	Eye contact: Flush with large amount of water for at least 15 minutes. Consult physician if irritation persists					

SECTION VII - Precautions for Safe Handling and Use

Steps to be Taken in Case Material is Released or Spilled:

Resin beads on floor may mechanically cause floor to be slippery. Use care to avoid falls. Sweep up and transfer to containers for recovery or disposal

Waste Disposal Method	Dispose of in accordance with Federal, State and Local Regulations
Precautions to be Taken in Handling and Storing:	Keep drums and plastic bags sealed to prevent drying or moisture loss.
Other Precautions:	Store below 49° (120°F) and above 0°C (32°F)

SECTION VIII - Control Measures

Respiratory Protection (Specify Type)	None			
Ventilation	Local Exhaust	Normal room ventilation	Special	N/A
	Mechanical (General)	N/A	Other	N/A

Protective Glove:	Cloth gloves	Eye Protection:	Safety glasses (ANSI Z 87.1)
Other Protective Clothing or Equipment	None		
Work/Hygienic Practices	Cleanliness is recommended.		

PUROLITE
ION EXCHANGE RESINS

Product Data Sheet

PUROLITE® A530E

Strong Base Anion Macroporous

Macroporous Strong Base Anion Exchange Resin

Purolite A530E is a special macroporous strong base anion resin crosslinked with divinylbenzene that is specially selective for hydrophobic anions. It shows good mechanical strength and an excellent resistance to osmotic and thermal shock. The macroporous matrix and special ion exchange group functionality imparts an especially high selectivity of Purolite A530E for perchlorate and pertechnetate. The selective removal of these oxy-anions is possible in the presence of higher concentrations of other anions that can compete with these oxy-anions for the selective sites. The nature of the pertechnetate is such that it would be difficult to handle the regeneration effluent. Thus it is recommended that the used resin be disposed off in a controlled fashion rather than regenerated.

Basic Features:

Application	Perchlorate and Pertechnetate Removal
Polymer Structure	Macroporous polystyrene crosslinked with divinylbenzene
Appearance	Spherical Beads
Functional Group	Quaternary Ammonium
Ionic form as shipped	Chloride Form

Typical Physical and Chemical Characteristics:

Total Capacity (min.)	Cl	0.60 eq/l
Total Capacity (min.)	Cl	13.10 kGr/ft^3
Moisture Retention	Cl	50-57 %
Mean Size Typical		0.60-0.85 mm
Uniformity Coefficient (max.)		1.70
Specific Gravity		1.40 g/ml
Shipping Weight (approx.)		670 g/l
Temp Limit	Cl	100 °C
Temp Limit	Cl	212 °F
pH Limits		0 - 14 (Stability)
pH Limits	Cl	4.5 - 8.5 (Operating)

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