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Revision 0

DEVELOPMENT OF CONTAMINANTS OF POTENTIAL CONCERN FOR THE 200-EA-1 OPERABLE UNIT

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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APPROVED
By Mary P. Curry at 2:00 pm, Nov 06, 2018

Release Approval Date

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ENVIRONMENTAL CALCULATION COVER PAGE

SECTION 1 - Completed by the Responsible Manager

Project: 200-EA-1 RFI/CMS/RI/FS	**RELEASE / ISSUE**
Date: 9/6/2018	DATE: Nov 06, 2018 HANFORD RELEASE
Calculation Title and Description: Development of Contaminants of Potential Concern for the 200-EA-1 Operable Unit	

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Brief Narrative of Experience: Ms. Blakley has over 15 years experience in environmental cleanup including: waste site characterization, remedial action design, and site closure.

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Brief Narrative of Experience: Senior engineer working in the environmental arena since 1990.

ENVIRONMENTAL CALCULATION COVER PAGE (Continued)

SECTION 2 - Completed by Preparer

Calculation Number: ECF-200EA1-18-0061	Revision Number: 0

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SECTION 5 - Applicable if Calculation is a Risk Assessment or Uses an Environmental Model

Prior to Initiating Modeling:

Required training for modelers completed:
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Print First and Last Name	Signature	Date

Safety Software Approved:
Integration Lead:

Print First and Last Name	Signature	Date

Calculation Approved:
Risk/Modeling Integration Manager:

Print First and Last Name	Signature	Date

Contents

1 **Purpose** 1

2 **Background** 1

3 **Methodology** 1

4 **Assumptions and Inputs** 1

5 **Software Applications** 2

6 **Calculation** 2

7 **Results/Conclusions** 2

8 **References** 19

Tables

Table 1. Radionuclide Candidates 3

Table 2. Chemical Candidates 8

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Terms

CAS	Chemical Abstract Service
COPC	contaminant of potential concern
EPA	U.S. Environmental Protection Agency
OU	operable unit

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1 Purpose

The purpose of this calculation is to document the basis for constituent exclusion to support identification of contaminants of potential concern (COPCs) for the 200-EA-1 Operable Unit (OU). The COPCs are used in the development of the 200-EA-1 OU work plan and associated sampling and analysis plan.

2 Background

The 200-EA-1 OU consists of 114 waste sites in the Hanford Site's Central Plateau Inner Area. These waste sites are associated with waste disposal or unplanned releases from numerous Hanford Site operations and facilities. Various waste streams are associated with the OU, and radionuclide and chemical contamination may be or are known to be present in waste site soil. SGW-60540, *200-EA-1 Operable Unit Scoping*, provides detailed scoping information for all 200-EA-1 OU waste sites, including available characterization data.

3 Methodology

The following steps were used to develop the list of candidate constituents and select COPCs:

1) Historic documents and existing characterization data for the 200-EA-1 OU waste sites were used to develop the constituent list for further consideration.

2) Candidate radionuclides with radioactive half-life values less than three years were excluded from further consideration.

3) Candidate chemical constituents with no published toxicity data were excluded from further consideration.

4) Remaining candidate constituents were reviewed individually for constituent-specific exclusions.

5) Candidate constituents for which no exclusion basis was identified were retained as COPCs for the 200-EA-1 OU work plan.

4 Assumptions and Inputs

The assumptions and inputs for each step in the methodology are provided below.

1) The following sources were reviewed to identify constituents for consideration:

- DOE/RL-92-04, *PUREX Source Aggregate Area Management Study Report*
- DOE/RL-92-05, *B Plant Source Aggregate Area Management Study Report*
- DOE/RL-92-18, *Semiworks Source Aggregate Area Management Study Report*
- DOE/RL-92-19, *200 East Groundwater Aggregate Area Management Study Report*
- DOE/RL-2007-02, *Supplemental Remedial Investigation/Feasibility Study Work Plan for the 200 Areas Central Plateau Operable Units: Volume I: Work Plan and Appendices*
- DOE/RL-2008-44, *Engineering Evaluation/Cost Analysis for the 200-MG-1 Operable Unit Waste Sites*
- DOE/RL-2008-45, *Engineering Evaluation/ Cost Analysis for the 200-MG-2 Operable Unit Waste Sites*

- Historical process knowledge information and existing characterization data presented in SGW-60540
- Preliminary chemical constituent list provided at the January 23, 2017, 200-EA-1 workshop

2) Radionuclide half-life values were obtained from ORNL/TM-2013/00, *Calculation of Slope Factors and Dose Coefficients*.

3) The following sources were reviewed to evaluate toxicity data availability:
   - The U.S. Environmental Protection Agency (EPA) Integrated Risk Information System database (available at: https://www.epa.gov/iris)
   - The EPA Provisional Peer Reviewed Toxicity Values for Superfund database (available at: http://hhpprtv.ornl.gov)
   - The California EPA Toxicity Criteria database (available at: http://oehha.ca.gov/tcdb/index.asp)
   - EPA's Health Effects Assessment Summary Tables (available at: https://epa-heast.ornl.gov)

4) Constituent-specific assumptions are identified individually in Chapter 7. Reviews of existing soil sample data were performed using Electronic Dashboard Application queries to the Hanford Environmental Information System. Proportional ratios of radionuclides were considered based on RPP-26744, *Hanford Soil Inventory, Rev. 1* and SD-CP-TI-094, *ORIGEN2 Predictions of N Reactor Cladding and Fuel Activation Product Composition*.

5) Retained COPCs are the result of an absence of an applicable exclusion criterion under previous steps. No further assumptions or inputs were applied.

5 Software Applications

Microsoft® Excel® 2010 was used to document and sort information [Hanford Information System Inventory Identification Number 1915]. This software is an appropriate and applicable tool for these uses.

6 Calculation

Chapter 7 provides compiled listings of all constituents identified for consideration. Application of exclusion criteria is documented for each constituent in these listings. Applicability of any one criterion for a given constituent is sufficient for exclusion from consideration as a COPC, and potential application of additional criteria was not considered.

7 Results/Conclusions

Tables 1 and 2 list the radionuclides and chemicals identified for consideration and describe the exclusion basis for those constituents that are not retained as COPCs for the 200-EA-1 OU.

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Table 1. Radionuclide Candidates

Radionuclide Candidates	Retained as a COPC?	Exclusion Basis
Actinium-225	No	Radionuclide with half-life less than 3 years.
Actinium-227	No	Progeny radionuclide that builds insignificant activity within 80 years.
Actinium-228	No	Radionuclide with half-life less than 3 years.
Americium-241	Yes	NA
Americium-242	No	Radionuclide with half-life less than 3 years.
Americium-242m	No	Actinide with atomic mass number greater than 241 that constitutes less than 1% of actinide activity in waste streams.
Americium-243	No	Actinide with atomic mass number greater than 241 that constitutes less than 1% of actinide activity in waste streams.
Antimony-122	No	Radionuclide with half-life less than 3 years.
Antimony-124	No	Radionuclide with half-life less than 3 years.
Antimony-125	No	Radionuclide with half-life less than 3 years.
Antimony-126	No	Radionuclide with half-life less than 3 years.
Antimony-126m	No	Radionuclide with half-life less than 3 years.
Astatine-217	No	Radionuclide with half-life less than 3 years.
Barium-133	No	Trace activation product that would not be present at significant activities relative to other radionuclides.
Barium-135m	No	Radionuclide with half-life less than 3 years.
Barium-137	No	Stable elemental isotope.
Barium-137m	No	Radionuclide with half-life less than 3 years.
Barium-140	No	Radionuclide with half-life less than 3 years.
Beryllium-7	No	Radionuclide with half-life less than 3 years.
Bismuth-210	No	Radionuclide with half-life less than 3 years.
Bismuth-211	No	Radionuclide with half-life less than 3 years.
Bismuth-212	No	Radionuclide with half-life less than 3 years.
Bismuth-213	No	Radionuclide with half-life less than 3 years.
Bismuth-214	No	Radionuclide with half-life less than 3 years.
Cadmium-113m	No	Radionuclide potentially present only as a trace fission product with activity yield less than 1% of the activity yield for cesium-137 and not targeted by a separation/concentration process.
Carbon-14	Yes	NA
Cerium-141	No	Radionuclide with half-life less than 3 years.
Cerium-144	No	Radionuclide with half-life less than 3 years.
Cesium-134	No	Radionuclide with half-life less than 3 years.

Table 1. Radionuclide Candidates

Radionuclide Candidates	Retained as a COPC?	Exclusion Basis
Cesium-135	No	Radionuclide potentially present only as a trace fission product with activity yield less than 1% of the activity yield for cesium-137 and not targeted by a separation/concentration process.
Cesium-137	Yes	NA
Cobalt-57	No	Radionuclide with half-life less than 3 years.
Cobalt-58	No	Radionuclide with half-life less than 3 years.
Cobalt-60	Yes	NA
Curium-242	No	Radionuclide with half-life less than 3 years.
Curium-243	No	Actinide with atomic mass number greater than 241 that constitutes less than 1% of actinide activity in waste streams.
Curium-244	No	Actinide with atomic mass number greater than 241 that constitutes less than 1% of actinide activity in waste streams.
Curium-245	No	Actinide with atomic mass number greater than 241 that constitutes less than 1% of actinide activity in waste streams.
Europium-152	Yes	NA
Europium-154	Yes	NA
Europium-155	Yes	NA
Francium-221	No	Radionuclide with half-life less than 3 years.
Francium-223	No	Radionuclide with half-life less than 3 years.
Gadolinium-152	No	Naturally occurring isotope not generated as part of Hanford operations.
Gadolinium-153	No	Radionuclide with half-life less than 3 years.
Hydrogen-3 (tritium)	Yes	NA
Iodine-123	No	Radionuclide with half-life less than 3 years.
Iodine-125	No	Radionuclide with half-life less than 3 years.
Iodine-129	Yes	NA
Iron-55	No	Radionuclide with half-life less than 3 years.
Iron-59	No	Radionuclide with half-life less than 3 years.
Krypton-85	No	Gas not associated with discharges to waste sites.
Lanthanum-140	No	Radionuclide with half-life less than 3 years.
Lead-209	No	Radionuclide with half-life less than 3 years.
Lead-210	No	Progeny radionuclide that builds insignificant activity within 80 years.
Lead-211	No	Radionuclide with half-life less than 3 years.
Lead-212	No	Radionuclide with half-life less than 3 years.

Table 1. Radionuclide Candidates

Radionuclide Candidates	Retained as a COPC?	Exclusion Basis
Lead-214	No	Radionuclide with half-life less than 3 years.
Manganese-54	No	Radionuclide with half-life less than 3 years.
Neodymium-147	No	Radionuclide with half-life less than 3 years.
Neptunium-237	Yes	NA
Neptunium-238	No	Radionuclide with half-life less than 3 years.
Neptunium-239	No	Radionuclide with half-life less than 3 years.
Nickel-59	No	Activity would be less than 5% of the activity of nickel-63 present; not a significant potential risk contributor for waste sites.
Nickel-63	Yes	NA
Niobium-93m	No	Radionuclide potentially present only as a trace fission product with activity yield less than 1% of the activity yield for cesium-137 and not targeted by a separation/concentration process.
Niobium-94	No	Radionuclide with half-life less than 3 years.
Niobium-95	No	Radionuclide with half-life less than 3 years.
Niobium-95m	No	Radionuclide with half-life less than 3 years.
Niobium-96	No	Radionuclide with half-life less than 3 years.
Palladium-107	No	Radionuclide potentially present only as a trace fission product with activity yield less than 1% of the activity yield for cesium-137 and not targeted by a separation/concentration process.
Plutonium-238	Yes	NA
Plutonium-239	Yes	NA
Plutonium-240	Yes	NA
Plutonium-241	No	Activity can be inferred from activity of other isotopes.
Plutonium-242	No	Actinide with atomic mass number greater than 241 that constitutes less than 1% of actinide activity in waste streams.
Polonium-210	No	Radionuclide with half-life less than 3 years.
Polonium-211	No	Radionuclide with half-life less than 3 years.
Polonium-212	No	Radionuclide with half-life less than 3 years.
Polonium-213	No	Radionuclide with half-life less than 3 years.
Polonium-214	No	Radionuclide with half-life less than 3 years.
Polonium-215	No	Radionuclide with half-life less than 3 years.
Polonium-216	No	Radionuclide with half-life less than 3 years.
Polonium-218	No	Radionuclide with half-life less than 3 years.
Potassium-40	No	Naturally occurring isotope not generated as part of Hanford operations.

Table 1. Radionuclide Candidates

Radionuclide Candidates	Retained as a COPC?	Exclusion Basis
Praseodymium-143	No	Radionuclide with half-life less than 3 years.
Praeseodymium-144	No	Radionuclide with half-life less than 3 years.
Praeseodymium-144m	No	Radionuclide with half-life less than 3 years.
Promethium-143	No	Radionuclide with half-life less than 3 years.
Promethium-147	No	Radionuclide with half-life less than 3 years.
Protactinium-231	No	Progeny radionuclide that builds insignificant activity within 80 years.
Protactinium-233	No	Radionuclide with half-life less than 3 years.
Protactinium-234	No	Radionuclide with half-life less than 3 years.
Proactinium-234m	No	Radionuclide with half-life less than 3 years.
Radium-223	No	Radionuclide with half-life less than 3 years.
Radium-224	No	Radionuclide with half-life less than 3 years.
Radium-225	No	Radionuclide with half-life less than 3 years.
Radium-226	No	Naturally occurring isotope that is not significantly associated with 200-EA-1 OU waste streams.
Radium-228	No	Naturally occurring isotope that is not significantly associated with 200-EA-1 OU waste streams.
Radon-219	No	Radionuclide with half-life less than 3 years.
Radon-220	No	Radionuclide with half-life less than 3 years.
Radon-222	No	Radionuclide with half-life less than 3 years.
Rhodium-103	No	Stable elemental isotope.
Rhodium-103m	No	Radionuclide with half-life less than 3 years.
Rhodium-106	No	Radionuclide with half-life less than 3 years.
Ruthenium-103	No	Radionuclide with half-life less than 3 years.
Ruthenium-106	No	Radionuclide with half-life less than 3 years.
Samarium-147	No	Naturally occurring isotope not generated as part of Hanford operations.
Samarium-151	No	Radionuclide potentially present only as a trace fission product with activity yield less than 1% of the activity yield for cesium-137 and not targeted by a separation/concentration process.
Selenium-75	No	Radionuclide with half-life less than 3 years.
Selenium-79	No	Radionuclide potentially present only as a trace fission product with activity yield less than 1% of the activity yield for cesium-137 and not targeted by a separation/concentration process.
Silver-110	No	Radionuclide with half-life less than 3 years.

Table 1. Radionuclide Candidates

Radionuclide Candidates	Retained as a COPC?	Exclusion Basis
Silver-110m	No	Radionuclide with half-life less than 3 years.
Sodium-22	No	Radionuclide with half-life less than 3 years.
Strontium-85	No	Radionuclide with half-life less than 3 years.
Strontium-89	No	Radionuclide with half-life less than 3 years.
Strontium-90	Yes	NA
Sulfur-35	No	Radionuclide with half-life less than 3 years.
Tantalum-182	No	Radionuclide with half-life less than 3 years.
Technetium-99	Yes	NA
Tellurium-121	No	Radionuclide with half-life less than 3 years.
Tellurium-125m	No	Radionuclide with half-life less than 3 years.
Tellurium-127	No	Radionuclide with half-life less than 3 years.
Tellurium-129	No	Radionuclide with half-life less than 3 years.
Tellurium-129m	No	Radionuclide with half-life less than 3 years.
Thallium-207	No	Radionuclide with half-life less than 3 years.
Thallium-208	No	Radionuclide with half-life less than 3 years.
Thallium-209	No	Radionuclide with half-life less than 3 years.
Thorium-227	No	Radionuclide with half-life less than 3 years.
Thorium-228	No	Radionuclide with half-life less than 3 years.
Thorium-229	No	Progeny radionuclide that builds insignificant activity within 80 years.
Thorium-230	No	Naturally occurring isotope that is not significantly associated with 200-EA-1 OU waste streams.
Thorium-231	No	Radionuclide with half-life less than 3 years.
Thorium-232	No	Naturally occurring isotope that is not significantly associated with 200-EA-1 OU waste streams.
Thorium-233	No	Radionuclide with half-life less than 3 years.
Thorium-234	No	Radionuclide with half-life less than 3 years.
Thulium-170	No	Radionuclide with half-life less than 3 years.
Tin-113	No	Radionuclide with half-life less than 3 years.
Tin-123	No	Radionuclide with half-life less than 3 years.
Tin-123m	No	Radionuclide with half-life less than 3 years.
Tin-125	No	Radionuclide with half-life less than 3 years.
Tin-126	No	Radionuclide potentially present only as a trace fission product with activity yield less than 1% of the activity yield for cesium-137 and not targeted by a separation/concentration process.

Table 1. Radionuclide Candidates

Radionuclide Candidates	Retained as a COPC?	Exclusion Basis
Uranium-233	Yes	NA
Uranium-234	Yes	NA
Uranium-235	Yes	NA
Uranium-236	No	Not readily differentiated from uranium-235 in analysis; uranium-235 is retained as a COPC.
Uranium-237	No	Radionuclide with half-life less than 3 years.
Uranium-238	Yes	NA
Vanadium-49	No	Radionuclide with half-life less than 3 years.
Yttrium-88	No	Radionuclide with half-life less than 3 years.
Yttrium-90	No	Radionuclide with half-life less than 3 years.
Yttrium-91	No	Radionuclide with half-life less than 3 years.
Zinc-65	No	Radionuclide with half-life less than 3 years.
Zirconium-93	No	Radionuclide potentially present only as a trace fission product with activity yield less than 1% of the activity yield for cesium-137 and not targeted by a separation/concentration process.
Zirconium-95	No	Radionuclide with half-life less than 3 years.

COPC = contaminant of potential concern
OU = operable unit
NA = not applicable

Table 2. Chemical Candidates

CAS Registry No.	Chemical Candidates	Retained as a COPC?	Exclusion Basis
71-55-6	1,1,1-Trichloroethane	Yes	NA
79-00-5	1,1,2-Trichloroethane	Yes	NA
75-34-3	1,1-Dichlorethane	Yes	NA
120-82-1	1,2,4-Trichlorobenzene	No	Identified as a candidate based on soil detection identified for Well 299-E28-30 near 216-B-12 in SGW-60540. Further review of the data identified that the result was a non-detect.
95-63-6	1,2,4-Trimethylbenzene	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.

Table 2. Chemical Candidates

CAS Registry No.	Chemical Candidates	Retained as a COPC?	Exclusion Basis
95-50-1	1,2-Dichlorobenzene	No	Identified as a preliminary candidate based on analytical method only. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
107-06-2	1,2-Dichloroethane	Yes	NA
541-73-1	1,3-Dichlorobenzene	No	Identified as a preliminary candidate based on analytical method only. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
563-58-6	1,3-Dichloropropene	No	Identified as a preliminary candidate based on analytical method only. Not a significant potential risk contributor for waste sites.
100-25-4	1,4-Dinitrobenzene	No	Identified as a preliminary candidate based on analytical method only. Not a significant potential risk contributor for waste sites.
95-95-4	2,4,5-Trichlorophenol	No	Identified as a preliminary candidate based on analytical method only. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
120-83-2	2,4-Dichlorophenol	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
105-67-9	2,4-Dimethylphenol	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
51-28-5	2,4-Dinitrophenol	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
121-14-2	2,4-Dinitrotoluene	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
128-37-0	2,6-bis(tert-Butyl)-4-methylphenol	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.

Table 2. Chemical Candidates

CAS Registry No.	Chemical Candidates	Retained as a COPC?	Exclusion Basis
78-93-3	2-Butanone (methyl ethyl ketone)	Yes	NA
591-78-6	2-Hexanone	Yes	NA
107-87-9	2-Pentanone	No	No available toxicity data.
88-85-7	2-sec-Butyl-4,6-dinitrophenol (dinoseb)	No	Identified as a preliminary candidate based on analytical method only. Not a significant potential risk contributor for waste sites.
563-80-4	3-Methyl-2-butanone	No	No available toxicity data.
72-54-8	4,4'-Dichlorodiphenyldichloroethane	Yes	NA
72-55-9	4'4-Dichlorodiphenyldichloroethylene	Yes	NA
50-29-3	4'4'-Dichlorodiphenyltrichloroethane	Yes	NA
59-50-7	4-Chloro-3-methylphenol	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
108-11-2	4-Methyl-2-pentanol	No	No available toxicity data.
108-10-1	4-Methyl-2-pentanone (hexone, methyl isobutyl ketone)	Yes	NA
106-44-5	4-Methylphenol	No	Identified as a preliminary candidate based on analytical method only. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
83-32-9	Acenaphthene	Yes	NA
208-96-8	Acenaphthylene	Yes	NA
67-64-1	Acetone	Yes	NA
75-05-8	Acetonitrile	Yes	NA
98-86-2	Acetophenone	No	Identified as a preliminary candidate based on analytical method only. Not a significant potential risk contributor for waste sites.
107-02-8	Acrolein	No	Identified as a preliminary candidate based on analytical method only. Not a significant potential risk contributor for waste sites.
107-13-1	Acrylonitrile	No	Identified as a preliminary candidate based on analytical method only. Highly mobile constituent, but not detected in Hanford groundwater sampling.
309-00-2	Aldrin	Yes	NA
319-84-6	alpha-BHC (alpha-HCH)	Yes	NA

Table 2. Chemical Candidates

CAS Registry No.	Chemical Candidates	Retained as a COPC?	Exclusion Basis
7429-90-5	Aluminum	No	Not detected above background levels in previous 200 Area soil sampling and not a significant potential risk contributor for waste sites.
7664-41-7	Ammonia	Yes	NA
14798-03-9	Ammonium	No	No available toxicity data; ammonia retained as a COPC.
120-12-7	Anthracene	Yes	NA
7440-36-0	Antimony	Yes	NA
N/A	Aroclor	No	Non-specific identification. Total polychlorinated biphenyls will be retained as a COPC.
12674-11-2	Aroclor-1016	No	Not a significant potential risk contributor relative to aroclor-1254 and 1260. Total polychlorinated biphenyls will be retained as a COPC.
11104-28-2	Aroclor-1221	No	Not a significant potential risk contributor relative to aroclor-1254 and 1260. Total polychlorinated biphenyls will be retained as a COPC.
11141-16-5	Aroclor-1232	No	Not a significant potential risk contributor relative to aroclor-1254 and 1260. Total polychlorinated biphenyls will be retained as a COPC.
53469-21-9	Aroclor-1242	No	Not a significant potential risk contributor relative to aroclor-1254 and 1260. Total polychlorinated biphenyls will be retained as a COPC.
12672-29-6	Aroclor-1248	No	Not a significant potential risk contributor relative to aroclor-1254 and 1260. Total polychlorinated biphenyls will be retained as a COPC.
11097-67-1	Aroclor-1254	Yes	NA
11096-82-5	Aroclor-1260	Yes	NA
7440-38-2	Arsenic	Yes	NA
7440-39-3	Barium	Yes	NA
71-43-2	Benzene	Yes	NA
56-55-3	Benzo(a)anthracene	Yes	NA
50-32-8	Benzo(a)pyrene	Yes	NA
205-99-2	Benzo(b)fluoranthene	Yes	NA
191-24-2	Benzo(ghi)perylene	Yes	NA

Table 2. Chemical Candidates

CAS Registry No.	Chemical Candidates	Retained as a COPC?	Exclusion Basis
207-08-9	Benzo(k)fluoranthene	Yes	NA
100-51-6	Benzyl alcohol	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
7440-41-7	Beryllium	Yes	NA
319-85-7	beta-BHC (beta-HCH)	Yes	NA
92-52-4	Biphenyl	No	Identified as a preliminary candidate based on analytical method only. Not a significant potential risk contributor for waste sites.
117-81-7	Bis(2-ethylhexyl)phthalate	No	Identified as a general organic contaminant candidate. Commonly detected as a laboratory contaminant in soil sampling, and not a significant potential risk contributor for waste sites.
7440-69-9	Bismuth	No	No available toxicity data.
7440-42-8	Boron	No	Trace contaminant that is not a significant potential risk contributor for waste sites.
74-83-9	Bromomethane	No	Identified as a preliminary candidate based on analytical method only. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
128-37-0	Butylated hydroxyl toluene	No	Identified based on potential trace presence in certain waste streams. Not a significant potential risk contributor for waste sites.
7440-43-9	Cadmium	Yes	NA
7440-70-2	Calcium	No	No available toxicity data; essential nutrient.
86-74-8	Carbazole	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
124-38-9	Carbon dioxide	No	Gaseous chemical. No available toxicity data for carbonate or bicarbonate; pH will be evaluated as a general physical parameter.
56-23-5	Carbon tetrachloride	Yes	NA
497-19-8	Carbonate	No	No available toxicity data.
7440-45-1	Cerium	No	No available toxicity data.
5103-74-2	Chlordane	Yes	NA
16887-00-6	Chloride	Yes	NA

Table 2. Chemical Candidates

CAS Registry No.	Chemical Candidates	Retained as a COPC?	Exclusion Basis
108-90-7	Chlorobenzene	Yes	NA
75-45-6	Chlorodifluoromethane	No	Identified as a preliminary candidate based on analytical method only. Not a significant potential risk contributor for waste sites.
75-00-3	Chloroethane	No	Identified as a preliminary candidate based on analytical method only. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
67-66-3	Chloroform	Yes	NA
74-87-3	Chloromethane	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
7440-47-3	Chromium (total)	Yes	NA
18540-29-9	Chromium (VI)	Yes	NA
218-01-9	Chrysene	Yes	NA
156-59-2	cis-1,2-Dichloroethene	Yes	NA
7440-48-4	Cobalt	Yes	NA
7440-50-8	Copper	Yes	NA
74-90-8	Cyanide	Yes	NA
110-82-7	Cyclohexane	Yes	NA
108-94-1	Cyclohexanone	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
110-83-8	Cyclohexene	No	Identified as a general organic contaminant candidate. Not environmentally stable and not a significant potential risk contributor for waste sites.
124-18-5	Decane	No	No available toxicity data.
298-07-7	Di-(2-ethylhexyl) phosphoric acid	No	No available toxicity data.
84-74-2	Di-n-butylphthalate	No	Identified as a preliminary candidate based on analytical method only. Commonly detected as a laboratory contaminant in soil sampling, and not a significant potential risk contributor for waste sites.
53-70-3	Dibenz[a,h]anthracene	Yes	NA
132-64-9	Dibenzofuran	Yes	NA

Table 2. Chemical Candidates

CAS Registry No.	Chemical Candidates	Retained as a COPC?	Exclusion Basis
78-46-6	Dibutyl butyl phosphonate	No	No available toxicity data.
107-66-4	Dibutyl phosphate	No	No available toxicity data.
75-71-8	Dichlorodifluoromethane	No	Identified as a preliminary candidate based on analytical method only. Not a significant potential risk contributor for waste sites.
60-57-1	Dieldrin	Yes	NA
60-51-5	Dimethoate	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
122-39-4	n,n-Diphenylamine	No	Identified as a preliminary candidate based on analytical method only. Not a significant potential risk contributor for waste sites.
72-20-8	Endrin	Yes	NA
64-17-5	Ethanol	No	No available toxicity data.
100-41-4	Ethylbenzene	Yes	NA
60-29-7	Ethyl ether	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
107-21-1	Ethylene glycol	No	No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
60-00-4	Ethylene-diamine tetra acetic acid	No	No available toxicity data.
206-44-0	Fluoranthene	Yes	NA
86-73-7	Fluorene	Yes	NA
16984-48-8	Fluoride	Yes	NA
50-00-0	Formaldehyde	No	Chemical used in minor quantities only, and not a significant potential risk contributor for waste sites.
7440-54-2	Gadolinium	No	No available toxicity data.
58-89-9	gamma-BHC (gamma-HCH, Lindane)	Yes	NA
79-14-1	Gylcolate	No	No available toxicity data.
76-44-8	Heptachlor	No	Identified as a general pesticide contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and detected only at trace concentrations in soil at other Hanford pesticide application locations.

Table 2. Chemical Candidates

CAS Registry No.	Chemical Candidates	Retained as a COPC?	Exclusion Basis
118-74-1	Hexachlorobenzene	No	Identified as a preliminary candidate based on analytical method only. No significant soil detections in previous 200 Area soil sampling.
87-68-3	Hexachlorobutadiene	No	Identified as a preliminary candidate based on analytical method only. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
67-72-1	Hexachloroethane	No	Identified as a preliminary candidate based on analytical method only. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
302-01-2	Hydrazine	No	Limited use associated with 200-EA-1 OU waste sites; not detected in previous 200 Area soil sampling.
201-180-5	Hydroxyacetic acid	No	No available toxicity data; pH will be evaluated as a general physical parameter.
193-39-5	Indeno[1,2,3-cd]pyrene	Yes	NA
7439-89-6	Iron	No	Not detected above background levels in previous 200 Area soil sampling and not a significant potential risk contributor for waste sites.
78-59-1	Isophorone	No	Identified as a candidate based on soil detection identified for Boring C4160 near 216-A-36A in SGW-60540. No other detections in previous 200 Area soil sampling and not a significant potential risk contributor for waste sites.
67-63-0	Isopropyl alcohol	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
7439-91-0	Lanthanum	No	No available toxicity data.
7439-92-1	Lead	Yes	NA
7439-93-2	Lithium	No	Trace contaminant that is not a significant potential risk contributor for waste sites.
7439-95-4	Magnesium	No	No available toxicity data; essential nutrient.
7439-96-5	Manganese	Yes	NA
7439-97-6	Mercury	Yes	NA

Table 2. Chemical Candidates

CAS Registry No.	Chemical Candidates	Retained as a COPC?	Exclusion Basis
67-56-1	Methanol	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
624-83-9	Methyl isocyanate	No	Identified as a general organic contaminant candidate that may have been present in trace concentrations in certain waste streams. Typically considered as an airborne hazard in industrial production settings; limited environmental persistence as a soil contaminant. No standard analytical method available for environmental analysis.
75-09-2	Methylene chloride (dichloromethane)	Yes	NA
7439-98-7	Molybdenum	No	Trace contaminant that is not a significant potential risk contributor for waste sites.
1623-15-0	Monobutyl phosphate	No	No available toxicity data.
91-20-3	Naphthalene	Yes	NA
71-36-3	n-Butanol (butyl alcohol)	Yes	NA
104-51-8	n-Butylbenzene	Yes	NA
7440-00-8	Neodynium	No	No available toxicity data.
110-54-3	n-Hexane	Yes	NA
7440-02-0	Nickel	Yes	NA
7440-03-1	Niobium	No	No available toxicity data.
14797-55-8	Nitrate	Yes	NA
14797-65-0	Nitrite	Yes	NA
98-95-3	Nitrobenzene	No	Identified as a preliminary candidate based on analytical method only. Not a significant potential risk contributor for waste sites.
62-75-9	n-Nitrosodimethylamine	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling.
87-86-5	Pentachlorophenol	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
TPH	Petroleum hydrocarbons (diesel to kerosene range)	Yes	NA
85-01-8	Phenanthrene	Yes	NA
108-95-2	Phenol	Yes	NA

Table 2. Chemical Candidates

CAS Registry No.	Chemical Candidates	Retained as a COPC?	Exclusion Basis
7440-05-3	Palladium	No	No available toxicity data.
14265-44-2	Phosphate	Yes	NA
7440-09-7	Potassium	No	No available toxicity data; essential nutrient.
129-00-0	Pyrene	Yes	NA
110-86-1	Pyridine	No	Identified as a preliminary candidate based on analytical method only. Not a significant potential risk contributor for waste sites.
7440-17-7	Rubidium	No	No available toxicity data.
7782-49-2	Selenium	Yes	NA
7440-21-3	Silicon	No	No available toxicity data; essential nutrient.
7440-22-4	Silver	Yes	NA
7440-23-5	Sodium	No	No available toxicity data; essential nutrient.
7440-24-6	Strontium	No	Trace contaminant that is not a significant potential risk contributor for waste sites.
14996-02-2	Sulfate	Yes	NA
100-42-5	Styrene	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
7440-29-1	Thorium	No	No available toxicity data.
127-18-4	Tetrachloroethene (PCE)	Yes	NA
109-99-9	Tetrahydrofuran	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
326-91-0	Thenoyltrifluoroacetone	No	No available toxicity data.
7440-31-5	Tin	No	Trace contaminant that is not a significant potential risk contributor for waste sites.
7440-32-6	Titanium	No	No available toxicity data.
108-88-3	Toluene	Yes	NA
NA	Total polychlorinated biphenyls	Yes	NA
8001-35-2	Toxaphene	No	Identified as a preliminary candidate based on analytical method only. No significant soil detections in previous 200 Area soil sampling.
156-60-5	trans-1,2-Dichloroethene	Yes	NA
126-73-8	Tributyl phosphate	Yes	NA

Table 2. Chemical Candidates

CAS Registry No.	Chemical Candidates	Retained as a COPC?	Exclusion Basis
79-01-6	Trichloroethene	Yes	NA
75-69-4	Trichlorofluoromethane	No	Identified as a general organic contaminant candidate. No significant soil detections in previous 200 Area soil sampling, and not a significant potential risk contributor for waste sites.
102-87-4	Tri-n-dodecylamine	No	No available toxicity data.
139-89-9	Trisodium hydroxyethyl ethylene-diamine triacetate	No	No available toxicity data.
7440-33-7	Tungsten	No	No available toxicity data.
7440-61-1	Uranium	Yes	NA
7440-62-2	Vanadium	Yes	NA
75-01-4	Vinyl chloride	Yes	NA
1330-20-7	Xylenes (total)	Yes	NA
440-65-5	Yttrium	No	No available toxicity data.
7440-66-6	Zinc	Yes	NA
7440-67-7	Zirconium	No	No available toxicity data.

Sources: SGW-60540, *200-EA-1 Operable Unit Scoping*

CAS = Chemical Abstract Service
COPC = contaminant of potential concern
NA = not applicable
OU = operable unit

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